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THE

MEDICAL AND SURGICAL HISTORY

OF THE

WAR OF THE REBELLION.

PART III.

VOLUME II.

SURGICAL HISTORY.

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WAR DEPARTMENT,

SURGEON GENERAL'S OFFICE,

WASHINGTON, D. C., *January* 2, 1883.

Brigadier General CHARLES H. CRANE,

Surgeon General, U. S. Army.

SIR:

With the present volume, which I have the honor to submit to you, the surgical series of the Medical and Surgical History of the War of the Rebellion is complete.

The treatment of regional injuries of gunshot origin is continued, and those of the Lower Extremities are taken up and thoroughly discussed in Chapter X. Miscellaneous Injuries not strictly gunshot in character, but incident to the military status, form the subject of Chapter XI. Chapter XII, on Wounds and Complications, includes facts of general interest and of statistical value relative to wounds; to the nature, peculiarities, and effects of missiles and projectiles; to conditions affecting the course and results of wounds, with especial reference to the graver complications of secondary hæmorrhage, erysipelas, pyæmia, gangrene, and tetanus; and, finally, a condensed summary of operations and treatment. Anæsthetics, with reference to their use in the Army, are treated of in Chapter XIII. A brief historical sketch of the Medical Staff, and a description of the Materia Chirurgica will be found in Chapter XIV. The methods of field, railway, and water transportation of the wounded are detailed in the concluding Chapter (XV).

It was attempted, from the inception of the work, to give, in the beginning of each chapter, the number of cases to be treated therein. But, as the work progressed, new cases had to be added, duplicates had to be eliminated, or additional information changed the nature of a case, so as to transfer it to a group different from the one to which it had been originally assigned. Thus the total number of cases given in the beginning of a chapter was frequently found to be incorrect at its close, and as the preceding pages had been stereotyped, it was not practicable to make the necessary corrections. The percentages and general deductions, however, were not materially affected by these discrepancies, which have been corrected in the summary of cases given in Chapter XII, in this volume.

In undertaking the completion of this work, interrupted by the untimely death of its distinguished author, it may be proper to say that no change in, or deviation from, the

original plan has been attempted; that, so far as known, his wishes and intentions with regard to the arrangement and development of the History have been scrupulously regarded.

The work was entered upon, not without serious misgivings as to the wisdom of the choice of successor, and with a full appreciation of the delicate nature of the task and the difficulties involved in its satisfactory solution; its prosecution has been a source of pleasure, while the labor has been materially lessened by the valuable assistance afforded by Mr. C. J. MYERS, who has been associated with the work as colaborer since its inception, and to whose faithful and assiduous care the reliability and accuracy of the History is largely due. The completed volume now awaits your approval and the judgment of the profession. It is hoped that its short-comings may not seriously impair or detract from the beauty and harmony of the masterpiece, which must remain a living monument to the intelligent industry, perseverance, and professional learning of the late Surgeon GEORGE A. OTIS.

I am, sir,

Very respectfully,

Your obedient servant,

D. L. HUNTINGTON,

Surgeon, U. S. Army.

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THE

MEDICAL AND SURGICAL HISTORY

OF THE

WAR OF THE REBELLION (1861-65).

PART III, VOLUME II.

BEING THE THIRD SURGICAL VOLUME.

ON SPECIAL WOUNDS AND INJURIES—CONTINUED.

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CHAPTER X.

WOUNDS AND INJURIES OF THE LOWER EXTREMITIES.

In attempting to furnish a description, as adequate as practicable, of the various classes of injuries inflicted by war-weapons that were reported during the late war in this country, I have reviewed and analyzed at great length, in two preceding volumes, histories of cases of wounds of the head, neck, trunk, and upper extremities. It remains, to complete this branch of the subject, to discuss, in like manner, Wounds of the Lower Extremities, a very important group, comprising not only a larger number of those cases that come under the treatment of the military surgeon than any other group, but a greater proportion of cases demanding operative interference than is observed in other regions, and presenting to the field surgeon, especially in connection with lesions of the hip and thigh, some of the most difficult practical problems he has to encounter.

Of the 253,142 cases of wounds returned during the War that have been examined and classified and entered on the permanent registers of the Surgeon-General's Office, 89,528 are cases of Wounds of the Lower Extremities. Of these, 59,376 are entered as Flesh Wounds, of which 674 were punctured or incised wounds, and the rest shot wounds. The remaining 30,152 cases were all returned as shot fractures, and were distributed as

follows: Shot Fractures of the Femur, including fractures penetrating the hip joint, 7,776; Fractures involving the Knee Joint, 3,557; Fractures of the Shafts of the Tibia or Fibula, or of both, 10,026; Fractures implicating the Tarsus, Metatarsus, and Phalanges, 8,793. It must be borne in mind that this total of 89,528 cases of wounds of the lower extremities represents only those cases that have been accurately determined and entered on the registers, and by no means all the cases belonging to this group that were reported during the War, and hence as the work progresses the figures will need to be modified. Besides the 253,142 registered cases, quite a number, reported with insufficient details for classification, have been noted for investigation; and, by searching the Pension Records, and through Union and Confederate reports which continue to be sent in, even at this late date, and by special reports from surgeons who kept note-books, and who, since the publication of the *First Surgical Volume*, have been led to transmit particulars of their cases, it will be possible, as each successive subject is taken up for analysis, to sensibly augment the aggregates of each group. This was observed in the discussion of the Wounds of the Upper Extremities. In TABLE XII, on page 454 of the *Second Surgical Volume*, but 84,718 cases of such wounds are recorded as registered, but in examining CHAPTER IX it will be found, as mentioned in the MEMORANDUM at page III of that Volume, that 88,741 cases are actually specified, the particulars of 4,023 additional cases having been obtained through information derived from various sources. Such additions may be expected in this Volume also; but they will not invalidate the approximate correctness of the figures above given, so far as relates to the relative frequency of wounds of the lower extremities. For such a purpose, the numbers 89,528 : 253,142 are ample, and the ratio is perhaps quite as reliable as it could be made by larger aggregates.

The relative frequency of wounds of the lower extremities received in battle, compared with the total number that came under treatment, appears from the above returns to be represented by a ratio of 35.3 per cent., or a little over one-third. There is good reason to believe that this is a very near approximation to the precise facts. Note, for example, its correspondence with returns from other campaigns:

TABLE I.

Collated Returns, indicating the Relative Frequency of Shot Wounds of the Lower Extremity in Aggregates of Wounded Men who came under Treatment.

WARS, CAMPAIGNS, AND OTHER OCCASIONS.	AGGREGATE WOUNDED.	WOUNDS OF LOWER EXTREMITY.	RATIO.
July, 1830, days in Paris and Lyons (SERRIER'S table[1])	784	185	23.5
Crimean War (MATTHEW'S return[2])	7,660	2,396	31.2
Crimean War (CHENU'S return[3])	34,306	11,873	34.6
Italian War of 1859 (CHENU'S return[4])	19,672	7,704	39.1
Italian War of 1859 (DEMME'S estimates[5])	17,095	5,248	30.6
Danish War of 1864 (HEINE[6])	1,907	553	28.9
Franco-German War (Consolidated returns[7])	24,788	7,560	30.5
Totals	106,212	35,519	33.4

[1] SERRIER (L.), *Traité des plaies d'armes à feu*, Paris, 1844, p. 30. The insurgents fighting behind barricades, the proportion of injuries of the lower extremities is less than usual. [2] MATTHEW (T. P.), *Med. and Surg. Hist. of the Brit. Army in the years* 1854–55–56, London, 1858, Vol. II, p. 355. [3] CHENU (J. C.), *Rapport, etc., de Campagne d'Orient en* 1854–55–56, Paris, 1865, p. 627. [4] CHENU (J. C.), *Statistique Med. Chir. de la Campagne d'Italie en* 1859 *et* 1860, Vol. II, p. 850. [5] DEMME (H.), *Studien*, Würzburg, 1861, B. I, p. 20. [6] HEINE (C.), *Die Schussverletzungen der Unteren Extremitäten*, Berlin, 1866. I much regret that, in regard to the statistics of the Danish War of 1864, I cannot refer to the conclusions of the lamented Generalarzt F. LŒFFLER, from whose excellent *General-Bericht über den Gesundheitsdienst im Feldzuge gegen Dänemark* 1864, Berlin, 1867, the statistics

It will be observed, by comparing the tabular statement on page 434 of the *Surgical Volume* of Part II, that the relative frequency of shot wounds of the lower extremities does not exceed that of wounds of the upper limbs to the extent that might be anticipated from the greater size of the lower limbs. This is doubtless due to the fact that, in all fighting in entrenched positions, the lower part of the person is partially screened from injury. In the last year of the War, the field casualties of the Union armies were reported with much completeness and accuracy, as has been already noticed (*supra*, Part I, Vol. II, p. 600, Part II, Vol. II, pp. 6, 917), and over a hundred thousand cases of wounds were recorded with careful discrimination of their nature and position. In the engagements during this period, the combatants had learned to cover their positions with hastily improvised earthworks; and this may partly account for the smaller ratio of wounds in the lower limbs presented in these returns. Notice, for example, in the following tabular statement, the very small proportion of wounds of the lower limbs in the siege operations before Mobile. Another probable cause why the proportion of wounds of limbs was smaller in the field than in the general hospital returns, is that a large number of rapidly mortal wounds of the head and trunk appear on the field casualty lists, representing patients who never reached the base hospitals.

TABLE II.

Partial Numerical Statement of Shot Wounds of the Lower Extremities in the Field or Primary Hospitals in various Campaigns during the last year of the War, 1864–65.

CAMPAIGNS.	FLESH WOUNDS.				FRACTURES.				FOOT.		MISSILE.		TOTAL WOUNDED.	PERCENTAGE OF WOUNDS.
NAMES AND DATES.	THIGH.		LEG.		THIGH.		LEG.							
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Large projectiles, cannon shot, shell, and bomb fragments, grape, and canister.	Small projectiles, musket, carbine, rifle, pistol balls, and small missiles from shrapnel and canister.		
Army of Potomac, from May 4 to August 31, 1864..	4,037	10	3,843	6	812	104	938	21	2,369	1	978	10,828	38,944	30.5
Campaign to Atlanta, from May 4 to Sept. 8, 1864..	3,312	16	2,058	6	573	73	581	31	1,044	....	543	5,720	23,308	32.4
Gen. G H. Thomas's Army, from Oct. 25 to Dec. 31, '64.	376	...	450	....	81	....	106	1	93	....	74	1,025	3,610	30.6
Gen. W. T. Sherman's Army through Carolinas in '65.	225	3	148	....	46	3	47	....	62	1	16	498	1,333	34.4
From Fort Fisher to Goldsborough, N. C., 1865	116	....	124	1	32	2	32	1	35	....	43	178	1,075	31.5
Siege of Mobile, from March 26 to April 19, 1865 ...	100	....	84	....	40	8	32	....	48	....	57	137	2,111	14.4
Army of James, from May 4, 1864, to April 9, 1865.	1,091	6	1,856	...	390	27	436	11	718	....	504	3,899	16,120	27.8
Shenandoah Valley, from May 4 to August 20, 1864.	253	2	265	....	29	4	23	1	16	....	32	554	2,196	26.7
Shenandoah Valley, from Aug. 21 to Dec. 30, 1864..	829	1	949	...	273	18	320	5	403	...	226	2,540	7,542	26.6
Army of Potomac, from Sept. 1, 1864, to Ap'l 9, 1865.	1,017	1	1,126	....	269	32	272	10	535	....	176	2,581	10,407	31.1
Aggregates.....	11,356	39	10,903	13	2,545	271	2,787	81	5,243	2	2,649	27,960	106,846	30.7

of wounds of the upper extremity in this campaign were cited in the *Second Surgical Volume* (Chap. IX, p. 434). This eminent surgeon died in 1874; and I have been unable to procure the second volume of his most painstaking and accurate treatise; or to learn that it has been published. Fortunately, Dr. HEINE'S statistics cover the ground, if not as thoroughly, at least with commendable precision. [7] These 24,788 cases are collected from the following authors: MCCORMAC (W.) (*Notes and Recollections of an Ambulance Surgeon*, London, 1871, p. 129; total number of cases, 610, lower extremities, 257); BILLROTH and CZERNY (*Chirurgische Briefe*, Berlin, 1872, p. 180;—277—135); RUPPRECHT (*Militärärztliche Erfahrungen*, 1871, S. 10;—361—128); MÜHLBAUER (*Erfahrungen aus dem Feldzuge, etc.*, in *Bayerisches ärtzliches Intelligenzblatt*, 1871, S. 374;—1899—849); STEINBERG (*Die Kriegslazarethe und Baracken von Berlin*, Berlin, 1871, S. 146;—8531—974); GOLTDAMMER (*Bericht über die Thätigkeit des Reserve-Lazarethes des Berliner Hülfsvereins*, in *Berliner Klin. Wochenschr.*, 1871;—639—67); HEYFELDER (O.) (*Bericht über meine Wirksamkeit am Rhein*, in *Petersburg Med. Zeitschrift*, 1871;—226—81); SOCIN (A.) (*Kriegschirurgische Erfahrungen*, Leipzig, 1872, p. 8;—643—328); MUNDY and MOSETIG (*Service Med. chir. de l'ambulance du Corps législatif*, in *Gaz. des Hôp.*, 1871, No. 149;—136—58); BECK (B.) (*Chir. der Schussv.*, 1872, S. 160;—4344—1787); FISCHER (H.) (*Kriegschir. Erfahrungen*, Erlangen, 1872, S. 28;—875—356); KIRCHNER (C.) (*Ærtzlicher Bericht u. s. w. im Palast zu Versailles*, Erlangen, 1872;—2099—751); GRAF (E.) (*Die Königl. Reservelazarethe zu Düsseldorf*, 1872;—298—101); SCHÜLLER (*Kriegs. chir. Skizzen*, Hannover, 1871;—491—166); GROS (F.) (*Notice sur l'hôpital civil, etc., de Strasbourg*, in *Gaz. Med. de Strasbourg*, 1872, No. 17;—140—55); BERTHOLD (*Deutsche Mil.-ärzt Zeitschrift*, 1872, B. I, S. 429;—1804—723); and MOSSAKOWSKY (P.) (*Deutsche Zeitschrift für Chir.*, 1872, B. I, S. 333;—1415—744).

Examining carefully several series of a thousand each of the 89,528 registered cases of wounds of the lower extremities,[1] including only those in which the seat of injury was noted with precision, a predominance of wounds of the left lower extremity is found in the following proportion: Both limbs, 3.4 per cent.; left limb, 53.1; right limb, 43.5.[2]

A word may be added regarding the recorded instances of evulsion of one or other of the lower limbs by solid shot, fragments of shell, torpedoes, or other large projectiles. Of 164 such instances 93 recovered, 62 or 40 per cent. were fatal, while in 9 instances the results were not ascertained. In 129 of the 164 cases it is noticed that ablations, many of them doubtless resembling merely the paring and regularization of the soft tissues with removal of splinters or sharp projections of bone, rather than legitimate amputations, were performed. Two of these, however, were successful formal disarticulations at the ankle joint, 2 successful amputations at the knee joint, 1 a fatal exarticulation at the hip. Seventy-six, with 56 recoveries, 14 deaths, and 6 unknown terminations, were operations in the continuity of the leg; forty cases, 26 successful, 13 fatal, 1 doubtful, were amputations in the thigh. In 4 cases, both legs were removed in the continuity with 2 recoveries, 1 fatal and 1 unknown result. In 1 fatal case the left thigh and right leg were simultaneously removed; in 1 case of recovery amputation was performed in the right thigh and through the left knee joint; in 1 fatal case simultaneous amputation of both thighs in the continuity was practised; and in one instance disarticulation of the left hip and ablation of the right leg was performed, the case terminating fatally. In 35 of the aggregate of 164 cases there is no record of operative interference. Of these, 1 was a fatal instance of evulsion of both limbs in the continuity of the thigh; in 6 fatal cases both limbs were torn off in the leg; in 4 fatal cases the right or left limb was torn off in the thigh, and in 24 the mutilation took place in the continuity of the leg with 4 recoveries, 19 deaths, and 1 with unknown result.

An additional proof that of the shot wounds received in action those inflicted upon the lower extremities ordinarily constitute about one-third of the aggregate, is found in the carefully prepared statistical researches of Councillor G. Fischer.[3]

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[1] The lamented LŒFFLER, one of the soundest of modern Prussian military surgeons, sets forth (*General-Bericht über den Gesundheitsdienst im Feldzuge gegen Dänemark*, 1864, Berlin, 1867, p. 48) that of 2,388 Prussians killed and wounded in the Danish War of 1864, about 31 per cent. were struck in the lower extremities, and remarks (S. 49): "The comparatively small proportion of wounds of the lower extremities may appear strange. One is accustomed to regard the preponderance of such injuries as considerable. The protections above referred to (trenches, and, in Schleswig, brush-hedges [*Knicks*]) would undoubtedly partially protect the lower limbs. But statistics that omit the killed are defective; they give to the shot wounds of the extremities an undue preponderance, because their immediate fatality is much more limited than is observed in wounds of the head and trunk." Professor H. FISCHER (*Lehrbuch der Allgemeinen Kriegschir.*, Erlangen, 1868, S. 25) observes: "In later wars, in which the fighting was mainly in the open field, the remarkable fact has almost uniformly appeared, that among shot injuries those of the lower extremities far exceed those of the upper limbs. Dr. MACLEOD'S statistics refer 68 per cent. of wounds in action to wounds of the lower extremities. [This is an oversight. Dr. MACLEOD (*Notes on the Surgery of the War in the Crimea*, 1858, p. 414) gives the proportion of wounds of the lower extremities among the men as 31.7; among officers 35.2. Professor FISCHER seems to have added these ratios together.] DJOERUP reports the proportion of wounds of the lower limbs in the Danish army, in the war of 1848–50, as 40.5 per cent. In Paris in 1848, and in Italy in 1859, the wounds of the lower extremities constituted a third, and those of the upper limbs nearly another third. When it is considered that the remaining third was made up of cases of injuries of the head, chest, abdomen, and pelvis, it is apparent how enormously large is the number in modern wars that have to be transported with the utmost care and skill. Hence, perhaps, the most difficult problem for the modern military surgeon is the management of the ambulance trains. LŒFFLER, it is true, has said that the preponderance of wounds of the lower limbs in modern wars is seeming rather than real, and is conditioned on the less proportion of immediate fatality in wounds of the limbs. This assumption, though assuredly founded on facts, might explain the conspicuous fact that the shot injuries of the limbs predominate greatly over those of the head and trunk; but does not explain the extraordinary disproportion between the shot injuries of the upper and lower limbs." I may remark that the statistics I have examined do not show any greater disparity in the frequency of wounds in the upper and lower limbs than is warranted by the relative size and position of the extremities.

[2] HEINE (C.) (*Die Schussverletzungen der unteren Extremitäten*, Berlin, 1866, p. 30) remarks that in the Schleswig-Holstein War, 1860, 27 of the 562 cases of injuries of the lower extremities both limbs were injured, or a percentage of 4.8, and FISCHER (G.) (*Statistik der in dem Kriege* 1870–'71, *&c., vorgekommenen Verwundungen und Tödtungen*, Berlin, 1876) tabulates 780 cases of injuries of both limbs in a total of 20,160 cases of injuries of the lower extremities, or 3.8 per cent.

[3] The *Statistik der in dem Kriege* 1870–1871 *im Preussischen Heere, vorgekommenen Verwundungen und Tödtungen von* G. FISCHER comes to hand as these pages are going to press. Tabelle C (*loc. cit.*, p. 59) contains a recapitulation of the seat of injury in 64,897 cases (7,735 killed and 57,162 wounded). In 18,905 instances, or 29.14 per cent., the upper extremity was injured, and in 20,160, or 31.06 per cent., the lower extremity was involved, The latter percentage varies but little from that given on page 2 (*ante* 30.5), which was consolidated from a number of publications by various authors that have appeared since the late Franco-Prussian War.

Section I.

FLESH WOUNDS OF THE LOWER EXTREMITIES.

The reader is respectfully referred to the introductory observations to the first section of the Ninth Chapter, in Part II, Volume II, page 435, for many remarks on the Flesh Wounds of the Upper Extremities, which are equally applicable to the cases of the category now to be considered. The gravity of flesh wounds in the lower extremities greatly exceeds, however, that of analogous injuries in the upper limbs. The dangers arising from lesions of the great blood-vessels and nerves of the lower extremities, from peri-articular wounds, and especially from deep seton wounds and lacerations of the massive muscles of the thigh, are great. Many perforations of the thigh that are lightly regarded at the outset, present ultimately formidable complications. Dr. H. Fischer remarked,[1] in the late Franco-German War, that "many a wounded man sent to the rear with the diagnosis 'slight shot wound of the thigh,' succumbed to burrowing of pus, detected too late and treated with too little vigor. We had five such cases, and succeeded in all in controlling this terrible complication by early and deep incisions, absolute rest, and disinfecting bandages. When the first stage is neglected, the surgeon loses the mastery, pyæmia delighting to develop in deep phlegmonous cavities."

It was impossible, with the clerical force available, to make more than a superficial examination of the individual cases of the immense series of nearly sixty-thousand flesh wounds of the lower extremities.[2] All that has been attempted has been to sift out duplicated cases and those that ultimately proved to be complicated by contusion of bone or by fracture, and to scrutinize the series sufficiently to select instances illustrating the different varieties of injuries of this group, to determine the average distribution of the wounds in the several regions of the limb, and to ascertain approximatively the mortality.

Of the series of flesh wounds of the lower extremities, six hundred and seventy-four were punctured or incised, and fifty-eight thousand seven hundred and two were shot wounds.

PUNCTURED AND INCISED WOUNDS.—There were reported six hundred and seventy-four cases of punctured or incised wounds of the lower extremities, including a hundred and seventy-six bayonet wounds, twenty-two sabre wounds, and four hundred and seventy-six wounds from daggers, knives, axes, or other pointed or cutting weapons.

Bayonet Wounds.—The series of bayonet wounds included sixty-two stabs in the thigh, with two deaths; seventy-seven penetrations of the leg, with two deaths; and thirty-

[1] FISCHER (H.), *Kriegschirurg. Erfahrungen, Vor Metz*, Erlangen, 1872, S. 164. Dr. Fischer, professor of surgery at Breslau, was a volunteer surgeon in the Prussian army during the campaign from Saarbrücken to Metz, August 10 to October 27, 1870.

[2] Of the 89,528 registered cases of wounds of the lower extremities, 30,152, or 33.6 per cent., were returned as fractures, so that, as in the upper limbs, the wounds of the soft parts alone constitute very nearly two-thirds of the aggregate—59,376 in 89,528 cases.

seven wounds of the soft parts of the foot, with one death,—the series of a hundred and seventy-six cases thus presenting a mortality of 2.8 per cent. Several of the cases present particulars of interest:

CASE 1.—Private P. Dietrich, Co. E, 151st New York, aged 34 years, was wounded at Spottsylvania, May 12, 1864, and admitted to the field hospital of the 3d division, Sixth Corps. Surgeon R. Barr, 67th Pennsylvania, recorded: "A bayonet thrust through the right leg." The patient was transferred to Douglas Hospital, Washington, subsequently to Summit House, and lastly to the Satterlee Hospital, Philadelphia, whence he was discharged April 27, 1865, because of "lameness of the right leg, caused by chronic eczema," following a bayonet injury. Examiner H. N. Loomis, of Buffalo, New York, May 8, 1865, certified: "A bayonet was thrust through the right leg between the tibia and fibula, about six inches below the knee. The wound healed; but is followed by chronic eczema, extending from the knee to the ankle, much inflamed, with some ulceration, and producing so much lameness as to unfit him for any kind of labor." In August, 1868, the pension examiner states that the eczematous eruption occupies about half the space between the knee and the ankle, and that the limb is still inflamed, ulcerated, and swollen. This pensioner was paid to March 4, 1870, since when he has not been heard from.

In two cases the femoral artery was reported severed by a bayonet. One of these is related by Surgeon J. A. Lidell,[1] U. S. V.: A soldier of the 106th Pennsylvania received a thrust in the upper inner part of the thigh from a sabre-bayonet, in a picket skirmish near Fair Oaks, in June, 1862, and perished from hæmorrhage before assistance could reach him. The result of the second case suggests the probability that a minor branch, rather than the main femoral trunk, was injured by the weapon:

CASE 2.—Corporal E. Hacket, Co. A, 1st Pennsylvania Chasseurs, was accidentally wounded near Camp Whipple, Philadelphia, in August, 1863. Acting Assistant Surgeon L. D. Radzinsky reported: "While at bayonet exercise he received a punctured wound of the right femoral artery, below Poupart's ligament. The wound was received a short distance from the camp. When brought to the hospital tent the man was considerably exhausted from loss of blood. Judging from the clots found in his clothes he must have lost at least twelve ounces. The hæmorrhage was immediately controlled by manual pressure upon the external iliac artery, a compress and spica bandage applied, and pressure continued with a tourniquet for three days, at which time the tourniquet was removed, a new dressing applied, and pressure continued with the spica bandage. He was returned to duty five days afterwards, and has not had any untoward symptoms since." Hacket is not a pensioner.

Surgeon T. H. Squire, 89th New York, reports a case in which the synovial cavity of the knee was penetrated by a bayonet without bad results, remarking that Dr. James Allen, of Marathon, New York, examined the recent wound and concurred in the diagnosis:

CASE 3.—"Private C. A. Ball, Co. K, 89th New York, aged 16 years, in the spring of 1862, at Roanoke Island, while jumping for exercise, accidentally sprang against the point of a bayonet. At a moment when the joint was partially flexed, the point of the bayonet penetrated the cavity of the knee joint, the wound being immediately above the centre of the patella. The patient was immediately received into the regimental hospital, and Assistant Surgeon W. A. Smith, 89th New York, enjoined perfect rest in bed and low diet, with cold applications to the joint. The wound was from the first regarded as a dangerous one. Some days after the accident occurred, Dr. Squire saw the case with Dr. Smith. There was then synovial swelling of the joint, and other conclusive evidences that the joint had been penetrated. The boy was kept in hospital till the recovery was complete, when he again entered the ranks for duty. The recovery was complete, and no bad effects followed. The wound was not very extensive. The point of the bayonet may have gone through the synovial membrane half an inch or so, and in such a glancing direction as not to injure the cartilage or bone. Dr. Squire did not know exactly how long the boy was kept in hospital, but thought about four weeks." The field registers show that this Private Ball received a gunshot wound of the right side of the thorax at the battle of Chapin's Farm, September 29, 1864, which fact is corroborated by the examining surgeons. For this injury he is a pensioner, but the Pension Records make no mention of a bayonet injury of the knee.

Of the five fatal cases in this subdivision of bayonet wounds in the lower limbs, three succumbed from gangrene, one from pyæmia, and one from primary hæmorrhage. The following is one of the cases complicated by gangrene:

CASE 4.—Private S. Dick, Co. E, 79th Indiana, was wounded at Chickamauga, September 19, 1863, and sent to hospital No. 13, Nashville, October 1st. Assistant Surgeon J. K. Bauduy, U. S. V., reported: "He was admitted with a flesh wound of the calf of the left leg, caused by a bayonet. The wound was superficial and slight, and did well for several days; treated with cold-water dressings. On October 20th, hospital gangrene manifested itself; the disease was then prevailing endemically in the hospital. This patient was immediately transferred to the gangrene ward, and applications of pure bromine were made. Tincture of iron and fluid extract of cinchona were freely administered. Milk-punch and beef-tea were also given at stated intervals. His bowels, which were inclined to be costive, were kept open with enemeta of salt, molasses, and tepid water. The disease steadily progressed, and large sinuses formed in all directions in the intermuscular spaces. One immense sinus ran

[1] LIDELL (J. A.), *Bayonet Wounds, with cases*, in *Am. Med. Times*, 1866, Vol. VII, p. 153.

along the course of the tendo-achilles. The sinuses were freely opened and injected with chlorinated soda solution, and bromine was thoroughly applied, taking great care to get it well into the intermuscular spaces. Disinfecting poultices were used in the removal of the sloughs. November 4th, the gangrene at this date was entirely arrested, but symptoms of pyæmia arose. The pulse became frequent and weak, ranging between 140 to 150. Rigors; skin cold and clammy; breathing oppressed and labored. Patient complained of pain in chest. The conjunctiva assumed an icteroid hue, and the whole surface of the body became tinged with a pale yellow appearance. The knee and ankle joints commenced to swell and cause great pain. The following treatment was then resorted to: Carbonate of ammonia in large and frequent doses; stimulants every half hour; iron and cinchona continued; tincture of iodine and blisters to swollen joints; surface of body washed with whiskey and water. Patient continued to sink, and died on the afternoon of November 7, 1863. *Post-mortem:* Lungs healthy; no metastatic foci could be found in either of them or in the liver; but microscopical examination of the latter revealed a fatty infiltration. The liver was also greatly hypertrophied. The heart, spleen, pancreas, bowels, and kidneys were all healthy. There was an accumulation of pus in the left knee joint."

Sabre Wounds.—None of the twenty-two reported sabre-cuts of the lower limbs[1] were of a sufficiently grave character to prove fatal. Seventeen of the patients returned to duty, and five were discharged for slight disabilities. Six cases were flesh wounds of the thigh, ten of the leg, and six of the foot. One of the patients, Corporal Rice, 1st Vermont Cavalry, whose case is recorded on page 22 of the *First Surgical Volume*, suffered also from a sword-cut of the frontal; but he, with the rest, recovered without serious trouble.

Other Punctured and Incised Wounds.—Besides wounds caused by legitimate weapons of war, a considerable number were reported as inflicted by daggers, dirks, or bowie-knives, arrows, picks, and other pointed implements, and by knives, scythe-blades, hatchets, axes, and other cutting instruments. There were seventy-two of these serious punctured wounds of the lower limbs, and four hundred and four cases of severe incised wounds. There were eight deaths in this series of four hundred and seventy-six cases, a mortality-rate of 1.6 per cent., and disability leading to discharge from service resulted in a hundred and two of the cases. Twenty-eight cases were wounds of the thigh, a hundred and seventeen wounds of the leg, three hundred and thirty-one wounds of the foot.

Ligations.—In four instances, at least, of this series, ligations of arteries were practised on account of hæmorrhage or aneurism. One of these, an instance of aneurismal varix from puncture of the femoral artery and vein, by a pocket-knife, has been narrated, with a figure of the specimen, at page 336 of the *Surgical Volume* of Part II.[2] The three other cases were ligations of the tibial arteries:

CASES 5, 6, 7.—Assistant Surgeon J. C. G. Happersett, U. S. A., reports that Private T. J. Moore, Co. B, 82d Ohio, aged 29 years, received, July 14, 1865, a punctured wound near the right ankle. The hæmorrhage was so uncontrollable that, on July 22d, Assistant Surgeon H. M. Lilly, U. S. V., ligated the posterior tibial artery, placing a single proximal ligature. July 24th, unhealthy gangrene attacked parts, and bromine dressings were applied. The patient recovered, and was transferred to Jeffersonville October 19th, and to Post Hospital, Louisville, December 16, 1865.—6. Surgeon C. A. Cowgill reports that Lieutenant T. Linder, Co. E, 158th New York, aged 30 years, received, May 11, 1864, a punctured wound by a sharp knife on the inner side of the right leg at the juncture of the lower and middle thirds, dividing the posterior tibial artery through one half its diameter and causing a diffused traumatic aneurism. He was admitted into the Foster Hospital, New Berne, May 20th; the cellular tissue and intermuscular spaces were filled with coagula, which had temporarily arrested hæmorrhage. There was great tension and considerable sloughing of the soft parts. May 22d, Surgeon C. A. Cowgill, U. S. V., made an incision five inches long over the wound, through the integuments down to the posterior tibial artery, and, ligating it above and below the wound, the coagula were removed and the wound closed by adhesive straps. A good recovery ensued, and the officer returned to duty June 29, 1864.—7. Surgeon G. A. Otis, 27th Massachusetts, reports that Private C. D——, Co. B, 27th Massachusetts, in December, 1863, at Newport News, Virginia, received a severe wound in the left leg from an axe, about three inches above the annular ligament. The tendons of the tibialis anticus, the common and proper extensors, and the anterior

[1] In old times, and in the combats of the trained European Cavalry, sabre cuts of the lower limbs were not uncommon. RAVATON (*Chirurgie d'armée*, 1768, Chap. IX, p. 518) gives many examples, in which not only the soft parts but the bones were hacked by sword-cuts. M LEGOUEST also (*Chirurgie d'armée*, 2ème éd., 1872, p. 461) details several such examples, and refers to illustrations in the Museum of HUTIN at the Hôtel des Invalides. Abstracts of interesting incised wounds of the lower limbs may be found also in LE DRAN (*Observat. de Chir.*, 1731, T. II. p. 332) and in LA MOTTE (*Traité complète de Chirurgie*, 1771, T. III, p. 143 *et seq.*).

[2] First the femoral, then the external iliac, and finally and fatally the common iliac were ligated by Dr. J. B. CUTTER. The operator has published abstracts of these ligations in the *Am. Jour. Med. Sci.*, 1864, Vol. XLVIII, p. 36, *Ibid.*, 1865, Vol. L, p. 391. The pathological specimen, showing the communication between the artery and vein and the huge saeculation of the latter, is numbered 3597 in Sect. I of the Army Medical Museum.

tibial artery veins and nerve were divided, and the periosteum. The wound gaped widely, and the artery gave freely *per saltum*. The vessel was completely severed. Ligatures were at once placed by Dr. Otis about the upper and lower orifices of the artery, and the wound was united by sutures. Recovery was rapid and uncomplicated, and the soldier returned to duty.

Amputations.—In four instances, after deep incised wounds by axes, complications arose, and recourse was had to amputation. Two were thigh amputations:

CASES 8, 9.—Private Christian Webber, 8th Co., New York Independent Volunteers, received, September 24, 1863, a severe wound from an axe, severing the quadriceps of the left thigh two inches above the patella. He was sent to Fairfax Seminary Hospital, September 26th, and deep-seated suppuration having appeared, burrowed, and finally penetrated the knee joint, Surgeon D. P. Smith thereupon decided to amputate the limb. The operation was practised, October 4th, at the junction of the lower and middle thirds of the femur. The patient was transferred, convalescent, to York, Pennsylvania, October 30th, and subsequently discharged. The portion of the femur amputated has been catalogued in the Army Medical Museum,[1] but exhibits nothing abnormal.—9. Private T. H. Breckridge, Co. C, 6th New York Artillery, received a wound by an axe in March, 1864, and was sent to Armory Square Hospital. Surgeon D. W. Bliss, U. S. V., reported that the wound involved the right tarsus and metatarsus, and presently became erysipelatous, and that gangrene then supervened. On this account, on May 27th, Dr. Bliss amputated the limb, at the junction of the middle and lower thirds of the femur, by antero-posterior flaps formed by transfixion. Recovery was satisfactory. On December 28, 1864, he was supplied with an artificial limb at Ladies' Home, New York, by Dr. E. D. Hudson, at Government expense. The stump was then soundly healed, and "creditable" in shape. This soldier was discharged July 12, 1865, and pensioned. His pension was paid March 4, 1876.

In two instances the leg was amputated for incised wounds of the ankle or foot:

CASES 10, 11.—Private M. Dunham, Co. D, Engineer Battalion, aged 23 years, received a severe incised wound of the left ankle January 24, 1864. He was sent to hospital at Alexandria. Surgeon E. Bentley, U. S. V., reports that long-continued suppuration had ended in necrosis of the tibia-tarsal articulation, the patient being of a strumous habit. Dr. Bentley practised a circular amputation in the lower third of the leg May 5, 1864. Pyæmia supervened, and death ensued June 18, 1864.—11. Private A. Stacy, Co. H, 12th Kansas, received a severe wound of the left leg by an axe on March 17, 1864. He was sent to hospital at Fort Leavenworth. In September, 1864, the limb was amputated by short anterior and long posterior flaps by Dr. Clark. The patient recovered with a good stump, and was fitted with an artificial limb by B. Frank Palmer, at New York, June 23, 1866. He is a pensioner, and was paid March 4, 1876.

The foregoing instances comprise nearly all the seriously complicated cases reported of punctured and incised wounds of the lower extremities. There was a case (Private Wherry, 115th New York) where half the small blade of a pocket-knife broke off against the femur after perforating the quadriceps two inches above the knee joint; attempts at extraction of the foreign body failed; the patient recovered with partial false anchylosis at the knee. Except those noted, the examples of sloughing or consecutive bleeding were trivial, and no case of tetanus was observed.

SHOT FLESH WOUNDS.—In the vast series of fifty-eight thousand seven hundred and two cases of shot wounds of the soft parts of the lower limbs placed on the registers, it is difficult in many cases to determine, from the hasty field notes or brief hospital entries, the exact positions and extent of the wounds. As nearly as can be approximated, however, it would appear that about twenty-six thousand of these wounds were in the thigh, about twenty-one thousand in the leg, and about ten thousand in the foot, a certain number of reports presenting no indication of the precise seat of injury.

These wounds were of every grade of severity, from trivial skin-scratches to huge lacerations by large projectiles; long furroughed wounds with tortuous tracks, deep seton perforations, superficial or deep penetrations with lodgement of the missile, filling up the gamut. In reviewing the great series, two small groups especially claim attention—the wounds attended by lesion of the principal nerves, and those with injury of the main blood-vessels. We shall consider these first, and then typical examples of shot injuries of the soft parts, selecting for illustration those cases remarkable for extent of lacerations, those in which foreign bodies were lodged in the limb, those ultimately complicated by extension of inflammation to the joints, or by disease of the arteries, or by gangrene, tetanus, and other complications.

[1] See No. 2004, Section I, p. 364, of *Catalogue of the Surgical Section of the Army Medical Museum*, Washington, 1866.

Flesh Wounds of the Lower Limbs, with Injury of the larger Nerves.—Instances in which wounds of the larger nerves were sufficiently distinct and uncomplicated to be returned under this head were comparatively few; they were less frequent, indeed, than in the upper limbs.[1] The relations of the large nerve trunks of the lower extremities to the blood-vessels, bones, and joints are such that they are more liable to share in the injuries of these parts than in wounds mainly involving the muscular tissues. Moreover, it is probable that in many flesh wounds, nervous branches of magnitude were implicated without manifestation of any very serious results, and that such cases were not returned as injuries of nerves.[2] Presenting less urgency in relation to immediate treatment than lesions of the arteries and bones, these accidents nevertheless were frequently very grave, entailing a vast amount of protracted misery, and sometimes fatal consequences. Of fifty-nine cases referred to this category, thirty-one were reported as wounds of the sciatic, two of the crural, five of the long saphenous, one of the middle cutaneous, nine of the popliteal, five of the anterior tibial, three of the posterior tibial, and three of unspecified large nerve trunks. Eleven cases proved fatal, of which six succumbed from tetanus. Amputation was resorted to in four cases, briefly noted in succeeding tables. Two amputations in the thigh were successful; one through the knee joint, and one in the leg proved fatal.

Of thirty-one cases of wounds of the sciatic nerve, twenty-five recovered, including one in which amputation in the thigh was practised, and six were fatal. Four died of tetanus.[3] One succumbed, long after the injury, from secondary traumatic coxitis.[4] Erysipelatous inflammation with sloughing, extending to the hip joint, and resulting in ulceration of the cartilages and caries of the head of the femur and acetabulum. The fourth fatal case[5] was an example of exhaustion from protracted suffering. Of the

[1] As indicated in Part II, Vol. II, p. 461, there were 96 cases distinguished as nerve lesions of the upper extremities, contrasted with 59 instances in the lower extremities. Professor A. SOCIN (*Kriegschir. Erf.*, Leipzig, 1872, p. 64) remarks a similar disproportion in the Franco-German War. Relating 16 cases of shot injuries of the nerves, he observes that: "more than five-eighths of these concerned the upper extremities."

[2] In their treatise on *Gunshot Wounds and other Injuries of Nerves.* By S. WEIR MITCHELL, M. D., GEORGE R. MOREHOUSE, M. D., and WILLIAM W. KEEN, M. D., Philadelphia, 1864, the authors detail (pp. 92, 93) two cases of shot injury of the sciatic nerve: Private K. Grim, Co. B, 121st Pennsylvania, who received at Fredericksburg, December 13, 1862, a shot perforation of the left thigh, the ball entering externally four inches above the upper border of the patella, and emerging on the inside of the thigh, two inches lower down, slightly injuring the sciatic nerve. He had, July, 1863, severe burning on the dorsum of the left foot, and eczema, with ulceration about the nails, complete paralysis of the flexors of the foot and partial paralysis of the flexor communis and calf muscles. The other patient entered the hospital about the same time, a ball wound passing close to the sciatic. He had complete loss of power in the flexors of the foot, defective sensation on the outside of the leg and foot, and eczema with burning pain. Both patients were treated with electricity, with gradual gain of motion and relief of pain, and were regarded as fair types of partial wound or commotion of a nerve. At page 128, of the same work, the case of Private J. S. L. Scott, Co. F, 121st New York, aged 31 years, is related: He had a shot wound of the calf of the right leg, at Chancellorsville, May 3, 1863. The ball passed between the fibula and tibia about mid-leg. Total loss of motion below knee, slightly tactile insensibility, foot extended and powerless. September, 1863, rapid improvement followed alternated cold and hot douches, with faradization, and a splint to correct the malposition of the foot. Discharged, improved, February 12, 1864. The reports of Pension Examiners Mann and Lanning, of Manchester, Ohio, where this pensioner now resides, recapitulate the foregoing facts, and describe the paralysis as in all probability permanent. The latest report by Dr. Lanning, February 4, 1874, states that "paralysis of the foot and toes is nearly complete," and recommends that the pensioner be excused from further biennial examinations, as his disability is considered irremediable. This recommendation was opposed, and the pensioner's condition was unchanged when he was last paid, March 4, 1876. In *Circular* 6, S. G. O., 1864: On *Reflex Paralysis* resulting from shot wounds, the same authors narrate two examples of reflex paralysis of the upper extremity induced by shot flesh wounds implicating the nerves of the lower limbs: Private W. W. Armlin, Co. D, 134th New York, aged 23 years, was shot at Gettysburg, July 1, 1863, the ball entering anteriorly about midway on the inner part of the right thigh and emerging outside and below the tuberosity of the ischium, just above the fold of the nates. The sciatic nerve was probably injured. There was partial paralysis of the right leg, and reflex paralysis of the right arm. The latter speedily recovered.—Private D. Kent, Co. B, 145th Pennsylvania, aged 24 years, was struck, at Gettysburg, July 2, 1863, over the upper third of the right rectus femoris, by a musket ball, which passed through the thigh, emerging at the inner side a little below the fold of the nates. There was loss of motion and sensation in the thigh and leg, and reflex motor paralysis in the right arm. The patient was discharged January 20, 1864, for tuberculosis. The paralysis had amended under the use of hot and cold douches, active motor, and faradization. In his work, entitled *Gunshot Wounds of the Nerves and their Consequences*, Philadelphia, 1872, Dr. S. WEIR MITCHELL cites the case of Sergeant C. Beatty, 26th Pennsylvania, shot through the calf, at Chancellorsville, May 3, 1863, who suffered intensely from causalgia. The foot, a few days after injury, was prickling and burning intensely. After a fortnight the prickling ceased; but the burning persisted. He recovered in about five months, without treatment. In this valuable work, abounding in illustrations of the effects of shot lesions of the nerves of the trunk and upper limbs, I find no other example of shot wound of the nerves of the lower extremities.

[3] Privates Albro, 27th Michigan; Fry, 3d New Jersey; Riley, 10th New York; and Smith, 46th New York.

[4] Case of Private *T. J. Dame*, Co. E, 18th Mississippi, wounded at Antietam, September 17, 1862. Died June 19, 1863. See *Spec.* 3849, A. M. M., *Cat. Surg. Sect.*, 1866, p. 243.

[5] Case of Private E. M. McGregor, Co. C, 76th New York, shot through the left sciatic nerve September 6, 1862. The missile lodged and could not be detected during life. He had motor paralysis of the leg muscles, and intense pain in the upper part of the track of the perineal and anterior tibia, and used hypodermic injections of morphia. He died February 1, 1863.

twenty-five survivors, one fully recovered and returned to duty, three entered the Veteran Reserve Corps, and twenty-one were discharged. With few exceptions, they suffered from neuralgia or from partial motor paralysis. One (Private Armlin, 134th New York) had reflex paralysis of the arm on the side corresponding with the injury to the sciatic nerve.[1] Notes of two of the cases of persistent neuralgia are appended:

CASE 12.—Private W. T. Burk, Co. F, 151st New York, aged 24 years, was wounded at Monocacy, July 9, 1864, and admitted to hospital at Frederick the following day. Acting Assistant Surgeon E. R. Ould reported: "Gunshot flesh wound of both thighs, perforating upper third and injuring the sciatic nerve of the right thigh. The patient is of a nervous and irritable temperament. Simple dressings were applied, and opiates given at night; wound healing. July 20th, great pain complained of in the course of the sciatic nerve and increasing in the region of the foot and ankle; pulse accelerated, 100 per minute; pain increasing; general appearance moderately good; appetite poor. Applied pounded ice to foot and gave two drachms of solution of morphia four times a day. August 1st, the ice moderated the amount of pain; treatment continued. Patient slept half the night. August 12th, patient much improved; ice discontinued; prescribed morphia, iron, and quinine four times a day. September 1st, pain more severe; the wounds have entirely healed; treatment continued. September 20th, walking about with crutches, but very lame; stimulating and anodyne liniment used night and morning. September 25th, patient finds great relief by keeping his hands wet with water; bowels regular; pulse natural. October 1st, but slight improvement; continued the quinine and iron mixture, also one drachm of fluid extract of cimicifuga. October 30th, still walks lame, the leg being very painful on motion. October 31st, furloughed this day; patient has but little prospect of a speedy recovery." He subsequently returned to the hospital, and was mustered out of service May 31, 1865, and pensioned. Examiner J. H. Helmer, of Lockport, New York, February 9, 1866, certified: "Ball entered right thigh, upper third, passed through in front of the bone, and through the left thigh back of the bone, destroying the femoral nerve. Left leg two inches smaller than the right; muscles flabby; no voluntary motion of the left foot. He can walk, but walks like a paralytic." At a subsequent examination it was additionally reported that "the temperature of the left leg and foot is reduced," etc. The pensioner was paid June 4, 1876.

CASE 13.—Private C. J. Keegan, Co H, 80th New York, aged 40 years, was wounded at Gettysburg, July 1, 1863, and entered the York Hospital on July 19th. Acting Assistant Surgeon G. Byers reported: "Gunshot flesh wound of right thigh; ball entered the middle third below the edge of the sartorius muscle, passing upward and outward, made its exit two inches below and behind the trochanter, injuring the great sciatic nerve in its course. The wound closed kindly; the leg and foot, however, continued œdematous, and the man has suffered very greatly with pains of a darting character. He has at no time been able to use the limb since the receipt of the injury. Liniment of aconite was applied to the leg, and opiates were given internally. May 23, 1864, the pain has much diminished in intensity within the last two months." The patient was discharged from service June 28, 1864, and pensioned. Examiner H. B. Day, of Utica, New York, certified, February 16, 1865: * * "The great ischiatic nerve must have been injured, as he has constant pain, numbness, and partial paralysis of the parts supplied by this nerve and its branches, rendering him unable to stand for any length of time," etc. Examiner I. Spencer, of De Ruyter, certified, October 19, 1865: "Permanent lameness of the thigh. The foot is also deformed by an unnatural action of the muscles contracting the toes obliquely, and there is an unnatural fixedness of the arch of the foot," etc. Subsequent examiners reported substantially the same, and all concur in their belief as to the nerve injury. This pensioner was paid June 4, 1876.

The two patients wounded in the anterior crural nerve, were discharged without relief of the persistent pain that followed their injuries. Surgeon I. I. Hayes, U. S. V., has furnished a detailed report of one of the cases:

CASE 14.—Private W. H. Cookson, Co. E, 42d New York, aged 23 years, was wounded at Antietam, September 17, 1862, and entered the Satterlee Hospital, Philadelphia, nine days afterwards. Four months after his admission Surgeon I. I. Hayes, U. S. V., reported: "He was wounded by a minié ball entering on the outer side of the right thigh, about midway between the anterior superior spinous process of the ilium and the trochanter major, and, passing obliquely upward, made its exit near the middle of Poupart's ligament, wounding, I infer, the anterior crural nerve, from the intense pain he has suffered in the course of that nerve. The wound has long since healed. The suffering experienced over the front and side of the thigh, parts supplied by the anterior crural nerve, is instructive as showing the effect of an injury in the course of a nerve manifesting itself in the extremities of that nerve. The pain has not abated by the use of the most powerful anodynes, and sleep is only procured through the influence of sulphate of morphia. A question, which is still 'subjudice,' arises: Shall we excise that portion of the nerve which is wounded, hoping thereby to relieve his almost intolerable suffering?" The patient was discharged from service February 28, 1863, and pensioned. Drs. T. S. Johnston and R. H. Hope, of Rock Hill, S. C., in certifying to the results of the wound, May 9, 1874, stated that "from this cause he is now suffering with neuralgia and partial paralysis of the extensor muscles of the thigh." The pensioner was paid June 4, 1876.

Of the five cases of wounds of the long saphenous, one resulted in complete recovery,

[1] J. MASON WARREN, in an interesting article on *Neuralgic Affections following Injuries of Nerves*, in *Am. Jour. Med. Sci.*, N. S., 1864, Vol. XLVII, p. 316 (which is reproduced in his excellent *Surgical Observations*, Boston, 1867, p. 465), details the case of a soldier with wound of the sciatic nerve, who was probably Private D. Callahan, Co. E, 19th Massachusetts, aged 22 years, whose history on the registers of this Office closely corresponds to the graphic description given by Dr. Warren, to which the reader is referred. His Pension Report for 1876 may be added: There was atrophy of the injured thigh and leg, with diminished temperature and greatly diminished motor power in the muscles of the leg and foot.

four in more or less paralysis and atrophy.[1] The case of wound of the middle cutaneous nerve was attended with severe neuralgia, which yielded to blistering and other remedies, and the patient returned to duty.

The series of nine cases of wounds of the popliteal nerve comprises a fatal case of tetanus.[2] The other patients recovered, and three entered the Veteran Reserves, while five were discharged, one after recovery from amputation in the thigh, and one with excruciating neuralgia.

The category of five cases of wounds of the anterior tibial included one death from tetanus.[3] The four survivors had partial paralysis of the extensor muscles. An instance is detailed:

CASE 15.—Private D. S. Pierce, Co. B, 1st Michigan, aged 22 years, was wounded at Bull Run, August 30, 1862, and admitted to Ryland Chapel Hospital, Washington, three days afterwards. Surgeon J. A. Lidell, U. S. V., reported: "The patient was admitted to Stanton Hospital from Ryland Chapel, December 5th, with wound in the right leg. The bullet entered the outer part of the front of the middle third of said leg, about midway between the tibia and fibula. The bullet did not go through the limb. It, however, went in so deep that it could not be reached by exploration. The wound has been healed since the middle of October. The missile has gravitated through between the tibia and fibula, and can now be felt deeply seated in the muscles of the calf. It gives him no trouble. The anterior tibial nerve was divided by the bullet, in consequence of which the muscles of the front of the leg are paralyzed. The end of the foot points downward from activity of those on the back of the leg, and the case resembles talipes equinus. The patient walks haltingly, but without a cane, by the aid of a high-heeled shoe. He has suffered but little pain since the wound healed, and considers himself to be slowly improving. He was discharged December 16, 1862." Examiner D. Hudson, of Lansing, Michigan, reported, May 8, 1863: "Ball passed through both peroneal muscles, dividing the tibial nerve * * and lodging deep in the soleus muscle. Ankle joint became stiff at an obtuse angle, requiring a heel more than an inch higher on the right shoe than on the left one. Neuralgic pain in foot and ankle daily and hourly." Drs. J. B. Hull and I. H. Bartholomew, of the Lansing Examining Board, certified, December 7, 1870: "The ball passed down, and now lies under the skin above the inner malleolus. He cannot stand on his leg but a short time, and is getting worse," etc. They also stated that they excised the ball, and reported, September, 1872: "The nerve is diseased, and he suffers great pain through the whole leg; is emaciated and feeble, and growing worse." This pensioner died of "consumption," November 22, 1872, superinduced, in the opinion of the attending physicians, by "the continually depressing effects of the pain and tenderness of his limb."

The three cases of wounds of the posterior tibial nerve were fatal. Two involved unsuccessful amputations, one at the knee joint and one in the leg, and the third was fatal from gangrene.[4] The two amputations were practised after tetanus had supervened:[5]

CASE 16.—Corporal B. Prather, Co. D, 103d Ohio, aged 18 years, was wounded at the battle of Nashville, December 15, 1864, and was admitted to the Cumberland Hospital on the following day. Surgeon B. Clark, U. S. V., reported: "Gun-shot wound of right foot, ball entering immediately under the metatarsal bone of the great toe and burying itself in the plantar fascia. The soft parts were remarkably sensitive in the vicinity of the wound, showing a great degree of muscular and nervous irritability. The foot was not swollen, the bones were not fractured, nor the tissues severely lacerated. December 26th, the ball was removed by Acting Assistant Surgeon S. G. Ayres; second operation, exsection of a half inch of the posterior tibial nerve, behind the inner malleolus, by Assistant Surgeon W. B. Trull, U. S. V.; third operation, amputation of the toe, with removal of the first metatarsal bone, by Acting Assistant Surgeon L. E. Tracy. The patient complained, on December 26th, saying that a feeling of stiffness had been coming on for three days, especially in the shoulders, neck, and jaws. The latter gradually closed until it was impossible to introduce food into his mouth. There was a tetanic spasm of the muscles of deglutition, so that the patient was dying from inability to swallow. Chloroform alone seemed to afford temporary relief from his intense sufferings. Relaxation of the jaws was effected by division of the nerve, but the spasms of the muscles immediately returned. At midnight of the 27th, amputation at the lower third of the leg was performed by Acting Assistant Surgeon S. G. Ayres, but without effect. Large opiate injections were afterward given, and the patient obtained sleep. A copious warm perspiration breaking out upon the face and the improved pulse were considered favorable symptoms. Died December 28, 1864."

The three cases of shot wounds of unspecified nerves were probably examples of

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[1] Cases of Lieutenant A. Rodman, 2d Wisconsin, wounded in 1862, and who recovered. Also of Private W. Lette, Co. F, 29th New York, wounded at Bull Run, August 29, 1862; Corporal A. McNeal, Co. A, 121st New York, wounded October 19, 1862; Sergeant *C. E. Clark*, Co. H, 32d Virginia, wounded at Spottsylvania, May 12, 1864; and Private P. J. Vimont, Co. C, 7th Kentucky Cavalry, who were discharged for disability.

[2] Case of Private *J. G. Grissetta*, Co. D, 2d Alabama; wounded at Fort Blakely, April 9, 1864; died April 21st. It is stated that the popliteal nerve was "dark and disorganized."

[3] Private *James Rollins*, Co. H, 28th North Carolina, aged 30 years; wounded at Gettysburg, July 3, 1863; tetanus July 20th; death, July 22, 1863.

[4] Case of Private G. Richmond, Co. D, 111th New York, wounded at Bristow Station, October 14, 1863, in the upper third of the left calf by a carbine ball. He was sent to the Third Division Hospital at Alexandria. The wound was dilated by an incision. Gangrene appeared and spread very rapidly, and death took place October 23, 1863.

[5] CASE 16, and the case of Private J. Leonard, Co. G, 5th Ohio, aged 22 years, wounded at Gettysburg, July 3, 1863; tetanic symptoms July 14th, amputation at knee joint July 16th, and death three hours after.

injuries of the sciatic in one instance, of the anterior and posterior tibials in the others. Abstracts of two of the cases are subjoined; the third case has been published, and has been noticed in the foot-note on page 9 (case of Private J. S. L. Scott, 121st New York).

CASE 17.—Sergeant J. W. Crane, Co. A, 79th New York, aged 27 years, was wounded at Bull Run, August 30, 1862, and admitted to Judiciary Square Hospital, Washington, one week afterward. On May 9, 1863, he was transferred to DeCamp Hospital, David's Island, whence Acting Assistant Surgeon J. W. Dickie reported: "A ball passed through right thigh at about the junction of the upper and middle thirds. The wound closed about the first of March, and a small abscess formed, about that time, a little below the wound. When the abscess healed a pain commenced in the left hip joint, extending to the foot. This pain was constant. No pain was felt in the right leg except when pressure was made on the wound. The pain was most severe in the hip and calf of the leg. It would at times ascend and affect the respiratory muscles, causing great distress and difficulty in breathing. Appetite poor when admitted, yet the patient is quite fleshy. Had taken considerable quantity of morphia, so much as to be free from pain. May 13th, had recurrence of pain and dyspnœa, and spasm of upper extremities. Gave chloroform, twenty drops, and repeated the dose in fifteen minutes. May 17th, had another spasm; same treatment. Has slighter attacks more frequently, which are relieved by exposure to cold. May 19th, had another spasm; two grains of sulphate of morphia given; pain checked. May 24th, another spasm; gave chloroform one drachm, and sulphate of morphia one grain; pain relieved. On the next day cauterization was performed along the course of the great ischiatic and peroneal nerves. May 28th, gave nine grains of sulphate of quinine and a half grain of sulphate of morphia, and repeated every evening. May 29th, had a recurrence, but not much spasm. June 12th, the cauterized surface is healed; patient improving and has but little pain. June 22d, walked out, supporting himself by means of canes." The patient was subsequently transferred to McDougall Hospital, where he was recorded as having been "returned to duty December 28, 1863." The records, however, do not show that he resumed active duty in the field. He was mustered out October 6, 1864, and pensioned. The Hartford Examining Board certified, May 3, 1871: * * "The muscles and skin are bound down to the bone and are much impaired in action. Partial paralysis of both limbs, owing to the injury to the nerves." The same Board reported, September 15, 1873, that "owing to the injury to some nerve he suffers excruciating pain on slight exercise or change of temperature," and, at a subsequent examination, they stated that "pain extends to the spine and down the other leg, and the limb at such times is drawn up spasmodically;" also that "he is confined to bed from one to three months every year," etc. The pensioner was paid June 4, 1876.

CASE 18.—Private J. W. Young, Co. E, 137th New York, aged 27 years, was wounded at Gettysburg, July 2, 1863, and admitted to Harewood Hospital, Washington, three weeks afterward. Acting Assistant Surgeon T. H. Elliott reported: "Gunshot wound of right leg. Ball entered through upper portion of gastrocnemius muscle and emerged near the head of the fibula. The foot, immediately after the injury, dropped to full extension; all of the muscles of the leg paralyzed from division of nerves; flexors of thigh contracted, causing the heel to be raised from the floor three inches in the erect posture. Patient is unable to bear any weight on the limb. August 6th, wound unhealed; paralysis of extensor muscles complete. Patient discharged from service August 16, 1863." Examiner J. G. Orton, of Binghamton, New York, September 15, 1866, certified: "The power of flexion of the foot upon the leg is impossible in consequence of injury to flexor muscles; walking is performed with much difficulty and not without assistance." On February 29, 1876, he reported: * * "The power of flexion of the foot is entirely gone. It is at present almost worthless, the foot being swollen, and drags when he walks; he cannot walk without assistance." The pensioner was paid March 4, 1876.

In addition to the cases of reflex paralysis cited from Dr. Keen in foot-note 2 on page 9, a report of an instance of this rare affection is given below.[1] Special reports of operations on this subject are infrequent.[2]

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[1] Private C. Sullivan, Co. K, 69th New York, aged 36, was wounded at Spottsylvania, May 10, 1864. From a field hospital of the Second Corps he passed to Douglas Hospital at Washington, and thence to South Street at Philadelphia, from all of which places "a shell wound of the left leg" was reported. Assistant Surgeon S. A. STORROW, U. S. A., in charge of the Filbert Street Hospital, described the injury as "a shot wound of the gastrocnemius muscle, involving the posterior tibial nerve." Acting Assistant Surgeon L. Tosier reported the patient's admission to the Ladies' Home Hospital, New York City, November 7th, and the following history: "A shell wound of the posterior portion of the leg, severing the lower portion of the gastrocnemius muscle. The wound has healed with considerable contraction of the parts, flexing the foot strongly and leaving the ankle joint exceedingly tender and painful—almost immovable. On the morning of July 11th the patient awoke with almost complete paralysis of each forearm and hand, in which condition they yet remain." The patient was discharged December 9, 1864, and pensioned. Examiner E. Bradley, of New York, on February 10, 1866, certified to atrophy of the wounded limb and an open ulcer occupying the lower and posterior surface: also to partial paralysis of the right hand. The New York Examining Board reported, September 11, 1872: "A shell wound, etc., leaving a tender cicatrix which is constantly breaking open. Locomotion is interfered with. The limb is very tender, and it is painful for him to walk. He cannot move his right hand on account of total paralysis of it, nor close the fingers. He states that both hands became paralyzed after he was wounded, and that he recovered the use of the left hand, but the other hand remained useless. We cannot discover any connection between the wound of the leg and the paralysis of the hand." Dr. A. B. MOTT, of New York City, who was surgeon in charge of Ladies' Home Hospital at the time of the pensioner's discharge from service, certified, February 22, 1873: 'At the time of his admission to the hospital the patient had lost the use of both arms, but he recovered the use of the left arm. As far as my memory serves me, it was my opinion at that time that the paralysis was due to shock at the time of receiving the wound" The pensioner was paid June 4, 1877.

[2] On wounds of the nerves of the lower extremities the reader can consult, in addition to the works already cited, and the researches of CRUIKSHANK, FONTANA, J. F. MECKEL, RETZIUS, TIEDEMANN, and other experimenters in surgical physiology on the results of division of the nerves, the following authors: DESCOT, *Diss. sur les affections locales des nerfs*, Paris, 1822, No. 233; SWAN (J.), *A Treatise on Diseases and Injuries of the Nerves*, 2d ed., London, 1834; HAMILTON (J.), *On some effects resulting from Wounds of Nerves*, in *Dublin Jour. of Med. Sci.*, 1834, Vol. XIII, p. 38; WALLER, *Nouv. meth. anat. pour l'investigation du système nerveux*, Bonn, 1852; PHILLIPEAUX and VULPIAN, *Recherches sur la régéneration des nerfs*, in *Mem. de la Société de Biologie*, 1859; DUCHENNE, *De électrisation localisée, etc.*, 2d ed., 1860; LONDE, *Recherches sur les névralgies, consécutives aux lesions des nerfs*, Paris. 1860, No. 199; TILLAUX (P.), *Des Affections Chirurgicales des Nerfs*, Paris, 1866; PAULET, *Les Suites immediates et eloignees des lesions traumatiques des nerfs*, in *Gaz. Hebdom.* de Paris, 1868, T. V, p. 283; FOLLIN (E.), *Traité élém. de path. ext.*, Paris, 1867, T. II. p. 233.

Flesh Wounds of the Lower Limbs with Injury of the larger Blood-vessels.—As indicated in my preliminary surgical report in *Circular* 6, S. G. O., 1865, p. 38, shot wounds of the larger arteries of the lower extremity, the femoral, profunda, peroneal, and tibials, uncomplicated by fracture of the adjacent bones, or by extended disorganization or complete removal of the limb by the impact of large projectiles, that come under the treatment of the military surgeon, are comparatively infrequent. It is difficult to convince surgeons who have had little field practice of the rarity of this form of accident.[1] It is strikingly illustrated by the fact that, in the series of fifty-eight thousand seven hundred and two cases of shot flesh wounds of the lower extremities we are now discussing, only a hundred and fifty-six instances of this particular lesion, or 2.6 per thousand, were reported. Of one hundred and fifty-six cases, thirty-three were treated without operative interference, eighty-seven by ligation, twenty-three by amputation, and eight by ligation followed by amputation. These four groups will be separately considered.

Wounds of Blood-vessels treated without Operation.—This group comprises eighteen cases of wounds of the femoral artery, in two of which the femoral vein was likewise implicated. Of these fifteen terminated fatally. There were three fatal cases in which the femoral vein alone was involved. There were four cases of wounds of the popliteal, with two recoveries. Of two cases of wounds of the posterior tibial, one complicated by wound of the peroneal was fatal. Of two cases of wounds of the peroneal one was fatal, and the result in the other case cannot be ascertained. Two cases of wounds of the internal saphenous vein resulted favorably, as did a case of wound of the dorsalis pollicis. A case of wound of an unspecified artery of the lower extremity had a fatal result. Twenty-three of the thirty-three cases terminated fatally, a mortality of 71.8 per cent. A few examples of these injuries will be detailed, commencing with a case of occlusion of the femoral artery from contusion, and two instances of direct lesion of that vessel:[2]

CASE 19.—Private S. T. Newell, Co. B, 1st U. S. Artillery, aged 21 years, was wounded at Gettysburg, July 2, 1863, and entered the Satterlee Hospital, Philadelphia, July 11th. Acting Assistant Surgeon W. C. Dixon reported: "The missile, a piece of shell, struck the inner side of the left thigh, middle third, producing a severe flesh wound. Simple dressings were applied. On the 19th the wound assumed a gangrenous appearance; a mixture of equal parts of creasote, alcohol, and water was applied. Under that treatment it remained about the same until July 28th, when the sloughing commenced to spread rapidly and nitric acid was applied. On the 29th the femoral artery was exposed at the upper and lower edges of the wound, with a large amount of sloughing tissue occupying the intermediate space. Two days later the slough was removed from around the artery, which was found to have been converted into a fibrous cord bearing no resemblance to an artery. It was watched closely to guard against hæmorrhage. At 2 o'clock P. M. on August 1st the artery separated, and the proximate and distal extremities of the vessel were found to be perfectly occluded. The wound healed rapidly, and in September the patient was transferred to Fort Hamilton." He was discharged, at Fort Independence, December 7, 1863, and pensioned. Examiner J. H. Crombie, of Derry, N. H., certified, May 6, 1874: * * "Was struck by a piece of shell, * * making a wound six inches in length and three in width, penetrating nearly to the bone. The limb is weakened very much. The muscular power is considerably limited. He is unable to walk or labor on the limb for any length of time by reason of weakness." The pensioner was paid June 4, 1876.

[1] HEINE (C.) (*Die Schussverletzungen der unteren Extremitäten*, Berlin, 1866, p. 127) remarks that: "The rarity with which shot injuries complicated by serious arterial hæmorrhages present themselves to surgeons at the stations for first dressings (*erste Verbandplatz*) is an experience that repeats itself in every campaign. Hence operative interference on account of wounded blood-vessels is seldom necessary at this stage. From the last war [the Danish war of 1864] I cannot recall a single case in which ligation or amputation was performed for primary bleeding at the field ambulance stations." The first chapter of GUTHRIE'S *Commentaries on the Surgery of the Peninsular War*, that excellent *vade-mecum* of the military surgeon, and the chapter on gunshot wounds of the extremities by MATTHEW, the historian of the surgery of the British army in the Crimea, have already established the doctrine above enunciated. The misconceptions which such an authority as VALENTINE MOTT adopted in his paper *On Hæmorrhage from Wounds*,—a paper contributed to the publications of the SANITARY COMMISSION,—can only be explained by his comparatively slight acquaintance with the effects of shot injuries.

[2] Of the remaining fifteen cases of shot wounds of the femoral artery treated on the expectant plan, one resulted successfully—case of *Wammack*, 5th North Carolina—and fourteen fatally, viz: Dinguid, Griffin's Battery; *Ledbetter*, 9th Alabama; Sylvester, 9th New Hampshire; Riming, 81st Pennsylvania; Corris, 17th Illinois; Collins, Ordnance Corps; Blaisdell, 17th Massachusetts; Lawrence, 9th New York Cavalry; Masser, 143d Pennsylvania; Craft, 144th New York; Stephen, 147th New York; *Geary*, 4th Georgia; Bailey, 8th Illinois Cavalry, and Clarendon, 26th Massachusetts. In the last two cases the femoral vein was also implicated. It is impracticable to give the details of these cases, but the names are mentioned in order that students of this special subject may be enabled to refer to them in the MS. records of the Surgeon General's Office.

Of the cases of wounds of the *femoral artery* treated without operation, a case of recovery and a fatal case will be detailed:

CASE 20.—Lieutenant L. Hallman, Co. D, 51st Pennsylvania, aged 24 years, was wounded at South Mills, April 19, 1862, and admitted to Hygeia Hospital, Fort Monroe, five days afterwards. Surgeon R. B. Bontecou, U. S. V., reported: "Gunshot wound of femoral artery, a bullet traversing the middle of the left thigh, entering anteriorly, and escaping on the posterior aspect just opposite. Pulsation could indistinctly be felt in the pedal and posterior tibial arteries. About one week after admission a smart arterial hæmorrhage came from the anterior wound. Compression by a bandage and cold wet applications were made, and the hæmorrhage was controlled, but returned the next day. We proceeded to his room to tie the femoral; on consultation, however, it was decided to wait, and, if it should bleed again, to operate. He continued doing well. Treatment: Absolute rest and cold wet applications, ice in small portions being allowed to melt on the bandage which surrounded the thigh. May 20th, abscess of the skin appeared, and discoloration of the great toe, which eventually sloughed to the first phalanx; temperature of the foot all the while good. He was sent to Philadelphia, in June, quite well." Lieutenant Hallman was transferred to the Veteran Reserve Corps on March 14, 1864, and ultimately mustered out of service June 30, 1866, and pensioned. Examiner W. Carson, of Norristown, Pennsylvania, March 3, 1867, certified: "Ball passed through left thigh, * * wounding the sciatic nerve; has lost first joint of great toe, with immobility of all the toes. Atrophy of limb equal to one inch in circumference; foot cold." Examiner H. E. Goodman, of Philadelphia, certified, September 18, 1869: * * "Limb much weakened and painful all the time." The pensioner died, of consumption, November 24, 1871.

CASE 21.—Sergeant H. Booth, Co. E, 7th Indiana Cavalry, aged 24 years, was admitted to the Gayoso Hospital, Memphis, April 18, 1864, having been wounded on the previous day by the accidental discharge of a revolver held in the hands of one of his comrades. Surgeon F. N. Burke, U. S. V., made the following report: "The ball entered the left thigh directly over the course of the femoral vessels, two inches below Poupart's ligament, and escaped at the crease of the nate and median line of the left thigh. There was copious hæmorrhage at the time the wound was received, but it was arrested by application of the tourniquet. As a precautionary measure it was left on at the time of admission, but not tightened. The wound became unhealthy and had a gangrenous smell on the fourth day. Charcoal cataplasms were then applied, and Labarraque's solution used to the wound. On the sixth day hæmorrhage again occurred, amounting to about six ounces, but pressure again arrested it. For the twenty-four hours preceding this the whole limb had become swollen and œdematous, especially the upper portion of the thigh. The patient had become very much prostrated and his pulse quite weak. He was naturally of a weak constitution. It was thought that to tie the artery there would result in gangrene of the limb, as its vitality was evidently quite low, and, the wound being unhealthy, secondary hæmorrhage from the sloughing of the vessel would be imminent. Amputation was then thought of, but it was obvious that the patient was too much prostrated to hope for a successful result. Oozing of blood occurred a couple of times during the ensuing few days, but the formation of a small clot was sufficient to arrest it. He died on April 28, 1864. The *post-mortem* examination discovered the femoral artery to have been perforated so as to admit the passage of a duckshot through the wound about half an inch below the origin of the profunda. The femoral vein was found to have sloughed for a distance of about one and a half inches, gangrene having extended along the fascia and cellular planes from one to one and a half inches at different parts along the course of the wound. The ball had passed between the femoral vessels and the femur."

Of the four cases of injury of the *popliteal artery*, a fatal instance and one that eventually resulted in fatal aneurism are selected for illustration:[1]

CASE 22.—Private J. C. Mapes, Co. K, 103d Pennsylvania, aged 22 years, was wounded in the left leg at Kinston, December 14, 1862, and entered the Stanley Hospital, New Berne, six days afterwards. Acting Assistant Surgeon J. B. Upham reported: "A minié ball entered three inches above the knee joint, on the inside, over the track of the femoral artery, and passing downward and backward emerged in the popliteal space near the insertion of the biceps, lacerating, in its course, the popliteal artery. His condition at the time of his admission was one of great mental and bodily depression. He was treated by stimulants, warm applications, and generous diet. Three days afterwards, secondary hæmorrhage coming on, attempt was made to ligate the femoral artery by dilating the wound, which failed. Amputation was not resorted to on account of the condition of the patient. Gangrene below the point of the injury came on rapidly, and the patient died December 29, 1862, fifteen days after the reception of the wound. The *post-mortem* examination revealed the injury of the artery already alluded to, which extended for a considerable distance, the track of the ball being almost in a direct line with the course of the vessel itself."

The other case referred to is a remarkable example of aneurism developed after fourteen years, as the remote result probably of a shot contusion of the popliteal artery:

CASE 23.—Private W. Young, Co. K, 4th New York, aged 19 years, was wounded at Fredericksburg, December 13, 1862, and admitted to Campbell Hospital, Washington, four days afterwards. Surgeon J. H. Baxter, U. S. V., recorded: "Gunshot wound of leg; patient transferred to Baltimore January 8, 1863." Surgeon L. Quick, U. S. V., reported that the patient was discharged from McKim's Mansion Hospital, March 18, 1863, for "gunshot wound of left leg, ball entering near the head of the tibia and emerging through the internal belly of the gastrocnemius muscle, producing lameness." The Boston Examining Board certified, October 27, 1865: "Has had wound of leg below knee, * * ball emerging one inch below and behind the internal condyle of the femur, evidently passing across the internal saphenous vein. Cicatrices not adherent, but there is some loss of substance of muscle, and the veins of the leg are varicose, probably in consequence of the wound. Motions of joint good. He says he has pain in leg on walking or standing, and much pain in popliteal space while sitting." On August 25, 1875, this pensioner came under the care of Dr. J. Collins Warren, at the Massachusetts General Hospital, who

[1] The other two cases of shot wounds of the popliteal artery are those of Pogue, 110th Ohio, who recovered and was discharged, and of Thompson, 120th New York, who died sixteen days after the reception of the injury.

reported the further progress of the case to the Boston Society for Medical Improvement, in the *Boston Medical and Surgical Journal*, Vol. XCV, No. 18, as follows: "Was wounded fourteen years ago, at the battle of Fredericksburg, by a musket ball, which entered the calf of the left leg a little to the inside, and came out opposite the inner aspect of the knee joint. There was no unusual amount of hæmorrhage at the time, and the wound healed well, but on recovery a small bunch remained in the popliteal space, growing larger at times, and again almost wholly disappearing. One year ago it grew larger than before and began to pulsate. It soon filled the hollow of the knee, and during the last two months has spread rapidly on the inside of the thigh. The skin over the popliteal space is made tense by an ill-defined pulsating mass, which spreads along the course of the femoral artery to within eleven inches of the anterior superior spinous process of the ilium. The left knee is nineteen inches in circumference, while the right knee measures but thirteen and one-fourth inches. The patient suffers severely from pain in the calf and foot, which is relieved only by frequent subcutaneous injections of morphine. A pound cannon-ball applied to the femoral diminishes but does not arrest pulsation in the vessel. Heavy pressure with the hand arrests pulsation entirely. August 30th: The patient was etherized and pulsation in the femoral was arrested by two hospital tourniquets applied, near the apex of Scarpa's triangle, alternately every fifteen minutes for twelve hours. During this period the patient was kept profoundly etherized, about a pound and a half of ether having been consumed for that purpose, with the exception of a few minutes during the afternoon, when some beef-tea and brandy were administered. The pulse during this time gradually rose from the normal rate to about 120, but subsided somewhat after nourishment had been taken. On removing the tourniquets pulsation had ceased, although on auscultation a slight murmur was heard beneath the tumor. At midnight there was no return of the pulsation, but the next morning a slight pulsation was observed, which gradually increased to its previous force. September 10th: Pressure was applied as before by tourniquet without ether, the patient preferring to bear the pain, and was continued for twenty hours, but had no effect upon the pulsations, which reappeared after it was removed. September 19th: The patient was etherized, the sac laid open, the clots, which were numerous, everted, and the artery tied at each end. It was found that the sac extended to the point of bifurcation of the popliteal artery. Two ligatures were therefore necessary at this point. The patient rallied well from the operation, and for the first week the wound healed rapidly. An attack of erysipelas arrested the healing process and reduced the patient greatly. On October 3d, hæmorrhage occurred from the upper end of the wound during the afternoon, and although digital pressure was immediately resorted to by an attendant, and in a few minutes the tourniquet was applied, the patient sank, and died the same evening. Dr. Fitz showed the specimen, which consisted of the aorta from its origin, the left femoral, and a portion of the aneurism in continuity. The fatal hæmorrhage had resulted from the sloughing of the walls of the artery at the upper end of the aneurismal sac, where the ligature had been applied. There was no alteration of the inner surface of the femoral artery, but the fibrous tissue was indurated around it, corresponding with the region where compression had been applied. The entire inner coat of the thoracic aorta was thickened, wrinkled, elevated in patches of an opaque grayish-white color, and the canal was dilated, especially that of the arch. Just above the cœliac axis these alterations ceased abruptly, the interior of the abdominal aorta being smooth and yellow, its walls evidently in a normal condition. The specimen was particularly interesting from the absence of changes at the point of compression and the presence of chronic inflammatory conditions of the thoracic aorta, such as are associated with the formation of aneurisms in a young man in whom a popliteal aneurism had arisen directly or indirectly from a traumatic cause."

Of five cases in which large veins were wounded, three in which the *femoral* vein was separately injured proved fatal, and two, in which the internal or long *saphenous* was believed to be lacerated, recovered. One of these is detailed:[1]

CASE 24.—Lieutenant L. D. Martin, Co. A, 29th Illinois, aged 32 years, was wounded through the left thigh at the siege of Fort Donelson, February 15, 1862. Dr. Madden, of Nashville, noted the following history of the case, which was forwarded by Surgeon E. Swift, U. S. A., Medical Director: "A rifle ball entered the limb at a point directly over the saphenous opening and glanced around upon the fascia lata to the outer aspect of the thigh, where it emerged one inch below the trochanter major. There was a copious flow of blood from the wounded veins at the time of the injury, but this was readily checked with lint. The patient was conveyed to the Academy Hospital at Nashville. On the eighth day there was a recurrence of venous hæmorrhage from the inguinal wound. This was again arrested by pressure, and the patient continued to improve till the evening of the 5th of March, when the bleeding was suddenly renewed to such a degree that the coats of the femoral artery were supposed to have yielded. Surgeon E. Swift, Medical Director in this city, having been consulted, he directed that the artery should not be ligated but judiciously compressed, and it was decided to postpone till the next morning any attempt to place a ligature upon the vessel. Pressure with the fingers upon the artery at the point of its emergence from beneath Poupart's ligament was maintained during the whole night by relays of assistants. Next morning, on intermission of the pressure, there was no hæmorrhage, nor was there any pulsation distinguished below the wound. A compress was placed over the artery, and a bandage applied from the toes to the groin. This was removed at the expiration of twelve hours, and the limb was wrapped in flannels. Pulsation below the groin was not perceptible for several days. The limb, however, retained its temperature and its vitality, and the circulation gradually became re-established. There was no recurrence of hæmorrhage. The patient recovered his strength rapidly, and returned to his home April 5, 1862, at which time he was able to walk with the assistance of a cane." Lieutenant Martin resigned the service September 17, 1862, and was pensioned. Examiner J. W. Redden, of Shawneetown, Illinois, March 1, 1864, certified: "The ball entered the front of the left thigh near the femoral artery, which seems to have been wounded; there is general derangement of the nerves affecting the joints, and muscular activity and strength of the limb." Examiner H. W. McCoy, of Golconda, Illinois, September 16, 1873, reported the pensioner as having received a "flesh wound of the left shoulder" in addition to the above injury, but no mention is made of this in any previous reports. The pensioner was paid June 4, 1876

[1] The three cases of injury of the femoral vein are: Scullen, 25th Ohio, who died of pyæmia on the 16th day; Bainbridge, 64th New York, fatal on the 23d day (for autopsy see Lincoln Hospital Case Book No. 17); and Schumaker, 2d New York Cavalry, who died on the eighth day after the reception of the injury. The other case of injury of the internal saphenous vein is that of Johnson, 7th Connecticut, who recovered and was discharged.

The result of this series of thirty-three shot wounds of the larger arteries and veins of the lower limb sufficiently prove that compression, styptics, or a let-alone practice cannot be safely adopted in such grave accidents. The histories of three fatal cases of wound of the femoral vein corroborates the argument of Surgeon S. W. Gross, U. S. V., in favor of the ligation of wounded venous trunks.[1] Surgeon J. A. Lidell, U. S. V., in his excellent memoir on traumatic hæmorrhage,[2] has cited two or three other instances of shot lesions of the great vessels of the thigh, reported by Surgeon W. Clendenin, U. S. V., of which I am unable to find any mention in the official returns. The comparative rarity of profuse primary bleeding from shot wounds of the large blood-vessels of the extremities can hardly be seriously contested.[3]

Wounds of Blood-vessels treated by Ligation.—Eighty-seven cases were reported of shot flesh wounds of the lower extremities with lesions of the larger blood-vessels, treated by primary or intermediary ligation of arteries. Only twenty-six of these resulted favorably, leaving the formidable mortality-rate of 70.1 per cent. Six cases in which the external iliac artery was tied for wound of the femoral or profunda, or of these vessels and their accompanying veins, were fatal. Of sixty-two ligations of the femoral but seventeen, or 27.4 per cent., were successful. One of two ligations of the profunda was successful. In seven ligations of the popliteal, two patients survived. There were two ligations of the anterior tibial with one recovery,—five of the posterior tibial with four recoveries,—two of both tibials with one recovery,—and one fatal case of ligation of the peroneal artery. All of these cases will be hereafter enumerated in brief abstracts or in tabular form; but, as there are many other cases of deligation of the same vessels in shot flesh wounds without primary arterial lesion, it will be most convenient to classify the analogous cases further on, and there will be presented here only a single abstract of a remarkable recovery after ligation of the femoral artery for shot injury:[3]

CASE 25.—Assistant Surgeon R. S. Vickery, 2d Michigan, aged 33 years, was wounded at Petersburg, July 30, 1864, and admitted to the field hospital of the 3d division, Ninth Corps. Surgeon P. A. O'Connell, U. S. V., reported: "Gunshot wound of upper third of left thigh by minié ball; ligation of femoral artery performed by Surgeon W. B. Fox, 8th Michigan." From the field hospital the patient was moved to City Point, and subsequently to New York. Assistant Surgeon J. E. Semple, U. S. V.. reported his admission to the Officers' Hospital, Bedloe's Island, August 25th, with "flesh wound involving direct injury to the large artery of the thigh." In January following, the invalid was transferred to Armory Square Hospital, Washington, where he was discharged from service March 11, 1865. Examiner J. Nichols, of Washington, certified, March 24, 1865: "Gunshot wound of left thigh, inner aspect, upper third, ball severing femoral artery. Limb much atrophied and shrunk away almost to the bone; leg partially flexed upon the thigh; inability to extend it. Great danger of secondary hæmorrhage from the artery, which requires a long time for restoration. Limb perfectly useless; prognosis doubtful—may yet have to be amputated." Dr. Vickery was a pensioner until May 14, 1867, when he was appointed Assistant Surgeon in the regular army.

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[1] GROSS (S. W.), *Remarks upon the General Applicability of Ligation as a Venous Hemostatic Agent*, in *Am. Jour. Med. Sci.*, 1867, Vol. LIII, pp. 17, 305.

[2] In his paper on the *Wounds of Blood-vessels, Traumatic Hæmorrhage, Traumatic Aneurism, and Traumatic Gangrene*, in the *Surgical Memoirs of the Sanitary Commission*, 1870, Vol. I, p. 51, etc., Dr. JOHN A. LIDELL published several abstracts, contributed by Surgeon W. CLENDENIN, U. S.V., purporting to be descriptions of examples of "complete division of arteries by gunshot projectiles." Although these abstracts aptly illustrate the subject in hand, it has been found impracticable to verify the cases on the regimental and hospital returns; but in the confusion of the battle-field it is probable that not a few important surgical accidents failed to get recorded In the case of James Brown, 3d Tennessee Mounted Infantry (*loc. cit.*, p. 51), it appears that this regiment was never in action, and the patient's name is not on the hospital registers, nor does it appear on the death records. In the case of James O'Neal (*loc. cit.*, p. 55), it is left to conjecture whether the man belonged to the 10th Tennessee Mounted Infantry or to Wheeler's Cavalry. No reference to such a case is found on the files of the War Department. In the case of Sergeant French, 4th U. S. Cavalry (*loc. cit.*, p. 56), neither the date of the injury nor the engagement in which it was received are given, and on inquiry of the Adjutant General it has been ascertained that "there is no record of the enlistment of any soldier by the name of French in the 4th U. S. Cavalry, from 1856 to 1865, inclusive."

[3] BILLROTH (TH.) (*Chirurgische Briefe*, etc., Berlin, 1872, p. 113) remarks: "Of the immediate results of injuries of the larger blood-vessels, of profuse hæmorrhages on the field of battle, I have as little to relate as other surgeons that have served in the field. None of the colleagues with whom I conversed had observed such bleedings. Nowhere did I find a case of primary ligation of a large blood-vessel. It has been asserted that injuries of this kind prove fatal so rapidly on the battle-field that any assistance comes too late. There is no valid proof of this assertion. * * Observations are accumulating that arteries, even of the size of the aorta, when perforated by some modern shot projectiles, do not invariably bleed. In Carlsruhe, I have learned of a case *a priori* incredible, but attended by a careful autopsy, in which a shot through the aorta caused no bleeding until several days after the injury; the patient was therefore transported from Wörth to Carlsruhe with a hole in his aorta without any bleeding. I have, myself, seen three cases of shot wounds of the external iliac and femoral artery in which no bleeding occurred." Professor BILLROTH then details the cases.

Dr. F. H. Hamilton states (*Appendix to Treatise on Military Surgery and Hygiene*, 1865, p. 640) that in this case "the bleeding was arrested temporarily by a tourniquet, and three hours afterwards Surgeon Fox, of the 8th Michigan, enlarged the wound and tied the femoral *both above and below the seat* of injury."

No military surgeon now disputes the propriety of tying *both ends* of a bleeding artery at the wounded point,[1] and it is probable that if the judicious practice of Surgeon Fox had been more generally followed, and the precepts of Guthrie better appreciated, the deplorable fatality of this series of cases might have been largely averted.

Wounds of Blood-vessels treated by Amputation.—There were twenty-eight cases in which amputation was practised on account of uncontrollable bleeding from shot wounds of the larger blood-vessels of the lower extremity, and eight cases mentioned in the next subsection, in which recourse was had to amputation after proximal ligation of main arterial trunks had proved ineffectual. The series of twenty-eight cases includes twenty-six thigh amputations with only seven recoveries, a fatal amputation at the knee, and a fatal amputation in the leg. In this series the femoral artery was wounded in eleven instances, the profunda in one, the popliteal in nine, one of the tibials in six, and the long saphenous vein in one. All of these cases are tabulated further on. Details of two are inserted here:

CASE 26.—Corporal H. Schatt, Co. H, 64th New York, aged 30 years, was wounded at Hatcher's Run, March 25, 1865, and was admitted to the field hospital of the 1st division, Second Corps, where Surgeon F. M. Hammond, 126th New York, noted "a shot wound of the leg." On the following day the man was sent to City Point and thence to Washington. Assistant Surgeon H. Allen, U. S. A., reported his admission to Mount Pleasant Hospital April 2d, and contributed the following history: "Gunshot wound of left lower extremity, ball passing through popliteal space from without inward, injuring the popliteal artery. When admitted the patient's pulse was small, sharp, and fast; face pale and tongue coated. His toes were of a bluish tint, and the foot was covered with bluish and yellowish purple spots. The entire leg was greatly swollen and the superficial veins enlarged; the small veins of the lower third of the thigh, on the external surface, were somewhat discolored, and the integument was assuming a yellowish color. The limb was amputated at the lower third of the thigh, on the day of admission, by Acting Assistant Surgeon H. Craft. The operation was performed by the circular method, very little blood being lost. Two double ligatures were applied to the femoral and four to the branches. The anæsthetic consisted of equal parts of æther and chloroform. After the operation, cold-water dressings were applied, and a stimulating course adopted. The ligatures came away on the sixth and seventh days. On May 10th, there were symptoms of the femur exfoliating. The stump was nearly healed, when a collection of pus formed around the bone, and to give exit to it an incision was made just above the end of the stump. This was kept open by a tent and the stump encouraged to heal. Simple dressings were continued, and the tonic and stimulating course was persevered in. The exfoliating process steadily progressed up to June 19th, when a sequestrum was removed which proved to be nine inches long and was nearly a perfect shaft, extending nearly or quite to the trochanter major. It had only been partially destroyed on its under surface, and a new shaft of bone had formed around it. The stimulants and tonics were now increased, with nourishing diet, and by June 30th the patient was progressing favorably." The sequestrum was forwarded to the Army Medical Museum by Dr. Allen, and is represented in the annexed cut (FIG. 1). The patient was subsequently transferred to Rochester, and ultimately discharged from Ira Harris Hospital, Albany, September 25, 1865. Assistant Surgeon J. H. Armsby, U. S. V., contributed a cast of the stump (*Cat. Surg. Sect.*, 1866, p. 554), which shows the inferior portion to be baggy, and a deep and poorly healed cicatrix at that point, caused by loss of substance over the bone (FIG. 2). Examiner G. W. Cook, of Syracuse, N. Y., July 9, 1873, certified: "Tenderness of stump and slight covering over end of bone. He does not, nor can he, wear an artificial limb." The pensioner was paid June 4, 1876.

FIG. 1.—Cylindrical sequestrum from stump of left femur. *Spec.* 171. ½.

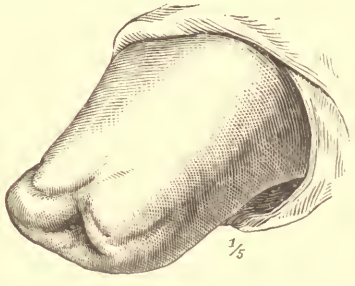

FIG. 2.—Stump after intermediary amputation of thigh. *Spec.* 2283.

Another case of this category is selected for illustration because it affords quite a typical example of what is likely to occur after a shot wound of the popliteal artery

[1] HEINE (C.) (*Die Schussverletzungen der unteren Extremitäten*, Berlin, 1866, p. 133), speaking of shot flesh wounds with injury of the arteries, remarks: "The ligation of the femoral artery was practised eight times [in the Danish War of 1864] and the external iliac was tied twice. In one of the latter cases, the femoral artery had been previously ligated; but as bleeding recurred, the external iliac was tied. This is the only case of the ten ligations that proved successful. * * The bleeding was primary in two cases only. * * In two other cases, no bleeding at all occurred, although the artery was completely severed in the wound; in the rest of the cases the bleeding was secondary,—from the seventh to the seventeenth day after the injury.

unless the proximal and distal ends of the vessel are promptly secured by ligature, and the formation of traumatic aneurism in the ham and consequent gangrene of the leg prevented. Moreover, in this instance, the patient having been brought to Washington, a very conscientious artist was able to depict the appearance of the gangrenous limb, in a water-color drawing, which is reproduced with tolerable accuracy in the chromolithograph opposite:

CASE 27.—Sergeant G. W. Gardner, Co. A, 12th Illinois Cavalry, aged 29 years, was wounded at Mitchell's Ford, on the Rappahannock, October 11, 1863. Surgeon S. B. Wylie Mitchell, 8th Pennsylvania Cavalry, reported that he was struck by a conoidal carbine ball, which entered four inches above the right knee, passed through the inner hamstring muscles and the adductor magnus, outward and downward, and lodged under the integument on the outer side of the thigh. Upon extracting the ball through an incision there was a profuse hæmorrhage, which ceased spontaneously. The patient was sent by railway to Washington, and entered Emory Hospital on October 13th. Acting Assistant Surgeon J. Walsh reported that "he was feeble and pallid; no pulsation could be detected in the tibial arteries of the injured limb. There was loss of sensibility and slight discoloration of the skin of the right foot. The leg was packed in raw cotton, and the temperature was kept up by bottles of hot water. Frictions with a stimulating liniment were occasionally employed. After October 18th, the leg was daily immersed in a bath of oxygen gas. On October 25th, two bits of blue cloth and a small piece of white cotton cloth were extracted from the wound. The foot was decidedly gangrenous, and gangrene began to advance rapidly up the leg." At this time a sketch of the appearances of the limb was made, under Surgeon J. H. Brinton's direction, by Hospital Steward E. Stauch. This drawing was elaborated, after the lamented death of Mr. Stauch, by Hospital Steward Schultze, and has been reproduced by chromolithography in the plate opposite (PLATE I, 28). On October 29th, Acting Assistant Surgeon W. H. Ensign amputated the limb at the lower third of the thigh. On examination of the amputated member it was found that the artery had been completely divided by the ball near the point at which it passes through the opening in the great adductor. The divided extremities of the artery were occluded by dark grumous clots. After the operation the patient was attacked by diarrhœa, and, on December 5, 1863, the case terminated fatally. A wet preparation of the lower half of the right femur, with a portion of the soft tissues, including the popliteal artery and vein, was contributed to the Army Medical Museum by Acting Assistant Surgeon J. Walsh (*Cat. Surg. Sect.*, 1866, p. 521), and is represented in the adjacent wood-cut (FIG. 3).

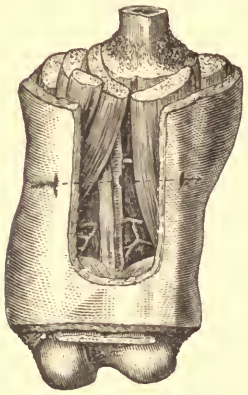

FIG. 3. — Preparation of lower half of the right thigh, showing a shot laceration of the popliteal artery. *Spec.* 1760.

Wounds of Blood-vessels treated by Ligation and subsequent Amputation.—Of the eight instances in which consecutive amputation was had recourse to after the failure of proximal ligation of large arteries for primary bleeding, six succeeded ligation of the femoral, one ligation of the popliteal, and one ligation of the posterior tibial. Five were amputations in the thigh, and three of the leg. Only one of the eight patients recovered, a case of wound of the popliteal artery treated by tying the femoral and subsequently amputating at middle thigh. One of the fatal cases is detailed:

CASE 28.—Corporal J. M. Harris, Co. E, 14th Iowa, aged 20 years, was wounded in the right thigh at the battle of Tupelo, July 15, 1864, and entered the Adams Hospital, Memphis, five days afterwards. Assistant Surgeon J. M. Study, U. S. V., made the following report: "A minié ball entered the lower portion of the middle of the thigh and passed beneath the bone without fracturing it. Aneurism of the femoral artery resulted. On July 27th, Surgeon J. G. Keenon, U. S. V., probed the sac with the finger, when excessive hæmorrhage ensued, and, after great difficulty in finding the ends of the artery, the vessel was ligated above and below the sac. Acting Assistant Surgeon S. S. Jessup assisted at the operation. Sphacelus of the foot and leg afterward necessitated amputation, which was performed, just below the knee joint, by Acting Assistant Surgeon R. W. Coale. The patient died of pyæmia August 3, 1864."

Recurrent hæmorrhage from the lower end of the wounded vessel was what commonly necessitated amputation in these cases.

Flesh Wounds of the Lower Limbs unattended by Primary Injury of the Large Nerves or Blood-vessels.—While in the two hundred and fifteen cases discussed in the two foregoing subsections, direct shot injury of the larger blood-vessels or nerves was regarded as the paramount lesion distinctively characterizing them, there were many other instances in the immense category of recorded shot flesh wounds of the lower extremities where the nerves and vessels shared in the laceration of the muscular and other soft parts by large projectiles, or were indirectly involved in the morbid processes following penetra-

Schultze pinx

J Bien Chromolith

CANCRENE FOLLOWING A SHOT LACERATION OF THE FEMORAL ARTERY

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CALIFORNIA

ting or perforating wounds by small missiles. These are included in this third subsection of shot flesh wounds of the lower extremities, a group of fifty-eight thousand four hundred and eighty-seven reported cases, which (as stated on page 8) it is difficult to classify. Some instances remarkable for the extent of laceration of the soft parts will be cited, some of lodgement of foreign bodies, and some distinguished by the complications of pyæmia, tetanus, gangrene, erysipelas, hæmorrhage, secondary involvement of joints, etc., will be adverted to. In a hundred cases, ligation of the larger arterial trunks was resorted to, and in a hundred and sixty-one recourse was had to amputation. It will be recollected that in the two preceding subsections ninety-five examples of ligations and forty of amputations have been alluded to, as connected with primary injury of the nerves or vessels. All of these cases of ligations and amputations will be cited in consolidated tabulations at the close of this section. Some cases of shot wounds of the lower limbs, in which no operative interference was undertaken, will now be detailed.

Shot Lacerations.—After extensive destruction of the fleshy parts of the thigh and leg, reparation was usually slow and imperfect, sometimes as much so as in the remarkable case of laceration of the buttocks, narrated at page 430 of the *Second Surgical Volume.* Practitioners accustomed to regard mere flesh wounds as of little moment were not always happy in their prognoses of shot injuries of the soft parts in the lower limbs.[1]

CASE 29.—Sergeant J. W. White, Co. F, 14th New Jersey, aged 24 years, was wounded at Monocacy, July 9, 1864, and admitted to hospital at Frederick on the following day. Acting Assistant Surgeon J. H. Bartholf reported: "The patient was wounded by a cannon ball, or, as he says, by an unexploded shell, which tore through the back of his left thigh and killed a man close by him. It produced a very extensive lacerated wound, extending on the back of his thigh from near his knee to the fold of his buttock—a huge flap hanging downward and a shorter one attached at the upper end of the wound. He was admitted here the next day, without then suffering from any shock. Free suppuration followed, but not any sloughing, and simple measures only were required, viz: poultices, dilute solution of permanganate of potash, balsam of peru, water dressings, oakum, simple cerate. It granulated, contracted, and healed till, on November 25th, the raw surface was only four inches square. No loss of motion at the knee joint, strange to say, resulted from this extensive involvement of the muscles. December 22d, he is transferred to hospital at Beverly this day. The wound is very nearly healed, and the patient in good health." Subsequently the man was transferred to the Whitehall Hospital, whence he was discharged June 17, 1865, and pensioned. The Trenton Examining Board certified, September 4, 1873: "The muscles of the posterior portion of the left thigh were very badly lacerated by a fragment of a shell; all the flexor muscles were torn through and a most persistent and gangrenous sore followed the wound, and the cicatrix is very large and tender, the leg weakened, so that he cannot walk far or stand long on it." The pensioner was paid June 4, 1876.

Even in young and healthy subjects the progress of repair was slow after large solutions of continuity:

CASE 30.—Corporal A. W. McCausland, Co. B, 16th Maine, aged 18 years, was wounded at Gettysburg, July 2, 1863, and admitted to the field hospital of the First Corps. On August 24th he was transferred to Camp Letterman, where he came under the care of Assistant Surgeon W. F. Richardson, C. S. A., who recorded: "A shell struck the outer side of the left thigh, inflicting a terrible flesh wound eight inches long by four in width, with ragged edges. When admitted the patient was in good health, the wound looking well and filling up with healthy granulations. Up to date the treatment has been cold-water dressings. Stimulants are given and simple cerate dressings now used. The patient improved rapidly, and the wound closed." In October the man was transferred to Satterlee Hospital, Philadelphia, and on January 10, 1864, he was discharged from service by reason of "lameness of left leg resulting from the wound." Examiner T. Hildreth certified, September 4, 1873: "Was wounded by a shell in the posterior part of the thigh, carrying away a very large part of the muscles and integument, resulting in a tender cicatrix. He now suffers from numbness of the limb." The pensioner was paid June 4, 1876.

Sometimes small projectiles produced extended lacerations by driving into the soft parts coins,[2] knives, or other hard objects carried in the pockets of the soldiers:

CASE 31.—Private J. C. Haggerty, Co. I, 124th New York, aged 21 years, was wounded at Chancellorsville, May 3, 1863. Surgeon J. S. Jamison, 86th New York, noted a "shot wound of the right thigh." The patient passed from a Third

[1] Dr. C. HEINE (*Die Schussverletzungen der unteren Extremitäten*, Berlin, 1866, p. 65) thinks that large shot lacerations of the fleshy parts of the lower extremities are peculiarly liable to be followed by tetanus; but I find in the records under discussion little to corroborate this view. I will revert to the subject in treating of *Tetanus*.

[2] SOCIN (A.) (*Kriegschir. Erf.*, Leipzig, 1872, p. 16) gives a drawing of a flattened *Langblei* (the missile of the needle-gun), together with three bent French copper sous pieces and two vest buttons, all of which were extracted from the thigh of a French soldier at the Swiss ambulance at Lure. The ball and the large copper coins were detected and removed soon after the reception of the injury, but the buttons were not extracted until three months afterwards.

Corps hospital to Fairfax Seminary, and thence to Satterlee Hospital, when Acting Assistant Surgeon I. Roberts reported the case as interesting, inasmuch as the ball struck a silver coin in the right pocket of the man's trousers and was thus deflected from the track of the femoral vessels; but passed through the soft parts, driving fragments of the pocket-book into the tissues, and escaping at the gluteal fold. The wound progressed favorably for a time, but, about July 20th, deep abscesses formed, and there was some sloughing at the aperture of entrance and exit. The abscesses were incised, and several fragments of the pocket-book came away with the pus. There was so much constitutional irritation that quinia and stimulants were freely exhibited. The wound healed about the middle of December, and the man was transferred to the Veteran Reserves. He was quite lame, and the right foot was much everted. He was discharged October 7, 1864, and pensioned. Examiner J. Nichols, of Washington, certified: "Ball entered anterior aspect of upper third of right thigh, passing directly through, and inflicting a frightful flesh-wound. Bone uninjured; cicatrix very deep and adherent to all the soft parts below, nearly to the bone, rendering free motion of the limb impossible, and, if much used, very painful." Examiner J. Gordon, of Newburgh, New York, reported, February 28, 1876: * * "There remains a large umbilicated cavity, with adhesions of skin, fascia, and muscles. He suffers more particularly from distress in the leg, extending in part to the foot, accompanied, before atmospheric changes, with shooting, darting pains, * * so severe at times as to unfit him for manual labor." This pensioner was paid June 4, 1876.

Extensive lacerations of the calf were very slow in healing, and usually resulted in adherent cicatrices with atrophy of the remaining muscular tissues, greatly disabling the functions of the leg and foot:

CASE 32.—Sergeant F. A. Ingerson, Co. K, 27th Massachusetts, was wounded at New Berne, March 14, 1862. Surgeon G. A. Otis, 27th Massachusetts, reported that "a large fragment of shell striking the calf of the left leg carried away the greater portion of the bellies of the gastrocnemius and soleus muscles. There was inconsiderable bleeding. The laceration was so very extensive that it was difficult to coaptate or adjust the wound, and much of it had to be dressed open." The patient was sent to Academy Green Hospital. After the separation of sloughs, there remained a huge granulating surface. On April 19th, the patient was sent to a northern hospital, and discharged December 19, 1862. Examiner A. Lambert, of Springfield, reported, March 11, 1863, the wound "unhealed and discharging constantly." The Boston Examining Board stated, March 23, 1870: "A fragment of shell engaged the left calf. During the suppurating process that ensued a considerable portion of the belly of the calf was lost. *The wound has not entirely closed,* and the injured leg is notably larger than the other." In October, 1875, Examiner A. W. Nelson, of New London, reported: "There is a large cicatrix of left calf, with loss of most of the substance of the gastrocnemius; * * patient unable to walk a long distance."

In a similar case, amputation was contemplated; but the patient ultimately made a satisfactory recovery without operative interference:

CASE 33.—Private P. C. Whidden, Co. B, 13th Massachusetts, aged 22 years, was wounded at Antietam, September 17, 1862, and entered the Mason Hospital, Boston, January 22, 1863. Acting Assistant Surgeon W. E. Townsend noted: "Shot wound of left leg. Patient returned to duty November 1, 1863." The following detailed account of his injury and its result was forwarded by the man in July, 1866, through Dr. H. I. Bowditch, of Boston: "Was struck by a piece of shell on the posterior aspect of the left leg, causing extensive laceration and loss of the soft tissues, without injury to the bone. The wound extended from just above the ankle joint about eight inches up the back of the leg, from which, within these bounds, the soft parts, integuments, tendons, muscles, both arteries, and the posterior tibial nerve were entirely carried away, exposing the bones through nearly the whole length of the wound. On the front of the leg, corresponding to the middle of the wound, but about an inch of sound skin was left. A rounded flap, about an inch and a half long, containing the lower portion of the tendo-achilles, was torn up and laid back over the heel. The upper part of the wound was ragged and contused, and the middle portion cleanly cut away. There was but little hæmorrhage. He walked with great difficulty to the rear, and was then carried to a house a short distance from the field, where a consultation as to the propriety of amputation was held, six surgeons being present. Four decided that amputation was necessary to preserve life; one assented to this under existing circumstances, but thought that under more favorable conditions there was a possibility of recovery without the operation; the other that amputation was uncalled for. The patient decided to retain the limb. The wound was dressed with lint and was not disturbed for five days. On the fifth day, he was carried in an ambulance a distance of twelve miles to the hospital in Hagerstown. Upon examination the wound was suppurating profusely and full of maggots, and it was dressed with yeast poultice and powdered charcoal. It was then determined to amputate, but the operation was postponed for three days, and nourishing diet and stimulants were ordered. On the fourth day an examination preliminary to the operation was made, when healthy granulations appeared along the edges of the bones, and the operation was abandoned. The patient was then carried to a private house, where he received proper nourishment and good nursing, and at the end of a month, no bleeding having at any time occurred, went to his home in Boston Granulations had been going on rapidly; the wound had been filling up without a sign of inflammation, and a pellicle was spreading out from the sound skin all around the borders of the wound. After the journey the parts became irritated and inflamed, and the process of cicatrization went on much more slowly. By the first of March following the parts were perfectly healed, and the patient walked about with the aid of a cane. But the pellicle covering the surface being excessively thin was easily abraded, and the newly formed tissues possessing but little vitality, it healed slowly, new portions being rubbed off before the old were renewed, so that at no time since the wound was first closed has it been entirely free from slight superficial ulceration. At the present time the gap is partially filled up with cicatricial tissue, which has undergone contraction, making the wound appear much smaller than it originally was. It is covered with a thin layer of epithelium which constantly desquamates. The flap torn up and laid over the heel, as referred to above, instead of presenting the narrow outline of the tendo-achilles, has, in healing, become a thick flabby mass beneath the cicatrix, and after long walking becomes œdematous. The length of the cicatrix from top to bottom, on each side of the flap, is seven inches in the median line; from the top

of the cicatrix to the edge of the flap five inches; across the widest part at top and bottom, three and a half inches; in the middle, the narrowest part, three inches. Four inches and a half above the malleoli the leg measures in circumference six and a half inches; the sound leg at the corresponding part, nine inches. The integument on the front of the leg, at its narrowest part, is three and a half inches in breadth. The muscles of the calf contract but exert no influence over the foot, the tendons being absent, and extension cannot be performed, but the foot drops with its own weight. Owing to contraction of the cicatrix the foot can be flexed to but little less than a right angle with the leg. Sensation, which was lost in the external border of the foot and heel, has gradually returned. There is slight obstruction to the circulation from the slow return of venous blood. The patient walks with ease, unaided by a cane, and without the slightest perceptible limp." The report of the Adjutant General of Massachusetts shows that Private Whidden was discharged from service, by order of the War Department, December 11, 1863. He is not a pensioner.

In extensive lacerations of the soft tissues of the thigh and leg by shell fragments, or other large projectiles, it was often difficult to make out the exact extent of the injuries inflicted, and the field returns of the surgeons who examined the primary wounds, and the later reports of the hospital surgeons and pension examiners were often, of necessity, wanting in precision regarding such lesions.[1]

Lodgement of Missiles.—A few cases of lodgement of projectiles or of foreign bodies driven by them into the soft parts of the lower limbs will be cited:[2]

CASE 34.—Private W. H. King, Co. E, 17th Maine, aged 24 years, was wounded at Bartlett's Mill, November 27, 1863, and admitted to Prince Street Hospital, Alexandria, one week afterwards. Acting Assistant Surgeon J. Cass contributed the specimen (FIG. 4), with the following history: "He was wounded by a musket ball which struck two pocket knives, breaking them and driving the fragments with the ball into the anterior side of the middle third of the left thigh. A hundred fragments of the knives and four of the ball were removed on the field. Lime-water dressings applied to the wound, and fifteen drops of tincture of iron given before meals. On December 13th, he suffered considerable pain in the wound, and on the following day an incision was made two and a half inches from the wound, and a jagged piece of ball an inch long and three-fourths of an inch wide was extracted. 16th, complained of strangury and some pain in the limb. A teaspoonful of spirits of nitre given three times a day. 17th, was restless during the night; sweats profusely, and had a chill this morning. Gave morphia and whiskey, also half an ounce of castor-oil. Has had no stool for forty-eight hours; pulse 115 and feeble; tongue coated; very thirsty; some soreness in inguinal glands. Prescribed extract of ginger and turpentine ten drops each, to be repeated in six hours if it does not operate, and gave tonics and stimulants. 18th, pulse 100, tongue moist and coated. Sweats all the time, and vomited in the night. Bowels moved freely and urinates more freely; appetite better. There is a greater discharge of pus from the wound. 19th, pulse 115 and feeble; vomited considerable during the day. Ordered two quinine pills to be taken before meals, and an anodyne injection at bedtime. 20th, about the same; had a chill yesterday; granulations are pale and flabby. 21st, pulse 140 and very feeble; great prostration; had a chill this morning and is delirious. Takes stimulants every hour. 22d, rested well, but is more prostrated and shows tendency to coma. Died at 4.30 P. M. Autopsy eighteen hours after death: On cutting through the muscles of the thigh, an inch and a half from the surface and an inch from the main channel of the wound, a sliver of horn from a knife-handle was found, half an inch long and one-sixteenth of an inch wide; also a brass rivet one-sixteenth of an inch in diameter and one-fourth of an inch long. In another place two pieces of horn from the other knife-handle, one three-eighths of an inch long and one-fourth wide, and the other one-eighth each way, were found; also a piece of a blade one-fourth of an inch long and one-eighth wide; and two pieces of brass, one being three-eighths of an inch long and one-sixteenth wide at one end and tapering to a sharp point at the other, and the other piece measuring one-eighth of an inch each way. Opposite the external wound the periosteum was found in places thickened, inflamed, jagged, discolored, slightly ossified, and separated from the bone for the space of two and a quarter inches longitudinally, and one inch transversely, with some pus beneath it." Dr. Cass

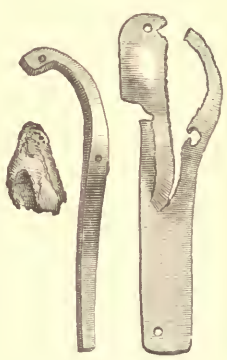

FIG. 4.—Fragments of ball and pocket knife extracted from thigh. *Spec.* 3236.

[1] CHENU (J. C.) (*Aperçu hist. stat. et clin., etc., pendant la guerre de* 1870–71, T. I, p. 283) observes: "*L'éclat de bombe ou d'obus* cause le plus souvent de *larges plaies avec perte de substance.* Nous connaissons quatre faits dans lesquels la partie antéro-interne des téguments de la cuisse fut enlevée d'un seul coup sans lésion de l'artère fémorale; on voyait les battements du vaisseau au fond de la plaie." The same surgical annalist cites a case, in which disarticulation at the hip joint was performed *in extremis* by M. MAURICE RAYNAUD on a soldier of the National Guard, aged 19, with a terrible flesh wound of the thigh.

[2] Among interesting published cases of lodgement of shot projectiles in the thigh is that of Major R. H. Stephenson, 24th Massachusetts, described by the late J. MASON WARREN (*Surgical Observations, with Cases and Operations*, 1867, p. 546): A musket ball, entering the front of the left thigh, about two inches below Poupart's ligament, was concealed somewhere beneath the rectus, and eluded the researches of a number of experienced surgeons. WARREN, after ineffectually searching for the ball a month after the injury, advised that the patient should use the limb with a view that muscular action would bring the ball from its hiding place. This prevision was justified, and a fortnight afterwards the position of the ball was recognized, and WARREN cut down and extracted it, and the officer speedily rejoined his regiment. The same writer has related (*Boston Med. and Surg. Jour.*, 1862, Vol. LXVI, p. 473) the case of Lieutenant C——, 2d Massachusetts, wounded in the retreat from Winchester, a musket ball making a long track in the gastrocnemius, and carrying before it, like a glove-finger, a patch of trousers and flannel underclothing, making a huge plug, which could only be removed the following day by free incisions. Dr. M. GOLDSMITH, of Rutland, Vermont, formerly Surgeon U. S. V., has described (*The Search for Balls in old Gunshot Wounds*, in *New York Med. Jour.*, 1868, Vol. VI, p. 426) the case of a color-bearer of a Vermont regiment, in which a ball deeply buried in the thigh was reached by dilating the sinus leading to it by sponge-tents.

also contributed five inches of the shaft of the femur of the injured thigh, which constitutes specimen 1985 of the Surgical Section of the Army Medical Museum. It is sawn longitudinally, and shows the shaft to be denser than usual and apparently somewhat hypertrophied. (See *Cat. Surg. Sect.*, 1866, pp. 258, 617.)

There were several cases in which large missiles buried in the fleshy parts escaped recognition; but none have been observed in which such concealed foreign bodies equalled in magnitude the projectiles that have been cited in some works on military surgery as embedded in the great muscles of the lower limb:[1]

CASE 35.—Lieutenant L. Soistman, Co. H, 98th Pennsylvania, aged 23 years, was wounded at Salem Heights, May 3, 1863. Three days afterwards he entered the Campbell Hospital, Washington, where he obtained a leave of absence on May 19th. On July 8th, he was admitted to the Officers' Hospital, Philadelphia, where Acting Assistant Surgeon W. Cammac recorded the following history: "A piece of shell entered the right thigh at the most depending inner part of the middle of the upper third, went under the deep fascia, and upward under the femoral artery and buried itself. The missile appears not to have been noticed at first, as the wound was sewed up. After going to his home in Philadelphia he was attended by a private physician, but the missile remained still undiscovered. On July 8th, Acting Assistant Surgeon W. Hunt was called in, who was struck by the peculiar feel, and on introducing a probe immediately found the foreign body, and ordered the patient to the hospital to have it removed. On July 9th, Dr. Hunt enlarged the wound, and, after considerable trouble from the proximity of the large vessels, removed, with the assistance of the forceps, a piece of shell weighing nine ounces, which had lodged in the thigh sixty-six days. Its presence had given rise to no great disorganization, but he complained, he says, of a weight in the part during the whole time. After recovery from the effects of the ether, a half grain of sulphate of morphia was given. Cerate dressings and light pressure were applied, and the wound drawn together with adhesive straps. The patient's general health was excellent. He did remarkably well and felt greatly relieved by the operation. On July 13th, cataplasms were ordered, the wound looking well and suppurating moderately, and the patient having better appetite than any time since wounded. On September 5th he was attacked with intermittent fever, which was checked after several days by quinine. By October 1st the wound had nearly healed, but the leg was still weak from extensive disorganization of the great muscles of the thigh. On November 9, 1863, he was returned to duty." This officer was again wounded, at the battle of the Wilderness, May 5, 1864, in the right side, for which injury he was treated in hospitals at Philadelphia and Annapolis. On August 2, 1864, he was again returned to duty, and on October 13, 1864, he was mustered out of service. The Philadelphia Examining Board certified, October 19, 1870: * * "A deep flesh wound, which, in healing, caused a cicatrix about five inches long and four inches wide, with loss of portion of muscular tissue, causing partial loss of power in the limb upon making much exertion," etc. The pensioner was paid March 4, 1876.

Sometimes musket balls buried themselves in the muscular parts of the lower limbs after ricochetting from stony or metallic surfaces:

CASE 36.—Private A. Wegner, Co. A, 16th Michigan, aged 25 years, was wounded at Gaines's Mill, June 27, 1862. Surgeon P. B. Goddard, U. S. V., contributed the specimen (FIG. 5), and reported: "He was wounded in the right hip by a shell and ball, taken prisoner June 30th, and carried to Richmond; paroled July 25th, and arrived at Sixth and Master Streets Hospital, Philadelphia, July 30th. This ball ricochetted from a stone or some hard substance, entered the front of the thigh near the femoral artery, and was cut out at the gluteus maximus muscle four inches higher up than the orifice of entrance. It did not touch the bone, but carried in with it a long strip of trousers." The patient was discharged January 26, 1863, and pensioned. In the certificate of disability Surgeon Goddard stated that "the ball wounded the sciatic nerve." Examiner R. G. Jennings, of Little Rock, certified, September 5, 1873: * * "One ball entered the right hip near the joint, glanced, and was cut out from the gluteal muscles. The wound occasionally discharges pus. Suffers from frequent pain in the joint. The leg remains weak and of comparatively little service to him, as he is unable to walk or stand long upon it." In January, 1876, the same examiner reported: "Has periodical discharges of pus and spiculæ of bone. The sensation of the right leg is much impaired and the motion impeded by partial paralysis," etc. The pensioner was paid June 4, 1876.

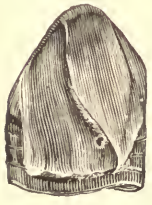

FIG. 5.—Distorted conoidal ball removed from the thigh. *Spec.* 4472.

[1] HENNEN (*Principles of Mil. Surgery*, 3d ed., 1829, p. 79) has recorded several examples of the lodgement of large projectiles in the thigh. He remarks that: "Masses of very extraordinary and almost incredible sizes are found. . . I have frequently seen them," he says, "of one and sometimes two pounds weight." He then cites the case of Lieutenant F——, 12th Regiment, wounded at Seringapatam. A cannon shot rolled over the banquet behind which this officer was lying down, and buried itself in the muscles of the hip. The bearers who conveyed him on a dooley to the tent of the chief medical officer, Dr. ALEXANDER ANDERSON, complained of the difficulty of carrying him from the trenches, owing to the litter "*having been unusually heavy on one side.*" The officer was moribund on his arrival; but, after his death, Dr. ANDERSON cut out what he told Dr. HENNEN was "unequivocally a thirty-two pound shot." GUTHRIE (*Treatise on Gunshot Wounds*, 1871, p. 72) relates the case of a soldier at Badajos, with a large piece of shell lodged in the thigh and buttock. HENNEN says (*loc. cit.*, p. 79) that the projectile weighed *eight pounds*. It was removed, and the man recovered. LARREY (*Mém. de Chir. Mil.*, 1812, T. III, p. 582) describes a case in which he removed a ball weighing *five pounds* from the thigh of a soldier. It had caused him little inconvenience, except a feeling of weight in the limb. PAILLARD (*Rélation chir. du siege d'anvers*) mentions that BÉGIN told him of a case in which a *nine-pound* shot was embedded in the muscles of the thigh. Dr. G. M. B. MACLEOD (*Notes on the Surgery of the War in the Crimea*, 5th ed., p. 108) states that he "saw a case at Scutari, in which a piece of shell weighing nearly three pounds was extracted from the hip of a man wounded at the Alma, which had been overlooked for two months, and to which but a small opening led." He further relates that BAUDENS describes the case of a French soldier in the Crimea, in which a shell fragment weighing 2 kilog. 150 grammes, or about five and three-quarters pounds avoirdupois, buried itself in the thigh so as to be invisible. I have not found this case in the *Guerre de Crimée* of BAUDENS, or in his letters of that date to the *Gazette Médicale*. A surgeon of a Maine regiment told me of a twelve-pound solid shot, that he had extracted from the muscles of the thigh of a volunteer soldier at Portland, which he should send to the Museum; but the missile never arrived, nor could the injury referred to be identified on the surgical records.

The small iron balls from spherical case-shot, having only a slight velocity at a little distance from the point of explosion, often lodged:

CASE 37.—Private E. E. Middleton, Co. C, 12th New Jersey, aged 24 years, was wounded at Gettysburg, July 3, 1863, and admitted to Newton University Hospital, Baltimore, several days afterwards. Surgeon C. W. Jones, U. S. V., reported: "The patient was in good condition when admitted. A ball entered near the posterior border of the tibialis anticus, a little above the middle third of the left leg, and, passing downward and backward, was removed July 13th, from the posterior portion of the leg by a counter-opening about four inches below the point of entrance. The missile on being removed proved to be a round ball from a spherical case shot. The wound has healed well and rapidly, but the contraction of the muscles makes the man look as if he had talipes equinus. However, the contraction is growing less by passive motion, and there is reason to hope that he will soon have perfect use of the limb. Simple dressings were used all the time." The missile was contributed to the Museum by Surgeon Jones, and is represented in the cut (FIG. 6). On February 2, 1864, the patient was transferred to Patterson Park Hospital, and one week afterwards he was returned to his command for duty. On June 4, 1865, he was mustered out of service. In his application for pension he alleged that "the wound healed, but broke out afresh in the spring of 1865, and discharged pieces of bone." Examiner B. H. Stratton, of Masonville, N. J., September 4, 1873, reported the leg as being in an ulcerated condition from necrosis of bone. Examiner F. Ashurst, of Mount Holly, certified, September 18, 1875: * * "The cicatrices are healed, and the pensioner enjoys very good health." This pensioner was paid June 4, 1876.

FIG. 6.—Iron case-shot extracted from the thigh. *Spec.* 3199.

In the next case, a musket ball had remained, innocuously, for more than two years, encysted near the outer hamstring tendons, and was not removed until the patient underwent amputation in the thigh on account of a complicated fracture of the leg. The cyst is of dense connective tissue.[1]

CASE 38.—Sergeant H. M. Lambert, Co. D, 12th Illinois Cavalry, aged 29 years, sustained a contusion of the right leg by the falling of his horse during a charge on the enemy near Germanna Ford, October 10, 1863. Three days after the accident he was admitted to Emory Hospital, Washington, whence Surgeon N. R. Moseley, U. S. V., contributed the specimen (FIG. 7), with the following report: "Slightly comminuted fracture of both bones of right leg at middle third, followed by copious discharge of sanious pus. The patient having become weak and debilitated, tonics and stimulants were resorted to with the desired effect. On October 25th, double-flap amputation at the upper third of the leg was performed by Acting Assistant Surgeon W. H. Ensign. Simple dressings and adhesive straps were used. The patient did well, and the stump had almost entirely healed, when, on November 8th, hæmorrhage supervened. Graduated compresses were resorted to without avail, and on November 10th the limb was reamputated at the lower third of the thigh by the double-flap method. The stump was again well-nigh healed, when, on November 26th, hæmorrhage again set in, and Dr. Mott's tourniquet was applied with perfect success. On December 10th the tourniquet was removed, and no return of the hæmorrhage followed. By January 18, 1864, the patient was up and about the ward, and doing well. The specimen, a conical ball enclosed in a sac, was removed from the amputated leg at the second operation. The patient had received this ball in a skirmish with the enemy in Kentucky, in October, 1861, and the missile had remained in the popliteal space beneath the outer hamstring tendons, without inconvenience, for two years and one month." The amputated tibia and fibula, showing no attempt at union, were contributed by the operator (See *Cat. Surg. Sect.*, 1866, p. 511), and constitute specimen 1744 of the Surgical Section of the Army Medical Museum. The patient was subsequently transferred to Judiciary Square Hospital, and discharged from service July 30, 1864. He is a pensioner, and was paid June 4, 1876.

FIG. 7.—Ball encysted in connective tissue. *Sp.* 1879.

There were cases in which missiles gravitated for considerable distances from the point at which they at first lodged:

CASE 39.—Private A. J. Dougherty, Co. I, 13th Indiana, aged 19 years, was wounded in the thighs at Turkey Bone Bridge, November 2, 1861. After being treated for a time at the regimental hospital he was returned to his company for duty, and subsequently he received a furlough to visit his home in Philadelphia. Acting Assistant Surgeon H. M. Bellows reported the following history: "He was admitted to Broad and Cherry Streets Hospital, April 13, 1863, at which time a foreign body was discovered beneath the skin on the front of the right thigh, five inches above the patella, which gave rise to considerable pain whenever the patient walked. On the next day it was removed by Surgeon J. Neill, U. S. V., and proved to be the half of a round leaden ball. He stated that the missile entered the left thigh just below and in front of the trochanter, where the only visible scar was found. After the injury he had some pain and tenderness on pressure over the lower part of the abdomen, with difficult micturition for a few days. On examination the presumption was that the fragment must have crossed from left to right, either in front or just above the pubes, and thence gradually downward into the thigh. The wound healed by granulations and by the 5th of May had completely cicatrized." The missile was contributed to the Museum by the operator, and constitutes specimen 1776 of the Surgical Section. The patient was subsequently transferred to Indiana, and mustered out at the expiration of his term of service, June 19, 1864. He afterward again enlisted, and was finally discharged June 21, 1865,

[1] At the points *a a* the ball is uncovered by the cyst; but the cellular envelope was probably nicked by the scalpel in cutting out the ball. This is one of the few good examples the Museum possesses of the "*Kyste définitif*" surrounding balls as defined by BAUDENS (*La Guerre de Crimée*, 2ème éd., 1858, p. 119). This "*Kyste primitif*," which he claimed to have "peremptorily demonstrated" to always invest balls embedded in the muscular tissues, even when extracted immediately after the infliction of injury, has not been observed by others (See MACLEOD, *Notes, etc., op. cit.*, p. 109), and doubtless means nothing more than that missiles sometimes get an investment from the intramuscular areolar tissue.

and pensioned. Examiner E. A. Smith, of Philadelphia, August 28, 1865, certified: * * "Pain in right testicle, and left leg feels perfectly dead at times; walks with difficulty." The Philadelphia Examining Board reported, February, 18, 1874: * * "Complains of pain in both limbs. Alleges that he has difficulty in passing water at times from irritable condition of bladder, and pain in the whole course of the ball. Cicatrices are without adhesions to the bone, and there is no atrophy of the limb. Slight stiffness about the left hip joint." This pensioner was paid June 4, 1876.

As in Chapter XI the peculiarities of shot wounds in general will be discussed, it would be superfluous here to dwell longer on the particular instances of missiles lodged in the fleshy parts of the lower limbs.[1] While not wishing to be rudely incredulous in regard to the almost marvellous accounts that some authors have given of large projectiles embedded in the soft parts of the thigh and leg, I may say that analogous authenticated examples are not to be found in the experience of the American War, and that in most of the remarkable heretofore recorded cases there is reason to believe that they were probably associated with fractures.

Peri-articular Wounds.—After the shot wounds of the soft parts of the lower extremity implicating the larger vessels and nerves, or producing great lacerations, or complicated by the lodgement of foreign bodies, cases are to be considered in which missiles, without immediately injuring the osseous articular surfaces, so injure the surrounding ligaments and other soft parts, in some instances even the synovial membrane, as to light up immediate or consecutive inflammation in the capsular cavity, or to induce, through the formation of cicatricial bridles or by other deformities, a diminution or even abolition of the movements of the joint. These injuries have been discriminated by M. Legouest under the title of *Peri-articular Wounds.*[2] He apparently includes in this group only cases in which the capsular cavity is not primarily opened; but I prefer to adhere to the definition proposed in my monograph on *Excision of the Head of the Femur*,[3] and have not felt at liberty to exclude from this category the rare instances in which evidence indicates the probability of a primary lesion of the synovial membrane without direct implication of the bones of the articulation, and I observe that Drs. Beck and Fischer adopt a similar view.[4] After a careful analysis of the reports of cases liable to belong to this group, four hundred and thirty-seven have been classified as instances of peri-articular shot wounds of

[1] The Army Medical Museum is rich in specimens of projectiles extracted from the soft parts of the lower limbs. Besides those described in the text, there are twenty examples of small missiles extracted from the soft parts of the thigh. These specimens are numbered 176, 1095, 1368, 2559, 2654, 2971, 4460, 4476, 4480, 4501, 4502, 4507, 4520, 4521, 4552, 4553, 4561, 4574, 4624, 4693. Brief notes of the particulars regarding these cases may be found in the *Catalogue of the Surgical Section* of 1866, from pages 593 to 597. Two of the most remarkable are illustrated in the annexed wood-cuts. That represented in FIGURE 8 was extracted by Assistant Surgeon J. T. CALHOUN, U. S. A., from the thigh of a private of the 12th New York, at the battle of the Wilderness, May 7, 1864, and was regarded as an explosive ball. *Specimen* 4553 (FIG. 9) was remarkable for having entered the left thigh below and in front of the great trochanter, and having passed subcutaneously around the pubic region and lodged in the right thigh five inches above the patella. The case is that of Private A. G. D——, 13th Indiana, wounded at Gauley River, November 2, 1862; the ball was extracted by Surgeon JOHN NEILL, U. S. V., April 14, 1863. There are seven specimens of missiles extracted from the fleshy parts of the leg in the Museum, viz: Numbers 1586, 2326, 3199, 4482, 4500, 4514, 4695, and two specimens extracted from the soft parts of the foot, viz: 1580 and 4523. All of these specimens are described, with notes of the cases to which they belong, in the 27th Chapter of the *Surgical Catatogue* already referred to. These specimens are neatly mounted on brass rods. Dr. A. SCHINZINGER (*Das Reservelazareth Schwetzingen im Kriege* 1870-71, Freiburg, i. B., 1873, p. 37) relates that he has a small collection of extracted bullets remarkable for their deformation, and that those extracted from German soldiers have been mounted in silver, and on the setting the name of the wounded man and the date of the battle engraved, at the thoughtful suggestion of the princess of that province.

FIG. 8. — Distorted ball extracted from thigh. *Spec.* 4561.

FIG. 9.—Flattened round ball extracted from thigh. *Spec.*4553.

[2] LEGOUEST (L.) (*Traité de Chirurgie d'Armée*, 2ème éd., Paris, 1872, p. 442). Some citations from his remarks on this subject may be found in the Surgical Volume of Part II of this work, footnote 1, p. 503. His further observation on this point is worthy of consideration, that "when shot wounds and notably even slight contused wounds are situated on the side of extension of joints, where they are exposed to continual attritions and tractions, they readily inflame and sometimes give rise to circumscribed abscesses or diffused phlegmous of more or less gravity."

[3] OTIS (G. A.), *A Report on Excisions of the Head of the Femur for Gunshot Injury. Circular* No. 2, War Department, Surgeon General's Office, Washington, D. C., 1869, pp. 63, 90, 92.

[4] BECK (B.) (*Chirurgie der Schussverletzungen*, 1872, p. 609) details 25 cases, in which the soft parts of the knee joint were either primarily or secondarily involved. Four, or 16.0 per cent., terminated fatally. He also gives 7 cases of flesh wounds of the ankle joint; no deaths. FISCHER (H.) (*Kriegschir. Erfahr.*, 1ster Theil, *Vor Metz*, Erlangen, 1872, p. 102) gives an account of 7 cases in which the knee joint was injured without lesion of the bony structure. Two, or 28.5 per cent., had a fatal termination.

the lower limb, of which forty-nine are referred to the hip joint, three hundred and fifty-one to the knee joint, and thirty-seven to the ankle joint. Each of these subdivisions will be concisely discussed.

In peri-articular shot wounds of the *Hip Joint*, the difficulties of diagnosis are almost insurmountable in the present state of our knowledge. In the cases of recovery, the exact extent of the lesions can only be surmised, and in the fatal cases necroscopic examination will scarcely determine with absolute precision whether the articular capsule was primarily or secondarily opened. Memoranda of forty-nine cases of shot wounds, which the reporters believed to have led to the opening of the coxo-femoral articulation without direct injury of the bones, are found on the registers. Thirty-five instances are adduced in which it was supposed that there was primary lesion of the joint capsule; twenty-one of them are reported as recoveries. Abstracts of seven of these have been already published.[1] Of the remaining fourteen recoveries, such scanty information as can be found in the reports is condensed in the appended abstracts:

CASES 40–48.—Lieutenant D. H. Miller, Co. H, 75th Ohio, aged 28 years, was wounded and captured at Gettysburg, July 1, 1863. After remaining a prisoner for a few days, he was admitted to the Eleventh Corps Hospital. Several weeks later he proceeded to his home in Logan, Ohio, where he was attended by Drs. G. W. Pullen and J. Sharp, who reported his case as follows: "The ball entered the posterier and inferior part of the glutei muscles of the left hip, passed over the neck of the femur, and came out on the inner side of the trochanter major. February 15, 1864, the wound has closed, but the motions of the hip joint are diminished to a great extent, and the leg is so weakened that he is unable to walk without the use of crutches." The patient was discharged from service January 22, 1864, Surgeon A. M. Speer, U. S. V., certifying to "shot wound of hip joint without fracture." Examiner T. O. Edwards, of Lancaster, Ohio, in February, 1871, stated that "the wound had opened and discharged a portion of his blouse," etc. Examiner W. C. Hyde certified, September 10, 1873: "There is flattening of muscles of the hip, the cavity of the joint injured by the missile, and the joint partially anchylosed." The pensioner was paid March 4, 1877.—Corporal *L. Bertram*, Co. A, 6th Louisiana, entered a Confederate hospital at Richmond with "shot wound of right hip, involving the joint," received May 4, 1863, and was furloughed April 15, 1864.—*T. J. Brandon*, a member of Co. F, 14th Alabama, was treated in the Confederate hospital at Farmville for "shot wound in the buttock with injury to hip joint," and was furloughed October 22, 1862.—Private *H. Kimberlin*, Co. G, 48th Virginia, received a gunshot injury of the right hip joint, producing lameness, and was furloughed from the Confederate hospital at Farmville.—Private *C. C. McMurray*, Co. H, 15th North Carolina, was admitted to hospital No. 24, Richmond, with "shot wound of hip joint," and was discharged September 13, 1862.—Private *G. W. Williams*, Co. F, 3d North Carolina, appears on a Confederate hospital case-book as having received a "shot wound of the hip joint, May 3, 1863, the ball being extracted near the knee." Furloughed.—Private J. Hilk, Co. B, 112th Pennsylvania, was wounded in June, 1862. Surgeon E. Griswold, of the regiment, reported, "an injury to hip joint by a pistol ball." The man was discharged from service October 16, 1862. He is not a pensioner.—Private I. J. Brown, Co. A, 18th Infantry, was wounded at Stone River, December 31, 1862. He was treated at various hospitals, and lastly at Camp Thomas, Ohio. Acting Assistant Surgeon C. R. Reed reported that he was discharged March 17, 1864, by reason of "shot wound of left hip joint." He is not a pensioner.—Private M. Ahern, Co. E, 183d Pennsylvania, aged 24 years, was wounded at Spottsylvania, May 14, 1864. Surgeon L. A. Edwards, U. S. A., reported his admission to Lovell Hospital with "shot wound of right hip joint." The man was mustered out July 13, 1865, and is not a pensioner.

Spontaneous luxation after traumatic coxitis from shot injury of the hip joint without fracture, was reported in three instances:

CASES 49–51.—Sergeant I. Murdick, Co. I, 134th Pennsylvania, aged 23 years, wounded at Fredericksburg, December 13, 1862. He was admitted to Stone Hospital, Washington, December 20th, with "gunshot wound of left thigh." Assistant Surgeon C. A. McCall, U. S. A., reported that the man was discharged from Mount Pleasant Hospital, April 16, 1863, because of "gunshot wound over left trochanter, passing in the direction of the hip joint; ball undiscovered and interfering with the free use of the joint." Examiner G. McCook, of Pittsburg, June 22, 1864, certified: * * "Inflammation and suppuration have ensued and have progressed until the round and capsular ligaments of the left hip joint have been destroyed and the femur drawn at least two inches above the acetabulum. The left leg is thrown across the right at least two inches or more above the right knee, resembling the position of a dislocated femur. The heel is elevated, and it is with extreme difficulty that he can walk with the aid of crutches. The toes of the left foot rest on the dorsum of the right." On November 22, 1867, the pensioner was furnished

[1] OTIS (GEORGE A.) (*A Report on Excisions of the Head of the Femur for Gunshot Injury. Circular* No. 2, War Department, S. G. O., Washington, 1869, pp. 90–92): CASE 166, Corporal H. C. Boyd, 39th Ill.; CASE 169, Lieut. C. Duncan, 18th Ind.; CASE 176, Pt. G. W. Minnick, 7th Md.; CASE 177, Pt W. M. Moore, 3d Ohio; CASE 178, Pt. W. N. Morgan, 9th Penn'a Reserves; CASE 185, Pt. Jacob Widmann, 97th New York; CASE 186, Pt. Henry Witzleben, 28th Ohio. In all seven cases the evidence of direct lesion of the articulation was inconclusive, and the opinions of the several surgical attendants were conflicting in each instance. Two cases (Witzleben, Morgan) terminated in false anchylosis. In the latter the adhesions were forcibly and successfully broken up by Professor S. D. GROSS. In one case (Widmann), after suppuration of the joint, the head of the femur was apparently luxated. Professor B. von LANGENBECK holds (*Ueber die Schussverletzungen des Hüftgelenks*, in *Archiv für Klin. Chir.*, B. XVI, p. 286) that, "the most usual result (constanteste Ausgang) of healing shot injuries of the hip joint is in anchylosis."

with an apparatus for dislocated hip joint, by Dr. E. D. Hudson, of New York City. Examiner J. K. Reinholdt, February 7, 1871, certified: "The downward momentum caused the ball to imbed itself securely in the hip joint. * * Parts swollen and tender; wound discharging; more or less injury to great sciatic nerve; limb deficient in temperature; more or less constant pain; confined to bed months at a time," etc. This pensioner died May 7, 1874, of convulsions superinduced by the results of his wound, his attending physician and others stating that the serious attacks of inflammation, resulting in the formation of abscesses, proved a severe tax upon his vitality and prepared the way for his sudden demise.—Private R. Emerick, Co. D, 82d Pennsylvania, aged 28 years, was wounded at Cold Harbor, June 1, 1864, and admitted to hospital at Alexandria, and subsequently to Pittsburg. Surgeon J. Bryan, U. S. V., reported that he was transferred to the Veteran Reserve Corps, October 8, 1864, by reason of "a grapeshot wound, dislocating the right femur." Not a pensioner.—Lieutenant F. Heck, Co. I, 74th Pennsylvania, aged 37 years, was wounded in the right thigh at Rappahannock Ford, August 22, 1862, and was discharged from service October 9, 1863. In 1874, the Examining Surgeons report: "Firm anchylosis, with head of femur thrown out of socket; knee and ankle joints entirely stiff; foot in an extended position, and limb shortened two inches."

Two cases are reported as injuries of the hip joint by large projectiles:

CASES 52–53.—Private J. Teeters, Co. A, 84th Pennsylvania, aged 34 years, was wounded at Bull Run, August 30, 1862, and discharged from service March 29, 1863. Assistant Surgeon J. D. McClure, of the regiment, certifying to "an injury in the right hip joint by a piece of shell, producing paralysis of the whole leg." This man was a pensioner, but has not been heard from since September 4, 1864.—Private *W. S. Gardiner*, Co. A, 14th South Carolina; injury to hip joint from bomb; furloughed.

The entire subject of traumatic lesions of the hip joint is of such importance that it is deemed proper to adduce or to refer to the previous publication of all the information that can be found on the registers, with the warning that, in many instances, the facts are derived from reports suggestive of superficial examination, and sometimes of diagnoses that must be regarded as little more than conjectures.[1]

Of the fourteen *Fatal Cases* in the series of thirty-five shot injuries believed to have been attended with primary lesion of the hip joint without fracture, the details of all are published in *Circular* 2, S. G. O., 1869, already cited.[2] In the reports of many of these cases it is stated that the character of the lesions was verified by necroscopic examination, and in others it may be inferred that autopsies were made, so that the series is, as a whole, more reliable than the preceding.[3]

Of the series of forty-nine cases of reported peri-articular shot wounds of the hip joint, fourteen may be classified as examples of *secondary traumatic coxitis*.[4] Seven were

[1] VON LANGENBECK (B.) (*Über die Shussverletzungen des Hüftgelenks*, in *Archiv für Klinische Chirurgie*, Berlin, 1874, B. XVI, p. 280) remarks: "It may be taken for granted that a gunshot injury of the hip joint may heal under favorable circumstances without traumatic coxitis beginning. Coxitis may certainly be avoided in simple capsule wounds, which are kept perfectly quiet from the commencement, as well as in gunshot injury of the knee joint, as I have seen the recovery of several cases without any inflammation arising. As, however, in most cases (Pott's) side splint was recommended by the surgeon or adopted by the patient, and as during the last war not a few of the men were subjected to distant transport, and, injury of the hip joint not having been discovered, were allowed to go about, it was difficult in such cases to avoid inflammation. It appears to me that we must admit that in all those cases in which coxitis suddenly appears a considerable time after the injury, recovery is certain under favorable external circumstances without any further trouble occurring." [The translation is the version of JAMES F. WEST, F. R. C. S.]

[2] *Circular* No. 2, S. G. O., 1869, *op. cit.*, pp. 90, 91, 92. The names of the patients, the duration of life after injury, and the names of the reporters are noted: CASE 165, W. Blair, survived injury 23 days; extent of injury demonstrated by autopsy; MCKEE, reporter.—CASE 167, A. D. Bradshaw, survived 19 days; verified by autopsy; BURNE, reporter.—CASE 168, P. Cornell, survived 3 days; WOLFE, reporter.—CASE 170, J. W. Faleoner, survived 15 days; autopsy; MORONG, reporter.—CASE 171, S. Finnegan, survived 1 day; COLE, reporter.—CASE 172, G. Green, survived 14 days; GRAHAM, reporter.—CASE 173, F. M. Hate, survived 102 days; HATCHITT, reporter.—CASE 174, J. E. Leedy, survived 7 days; LEAVITT, reporter.—CASE 175, J. McMahon, survived 19 days; BLISS, reporter.—CASE 179, B. F. Pittman, survived 73 days; JANES, reporter.—CASE 180, W. R. Reeves, survived 16 days; autopsy; HARRINGTON, reporter.—CASE 181, T. Smith, survived 28 days; autopsy; VANDERKIEFT, reporter.—CASE 182, R. Taylor, survived 4 days; autopsy; SEABROOK, reporter.—CASE 183, B. K. Wagoner, survived 265 days; HATCHITT, reporter.—CASE 184, of J. Wells, was also reported in *Circular* 2 as belonging to this group; but the carbine ball inflicting the injury, much deformed, with large bone fragments embedded in it (*Specimen* 2994, *Cat. Surg. Sect.*, 1866, p. 603), has since been discovered, and the case has been transferred to the category of shot fractures of the neck of the femur. In three cases, in which the patients died within a few days after the infliction of the injury, it is probable that there were grave concomitant lesions. In those in which they survived two months, three months, and eight months, respectively, there were no autopsies held, and the lesions were not accurately determined. In the eight remaining cases, the patients lived from one to four weeks; the mean was 16 days.

[3] BILLROTH (TH.) (*Chir. Briefe*, u. s. w., Berlin, 1872, p. 238) observes: "I am of opinion, that neither the direct injury of the joint capsule and bone, nor the secondary necrosis, can always be early diagnosticated. In cases resulting favorably, the diagnosis can generally only be made *ex post*, from the total anchylosis of the hip joint, and in many cases only after the discharging of some necrosed bone. . . Nevertheless I had not imagined the diagnosis to be so difficult; I had thought that there must be, under all circumstances, symptoms of acute coxitis; but I was mistaken therein. . . But gradually we arrive at a correct diagnosis in the majority of these cases from the slow progress after the injury, the copious suppuration, rapid debilitation, and speedy decubitus."

[4] *Circular* No. 2, S. G. O., 1869, *op. cit.*, pp. 93, 94. The cases of five of the seven patients who partially recovered have been enumerated in the Circular above cited: CASE 190, of Capt. H. C. Mason, 20th Massachusetts, is more extensively reported by J. MASON WARREN in his excellent *Surgical Observations with Cases and Operations*, Boston, 1867, p. 565. A fortnight after the accident, acute inflammation of the hip joint came on, and WARREN cut down and removed the ball from directly over the capsule of the joint. He ultimately recovered with stiff joint. The next case, No. 191, A. McGee, will be noticed on the next page. In CASE 193, Private S. Schafer, 81st Ohio, was struck in the left hip at Resaca, May 14, 1864, and recovered with a stiff joint, according to Surgeon W. THRELKELD, U. S. V., and others. CASE 196, Private W. A. Shingledecker, 101st Pennsylvania, Gettysburg, July

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PLATE LVI.—DRY TRAUMATIC ARTHRITIS OF THE RIGHT HIP.

Case of A. McGee. Spec. 5518, Surg. Sect., A. M. M.

fatal, and seven resulted in recovery. Abstracts of five of the latter have been published in *Circular* 2, and two others are here noted:

CASES 54–55.—Sergeant J. A. Heady, Co. B, 15th Kentucky, aged 22 years, was wounded at Chickamauga, September 20, 1863, and was discharged from Camp Chase July 18, 1864. Surgeon J. T. Carpenter, U. S. V., certified to "shot wound of left hip, the ball entering three inches above and posterior to the trochanter major and remaining; function of hip joint interfered with, and marching impossible." This man is an applicant for pension. The Louisville Examining Board reported, in 1875, that the missile was still unextracted.—Private E. D. Bates, Co. B, 24th New York Cavalry, aged 21 years, was wounded in the left hip at Petersburg, June 17, 1864, and was treated at various hospitals. Surgeon R. B. Bontecou, U. S. V., reported his discharge from Harewood Hospital, Washington, May 5, 1865, by reason of "shot wound resulting in necrosis of head of left femur." The various Examining Surgeons certify to more or less injury of the bone, also that the missile remains in the limb.

Of the seven examples of secondary coxitis from shot wounds which recovered, the most interesting is the one numbered 191 of *Circular* 2, in which the nature of the injuries was observed more than seven years after reparation had taken place.

CASE 56.—Albert McGee, a negro refugee, aged about 30 years, is reported to have been struck at the first battle of Bull Run, July 21, 1861, by a musket ball, which probably entered the right hip at the level of the trochanter major, and, passing downward and forward, made its exit from the inner surface of the thigh just below the perineum. He made a complete recovery with the right lower limb shortened two and a half inches. About seven years subsequently McGee entered the Howard Grove Hospital, at Richmond. Assistant Surgeon J. H. Janeway, U. S. A., then stationed at Richmond, learned from Dr. D. R. Brower that the man came to Howard Grove Hospital in the latter part of October from the settlement of refugees at Hampton, Virginia, and was then suffering with Bright's disease. Professor Hunter McGuire, of Richmond, and Dr. J. N. Upshur, at the time resident physician at the Howard Grove Hospital, have kindly contributed their recollection of the case.[1] An autopsy was made by Dr. J. N. Upshur, and the surgeons who examined the injury of the hip were of the opinion that the head of the femur had been grooved by the ball at its lower part.

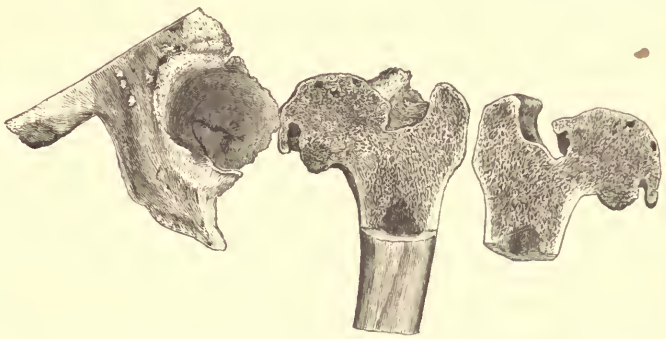

FIG. 10.—Chronic traumatic arthritis of the right hip joint following a shot injury, with secondary suppurative transformations which ultimately eventuated in recovery. *Spec.* 5518.

The pathological specimen[2] was sent to the Army Medical Museum, and there a vertical section of the epiphyses and upper portion of the femur was made, and it clearly appeared that there had never been a fracture of the head, and that the groove, supposed to have been made by the ball, was a depression resulting from a former abscess. The appearances closely resembled those sometimes observed in cases of chronic rheumatic arthritis. They are represented in the wood-cut above (FIG. 10), and yet more satisfactorily in the heliotype opposite (PLATE LVI).

2, 1863, after a gunshot wound disordering the functions of the right hip joint, recovered with a stiff joint, according to the testimony of Examiner of Pensioners G. MCCOOK.—CASE 197, Private T. Swartwood, 25th Ohio, was wounded May 8, 1862, by a musket ball which injured the right hip joint. Pension Examiner C. HUPP testified that the limb was shortened two inches and all movements of the articulation caused severe pain.

[1] Dr. HUNTER MCGUIRE writes, Richmond, Va., October 17, 1877: "I have received your letter of the 12th inst., and am sorry to be able to give you so little information about the case you speak of (CASE 191 of your report on excisions at the hip joint). I think I gave you at different times two specimens of shot wounds of the head of the femur. One of these cases you saw in the College Hospital here, before I operated. [Reference is made to *Specimen* No. 6217, Surg. Sect., A. M. M., an excised head and upper extremity of the right femur with osteomyelitis.] The other is the specimen Dr. UPSHUR speaks of, the one you here refer to. My recollection of this case is not very distinct, but I am quite certain that I looked upon it at the time as a case of peri-articular gunshot wound of the hip, and that the changes about the head and neck of the femur were due to the resulting coxitis. . . Dr. D. R. Brower was in charge of the Howard Grove Hospital when this specimen was obtained. He was, afterwards, superintendent of the Insane Asylum at Williamsburg, Virginia, and I think is now in Chicago and holds some office there under the government. He may be able to give you further information about the case, but I do not think it probable that he will remember anything about it." Dr. J. N. UPSHUR in a letter to Dr. HUNTER MCGUIRE, dated Richmond, October 16, 1877, remarks: "In compliance with your request, I would state in regard to the history of the negro man concerning whom you have received a letter from the surgeon in charge of the Medical Museum at Washington. He came to Howard Grove Hospital, then a hospital for freedmen—suffering with Bright's disease of the kidneys. Having noticed considerable shortening of the right leg, with inversion of the foot, I enquired if he had had fracture of the thigh; he replied that he had been in the army, and was shot by a Confederate sharpshooter stationed in an apple tree, the ball passing just below and through the hip joint. The wound had healed perfectly, and he possessed some motion in the joint. There was no reason for surgical interference at that time. After his death, which occurred a few weeks subsequently, I made a *post-mortem* examination, removing the head of the femur, which I found had been fractured *within* the *capsule*, and recovered with perfect *bony union*. As well as I remember, the bone bore plainly on its surface the track of the ball. The specimen was removed and given to you, and sent by you to the Medical Museum. I could not obtain from the man, who was an ignorant negro, a clinical history of the case."

[2] This specimen closely resembles one figured by M. LEBERT (*Traité d'Anatomie, pathologique gén. et spéc.*, Folio, 1861, T. II, p. 603, et Atlas, T. II, Pl. CLXXXI (Figs. 1–3), in his magnificent iconographic work. This is a specimen presented by M. VERNEUIL as "a beautiful typical specimen of dry arthritis (arthrite sèche) of the upper part of the femur. The upper ledge of the head of the bone is crushed down in the shape of a mushroom. At the anterior part of the neck a considerable projection is seen, a true exostosis of irregular surface, perfectly isolated by a line of demarcation from the rest of the bone. This tissue was at that point very red and vascular. On the surface of the head of the femur is found a multitude of rounded cartilaginous vegetations, some of which, narrow at their base, might have ultimately detached themselves and fallen as foreign bodies into the articular cavity. In spots the diarthrodial cartilage is ossified abnormally. On the specimen a condensation or kind of concentric hypertrophy of the head of the femur is observed in the section, while the lower part of the head of the bone presents, on the contrary, an atrophic rarefaction of its tissue. There is, therefore, an unequally distributed process of osteo-cartilaginous new formation, of atrophic absorption, and of ossification of the normal cartilage." *Loc.*

Abstracts of six of the seven fatal cases of secondary arthritis from peri-articular shot wounds of the hip are published[1] in the oft-cited *Circular* 2. The following is the seventh:

CASE 57.—Private *C. M. Blackwelder*, Co. A, 52d North Carolina, was wounded at Gettysburg, July 2, 1863, and admitted to hospital at Chester about three weeks afterwards. Surgeon E. Swift, U. S. A., reported: "Gunshot wound, followed by a dissecting abscess involving the head of the femur and its ligaments. The patient died of pyæmia, September 21, 1863. The *post-mortem* showed inflammation of the arachnoid membrane with serous effusion, also effusion of serum in the other serous membranes, and twelve ounces of pus in the left pleura."

Of peri-articular shot wounds of the *Knee Joint*, three hundred and fifty-one cases were reported. It would appear that of two hundred and fifty-five of these cases, according to the evidence available, the articular capsule of the knee joint was directly involved without fracture, and that in ninety-six cases the projectiles did not injure the joint, which was opened by secondary traumatic arthritis.[2] Of the aggregate of the three hundred and fifty-one cases, ninety-eight or 27.9 per cent. had a fatal termination. Three hundred and thirteen cases were treated without operative interference and thirty-eight were followed by amputation. The latter will be enumerated in the tabular statements of amputations following shot flesh wounds of the lower extremities. Of the three hundred and thirteen cases treated without operative interference, two hundred and forty-four recovered and sixty-nine or 22 per cent. proved fatal.

In the following two cases of recovery the joint appeared to be directly injured. The patients recovered with considerable use of the limbs:

CASE 58.—Private A. Parker, Co. K, 5th Maine, aged 18 years, was reported by Surgeon C. S. Tripler, U. S. A., as having received a "bullet wound of the left knee" at the battle of West Point, May 7, 1862. Surgeon A. B. Mott, U. S. V., in charge of the Ladies' Home Hospital, New York City, recorded the following description and result of the injury: "A musket ball entered the left knee joint at the junction of the tibia and fibula, passed through the joint, and emerged at the inner edge of the internal hamstring. Bleeding occurred freely for about forty-five minutes and then ceased spontaneously. The pain after the wound was very severe. On the day following a consultation of surgeons was held, when it was thought amputation would be necessary; but the operation was postponed. Two days after he went to Fort Monroe, where he remained until May 25th, when he came to this hospital. While at Fort Monroe he suffered considerable pain for six days after the receipt of the injury, and cold-water dressings constituted the entire treatment, with perfect quiet of the limb. When admitted here the leg and foot were badly swollen; discharge slight and watery; orifice of exit closed. The external wound was attacked with gangrene, and a deep slough came away. Charcoal poultices were used, and creasote, and the wound stuffed with pulverized cinchona. After the slough came away there was some synovitis, and tincture of iodine was applied for several weeks. The general treatment was tonic and sustaining; porter and ale were taken occasionally but not regularly. September 5th, wound has healed with a good cicatrix. There is stiffness in the knee which is gradually improving. Treatment: cold douche, passive motion and careful use of the limb. Patient has used crutches and afterwards a cane, but now uses neither. December 30th, the knee can be flexed to but little more than a right angle and is very straight. Patient walks without a limp, and there is very little weakness in the limb. He has been on guard duty for more than two months." This man was assigned to the Veteran Reserve Corps November 27, 1863. He is not a pensioner.

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cit., p. 603. In many respects this specimen closely resembles that of McGee, which is represented in FIGURE 10, and in the heliotype print, PLATE LVI, *Med. and Surg. Hist. of the War of the Rebellion*, Part III, Vol. II, pp. page 27. In the specimen in the Army Medical Museum there is more extensive ossification of the cartilage at the rim of the acetabulum, and the neighboring osseous surfaces are more densely studded with osteophytes. The atrophic rarefaction and absorption are more pronounced at the inferior portion of the head, giving rise to the appearance which was mistaken for a groove made by a ball. On such lesions consult further CARL ROKITANSKY, *Lehrbuch der Pathologischen Anatomie*, Dritte Umgearbeitete Auflage, Wien, 1856, B. II, S. 205.

[1] *Circular* No. 2, S. G. O., 1869, *op. cit.*, pp. 92, 94. The six published cases are: CASE 187. Pt. J. Delaney, 51st New York, wounded at Antietam, Sept. 17, 1862; matter burrowed about the left hip joint, and the thin part of the acetabulum was perforated. Dr. WILLIAM M. NOTSON reported his case and death, Dec. 24, 1862.—CASE 198. Pt. *G. J. Dunn*, 18th Mississippi, was struck at Antietam, Sept. 17, 1862. Secondary involvement of the head of the left femur, from which he died June 19, 1863. A wood-cut of the specimen is reproduced in the *Circular*.—CASE 189. Pt. A. Hall, 1st Cavalry, was wounded in Louisiana, Sept. 27, 1863, the ball penetrating ultimately into the hip joint of the left side. Death, January 12, 1866, Asst. Surgeon A. HARTSUFF, U. S. A., having reported the case.—CASE 194. Serg't C. M. Seovil, 14th Connecticut, wounded May 12, 1864, received a musket contusion of the left hip joint. He died July 14, 1864, as reported by Surgeon T. R. SPENCER, U. S. V.—CASE 195. Lieut. J. G. Seldon, 2d Cavalry, received July 3, 1863, at Gettysburg, a wound of the left thigh in the vicinity of the hip. The hip joint became involved secondarily. He died Sept. 17, 1863. Asst. Surgeon R. F. WEIR reported the case.—CASE 198. Serg't C. B. Wheeler, 81st Indiana, received a shot wound of the left hip joint, near Atlanta, August 8, 1864. The injury soon affected the articulation, and Surgeon M. S. SHERMAN, 9th Indiana, reports that he had profuse suppuration, and died October 7, 1864.

[2] HEINE (C) (*Die Schussverletzungen der unteren Extremitäten*, Berlin, 1866, p. 58) observes: "Shot wounds of the soft parts, in which, secondarily, suppuration of the joint resulted from the breaking down of the tissues surrounding the shot channel, especially at the knee joint, were not very rare, while at the hip joint we only observed a solitary but very remarkable case of this kind." KIRCHNER (C.) (*Aerztlicher Bericht über das Königlich Preussische Feld-Lazareth im Palast zu Versailles*, Erlangen, 1872, p. 86) tabulates 27 injuries of the soft parts of the knee joint; but does not give the results. ARNOLD (J.) (*Anatomische Beiträge zu der Lehre von den Schusswunden*, Heidelberg, 1873, pp. 123, 124) gives details of 2 cases of shot wounds of the knee joint, in which, at the autopsies, the bones of the joint were found uninjured.

CASE 59.—Private *G. Deacon*, Co. G, 14th Virginia Cavalry, aged 25 years, was wounded at Boonesboro', July 8, 1863, and admitted to the Cavalry Corps Hospital. Surgeon S. B. W. Mitchell, 8th Pennsylvania Cavalry, noted a "flesh wound at the knee joint." One week after the reception of the injury the wounded man was transferred to hospital at Frederick, whence Acting Assistant Surgeon W. S. Adams reported the following history: "He was wounded by a spent ball, which entered on the outer lateral surface of the right knee, passing inward and forward, striking the patella and lodging. The patient worked the ball out with his finger on the field. By examination I find no evidence of the ball having entered the cavity; the joint can be moved without pain, and there is no evidence of effusion. Simple dressings were ordered to the wound. On July 25th the external opening had closed and an abscess was forming at the point of lodgement of the ball. Enlarged the external opening so as to communicate with the abscess, when about a half ounce of pus escaped, but no synovial fluid, although there was evidence of the joint being involved, but perhaps not communicating with the opening. On the following day the swelling of the joint was more extensive and fluctuation well marked. Tincture of iodine was then ordered to be applied to the joint twice a day, and the limb was placed in Smith's anterior splint. On August 10th the wound had nearly healed, effusion within the joint had almost entirely subsided, and the patient was comfortable. By August 20th the wound was entirely healed; appearance of joint natural. Considerable anchylosis existed, partly owing perhaps to deposit and partly to long continuance in one position. About a week later the splint was removed, and afterwards passive motion was resorted to without producing much pain or tenderness. On September 5th the patient was transferred to Baltimore, having considerable and daily increasing motion of the knee." He was paroled from West's Buildings Hospital on September 25, 1863.

Then follow three fatal cases of direct shot injury involving the cavity of the knee without lesion of the osseous surfaces:

CASE 60.—Private J. Wagoner, Co. F, 116th Pennsylvania, aged 23 years, was wounded at Petersburg, June 22, 1864, and admitted to the field hospital of the 1st division, Second Corps, where Surgeon D. H. Houston, 2d Delaware, recorded: "Flesh wound of left thigh by a minié ball." Surgeon G. L. Pancoast, U. S. V., contributed the pathological specimen (*Cat. Surg. Sect.*, 1866, p. 333, *Spec.* 3260) with the following notes of the case: "The patient entered Finley Hospital, Washington, July 1st, with shot wound through left knee joint. The bone was not injured. He died July 17, 1864. Two days before death signs of pneumonia presented themselves. An autopsy was made by Acting Assistant Surgeon G. H. Hopkins, who found extensive inflammation extending all around the joint and its neighboring parts. The femur and tibia were denuded of cartilage around the edges. In the cavity of the thorax there was considerable pleuritic adhesion, with effusion of thick pus, the lungs themselves being very much congested and hepatized—in fact, the lungs were diseased throughout their entire extent. There was also effusion both in the pleura and pericardium." The specimen consists of the bones of the injured knee joint.

CASE 61.—Private E. Dolan, Co. D, 5th U. S. Cavalry, aged 21 years, was wounded at Gaines's Hill, June 27, 1862. Acting Assistant Surgeon R. P. Thomas contributed the pathological specimen (*Cat. Surg. Sect.*, 1866, p. 333, *Spec.* 227), with the following description: "The patient was wounded by a bullet, which entered on the outside of the left knee joint opposite its lower portion, and made its exit at the inside of the popliteal region, nearly on a horizontal line with the wound of entrance. He was admitted to the Episcopal Hospital, Philadelphia, July 30th, and died on September 30, 1862. During this period he was in a very low condition, the wounds and abscesses in the neighborhood of the joint discharging profusely the greater part of the time; he also suffered from diarrhœa. An autopsy, performed a few hours after death by Acting Assistant Surgeon R. P. Thomas, showed "loss of cartilage, and ulceration of the heads of the femur, tibia, and fibula, with extension of the disease on the posterior aspect of the femur and between the heads of the tibia and fibula. There was also ulceration of the posterior face of the patella and abscesses in the soft parts." The specimen (FIG. 11) consists of the bones of the knee. The age of the patient is perhaps overstated. The epiphyses, both in the tibia and fibula, were not united, and the real age was, probably, under 20; possibly did not exceed 19 years of age.

FIG. 11.—Bones of left knee. *Sp.* 227.

CASE 62.—Private U. Conn, Co. M, 12th Pennsylvania Cavalry, aged 28 years, was wounded during a cavalry skirmish at Frederick, July 10, 1864, and was admitted to hospital the same day. Acting Assistant Surgeon J. H. Bartholf reported: "He was wounded in the right knee joint by a pistol ball. The missile entered at the lower inner edge of the patella, and I removed it from the joint, having put in my finger between the femur and tibia after enlarging the wound to feel the ball. There was no fracture of any bone. On consultation, it was determined to try to save the limb. The joint was freely opened and local antiphlogistic treatment was employed. Great pain and swelling, for a few days only, ensued, with but slight irritative fever at any time, and the pulse for weeks ranged from 85 to 95. Sometimes for a fortnight at a time he had a really good appetite; this notwithstanding that extra capsular abscesses appeared early and continued throughout to discharge much; at other times he was in a precarious condition. He was placed on a water-bed, being thin in flesh on admission and soon troubled with bed-sores. About a month before his death there was some cough. He sank very gently, and died October 14, 1864. The *post-mortem* examination revealed the recovery from the joint wound by obliteration of its cavity and bony anchylosis, which was not so firm, however, but that accidental violence partly broke it. The crucial ligaments were still undestroyed. There was one vast abscess from the knee to the groin encircling the femur, and another four inches long from the knee downward—neither of them communicating with the joint. He had gray hepatization (pneumonic) of two-thirds of the middle lobe of the right lung, all the rest of the lungs being healthy. The heart was very small and its weight six ounces. All the other organs were healthy."

In the three following cases the projectile did not open or enter the knee joint, and the involvement of the articulation was secondary in its nature:

CASE 63.—Private E. Williams, Co. E, 5th Michigan Cavalry, aged 26 years, was wounded during the engagement at Shepherdstown, August 26, 1864. Acting Staff Surgeon N. F. Graham reported his admission on the day of the injury to

the field hospital at Sandy Hook with "shot wound of right thigh," and his transfer to Frederick two days afterwards. Acting Assistant Surgeon J. C. Shimer, from the latter hospital, made the following report of the case: "He was wounded by a fragment of a shell, which lodged in the external muscles of the lower third of the thigh in close proximity to the bone. It was extracted on the field through the opening. Upon admission the patient's general condition was good. He experienced no pain whatever from the injury. Suppuration was going on finely and everything indicated a speedy recovery. The wound was thoroughly examined with the finger and a sinus found leading in the direction of the knee, but not into the joint. September 15th, patient complains of slight pain and tenderness in knee. The discharge has nearly subsided and the wound is healing. I enlarged the opening so as to allow free vent for the pus. Tincture of iodine is directed to be applied every other day. September 25th, for the last few days there has been some general derangement of the whole system; appetite somewhat impaired; pulse excited; bowels irregular. The knee is still painful, especially upon pressure, and the discharge is the same in quantity. Ordered fifteen drops of tincture of iron three times a day, with a half pint of milk-punch, a poultice of flaxseed meal to be applied around the joint, and the limb to be kept at rest. September 30th, no change in the general condition. The discharge of pus has ceased, but a thin oily looking material, resembling synovia, constantly exudes from the small opening that remains at the entrance of the wound. October 10th, patient has been doing well until to-day; is very restless; pulse accelerated to 128; appetite very moderate; complains of excruciating pain in the knee. The wound has healed externally. Tonics, stimulants, and generous diet are continued; one pill of opium is given four times a day, and blisters are applied over the joint. October 20th, patient has received considerable relief from the blisters. The blistered surface having healed on October 25th, I directed them to be reapplied and the surface to be kept excoriated by an ointment of Goulard's cerate and powdered cantharides. The other treatment was continued. 28th, pulse 113; suffers but little pain in knee, and feels quite encouraged. An opium pill is given at bedtime. 30th, pulse 110; appetite improving; bowels regular; tongue clean; knee of its original size and no pain on pressure. November 10th, general health rapidly improving; the ointment is discontinued. November 18th, walks about the ward with a splint adjusted to favor the knee and keep it at rest; general health excellent. On December 1st the tonics and stimulants were discontinued and the splint removed from the limb; the knee is anchylosed, and no passive motion is made for fear of exciting inflammation. On December 21st the patient received a fall, the entire weight of the body resting for the time on the injured limb. He was directed to be confined to bed, the limb to be kept at rest, and iodine to be applied over the knee; parts painful. December 24th, doing well; no constitutional disturbance. December 29th, pain and swelling subsided; patient on crutches again. January 10, 1865, patient transferred to Michigan." Assistant Surgeon D. O. Farrand, U. S. A., reported that the man was discharged from Harper Hospital, Detroit, May 26, 1865, by reason of "anchylosis of the knee joint, produced by the wound." Williams is a pensioner, and has been reported by various examiners as suffering from "complete anchylosis of the right knee joint." He was paid June 4, 1876.

CASE 64.—Private *T. G. Scott*, Co. B, 54th North Carolina, aged 45 years, was wounded at Harper's Farm, April 6, 1865, and admitted to the field hospital of the 3d division, Second Corps. Surgeon O. Everts, 20th Indiana, noted, "shot flesh wound of left knee." From the field hospital the wounded man was transferred to City Point, and thence, on April 22d, to the West's Buildings Hospital, Baltimore. Acting Assistant Surgeon A. Kessler contributed the specimen, represented in the annexed wood-cut (FIG. 12), with the following description: "A minié ball passed through the left leg just below the knee joint, implicating the joint but not laying it open. The leg became much swollen and discolored, and from the openings flowed a quantity of what appeared to be arterial blood. Soon after the patient's admission there appeared severe constitutional symptoms: rigors followed by high and continued fever, delirium, extreme nervousness, much prostration, constant vomiting, and sleeplessness. Amputation, which, at an earlier period, might have saved his life, was then pronounced impracticable, and the patient died with symptoms of pyæmia, May 4, 1865. A *post-mortem* examination of the limb revealed the fact that the tissues above and below the joint, the muscles, fascia, etc., were a gangrenous mass, and that the greater portion of the joint itself was divested of its periosteum and rapidly assuming the character of caries. Otherwise the joint was found to be intact, exhibiting no fracture."

FIG. 12.—Caries of left knee joint. *Spec.* 4205.

CASE 65.—Private W. P. Werden, Co. K, 34th Massachusetts, aged 20 years, was wounded at New Market, May 15, 1864. Surgeon J. V. Z. Blaney, U. S. V., reported his injury as "a shot wound of the knee." Acting Assistant Surgeon J. H. Bartholf contributed the following history from the General Hospital at Frederick: "The patient was admitted here May 25th, from the post hospital at Martinsburg, with a flesh wound of the left leg near the knee, caused by a minié ball. The missile entered a half inch below the patella, between it and the tuberosity of the tibia, directly over the quadriceps extensor tendon, and lodged superficially just under the skin, whence it was extracted the same day. He was removed in an ambulance sixty miles to Martinsburg. The joint soon became inflamed and swollen, and remained so until his admission here. Water dressings had been applied. I found the joint inflamed and very much distended, probably with synovia or a collection of pus, over the tendon of the quadriceps. A counter-opening was made at the lowest part of this, and evaporating lotions applied, on the 29th of May. On the 1st of June the patient was somewhat better. June 4th, ice applied to the knee. June 11th, patient has made very rapid and great improvement, so that the synovitis is nearly gone and the abscess is almost healed; but there is communication with the knee joint from the abscess, a minute orifice having been made by ulceration apparently, through which healthy-looking synovia has been flowing in small quantities for a couple of days. There is no constitutional trouble. June 12th, no more synovia comes out. June 17th, patient is permitted to get out of bed and walk a little. July 4th, has gone on very favorably to this time, walking with a cane. Is now transferred to Baltimore." After this date the patient was treated in hospital at Annapolis until September 13, 1864, when he was returned to duty. The Adjutant General of Massachusetts reports that the man was mustered out June 30, 1865. He is not a pensioner.

Of thirty-eight recorded instances of lesions of the knee joint without injury to the

articular surfaces, followed by amputation, twenty-nine or 76.3 per cent. were fatal. Two of the cases will be detailed, and all will be enumerated in the tables of amputation at the end of this section:

CASE 66.—Lieutenant J. A. Boies, Co. H, 13th Infantry, aged 22 years, was wounded in the assault on Vicksburg, May 22, 1863. He was admitted on a hospital transport and conveyed to Memphis, whence he was admitted to the Marine Hospital at Chicago on June 8th. Acting Assistant Surgeon R. N. Isham reported: "He was struck upon the outer side of the left knee by a cannon shot from a distance of about two miles. The ball probably only glanced over the surface, for there was the merest trifling appearance of a redness, but no wound or bruise upon the surface. Amputation at the upper third of the thigh was performed on June 18th, and death resulted June 28, 1863, from pyæmia. A frequent pulse, brown tongue, anxious expression of the face, and diarrhœa indicated the existence of the poison on admission. The strongest symptom, that of profuse discharges from the bowels, almost involuntary, and of a color, smell, and consistency of the discharge from the stump, together with the sickening sweetish odor of the perspiration and chills, indicated the invasion of the disease in a marked manner on the night of the 18th. The treatment was by iron, quinine, and stimulants. Scrupulous attention was given to the stump, removing all soiled dressings three times a day and injecting the wound with a solution of bromine and occasionally with tincture of myrrh and balsam peru. This partially succeeded in correcting its unhealthy appearance and producing the secretion, for a short time, of good-looking pus. There never was any attempt at healing in the wound, the edges of which looked like 'cut edges of pork.' The discharge from the wound was of a dark-colored thin offensive character. There was no sloughing or gangrene. The system seemed to make great efforts to eliminate the poison, as evidenced by the profuse perspiration and diarrhœa. The blood seemed to part with its serum easily. No clot was formed in the stump, and late in the progress of the disease the discharge consisted of altered blood. The pulse during the case was from 130 to 150. No *post-mortem* was allowed by his friends, but the sudden invasion of pain in the joints, a swelling of the knee and fluctuation, satisfied me that pus had formed in the synovial cavity."

CASE 67.—Sergeant G. A. Dyer, Co. G, 6th Maine, aged 21 years, was wounded at Rappahannock Station, November 7, 1863, and was admitted to Armory Square Hospital, Washington, two days afterwards. Surgeon D. W. Bliss, U. S. V., reported: "A minié ball entered four inches below and in line with the trochanter major of the right thigh, took a downward and inward course, and could not be found on admission to the hospital. On November 29th, the missile was extracted from the popliteal space; suppuration continued free and of good character. Two weeks subsequent to the extraction of the ball a bit of woolen cloth came from the lower wound. December 10th, patient was allowed to get up and move about, using crutches. December 25th, knee joint became painful and continued to swell from this date. Under iodine the swelling subsided to a considerable extent, but the pain continued; suppuration still free and at times thin and poor in character. On February 1, 1864, synovial fluid was observed from the upper point in the discharge; pain in knee joint still considerable at night, and leg enlarged. On February 19th, the thigh was amputated above the condyles by flap operation; four arteries tied; loss of blood small; patient in fair condition constitutionally. On opening the knee joint after the operation, erosion of the cartilages was discovered, and an abscess below the knee joint communicating with it. February 22d, patient doing well." The specimen represented in the adjacent cut (FIG. 13) was contributed by Surgeon Bliss, and consists of the bones of the knee of the amputated limb, showing a slight deposit of callus on the posterior aspect of the shaft, apparently due to the irritation set up by contact with the ball in position. The patient was discharged from service April 18, 1864, and pensioned, and subsequently furnished with an artificial limb. In his application for commutation, dated 1870, he described the stump as being in a sound condition. The pensioner was paid June 4, 1876. In the cut only a portion of the specimen, which consists of the four bones entering into the articulation, is represented. The amputation was done at the middle of the femur, and not through the lower third as represented in the cut.

FIG. 13.—Lower part of right femur studded with osteophytes after shot contusion. *Spec.* 2047.

Of peri-articular shot wounds of the *Ankle Joint*, thirty-seven cases are indicated on the records;[1] but the evidence in regard to the precise nature of the injury may be termed unsatisfactory. In fifteen cases, of which one proved fatal, no operative interference was deemed necessary. In the remaining twenty-two cases the limb was amputated at the leg, with fatal results in twelve instances. One case may here be detailed; all the cases of amputations of leg for peri-articular shot wounds of the ankle joint will be enumerated in the tables of amputations following shot flesh wounds of the lower extremities:

CASE 68.—Corporal E. D. Goodell, Co. D, 25th Massachusetts, aged 21 years, was wounded at Cold Harbor, June 3, 1864. Surgeon S. A. Richardson, 13th New Hampshire, recorded his admission to the Eighteenth Corps field hospital with "shot wound of right ankle." Surgeon R. B. Bontecou, U. S. V., reported the result of the injury as follows: "The patient entered the Harewood Hospital, Washington, June 10th, with shot wound of right foot near os calcis, the ball severing the

[1] The records of shot flesh wounds of the ankle joint without injury to the bones are very meagre. KIRCHNER (C.) (*Aerztlicher Bericht über das Königlich Preussische Feld-Lazareth im Palast zu Versailles*, Erlangen, 1872, S. 86) tabulates 8 cases of flesh wounds of the tibio-tarsal articulation but gives no results. HEINE (C.) (*Die Schussverletzungen der unteren Extremitäten*, Berlin, 1866, S. 5) thinks it very remarkable that not a single case of secondary arthritis following "shot wound of the ankle joint without lesion to the bone" was observed.

tendo-achilles. On admission, he was very weak. The parts were swollen and suppurating freely, and became subsequently gangrenous, the tarsal and metatarsal bones denuded. An operation was deemed necessary, and performed on July 22d by Acting Assistant Surgeon B. F. Butcher, who amputated the leg at the lower third by the circular method. Sulphuric ether was used. The patient improved after the operation, and was furloughed August 17th, the stump looking well." The bones of the amputated ankle were contributed to the Museum by the operator, and constitute specimen 3332 of the Surgical Section. In December following the man was admitted to Dale Hospital, Worcester, whence Surgeon C. H. Chamberlain, U. S. V., reported that the stump assumed a large suppurating surface with several sinuses leading to diseased bone, and that on February 20, 1865, he removed a sequestrum eight inches in length by a longitudinal incision. After this the patient was reported as having made excellent progress, and the stump as being nearly healed on March 31st. He was ultimately discharged from the Soldiers' Rest, at Boston, October 31, 1865, and pensioned. The pensioner was paid March 4, 1877.

Peri-articular shot wounds of the joints should be treated at the outset by complete immobilization of the articulation, by wire-cloth splints, or plaster bandages, the wound being covered with simple dressings of thick compresses saturated with cold lotions. The complications are to be combatted as they arise.

Complications of Shot Flesh Wounds of the Lower Extremities.—In the great series of 58,702 shot flesh wounds of the lower limbs, besides the groups characterized by lesions to the principal blood-vessels and nerves, by extensive lacerations, by lodgement of foreign bodies or extension of inflammation to the joints, there were many examples of complications of *Pyæmia*, *Gangrene*, *Tetanus*, *Erysipelas*, and *Hæmorrhage*. A certain number of cases have been classified in each of these categories. The reader, however, must guard against the belief that this class of cases is complete, for, as explained heretofore, there was neither time nor clerical assistance for an exhaustive search. The cases, however, have been impartially selected, and the results probably present a fair average.

Pyæmia.—Three hundred and twenty-eight cases, of which three hundred and twenty, or 97.5 per cent., resulted fatally, were found recorded. One of the eight cases of recovery will be detailed:

Case 69.—Private S. S. Chase, Co. L, 1st Maine Cavalry, aged 43 years, was wounded at Stony Creek, October 27, 1864, and admitted to the field hospital of the 2d division, Cavalry Corps, where Surgeon F. LeMoyne, 16th Pennsylvania Cavalry, noted: "Shot flesh wound of both legs." The patient was moved to City Point on the following day, and on November 14th he was transferred to Washington. Surgeon D. W. Bliss, U. S. V., made the following report: "He was admitted to Armory Square Hospital with wounds of the right thigh and left leg. The first ball entered the thigh posteriorly, about the junction of the middle and upper thirds, passing inward and a little downward, and emerging on the inner side of the thigh; the second ball entered the left leg on the posterior aspect, about the middle, and passed directly forward, emerging on the inner side, one and a half or two inches from point of entrance. The patient had an unhealthy appearance and was considerably emaciated when admitted, the wounds discharging a very thin and offensive matter, not very profusely. On November 26th, pyæmia became developed; patient had several violent chills, which were repeated on the following days, when his wounds became dark colored and dry and ceased to discharge, and he grew delirious. From this period quinine, iron, and chlorate of potassa were prescribed, with stimulants and the most nourishing diet, together with applications of creasote, tannin, and solution of chlorate of patassa to the wounds, under which treatment he gradually improved. At present (December 31st) his wounds are about healed and he is able to leave his bed, being greatly improved in every respect, and convalescent." The man was discharged from service March 24, 1865, because of "permanent contraction of the gastrocnemius muscle of the left leg, resulting from the wound." Examiner J. O. Perry, of Portland, Maine, certified, April 30, 1868, that "both wounds are very tender;" and that "the wound in the leg so far involved the nerves that the leg below it and the foot are quite numb." The Portland Examining Board reported, in 1873 and 1875, that they find deep, and, on the left leg, adherent scars, with considerable loss of tissues in both wounds. The pensioner was paid June 4, 1876.

In the greater proportion of the fatal cases, although the ratio of mortality was so large, necroscopic appearances were not recorded:

Case 70.—Sergeant M. Armstrong, Co. M, 6th Cavalry, was wounded at Williamsburg, May 4, 1862, and admitted to the Hygeia Hospital, Fort Monroe, five days afterwards, when Surgeon R. B. Bontecou, U. S. V., noted a "shot wound of left thigh." Acting Assistant Surgeon S. J. Radcliffe contributed the following history, from Hospital No. 1, Annapolis: "The ball entered the external aspect and posterior of the upper third of the thigh, passing inward and downward, and emerged about the centre of the middle third. The patient was in hospital at Fort Monroe about ten weeks, when he rejoined his regiment. He went through most of the great battles and skirmishes until Gettysburg, in July, 1863, when he was taken prisoner at Fairfield, Penn., and went to Richmond via Staunton, arriving there on July 20th. He was paroled and left the enemy's lines on the 23d, arrived at Annapolis on the 24th and at Camp Parole on August 2d, and entered this hospital September 20th. He states that the leg has not been painful except in cloudy weather, and has not swelled, and that his health

has been good. Prescribed pills consisting of quinine one and a half grains, and blue mass and capsicum one half grain each, to be given every four hours. September 25th: Had a chill yesterday; tongue coated; skin dry; pulse quick; conjunctiva yellow; countenance dejected and of painful expression; great lancinating pain in leg; nervousness; bowels irregular. Stopped the pills and gave quinine in solution, five grains every six hours. September 27th: Has lost flesh during last week. Has had continued fever, and the leg has been swelling for two or three days and is very painful, the least motion being painful; abscess forming between the former orifices of the wound on the posterior aspect; general condition unfavorable. A large flaxseed poultice was applied to envelope the whole thigh, and the quinine was continued. Patient objects to taking stimulants, and takes but little. October 1st, A. M.: The thigh, from the groin to the knee, has continued to enlarge to this date, with sharp throbbing pain, sleeplessness, depressed nervous condition, deafness, fever of a low type, diarrhœa and loss of appetite; patient quite hectic, pulse quick, and cheeks flushed; abscess pointing at the eschar or orifice of wound of exit. Made an incision from one to five inches long, and a full stream of dark, thin, offensive matter followed, amounting to nearly two pints; bathed with warm water and vinegar, and continued the stimulants, beef-tea and quinine, with an occasional dose of compound mixture of catechu. 5 P. M.: Patient feels better; pulse quick and feeble; skin in good condition; tongue cleaner; bowels better. Ordered spirits of mindereri, one half ounce, to be given alternately with the other medicine. October 3d: Abscess still discharging very dark, thin, and fetid matter; patient very prostrate; emaciation very rapid and distinct. Gave stimulants freely and often. October 3, A. M.: Patient very feeble, pale and thirsty; pulse quick and sharp; bowels worse; delirium most of the night, and nausea; abscess still discharging; leg very much swollen and highly sensitive; sloughing about the wound. Applied charcoal and yeast poultices, and gave tincture of chloride of iron, twenty-five drops, with quinine every four hours. 3 P. M.: Pupils contracted; stupor; pulse 120, feeble, sharp, and quick; very sensitive to touch; bowels more involuntary; leg largely infiltrated, red and swollen, and pits at the knee; very little discharge of bloody serum; patient sinking. Died at 5.30 A. M. on October 4, 1863."

An example of the series of fatal cases in which autopsies were made is subjoined. This series constitutes seventy-three of the three hundred and twenty cases.

CASE 71.—Sergeant D. A. Lent, Co. A, 6th New York Heavy Artillery, aged 24 years, was wounded at Cedar Creek, October 19, 1864. Surgeon W. A. Barry, 98th Pennsylvania, noted his admission to the Sheridan Field Hospital with "shot flesh wound of right leg." Several days after being wounded the man was transferred to the Camden Street Hospital, Baltimore, and subsequently to Rulison, Annapolis Junction, whence Acting Assistant Surgeon A. Marion reported the following history: "The patient was admitted to this hospital January 4, 1865, with a wound of the right leg, middle third, a minié ball entering on the anterior aspect one inch outside of the tibia, lodging between the tibialis anticus, tibialis posticus, and the anterior tibial artery. When admitted the wound was completely healed up, but the leg was much swollen and no ball could be detected. During the first week after his admission the patient had his leg rolled up with a bandage, and the swelling completely disappeared. He became able to walk about until January 18th, when he again complained, and on examination I found the leg again much swollen, with a dark spot located where the wound first healed up. After this flaxseed poultices were constantly applied until February 2d, when, on opening the wound, the ball was carefully removed from its place of lodgement. On the two days following the operation the patient had a severe fever and chills, with extreme pain and great depression. I ordered eight grains of calomel with ten grains of rhubarb to be taken at once, followed by a saline aperient. On the morning after the 4th, I ordered strong beef-tea, with brandy, to be taken freely. This treatment was continued until February 7th, with some saline draughts, according to the condition of the bowels. On the morning of the 8th, I found the patient greatly depressed and complaining of extreme pain in the joints, and on examining the wrists and the left shoulder joint I discovered them to be very much swollen, with a peculiar boggy feel to the touch. All these symptoms were attended with rigors, drowsiness, yellowness of the skin, and offensive perspiration, sometimes accompanied with delirium. Poultices were applied over the joints, with warm fomentations, and opium was given to relieve the pains every night. The treatment was continued, but no amelioration whatever of the symptoms took place, the patient gradually sinking until the morning of February 15, 1865, when he died. At the *post-mortem*, an abscess was found in the upper lobe of the right lung, about two and a half inches long and two inches in width and depth, filled with thick pus. Both lungs were much congested. The right ventricle of the heart was filled with a semi-organized clot. Kidneys about six inches long and four inches wide; small abscesses were found in the cortical portion of each one. Pus was also found in the urethra. Liver, spleen, pancreas, stomach, and intestines normal. About one teaspoonful of thick fetid pus was found in the right knee joint, and about half as much in the right wrist joint. There was no pus in the ankle joints."

It is to be regretted that autopsies were not more generally practised in cases of this group, and that in the exceptional cases the necroscopical records were so imperfect.

Hospital Gangrene.—The shot flesh wounds of the lower extremity that were distinguished by the supervention of hospital gangrene[1] numbered two hundred and eighty-three, with one hundred and fifty-eight deaths, or 55.8 per cent. Details of three cases of recovery are appended:

CASE 72.—Private W. J. Briggs, Co. A, 102d Pennsylvania, aged 27 years, was wounded at Chancellorsville, May 3, 1863. Assistant Surgeon J. C. McKee, U. S. A., in charge of the General Hospital at Pittsburgh, reported the following

[1] In *Investigations upon the Nature, Causes, and Treatment of Hospital Gangrene as it prevailed in the Confederate Armies*, 1861–1865, by JOSEPH JONES, M. D., published in the *Surgical Memoirs of the War of the Rebellion collected and published by the U. S. Sanitary Commission*, the author details many illustrations of gangrenous wounds resulting from shot wounds of the lower extremities. Instances may be found in the *San. Comm. Memoir*, Surg. Vol. II, pp. 234, 250, 310, 311, 315, 318, 329, 331, 334, 337, 347, 375, 380, 388, 394, 399, 406, 411, 437.

history: "The ball passed between the tibia and fibula, about the middle of the leg, escaping through the calf opposite the point of entrance. The patient was four days at Falmouth Hospital, seven days at Douglas, Washington, and was then removed to Satterlee, Philadelphia. Seventeen days after his admission to the latter he was furloughed and came to Pittsburgh. The wound had healed at its entrance and was still discharging at its exit, but was considered fit to travel with. He had several slight chills before leaving Philadelphia, and one of a more severe character after his arrival home, followed by hæmorrhage from the posterior wound, which was arrested. The next day he came to the hospital. The wound presented the unmistakable evidence of gangrene. He was isolated, and nitric acid was freely applied to all parts. The disease was found very extensive, involving the greater part of the calf of the leg. Poultices of charcoal and pyroligneous acid, etc., were applied. The constitutional remedies were quinia, muriated tincture of iron, stimulants, beef-tea, etc. The disease was checked, and the patient is (July 31st) recovering rapidly. The interest in this case is the distance the man carried the contagion, the great rapidity and destructiveness of its attack, apparently uninfluenced by the comforts of a good home and the best of food and nursing." The patient remained in the hospital until September 3, 1864, when he was mustered out, his term of service having expired. The Pittsburgh Examining Board certified, in 1873 and 1875, that there was wasting of the gastrocnemius muscle from gangrene, and that the resulting adhesions have impaired the action of that muscle and cause pain in the ankle. The pensioner was paid June 4, 1876.

CASE 73.—Private A. W. Bretz, Co. D, 49th Ohio, aged 23 years, was wounded in the right thigh, at Murfreesboro', December 31, 1862. Surgeon J. R. McClurg, U. S. V., in charge of the General Hospital at Cleveland, contributed the following history: "The ball entered upon the outer and posterior aspect of the limb, passed through the biceps, semi-membranosus and semi-tendinosus muscles, and out upon the inner side of the thigh. The patient was in Hospital No. 21, Nashville, about ten days, after which he was sent to the West-End Hospital, Cincinnati, where he remained over three months. He says his limb was at one time almost healed, but it soon manifested symptoms for the worse, and afterward discharged considerably for several days. He was forwarded to and arrived at this hospital upon the evening of the 29th of April, and on the 30th his wound was examined and dressed. At this time we found a ragged, foul ulcer upon the back part of the limb, where the ball entered, about one and a half inches in diameter, surrounded by an erysipelatous—or a halo of dusky red—inflammation, hard and painful to the touch. The patient was feverish, restless, unable to sleep; had poor appetite, and appeared much prostrated. He complained of severe shooting pain in the limb and of the disagreeable odor of the wound. We dressed the wound with the creasote ointment and prescribed a tonic treatment. Some three days afterwards the whole integument and cellular tissue, previously inflamed and diseased, became one putrid mass and dropped out, leaving a large cavity, large enough to admit the whole hand. The hæmorrhage at this time was considerable, and was arrested at the time by applying the pure creasote to the whole bleeding cavity, together with compresses, adhesive strips, and a roller from the foot to the groin. The hæmorrhage was by this process arrested, and for two or three days afterwards my assistant surgeons reported the case favorably. But I was again called upon to visit the patient, who was reported to be sinking very fast, and that the wound was bleeding very much. I found to my surprise the whole bandage and bed saturated with blood, and the patient truly in a dangerous condition. Upon removing the bandages and compresses a large mass of coagulated blood and dead tissue dropped out, having the most intolerable stench imaginable. The hæmorrhage was still very great, and I was almost at a loss to know how to stop it. The whole back part of the thigh appeared to be one bleeding cavity. I introduced my hand into the wound and found I could pass my fingers almost up to the tuber ischii. At the bottom of the cavity, entirely exposed to view, were the belly of the biceps, the semi-membranosus and semi-tendinosus muscles. We used cold water, which succeeded in a measure to stop the hæmorrhage temporarily. Immediately afterward, or as soon as the patient had recovered from the shock produced by the loss of blood, I put him under the influence of equal parts of sulphuric ether and chloroform; then commencing immediately below the tuber ischii and cutting through the parts down to the muscles, I brought the knife down and out at the upper part of the cavity, turning the flaps outward and exposing the whole cavity; with a pledget of lint tied to a probang I cauterized every part of this cavity—the flaps and even the muscles—with pure nitric acid until they became perfectly charred and all hæmorrhage entirely ceased. The flaps were now brought together and fixed with wide adhesive strips around the thigh. A compress saturated with a lotion of nitric acid was applied, and over this a roller from foot to groin. The patient was ordered sulphate of quinine one grain, and tincture of chloride of iron fifteen drops, every two hours; also, eggnog, brandy-punch, and essence of beef. From this moment he began to improve rapidly and complained of no more severe stinging pain in the limb. Not the least hæmorrhage ensued afterward, and that most offensive fetid discharge subsided at once. We dressed the sore twice per day afterward, still using a weak lotion of nitric acid. It has progressed and is still (June 1st) progressing most favorably." The patient was assigned to the Veteran Reserve Corps December 11, 1863. There is no record of his ever having applied for pension.

In addition to the history of the case, Surgeon McClurg submits the following remarks in relation to the treatment of gangrene: "There is not a doubt in my mind but that the nitric acid is one of the most, if not the most, efficient remedy in use for sloughing phagedæna and hospital gangrene. I am aware that of late bromine[1] and its compounds are exciting considerable interest in the medical profession as curative agents in hospital gangrene, but I must acknowledge that my experience with these agents will not allow me to call them specific, and I certainly regard them as secondary remedies to nitric acid. The acid is an old and common remedy, and I believe the reason it has not oftener proved its superiority over all other remedies in hospital gangrene has been on account of the cautious manner in which it has been used. This is a serious disease, and the remedy should be freely applied. In the above case, I placed one ounce of acid in a tumbler, dipped my pledget of lint in again and again until the whole diseased part was effectually cauterized. All danger was at once over, and the disease that moment arrested."

[1] Among published papers on the local application of bromine in hospital gangrene may be mentioned *Bromine in Hospital Gangrene*, by R. L. STANFORD, M. D., Surgeon U. S. V., in *Am. Med. Times*, 1863, Vol. VII, p. 24, and *Remarks on Hospital Gangrene*, by Surgeon G. R. WEEKS, U. S. V., in *Am. Med. Times*, 1863, Vol. VII, p. 46. GOLDSMITH (M.), *A Report on Hospital Gangrene*, etc., Louisville, 1863. THOMSON (WM.), *Report of Cases of Hospital Gangrene treated in Douglas Hospital*, Washington, D. C., in *Am. Jour. Med. Sci.*, 1864, Vol. XLVII, p. 378.

CASE 74.—Private H. Barr, Co. I, 21st Iowa, aged 43 years, was wounded at the Black River Bridge, May 17, 1863, and was transferred from a field hospital to Memphis, two weeks after the injury. Acting Assistant Surgeon W. M. Dorran contributed the following history: "He received a flesh wound of the right leg, the ball entering about two inches below the head of the fibula, external aspect, passing inward and downward behind the bones of the leg, and escaping three inches below the head of the tibia, internal aspect. On June 4th, he was admitted into the Jackson Hospital, in this city. The wounds were then small, the external one nearly healed; both wounds were suppurating, and the pus was 'darkish,' the patient stated. Either pus burrowed or a diffuse abscess formed six inches below the internal wound on the calf of the leg, pointed and broke there, discharging a considerable quantity of pus. The tissues all around this new sore began to slough, and a destructive process extended down to within two inches of the ankle, up to the internal wound, forward to the spine of the tibia, and backward to the median line of the muscles of the calf. A consultation was held over the case, and it was decided to amputate, the patient states; but the superintendant of the hospitals happened to be present and overruled the decision, and had the patient transferred to the gangrene section of this, the Union Hospital, on June 30th. On admission, a large portion of black dead tissue surrounded the breach of the surface, which, when cut away by the scissors, made the ulcer to be about eight inches long and four inches in width at the middle of the leg. The tibia was denuded of periosteum to the extent of four inches in its middle third. The internal saphenous vein was a black cord for about six inches. The gastrocnemius and soleus muscles had sloughed to the median line, and the fascia between these two muscles, and also under the soleus, had sloughed away much farther in extent than the muscles. After it was cleaned as well as possible by cutting and washing, fuming nitric acid was applied, or almost poured on the dead and dying tissues still remaining, and with a piece of wood it was worked into their structure, and the semifluid slush or mud was cleaned away, as it formed, by the application of the acid. Then the whole leg was enveloped with a poultice of charcoal and linseed-meal, covered by an oilcloth, and bandaged from the toes to the knee. After the cauterization, when the patient was under the influence of some stimulants and morphia given to him during the operation, he expressed himself as feeling better than he had for two weeks past, and the leg easier. July 1st, Sloughing by acid not ready to be removed yet; acid again applied where gangrenous ulceration still proceeded, also the poultice and tight bandage. July 4th, The patient rests well at night, and his appetite is rather improved. He is cheerful and hopeful, and of the opinion now that there is a chance of his leg being saved, whereas before he had made up his mind that it was to be lost. The slough by the acid was removed to-day, and the sore is fresher in appearance anteriorly, but posteriorly the fascia is still sloughing. The strong acid was again applied in this region, causing the formation of a mass to be cleaned away to the amount of two or three ounces. Lint saturated with a solution of bromine and bromide of potassium is now introduced into every crevice and sinus and over every sloughing part, and over this a poultice and bandage. Stimulants are given four times a day, also tonics of quinine and tincture of chloride of iron. July 8th, By assiduous attention to treatment, after the manner already described, the sore has been brought to present a fresh and rather healthy base, and some granulations are springing up on the anterior part. Nitric acid has still to be applied under the muscles of the calf, and at the lowest margin of the ulcer some dead tissue remains. July 12th, The ulcer is quite clean and has quite a healthy appearance; granulations are springing up very beautifully, except at the lower margin. The patient's general condition has improved. Resin cerate is used to dress the parts where granulations are springing up, but solution of bromine or Labarraque's solution where any unhealthy appearance presents itself. July 16th, The sore appears quite healthy and granulating all over. The muscles that were separated from each other by destruction of tissue between them are beginning to grow together. The tibia, which was bare for some distance, is again being covered by granulations. The edges of the ulcer are becoming depressed and rather inverted instead of being indurated and everted. The internal saphena vein has been destroyed for eight inches of its length and cut away. There was no hæmorrhage at any time. September 1st, Ulcer very much reduced in size. Nitrate of silver is used at times to depress exuberant granulations. October 1st, Wound almost completely healed, and patient able to walk about." He was discharged April 6, 1864, and pensioned. Examiner R. S. Lewis, of Dubuque, Iowa, certified, June 16, 1864: "The right leg has been pierced by a ball about three inches below the knee, * * * followed by gangrene; is still discharging, leaving the limb useless." This pensioner was last paid September 4, 1868, since when he has not been heard from.

The pathology and treatment of gangrene of the lower extremities will be considered in the chapter on the general subject. In the lower limbs traumatic gangrene is usually of the humid variety and commonly progresses with great rapidity.

Tetanus.—Among cases of shot wounds of the lower extremities not attended by lesions of the bones, joints, great vessels or nerves,[1] there were one hundred and seventeen

[1] Surgeon J. JULIAN CHISOLM, C. S. A., in his *Manual of Military Surgery for the use of Surgeons in the Confederate States Army* (Columbia, S. C., 3d ed., 1864, p. 257), observes that the results described by LARREY in his campaigns in Egypt and Germany (*Mémoires de Chir. Mil. et Campagnes*, Paris, 1812. T. III, p. 286), in the frequent appearance of tetanus in wounded soldiers upon exposure on battle-fields to cold and damp night air, never followed the leaving of wounded soldiers upon the battle-fields of the Confederacy. Dr. EDWARD WARREN, Surgeon General of the State of North Carolina, declares (*An Epitome of Practical Surgery for Field and Hospital*, Richmond, 1863, p. 132) that "the experience of all surgeons establishes the fact that changes of temperature are prolific sources of this disease;" and Professor SAMUEL D. GROSS (*A System of Surgery, etc.*, 5th ed., 1872, Vol. I, Chap. X, p. 238) remarks that gunshot wounds are peculiarly liable to be followed by tetanus only when the sufferers are neglected, or permitted to lie upon damp, cold ground, or in currents of cold air, after an engagement. Dr. CHISOLM says (*l. c.*, p. 258) that "a trifling puncture or scratch is, at times, sufficient to cause an attack; and it has been noticed by military surgeons that the scraping of the skin by a ball, with bruising of the nerves, is more liable to this complication than the more severe wounds." "Wounds in certain situations," Dr. CHISOLM adds, "are thought to favor its appearance, viz: injury to the hands, *feet, joints*, etc." . . "Its common period for appearing is between the fifth and fifteenth days." Professor JOS. JONES, Surgeon P. A. C. S., in an article on *Traumatic Tetanus*, in *Confed. States Med. and Surg. Jour.*, 1864, p. 1, dwells upon the good effects of chloroform mixture, administered by the stomach, in shot flesh wounds. The compilers of *A Manual of Military Surgery prepared for the use of the Confederate States Army*, Richmond, 1863 [Surgeons A. TALLEY, W. F. CAMPBELL, ST. GEORGE PEACHEY, A. E. PETICOLIS, and J. DUNN are reported to have constituted the commission that prepared this work], in the chapter on *Tetanus*, on page 9, refer to the effect of draughts of cold air in determining violent exacerbations of muscular rigidity.

cases of tetanus noticed, with one hundred and six deaths, or 90.5 per cent. An example of one of the eleven instances of recovery is appended:

CASE 75.—Private G. C. Nichol, Co. C, 22d Iowa, aged 20 years, was wounded at Vicksburg, May 22, 1863. Surgeon T. F. Azpell, U. S. V., noted his admission to the Steamer R. C. Wood, from a field hospital, June 4th, with "shot wound of right thigh." Assistant Surgeon J. M. Study, U. S. V., reported the following history from Union Hospital, Memphis, where the patient was admitted June 8th: "The injury for which this man was admitted was an ordinary flesh wound, the ball passing transversely from without inward, through the posterior aspect of the right thigh. At the time of his admission the wound showed no indication of having made any progress toward reparation, but presented an extremely irritable margin. Warm-water dressing was applied, and on the following day there were marked symptoms of tetanus, chiefly confined to the jaws, which, however, soon became more general, and in addition to the trismus there was that frightful condition of the body intermediate between opisthotonos and pleurothotonos. Sufficient quantity of chloroform was administered by inhalation, to produce complete anæsthesia, twice regularly in twenty-four hours. Sulphate of morphia, in half-grain doses, was given each evening at bed-time, and brandy ad libitum. June 11th, no notable change in the case; patient is stupid, and there is an absence of muscular rigidity as long as the combined effects of the chloroform and morphia continue. June 14th, patient much in the same condition as when last noted, excepting an extensive tumefaction of the left limb, which tumefaction, so far as the most careful scrutiny would show, is entirely idiopathic in its nature. A roller was applied to this limb from the toes to the groin; otherwise the treatment of the case is the same. June 18th, tetanic symptoms subsiding somewhat; the wound has changed in appearance but little since first noted; tumefaction in left leg still present. Chloroform is given less freely than before; morphia continued the same, also the brandy. June 21st, patient is now able to separate the jaws to the width of half an inch; his general condition is improving rapidly; appetite is ravenous; the bowels are regular; swelling in left leg disappeared; wound beginning to suppurate. Morphia, in one-third doses, is given at bed-time; brandy, one ounce every two hours. June 28th, the wound has been suppurating freely, a large amount of the adjacent tissues having sloughed away. The warm-water dressing, which has been continued until now, is stopped, and scraped lint moistened with glycerine is applied. Patient takes one pint of ale daily. July 15th, the wound is quite healed, and the patient walks with the aid of a cane. On August 19th, he was furloughed." The registers of the Union Hospital show that this man returned from furlough, and was sent to his regiment for duty September 30, 1863.

Two examples of fatal cases are subjoined. It has been impracticable to discover any details of autopsies throwing any light on the subject.[1] Apparently there were no instances recorded in this group in which microscopical examinations of sections of the spinal cord were undertaken:

CASE 76.—Private P. Brown, Co. A, 169th New York, aged 36 years, was wounded at Cold Harbor, June 3, 1864, and admitted to Harewood Hospital, Washington, five days afterwards. Surgeon R. B. Bontecou, U. S. V., reported: "Shot flesh wound of left leg. Patient furloughed July 29th." Assistant Surgeon M. F. Coggswell, U. S. V., in charge of the Albany Hospital, reported the following result of the case: "The patient was admitted August 1st, having a large ulcer, measuring six by five and a half inches, on the calf of the leg, the result of a gunshot wound. His general health was very poor, and he was anæmic and debilitated. Gangrene had appeared previous to his admission to this hospital, and the ulcer was indolent, foul, and unhealthy. Nitrate of silver was applied and solution of chlorinate of soda, also poultices of flaxseed-meal mingled with pulverized charcoal. This treatment was followed in twenty-four hours by a healthy discharge of pus and a general improvement of the ulcer. Beef-tea, milk-punch, and extra diet were ordered. On the 2d of August his tongue was red and dry, his appetite failed, and he manifested great uneasiness and appeared to labor under an impression of impending evil. That night (August 2d) the weather, which had been very hot and dry for several days, suddenly became damp and chilly, and on the morning of August 3d, at 4 o'clock, symptoms of trismus appeared, and were followed in two hours by a general spasm of all the voluntary muscles. The *risus sardonicus* was marked, and the patient was in great distress; deglutition was impossible. Beef-essence and milk-punch were administered by enemata, and half a grain of sulphate of morphia was injected hypodermically over the epigastrium. The latter acted so speedily and powerfully that in two hours all the muscles were relaxed. The patient's strength, however, was completely exhausted, and at 8 o'clock P. M. he expired, there being no recurrence of the tetanic symptoms. No general *post-mortem* was made; a local examination did not reveal anything. The trunk of the posterior tibial nerve was intact, but its muscular and cutaneous branches were involved."

CASE 77.—Sergeant W. Walters, Co. B, 87th Pennsylvania, aged 29 years, was wounded at the Wilderness, May 8, 1864. Surgeon N. R. Moseley, U. S. V., reported his admission to Emory Hospital, Washington, May 16th, with "shot wound of foot." Surgeon J. H. Taylor, U. S. V., reported the following result of the injury: "The patient was admitted to Summit House Hospital, Philadelphia, May 20th, having been wounded by a ball striking the plantar surface of the left foot at the first interosseous space, one and a half inches from the metatarso-phalangeal joints, going directly through on the dorsum and producing a flesh wound. Cold-water dressings were applied. The patient is of strumous diathesis, having scars on the side of his neck, the remains of scrofulous abscesses. May 30th, at 8 A. M., he was in excellent health; at 12 M. he complained of stiffness and pains in the jaws and neck; great pain, referred to articulation of left inferior maxilla with temporal bone, together with constant fixed pains at the epigastrium, shooting around to the spine; jaws seemingly tied, as the patient expressed; mouth gradually closing; twitching of facial muscles; some difficulty of respiration, but none of deglutition.

[1] CHISOLM (J. JULIAN), M. D., (in his *Manual of Military Surgery*, 3d ed., Columbia, 1864, p. 259) states: "That fruitful source of information, pathology, gives us no instruction in this disease. An autopsy reveals to the eye nothing commensurate with the intensity of the symptoms. A slight congestion of the spinal cord and medulla oblongata is all that can be discerned."

Treatment: Bowels unloaded by injections; brandy and quinine given in large quantities, milk-punch and beef-tea by mouth and rectum. Liquor of morphia, one half ounce, was given every two hours for eight or ten hours, but with no effect. Injected one grain of sulphate of morphia, dissolved in one drachm of water, hypodermically just over the temporal region; but even this failed to produce any narcotic effect. Counter-irritation was used at the spine with chloroform and covered with oiled silk, but so severe was the burning pain that it soon had to be discontinued. On May 31st, the patient was attacked with severe cramps in the abdomen, the muscles here becoming hard and tense, the muscles of the back rigid and prominent; great pain, referred to chest in inspiration; pupils contracted. There was profuse perspiration over the entire body from the commencement of the disease; pulse natural. A solution of sulphate of atropia, one grain to an ounce of water, was now injected, in quantities of one drachm, a little to the left of the median line of the neck at first, and subsequently on each side of the spine, below the scapula, at intervals of one half, one, and two hours, in all seven or eight times. The pupils were now dilated, but there was not the slightest relaxation of muscular spasm; perspiration still profuse. An effort to rouse him from this state with cold douche had but little effect. The spasms continued to increase in frequency and violence until 3 A. M. on June 1, 1864, when he died."

Extraction of foreign bodies, removal of all causes of irritation to the wound, avoiding cold and currents of air, were the prophylactic measures advised. Anæsthetics and narcotics were generally employed, but in grave and confirmed cases the therapeutical results were most discouraging.

Erysipelas.—In forty-five cases, of which thirty-four proved fatal, extended erysipelatous inflammation was the most characteristic feature. An example of recovery from this complication is detailed:

CASE 78.—Private *W. Bowling*, Co. B, 1st Maryland Cavalry, aged 22 years, was wounded at Gettysburg, July 4, 1863, and entered the Frederick Hospital two days afterwards. Acting Assistant Surgeon W. S. Adams reported: "The patient was wounded by a minié ball which entered two inches above the right patella, passing downward, striking that bone and glancing, and came out at its lower border, without causing fracture or involving the joint. The patient's general health was good. Cold-water dressings were ordered, and rest. July 20th, evidence of erysipelas appeared this morning; bowels constipated; pulse quick. Ordered lead and opium wash to the knee joint, and gave three compound rhubarb pills. 21st, bowels open freely; pulse less frequent; tongue furred, with red edges and tip; skin dry; loss of appetite; erysipelas extending above and below the wound. Applied tincture of iodine around the limb beyond the disease. 23d, erysipelas extending rapidly; considerable gastric irritation; pulse quick but feeble. Ordered one pint of milk-punch a day, and three grains of quinine three times a day. 24th, erysipelas still extending and now occupying the entire right leg and thigh, and the pelvic region down the left thigh as far as the knee; right limb very œdematous and assuming a decided phlegmonous character. Evaporating lotions of ether were ordered to the worst points, and the other treatment continued. 30th, erysipelas still extending up the body and now occupies the entire left limb. It has subsided in its original seat, and desquamation has taken place. Numerous longitudinal incisions, extending from the instep to the toes of the left foot, were made to relieve the tension. Stimulants were increased to one pint of whiskey per day, and beef-tea and generous diet pushed as far as possible. August 2d, general condition much better, but erysipelas still continues on the feet and ankles, and there is some sloughing of the integuments over the metatarsus of the left foot owing to the incisions not having been made in due time. August 6th, condition still improving; erysipelas has nearly disappeared. 9th, decidedly convalescent; ulcer of left foot granulating finely; appetite good. 30th, ulcer entirely healed; wound of knee nearly so. October 13th, wounds entirely healed, and patient this day transferred to Baltimore." Surgeon T. H. Bache, U. S. V., reported that the patient was paroled from West's Buildings Hospital November 12, 1863.

The graver cases of erysipelas complicating flesh wounds were pernicious and contagious:

CASE 79.—Private L. Brittin, Co. M, 1st Pennsylvania Cavalry, aged 35 years, was wounded at Hanoverton, May 28, 1864, and admitted to the field hospital of the 3d division, Fifth Corps, where Surgeon L. W. Read, U. S. V., noted "a shot wound of leg." From the field hospital the patient passed to Washington and thence to Philadelphia, entering the Summit House June 28th, and subsequently the Satterlee Hospital. Surgeon I. I. Hayes, U. S. V., recorded the following history: "The injury was caused by a minié ball passing transversely and producing a slight flesh wound of the upper third of the right leg. The wound healed, when it was attacked by gangrene, and after again becoming healthy the whole limb was seized with erysipelas. On March 24, 1865, the whole external lateral surface of the knee presented two sloughing wounds, one on a line with the head of the tibia, the other just above the tendon of the muscle. The whole limb was swollen, red, and painful. General condition poor, with headache, fever, dry tongue, and dry hot skin. On March 26th, a large collection of pus, amounting to about six ounces, was evacuated immediately below the patella. The patient's bed was moved, the old splint removed and a Smith's anterior applied. On rinsing the limb a sloughing wound involving nearly the whole popliteal space was found. On the following day the patient was slightly more comfortable, but there was not much change in his general condition. On March 31st, there was no change in the appearance of the wound, but the patient's strength was evidently becoming exhausted. There were symptoms of pyæmia, and he was delirious during the afternoon, but better toward evening. His pulse was 120 and very small; countenance sunken, with hectic spots on the cheeks. He complained of no pain, but was evidently partially unconscious. He died April 6, 1865."

Hæmorrhage.—In addition to the group of cases of shot flesh wounds of the lower limbs with primary lesion of the large blood-vessels, as discussed on pp. 13, 18, *ante*, one

hundred and fifty cases have been noted—and this is probably an imperfect summary—of consecutive bleeding from the large vessels, among which were sixty-four examples of recovery, eighty deaths, and six cases with unknown results, a mortality rate of 55.5. Consecutive bleeding was from vessels varying in magnitude.[1] Tabulations have been made showing the time from the reception of the injury to the onset of the bleeding, the amount of blood lost, and the treatment, but there is not space to reproduce this analysis. Two illustrative cases are appended:

CASE 80.—Private J. C. Corliss, Co. G, 17th Illinois, aged 21 years, was wounded before Vicksburg, May 19, 1863, and entered the Jackson Hospital at Memphis eight days afterwards. Acting Assistant Surgeon H. D. Garrison recorded the following description of the injury and its result: "A conical ball entered the left thigh anteriorly, about five inches below Poupart's ligament, passing upward and slightly inward in its course. The wound was examined at the time by a surgeon, who was unable to extract the ball. When admitted to this hospital the man was in good health, and his wound gave him but very little pain. Water dressings were applied and all went well until about noon on the 28th, when, from some slight motion, copious hæmorrhage commenced suddenly. The femoral artery was almost instantly compressed over the pubic arch, but not until much blood was lost. A consultation being called, it was believed that the profunda femoris was probably severed, and that a tourniquet with a small roller for a pad placed over the track of the ball would probably be sufficient to prevent the recurrence of hæmorrhage until nature had time to permanently close the vessel. This plan was accordingly adopted and proved successful for twenty-four hours, when—while Surgeon E. M. Powers, 7th Missouri, in charge of the hospital, was looking at the appliance and congratulating the patient on his safety—the hæmorrhage again set in with all its former force. On consultation it was then agreed to inject the wound with solution of persulphate of iron, which was accordingly done, and the tourniquet was re-applied. No further hæmorrhage occurred afterwards, but in spite of stimulants freely administered the patient expired fourteen hours after the last attack. The *post-mortem* examination revealed the fact that the femoral artery was opened about an inch below the origin of the profunda. The opening was about the size of a small pea and seemed to have been caused by the sloughing of the coats. In this case the pulsation of the tibial and popliteal arteries demonstrated that the flow of blood through the femoral was uninterrupted and led to the adoption of an erroneous diagnosis." Surgeon Powers in his report stated that the loss of blood in this case amounted to four and a half pints, also that the bullet was extracted from its place of lodgement after the patient's admission to Jackson Hospital.

CASE 81.—Private A. Kunkle, Co. B, 62d Pennsylvania, aged 18 years, was wounded at Gettysburg, July 2, 1863, and remained at a field hospital for two weeks, when he was transferred to Baltimore. Acting Assistant Surgeon J. Dickson made the following report from Jarvis Hospital: "He was wounded through the right thigh, the missile entering near the tuberosity of the ischium, and, passing about fourteen inches through the deep muscles, emerged outside of the femur four inches from the knee. He stated that he bled very freely on the field, and after being taken to a neighboring house there was a recurrence, lasting all night. No further hæmorrhage occurred until the patient was brought to this hospital. At that time he was very anæmic and feeble. Generous diet and iron were ordered. On July 17th, an alarming hæmorrhage occurred from both wounds, which was arrested by compression and the local application of persulphate of iron. Two days afterwards there was another hæmorrhage as profuse as before, and the same treatment was resorted to with the same result. On July 28th, there was a recurrence nearly as profuse as the last. Amputation and ligation of the femoral artery was thought of; but it was concluded he would die after either, and compression upon the femoral and along the course of the wound was resorted to. On July 30th, the patient was rallying. On August 6th, another slight hæmorrhage came on, followed by a discharge of sanious pus, the contents of an aneurismal sac. By August 29th the wounds had almost healed and the patient quite built up and walking on crutches, his leg being considerably contracted but straightening gradually." In October following the patient was transferred to the Satterlee Hospital, Philadelphia, and subsequently to Pittsburg, whence he was returned to his regiment for duty February 12, 1864. The Adjutant General of Pennsylvania reports that the man was mustered out with his command July 13, 1864. He is not a pensioner.

Ligations of Blood-vessels of the Lower Limbs after Flesh Wounds.—At page 16 it will be recollected that attention was called to a considerable number of cases of direct injury of blood-vessels treated by primary or consecutive ligation, and that it was promised that further on such examples would be enumerated, together with cases of deligation of the same vessels for flesh wounds without primary arterial lesion. The series which will be here presented numbers one hundred and ninety-five instances,—one hundred and ninety-four ligations of arteries and one of the saphenous vein. It will be noticed, however, that among the hundred and ninety-four cases of arterial ligations there were six instances in which the femoral vein was simultaneously tied with the artery it accompanied.

[1] An analysis of the series shows 1 fatal case of bleeding from the external iliac; there were 23 cases of hæmorrhage from the femoral, with 18 fatal results, 3 recoveries, and 2 unknown. The hæmorrhages from the profunda, circumflex, and other branches were 19 with 5 deaths. There were 13 cases of secondary bleeding from the popliteal with 8 deaths; 6, of bleeding from the anterior tibial with 1 death, and 15 of the posterior tibial with 9 deaths. It is hardly necessary to follow out the statistics of the smaller vessels. There were 13 cases of profuse venous hæmorrhage of which 10 were fatal. This includes 4 cases of bleeding from the femoral veins, all of which were fatal.

A fatal instance of *deligation of the common iliac artery* is first detailed, constituting one of the six instances in which this operation was practised during the American civil war. This operation now (1877) foots up sixty-one cases with forty-eight deaths:

CASE 82.—Private J. Bouer, Co. I, 48th Pennsylvania, aged 19 years, was wounded at Tolopotomy Creek, May 31, 1864, and admitted to the field hospital of the 2d division, Ninth Corps. Surgeon J. Harris, 7th Rhode Island, noted, "shot flesh wound of both thighs by a minié ball." Four days after being wounded the man entered Judiciary Square Hospital, Washington. Assistant Surgeon A. Ingram, U. S. A., corroborated the above description of the injury, and reported the result as follows: "Disorganization of tissue from a deep flesh wound; hæmorrhage took place on June 10th, from the small vessels, and was controlled by pressure, but recurred on June 15th, when the femoral artery was taken up at Scarpa's triangle. This vessel was again ligated, on June 18th, at Poupart's ligament; hæmorrhage again occurred on the morning of June 22d, when the common iliac was ligated. The patient died during the day." The report does not show which of the two limbs was operated on, and diligent search has revealed no additional record of the particulars of the case.

The reader may compare, on page 333 *et seq.* of Volume II of Part II, the details and comments on four other examples of ligation of the common iliac artery practised during the War, two for shot wounds of the pelvis and two on account of aneurisms arising from punctured wounds. Yet another instance of unsuccessful ligation of the common iliac artery for consecutive hæmorrhage after a shot wound of the pelvis has been recorded by Medical Inspector F. H. Hamilton, U. S. A. The particulars, so far as they can be ascertained, are stated in the foot-note.[1]

Ligations of the External Iliac Artery.—In four of these examples ligatures were placed at first on this trunk, but in the seven remaining cases after the femoral had been tied.

CASE 83.—Private G. W. Husk, Co. F, 1st Maryland Cavalry, aged 47 years, was wounded at Deep Bottom, August 16, 1864. Assistant Surgeon C. Wagner, U. S. A., reported,[2] from the hospital at Beverly, New Jersey: "Admitted from City Point with a gunshot flesh wound of the upper third of the right thigh. Bleeding occurred from the femoral artery on November 10th, fifteen ounces of blood being lost. The patient was feverish, pulse 130, appetite wanting. Acting Assistant Surgeon J. C. Morton administered chloroform and ligated the external iliac artery. The patient died November 17, 1864, from recurrent hæmorrhage."

CASE 84.—Private *J. H. Gatewood*, Co. F, 21st Georgia, aged 32 years, wounded at Manassas, August 28, 1862, Surgeon J. Chambliss, P. A. C. S., reported:[3] "Small ball entered just behind the left trochanter, passed out below the perineum, entered the right thigh opposite, and emerged at the external aspect at middle of upper third of the thigh; bleeding was profuse for several minutes. Aneurism of the femoral artery; digital compression repeatedly used without avail. January 31, 1864, ligation of the external iliac artery, pretty much after Cooper's method, by Surgeon Jackson Chambliss, P. A. C. S. February 3d, erysipelatous inflammation subsided. February 15th, the wound presented a healthy granulated appearance and discharged healthy pus. He continued to improve until February 17, 1864, when violent arterial hæmorrhage occurred, from which he died in a few minutes."

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[1] Professor FRANK HASTINGS HAMILTON, A. M., M. D., LL. D., in *The Principles and Practice of Surgery*, New York, 1872, in treating of ligations of the common iliac, states, at page 232, that: "On the 15th of May, 1864, after the battle of the Wilderness, I tied the same vessel in the presence of Dr. WALSER and my student Mr. HOYN. The patient, John E. Preston, of the 19th Pennsylvania Vols., had been wounded by a rifle-ball which had traversed the pelvis, and the operation was made to arrest a hæmorrhage which had already nearly proved fatal. He died on the following day, but without a recurrence of the bleeding." In editing the surgical report in *Circular* No. 6, S. G. O., 1865, p. 78, I cited from the records but three cases of ligation of the common iliac practised during the American civil war,—the operation on the left common trunk by Surgeon J. COOPER MCKEE, U. S. A., for hæmorrhage after shot wound of the pelvis (which afforded the specimen 3464, Sect. I, A. M. M.), and the operations by Acting Assistant Surgeon R. N. ISHAM of Chicago, and J. B. CUTTER of Newark, for aneurisms consequent on stabs. In the seventh chapter of Volume II, of Part II, of the *Medical and Surgical History of the War*, pp. 233–6, these three cases of ligation of the common iliac artery were detailed, and a fourth operation of ligation of this trunk for hæmorrhage following shot injury, in the case of Colonel J. R. Scott, 19th Illinois, was quoted from the report of the operator, Professor D. BRAINARD, in the *Chicago Medical Journal*, 1864, Vol. XXI, p. 97, and reprinted in the *Am. Jour. Med. Sci.*, 1864, Vol. XLVII, p. 565. The operation of ligation of the common iliac for hæmorrhage after shot flesh wound of the lower extremity reported above (CASE 82) by Assistant Surgeon A. INGRAM, U. S. A., is the fifth, and the case adduced by Professor F. H. HAMILTON is the sixth, example of the war-series of this important procedure. From Professor HAMILTON'S printed report of the case of Preston I was unable to trace the injury upon the records, as there is no mention made of it either in the 19th or 119th Pennsylvania Volunteers; but after repeated diligent search the original manuscript entry of the case was found on the field register of the 3d division of the Sixth Army Corps hospital, at the Baptist Church, Fredericksburg, Virginia. It is there stated that Corporal John E. Preston, of Co. G, 119th Pennsylvania, was wounded at the battle of the Wilderness, receiving a "gunshot injury of the anterior superior spinous process of the left ilium." The precise date and extent of the injury is not noticed, nor the disposition made of the patient; but, in a list of deaths in the 3d division hospital, Sixth Corps, at the Baptist Church, Fredericksburg, the death of Corporal John E. Preston, on May 14, 1864, is recorded. In another part of the register, signed by Dr. J. W. WALSER, is a list of operations performed at Baptist Church Hospital after the battle of the Wilderness, by Drs. HAMILTON and BUCK, which comprises: "One ligation of the common iliac,—death in twenty-four hours." The data are very imperfect, but the probabilities are, from the documentary evidence accessible, that Corporal Preston, 119th Pennsylvania, was struck, on May 7th, at the Wilderness, by a musket ball which fractured the anterior superior spinous process of the left ilium, and that he was sent to Fredericksburg by the hospital trains that reached that town on May 11th. Further, that uncontrollable hæmorrhage arose, and that Medical Inspector F. H. HAMILTON, U. S. A., ligated the left common iliac artery on May 13th, and that the fatal termination of the case took place twenty-four hours afterwards, May 14, 1864.

[2] See *Report on Interesting Surgical Operations performed at the Hospital at Beverly, N. J., by Assistant Surgeon* C. WAGNER, U. S. A., 1864, p. 13.

[3] CHAMBLISS (J.), *Case of Traumatic Femoral Aneurism—Treated by Digital Compression—Ligation afterwards of the External Iliac Artery*, in *Confed. States Med. and Surg. Jour.*, 1864, Vol. I, p. 97.

CASE 85.—Private J. R. Spaulding,[1] Co. F, 112th New York, aged 23 years, was wounded at Fort Fisher, January 15, 1865. Assistant Surgeon S. H. Orton, U. S. A., reported, from McDougall Hospital, New York Harbor: "A minié ball entered the upper and inner aspect of the left thigh, and, passing a little downward and outward, emerged near the knee, apparently avoiding the bone and all important vessels. Simple dressings were applied for about three weeks, when the wound began to look unhealthy and had a tendency to slough. Solution of the permanganate of potash was freely used and tonics given. On March 23d, hæmorrhage occurred from the posterior wound and was arrested by sulphate of iron and pressure. On March 31st, bleeding commenced from the anterior wound. Dr. Orton applied a ligature to the external iliac artery. On April 21st, the hæmorrhage recurred from the anterior wound, probably through the collateral circulation, which in the meantime had become established. The bleeding was successfully restrained by the application of the horse-shoe tourniquet, which was kept constantly retained for the space of two weeks, when it was omitted without any subsequent recurrence of the hæmorrhage. At this time the patient was greatly afflicted with bed-sores, which were a source of great annoyance and sufficient to exhaust his strength. The wounds, however, were healing kindly. On May 31st, the patient was attacked with dysentery, which, in his enfeebled condition, resisted all efforts at once. The patient continued to sink under this complication, and died June 15, 1865, five months after the receipt of the original injury and about two and a half months after the operation of ligating the artery. At the time of his death the wounds were nearly healed."

The fourth case of this group is that of Private *J. Langford*, printed in full in the *American Medical Times*, 1863, Volume VI, page 256. A somewhat extended abstract of this interesting case is here appended:

CASE 86.—Private *J. R. Langford*, Co. F, 10th Georgia, was wounded at Antietam, September 17, 1862. Assistant Surgeon R. F. Weir, U. S. A., reported from the hospital No. 1, Frederick, that the patient entered that hospital October 27th. He had been struck by a musket ball which entered half an inch below Poupart's ligament, below the right groin, just over the vessels, and made its exit on a line with the right tuber ischii, about two inches and a half behind it. Profuse immediate hæmorrhage of arterial color produced syncope, and there was recurrent bleeding when the fainting was over. The patient was confined to his bed only about a week, and, by September 27th, both orifices had cicatrized. When he left his bed the thigh was flexed on the pelvis, extension causing pain. On October 27th, an examination revealed an aneurismal pyriform tumor in the right groin, its apex directed toward the scrotum and the greatest transverse diameter corresponding with Poupart's ligament. At the base its diameter extended to the vessels about four and a half inches; at the apex, internal to the vessels, and about three inches external to the vessels. Starting from Poupart's ligament, the tumor extended in its outer portion three fingers' breadth toward the anterior superior spine, and in the iliac fascia it extended a similar distance. Near the cicatrix of the wound of entrance the aneurismal thrill was very distinct. The patient said he perceived this thrill since he had been able to go about. The prominence of the tumor was moderate. The limb was flexed on the pelvis at an angle of about 45°. Neuralgic pains affected the anterior surface of the thigh and bitterly increased in its intensity. Pressure on the aorta or external iliac completely arrested pulsation. The pulsation of the posterior tibeal at the ankle was feeble. The patient was of fine physique, and reported himself as in excellent health prior to injury. By November 5th the tumor had rapidly augmented in bulk, and, after consultation, it was determined to operate by Syme's method on the following day. The measures proposed contemplated compression on the right common iliac, an incision through the cicatrix of the wound of entrance sufficient to introduce the left index, and feel and plug the original opening into the artery, then to freely lay open the sac and ligate the vessel above and below the point of injury. November 6th, at noon, patient was placed under ether. A straight incision two inches long, starting from just within the middle of Poupart's ligament and running obliquely downward along the thigh, was made. The upper end of this opening was prolonged by a curved incision one and a half inches long, running upward and outward as far as the ligature of the external iliac artery. This incision was deepened through the superficial fascia, and the knife being then laid aside, the dissection was carried on by means of the handle of the scalpel and the finger nails. The lymphatic of the saphenous opening was thus brought into view, immensely enlarged, congested, and pushed upward. The aneurismal tumor was found to have partially forced its way through this opening, overlapping its upper edge like a femoral hernia. Commencing at the inner margin of this opening the dissection was carried on without much difficulty to Poupart's ligament, which was found very tense, and the artery could be felt beating just beyond. The upper end of the incision was then prolonged one inch toward the umbilicus, and after dividing the tendons of the external oblique on a director, the ligament was divided directly over the artery by blunt-pointed scissors. The sheath of the artery was soon brought plainly into view and its covering pushed up to one-half inch beyond the epigastric and circumflex arteries, at which point a ligature was placed around from within outward by means of a Mott's aneurismal needle. The effect of ligation was to arrest pulsation in the tumor. The curved wound was closed by means of silver interrupted sutures. One small artery, the superficial epigastric, required ligation. Not more than one ounce of blood was lost during the operation. The limb was enveloped in cotton batting. An anodyne was given after recovery from the anæsthetic, and repeated at midnight. At 4 o'clock P. M. the patient was quiet; pulse 120, temperature of sound limb 93, of limb operated upon 95 in popliteal space. November 7th, patient passed a quiet night, though sleeping but little, and states that the neuralgic pains have ceased. In a paper on *Hospital Gangrene*, by Acting Assistant Surgeon A. North, printed in the

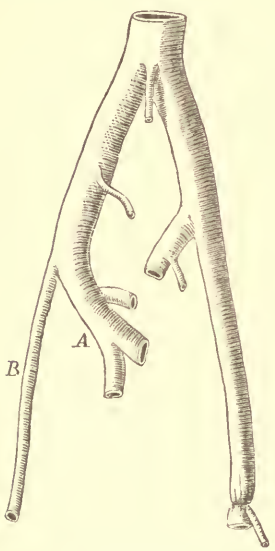

FIG. 14.—Ligation of right external iliac for shot injury. *Sp.* 3986.

[1] The case is briefly noted by Surgeon J. A. LIDELL, U. S. V., *Gunshot Wound of Thigh, etc.*, in *Surgical Memoirs of the War of the Rebellion, coll. and pub. by the U. S. San. Comm.*, 1870, Surgical Vol. I, p. 231.

American Medical Times, 1863, Volume VI, p. 257, the sequel of the history is given: "The operation was successful, and in two weeks the wound was nearly healed, when it took on an unhealthy action, and patient then complained of a burning pain in it. Anticipating what was coming, he was immediately moved to a stone building where there had previously been no gangrene; and here, November 21st, he came under my care. He remained here for four days before the disease became sufficiently developed to justify his removal to the gangrene tent. November 25th, patient is very desponding, and is growing weaker day by day; has considerable headache; pulse 120 and almost imperceptible; tongue furred, brown, tip and edges red and dry. The ulcer, which is three inches in width, extends from the pubes up nearly to the anterior spine of the ilium; has an unhealthy and sloughy appearance. Patient complains of a slight burning pain in wound, the edges of which are everted, jagged, and undermined for about two inches; the integument is indurated and tumefied, and extremely sensitive to the touch or the least movement of the limb; characteristic odor not well marked. The sinuses extending under the integument were freely laid open and the surface of the ulcer scraped with a spatula, to which the acid was first applied with a mop, and then worked in with a stick so as to get it down to the comparatively healthy tissue, and was also applied in a similar manner to the tissue surrounding the ulcer, to destroy, in this way, both the cuticle and cutis vera and thus to limit the extension of the disease. Superficially antiseptic poultices were applied, and opiates given to relieve pain; takes half an ounce of brandy and beef-tea every half hour. November 26th, although the pain following the application of the acid was so severe as to cause slight convulsions for a time, patient is feeling better to-day; pulse 108 and gaining in strength. Fearing that the progress of the disease has not been entirely arrested, the acid was again thoroughly applied. Takes stimulants and tonics, with fifteen grains of tartrate of iron and potass three times a day. November 28th, the black, charred slough has separated, revealing a healthy, granulating surface beneath. The extreme sensitiveness to the touch, together with the induration and swelling of the surrounding parts, has almost entirely disappeared; applied oakum saturated with acid wash to the ulcer. December 5th, patient represents himself as feeling much better; mind hopeful and cheerful; appetite good; ulcer is cicatrizing rapidly; continue stimulants and tonics. December 15th, all unfavorable symptoms have disappeared and patient is regarded as convalescent. For two months after this date patient was up and about the ward, when secondary hæmorrhage, following sloughing of the sac, supervened, and in four days resulted fatally," March 15, 1863. Assistant Surgeon R. F. Weir's notes state that a sudden change occurred on February 25th, when, in the evening, the patient had high fever; pulse 140 and almost imperceptible. On February 27th, considerable pain over the right tuber ischii and knee joint. A consultation failed to discover the cause of this change for the worse. On March 2d, an opening formed at the upper portion of the cicatrix and discharged twelve ounces of ill-conditioned pus. The opening was enlarged and examined digitally and with a probe; the cavity was syringed out. March 9th, the patient's condition had improved since the opening of the sac. March 13th, about the same, discharge increasing in quantity. It was decided to make a counter opening at the lower extremity of the sac, on the inside of the thigh, and seven ounces of fetid pus escaped, which was soon succeeded by a jet of arterial blood. The sac was laid freely open and a compress of sheet-lead was held over the sac by an assistant provided with relays of assistants. About seven ounces of blood was lost during the operation. On March 14th, at 9 o'clock A. M., pressure was removed and bleeding occurred, five ounces being lost. Pressure was again applied. On March 15th, the patient was much brighter, and it was decided to keep up pressure until bleeding recurred, and then to enlarge the lower opening, search for the bleeding point, and, if it could not be found, to freely lay open the sac. At 7 o'clock P. M., seven ounces of blood were lost. Chloroform was given and the opening enlarged; clots were turned out, the entire cavity was exposed, and nothing more than a general oozing could be found. The cavity was thoroughly cleansed, and the slight oozing of blood was stopped by cold water. The patient sank soon afterwards, from the antecedent hæmorrhages and the shock of operation. An autopsy was made four hours after death: "Body much emaciated; rigor mortis well marked; right thigh flexed on pelvis and everted. The incision, made for the purpose of opening the suppurating cavity to arrest the hæmorrhage which occasioned death, was seven inches long, commencing about one and a half inches to the inner side and on a level with the anterior superior spinous process, and terminating on the inner side of the thigh. The thickness of the tissue divided, part of which was cicatricial, was about three and a quarter inches, in which ran the femoral vessels. These were found to have been divided by this incision but did not otherwise directly communicate with the aneurismal cavity. This cavity occupied the iliac fossa of the right side and was situated between the fibres of the iliac muscles, and had crowded the caput coli toward the median line. It extended from a level with the fourth lumbar vertebra to four and a half inches below Poupart's ligament. The sac or abscess in the thigh was about four inches in diameter and of a size nearly to contain a fœtal head. It had dissected up the tissues with the exception of the tendons, psoas, and iliacus from lesser trochanter, and anterior and inner surfaces of the femur. Below this point, at the bottom of the cavity, a track extended to the inside of the lesser trochanter and approached to within an inch of the surface of the tuberosity of the ischium. Another track extended in front of the pubes toward the root of the pubis. This extensive cavity contained about four ounces of coagulum mixed with blood, which gave to the smooth wall a sloughy appearance. At the inferior, beneath the femoral artery, a small quantity of fresh coagulum was found in the cellular tissue, suggesting the idea that the hæmorrhage had proceeded from this point, but the vessels causing it could not be found. An attempt had been made to inject the artery, but had failed for the want of proper instruments. On dissection of the abdominal walls the peritoneal cavity and its contents were found in a healthy condition. The external iliac artery of the right side, from its origin to the point of ligation, had diminished to a small cord about one-eighth of an inch in diameter, firm to the touch, and of a dark color from its containing clot. The principal branch of the external iliac, the epigastric, and circumflex were found larger than the corresponding arteries of the left side. The sacral artery was also enlarged. The chain of lymphatic ganglia along the inside of the iliac artery was much enlarged and indurated, and the tissue in the region of Poupart's ligament had been much altered and firmly matted together by inflammatory action. The femoral artery, as it passed under the ligament, was nearly three-fourths of an inch nearer the pubis than usual. The femoral vein was in a normal condition. The artery below the point of ligature to the point of division, in the operation immediately preceding death, was about three and one-fourth inches in length. This portion was laid open, together with the upper portion of the femoral artery, in order to ascertain, if possible, the locality of the original injury. About one and a half inches below the origin of the epigastric and its inner margin there was a faint permanent discoloration, which also

presented a slight linear appearance; elsewhere the artery presented no peculiar appearance." The specimen is represented in the wood-cut (FIG. 14), drawn from the preparation 3986, Section I, A. M. M., and presented by Dr. Weir to the Museum.

In the other seven cases of ligation of the external iliac the femoral artery had previously been ligated. Successful results were finally attained in two instances:

CASES 87–93.—Private J. S. Degolia, Co. A, 76th Pennsylvania, aged 32 years, wounded at Drury's Bluff, May 16, 1864. Surgeon A. Heger, U. S. A., described the injury and its result as follows: "The patient was admitted to the Point Lookout Hospital May 19th, having been wounded by a musket ball entering the right hip at the external and posterior aspect, passing across, over the pubes, to the left thigh, and downward toward the knee, wounding the great vessels of the left side, and making its exit one inch above the knee, on the external surface. On May 24th, the femoral artery was ligated above the wound two inches below Poupart's ligament. The patient was much prostrated from the severity of the wound and loss of blood. Stimulants were used, and warm applications to the limb. Repeated hæmorrhage required the ligation of the external iliac on May 29th. The patient died, of gangrene, June 1, 1864. The first operation was performed by Surgeon A. Heger, U. S. A., and the second by Surgeon J. H. Thompson, U. S. V."—Private W. S. Marshall, Co. E, 11th Pennsylvania Reserves, aged 26, wounded at Gaines' Hill, June 27, 1862. Assistant Surgeon C. Wagner, U. S. A., reported that the patient was admitted into Hammond Hospital with a "gunshot wound of the right thigh and false aneurism of the femoral artery. The aneurism measured six and a quarter inches in its longest diameter. Dr. Wagner ligated the femoral near Poupart's ligament. On September 6th, hæmorrhage to the extent of forty ounces occurred from the femoral artery. Dr. Wagner then tied the external iliac. The bleeding did not recur. The patient died September 16, 1862, from exhaustion."—Private H. Locke, Co. H, 6th Vermont, aged 23 years, wounded at the Wilderness, May 5, 1864. Surgeon Henry Janes, U. S. V., reported, from Sloan Hospital, Montpelier: "Gunshot wound, right thigh; ligation of femoral and iliac arteries for secondary hæmorrhage. Transferred to Veteran Reserve Corps December 5, 1864."—Sergeant-Major L. C. Sears, 5th New Hampshire, aged 22 years, wounded at Fredericksburg, December 13, 1862. Surgeon T. Antisell, U. S. V., reported from Harewood Hospital, Washington: "A conical ball entered the right thigh two inches below Poupart's ligament. On the morning of December 19th there was a slight hæmorrhage from the wound. Search was made for the ball without result. A counter opening was made and a seton inserted. He remained very comfortable until the 22d instant, when a severe hæmorrhage occurred, which necessitated the tying of the femoral in the ward, by Dr. Antisell. On Sunday, January 4, 1863, there occurred a hæmorrhage which was arrested by means of styptics and compression. Another hæmorrhage followed on the evening of January 7th, which could not be controlled by styptics. Search was made for the bleeding vessel without result. The patient lost much blood. On the following morning, January 8th, the patient was again brought into the operating room and the wound was carefully explored, but the bleeding vessel was not found. The operation of tying the external iliac artery was then performed by Dr. Antisell, in the hope of arresting the hæmorrhage permanently. The operation was no sooner completed than there was a welling up of blood from the point from which the previous hæmorrhage had proceeded. Styptics and compression were applied, and the patient was returned to the barrack. Stimulants and beef-tea were freely given, and warmth was applied to the extremities to restore reaction. He revived toward evening, and remained sensible and quite comfortable until the evening of the 10th instant. He died January 11, 1863, from exhaustion."—Lieutenant J. A. McQuillan, Co. I, 38th Ohio, aged 25 years, wounded near Atlanta, July 29, 1864. Surgeon J. H. Phillips, U. S. V., reported, from Hospital No. 1, Chattanooga: "Gunshot wound of right thigh. Hæmorrhage occurred on September 20th, thirty ounces of blood being lost. The femoral artery was ligated September 20th, in the wound, which was gangrenous. On the 26th, the hæmorrhage again returned, and it being found impossible to ligate it again in the wound, the external iliac was ligated just above Poupart's ligament, after which the hæmorrhage did not recur, but the gangrene continued, and the patient sank, and died October 2, 1864."—Private R. B. Cornwell, Co. A, 23d Ohio, aged 23 years, wounded at South Mountain, September 14, 1862. Assistant Surgeon W. E. Waters, U. S. A., reported from Caspari Hospital that the patient died November 3, 1862, of peritonitis. Acting Assistant Surgeon L. Heard reported:[1] "The shot had entered some four inches below Poupart's ligament, over the track of the femoral artery. An examination gave evidence that the femoral artery had been wounded and that a traumatic aneurism was forming. Water dressing was applied till the 29th, when compression by means of a horse-shoe tourniquet was made, and continued until October 4th. On October 10th, Drs. J. F. May and Shippen, assisted by Drs. Hall and Seeley, ligated the femoral artery. Ligatures were placed on the cardiac and distal sides, and the vessel was divided between the two ligatures. On the sixth or seventh day bleeding occurred, which was soon arrested and a tourniquet placed upon the limb. In about a fortnight after the operation the proximal ligature came away of itself, with knot and loop at the end. On October 30th, profuse secondary hæmorrhage took place, which greatly reduced the strength of the patient. Dr. May ligated the external iliac artery. The patient gradually sank, and died November 3, 1862."—Sergeant J. K. Zeiders, Co. I, 53d Pennsylvania, aged 19 years, wounded near Gettysburg, July 3, 1863. Acting Assistant Surgeon W. V. Keating reported, from Broad Street Hospital, Philadelphia: "Gunshot flesh wound of the right thigh by a conical ball. The wound sloughed, and secondary hæmorrhage occurred from the femoral artery on July 28th. The hæmorrhage recurring on August 4th, Acting Assistant Surgeon A. Hewson ligated the femoral artery just above Scarpa's triangle, and on August 11th again ligated the vessel higher up. The thigh became somewhat œdematous; by October 28th the wounds of the previous ligations had nearly healed externally. A sinus extended into the tissues below, which were found to be in a softened broken-down condition; ligature separated. On October 8th, Dr. Hewson administered ether and ligated the external iliac artery through a curved incision about three inches long; about six ounces of blood lost. October 25th, slight hæmorrhage from point of ligature, and another in the afternoon, amounting in all to about six ounces; controlled by styptics to wound and oil of turpentine and veratrum viride internally. Pulse 130 and weak." The patient was discharged from service May 14, 1864.

[1] HEARD (L.), *Wound of the Femoral Artery—Ligation of both Cardiac and Distal Sides of Severed Vessel—Secondary Hæmorrhage—Ligature of External Iliac—Peritonitis—Death;* in *Am. Med. Times*, 1862, Vol. V, p. 337; and *Boston Med. and Surg. Jour.*, 1862, Vol. LXVII, p. 369.

Professor John Ashhurst, jr., has lately remarked[1] that a study of the statistics of the operations of tying some of the larger arteries impresses the fact that "as cases have accumulated, the percentage of mortality has greatly increased."[2] This comment, however, is less applicable to the series of ligations of the external iliac artery.[3] In studying the statistics the operations for disease and for traumatic cause must be discriminated. The war cases have a fatality more than twice as great as those in civil practice.[4]

Ligation of the Femoral Artery.—In a previous portion of this section, commencing at page 16, reference is made to sixty-two ligations of the femoral artery for direct shot injury of the vessel, with the large mortality of 72.6 per cent. An interesting example of a well-managed successful case is adduced, and the great importance of ligating the distal as well as proximal extremities of the vessel is urgently enjoined. In addition to these sixty-two cases there were sixty-five instances in which the femoral artery was tied for consecutive bleeding unattended by primary injury to the vessel. The hundred and twenty-seven examples are enumerated in the summary entitled TABLE III. This series presents the same grave mortality as when the cases of direct lesion of the vessels were separately considered. References to publications of detailed cases are given; a few abstracts will be presented of cases which furnished pathological material for the Museum:

CASE 94.—Private B. Ayres, Co. A, 5th Iowa, aged 40 years, was wounded at Vicksburg, May 19, 1863, transferred by hospital steamer to Memphis, and admitted into Gayoso Hospital on the 27th. On the Medical Descriptive List appear the following notes by Acting Assistant Surgeon A. W. Nelson: "A minié ball entered the left thigh through the centre of Scarpa's triangle, passing to the inside of the vein and out at the lower part of the left nates. At the time of admission the wound was in a very dirty and sloughing condition and the skin had a dark tinge. There was considerable diarrhœa, with free perspiration; he was dozing a good deal of the time without any opiate; pulse 100. Water dressings were applied, and he was ordered to lie on the abdomen occasionally to allow the discharge to escape. Ale was given daily. He had a severe rigor on the evening of the 30th, and on the 31st, at 7 o'clock P. M., had hæmorrhage from the anterior wound, which was checked by a compress. Fifteen grains of quinine were divided into four powders, one powder to be given every four hours. At 2 o'clock P. M. on June 1st the wound was opened to the sheath of the femoral vessels and a darning needle removed from the sheath; there was no hæmorrhage, and all compression was removed. The wound was thoroughly cleansed, and the patient removed to bed. About 8 o'clock P. M. blood, in large quantities, burst forth in a jet, apparently from below; it was quite dark, but the exact shade was not observed. The femoral artery was immediately ligated, but with difficulty owing to the thickened and diseased condition of the parts. There was no hæmorrhage after ligation, but patient did not rally under the use of stimulants, and he died at 11 o'clock P. M. Chloric ether was used during the operation. The autopsy disclosed great sloughing in the course of the wound. There was a slough of the femoral vein of the size of a three-cent piece. The vein was pierced by the large needle alluded to above, two small holes existing opposite each other; the artery was healthy. It was observed that well marked symptoms of pyæmia existed several days before his death; however, the autopsy was not carried far enough to verify this diagnosis." The specimens (FIG. 15) consist of wet preparations of the left femoral artery ligated below the origin of the profunda, and of the femoral vein, showing the point of perforation by the needle, which were contributed by Dr. Nelson.

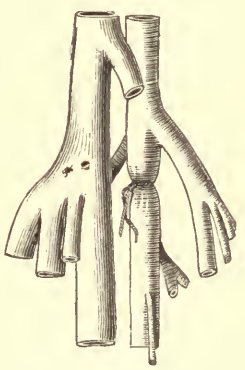

FIG. 15.—Femoral artery and vein. Ligation of artery. *Specs.* 2085, 2020.

[1] *Transactions of the International Medical Congress of Philadelphia*, 1877, p. 572.

[2] Thus Professor ASHHURST observes that when Dr. G. W. NORRIS published his classical paper in 1847 (*Am. Jour. Med. Sci.*, Vol. XIII, p. 24), he had collected sixteen cases of ligation of the common iliac artery with eight recoveries and eight deaths, a mortality of fifty per cent., while there are now recorded sixty-one cases with only thirteen recoveries and forty-eight deaths, a mortality of seventy-nine per cent.

[3] Thus HODGSON (*Treatise on Diseases of Arteries, etc.*, 1815, p. 416) enumerated twenty-one instances of ligations of the external iliac following the first operation by ABERNETHY, in 1796, and fifteen of the twenty-two patients completely recovered, or 68.2 per cent. In 1875, Dr. RABE collected (*Deutsche Zeitschrift für Chir.*, Leipzig, 1875, B. V, p. 213) two hundred and seven cases of ligations of the external iliac, of which one hundred and thirty-five recovered, or 65.2 per cent., advancing the death rate but 3 per cent., though the number of cases is decupled.

[4] Among American Surgeons two principal methods of ligating the external iliac artery are taught and practised. ABERNETHY, who first ligated this vessel on the living subject in 1796 (*The Medical and Physical Journal*, London, 1802, Vol. VII, p. 97, and *The Surgical and Physiological works of* JOHN ABERNETHY, London, 1830, Vol. I, p. 292), made a perpendicular incision "about three inches in length, through the integuments of the abdomen in the direction of the artery, and thus laid bare the aponeurosis of the external oblique muscle, which was next divided from Poupart's ligament, in the direction of the external wound, for the extent of nearly two inches. The margins of the internal oblique and transversalis being thus exposed, the finger was introduced beneath them for the protection of the peritonæum, and they were divided. Next, the peritonæum and its contents were pushed upward and inward, and the external iliac artery taken hold of with the finger and thumb. It now only remained to pass a ligature round the artery and tie it; but this required caution on account of the contiguity of the vein." In his second case, ABERNETHY made his incision in a line a little external to the artery to avoid the epigastric. Both of these operations failed, but ABERNETHY'S third and fourth attempts were completely successful. Sir ASTLEY COOPER'S operation is generally preferred as endangering the peritoneum less, and less weakening the abdominal parietes so as to give a tendency to hernia. Sir A. COOPER saved four of his six patients. His method of operating is described in HODGSON (*op. cit.*, p. 42), by HARRISON

CASE 95.—Private S. Brown, Co. G, 134th New York, aged 16 years, was accidentally wounded on August 30, 1862, and entered the Mansion House Hospital, Alexandria, six days afterwards. Assistant Surgeon W. A. Conover, U. S. V., contributed the following report of the injury: "The ball entered the left leg at the posterior middle third, penetrated the tibialis posticus muscle, and was extracted at the same opening. At first there was free discharge of laudable pus, but suppuration increased rapidly, and by September 26th infiltration of the tissues had nearly reached the popliteal space. Under a supporting treatment the patient seemed to gain rapidly until November 14th, when, during his sleep, a profuse hæmorrhage occurred from the sloughing of the posterior tibial artery and a great quantity of blood was lost before it was discovered. His condition not admitting an operation, the wound was plugged with styptics and a bandage was applied from the toes to the hip. This treatment controlled the hæmorrhage for eight days, stimulants being given freely in the mean time in order to prepare the system for an operation, if necessary. On November 28th another attack of bleeding was promptly controlled by the attendant, and, upon consultation, ligation of the femoral artery at the lower third was agreed upon as giving the patient a chance for his life. The operation was performed with some difficulty, owing to the abnormal structure of a branch artery which had to be carefully avoided. The patient bore the operation very well considering his condition, and, on the following day, his extremities were perfectly warm and remained so, showing that circulation had been re-established. The discharge, however, continued excessive, and although stimulants and tonics were used very freely, the patient sank steadily, and died of pyæmia on December 7, 1862. The autopsy confirmed the extensive disorganization from infiltration of pus, the artery being in an unhealthy condition up to within an inch of the ligature. The tying of the artery was a success, the clot having been perfectly formed and the circulation re-established by the profunda, which was sufficiently enlarged for the purpose." The ligated artery was contributed by Dr. Conover, a wet preparation of which is shown in the cut (FIG. 16).

FIG. 16.—Ligation of femoral. *Spec.* 1024.

FIG. 17.—Left femoral artery tied four and a half inches below the profunda. *Spec.* 3972.

CASE 96.—Private W. Colgan, Co. C, 2d Massachusetts Cavalry, aged 21 years, was wounded at Berryville, September 14, 1864. On the following day he was admitted to hospital at Sandy Hook, and three days afterwards he was transferred to Frederick. Assistant Surgeon R. F. Weir, U. S. A., reported: The wound was caused by a conoidal ball, which entered on the outer border of the popliteal space of the left limb, took a diagonal course up behind the femur, and emerged on the inner aspect at the lower portion of the upper third. The patient was very anæmic when admitted, and stated that he lost a considerable amount of blood on the field. Stimulants and generous diet were ordered. On September 24th there was an attack of hæmorrhage to the amount of twelve ounces, which was checked by compression. On the following day another hæmorrhage occurred, when the femoral artery was ligated four and a half inches below the profunda by Acting Assistant Surgeon J. C. Shimer. On the morning of September 28th there was slight oozing of arterial blood, when the openings were enlarged and the source of bleeding searched for ineffectually. Recourse was had to digital compression. Death ensued at 10 o'clock, September 28, 1864. At the *post-mortem* (see the adjoining wood-cut, FIG. 17) the femoral and profunda arteries were found to be intact. (See the *Catalogue* of the Surgical Section of the Army Medical Museum, 1866, p. 433.)

CASE 97.—Private I. Curler, Co. G, 5th Michigan, was wounded at Fair Oaks, May 31, 1862, and admitted to Hygeia Hospital, Fort Monroe, four days afterwards. Surgeon R. B. Bontecou, U. S. V., reported: "Gunshot wound of femoral artery, the ball entering the anterior and middle portion of the right thigh and passing out opposite posteriorly, going close to the inside of the femur. The temperature of the limb was good, although the artery at the ankle beat feebly. Hæmorrhage from both wounds occurred on June 10th, and returned in a few hours. An unsuccessful attempt to find the artery below the wound was made, and I tied the femoral, as I supposed, above the profunda; but pulsation being so strong in the artery exposed below the ligature, further search was made and the profunda was found unusually high up. This was also tied, and no hæmorrhage returned. The foot, before the operation warm, now became cold; but by the aid of external heat its temperature returned on the following day. The patient was a fine healthy looking young fellow. He was transferred to New York by steamer on June 12th." Surgeon S. W. Gross, U. S. V., contributed the specimen shown in the annexed cut (FIG. 18) and reported the result of the case as follows: "The patient was admitted to DeCamp Hospital, David's Island, New York, June 15th, and was placed under the charge of Acting Assistant Surgeon W. K. Cleveland. At the time of his admission the ligature had come away but the wound had not united. On June 17th, profuse hæmorrhage occurred from the profunda femoris, around which a ligature was cast. The patient, however, had lost so much blood that he succumbed two hours after the operation." The specimen (FIG. 18) consists of a small section of the femoral and profunda arteries, and shows the femoral blocked up with a clot at the seat of the ligature, also the ligature around the profunda, where another clot was formed.

FIG. 18.—Section of right femoral and profunda. Ligature on the former has cut its way out. *Spec.* 1004.

CASE 98.—Private D. Rapp, Co. K, 7th Indiana, aged 20 years, was wounded at Robinson's Creek, November 30, 1863. He was admitted to the field hospital of the 1st division, First Corps, where Surgeon G. W. Metcalf, 76th New York, noted: "Gunshot wound of left thigh." On December 6th, the wounded man was transferred to Douglas Hospital, Washington. Three days afterwards he was operated on by Assistant Surgeon W. Thomson, U. S. A., who furnished the following detailed

(*Surg. Anat. of the Arteries*, 4th ed., 1839, p. 351), and most of the text-books. Dr. STEPHEN SMITH has published a good account of thirty-two deligations of the primitive iliac artery (*Am. Jour Med. Sci.*, 1860, Vol. XL, p. 17). I have mentioned many of the more recent cases in a foot-note to Part II, Vol. II, p. 333, of the *Med. and Surg. Hist. of the War*. But by far the most comprehensive analytical summary furnished is given by Dr. L. RABE [*Zur Unterbindung der grossen Gefässstämme in der Continuität by Erkran-Kungen und Verletzungen der unteren Extremitäten*, in *Deutsche Zeitschrift für Chir.*, Leipzig, 1875, B. V, p. 213), who tabulates 207 cases of ligations of the external iliac, of which 72, or 34.7 per cent., proved fatal. Of these 207 cases the author distinguishes 34 with 22 deaths (64.7 %) as war cases, and 173 with 50 deaths (28.9) as cases from civil practice. In four of the cases from civil life the common iliac was afterwards ligated (twice successfully), and in one of the cases from war practice the same vessel was tied with temporary success. This was Dr. BRAINARD'S case, published in the *Chicago Med. Jour.*, 1864, Vol. XXI, p. 97, which Dr. RABE quotes from Professor GÜRLT'S *Jahresbericht* for 1864.

report of the case: He was a well developed and very muscular man and had been apparently in good health. At the moment of injury he was retreating, and was struck by a bullet on the posterior aspect of the left thigh a short distance below the gluteal fold, which passed through the limb to the inside of the bone, divided both femoral artery and vein, and made its exit three and a half inches below Poupart's ligament, at the point of election in ligating the femoral in Scarpa's space. There was profuse hæmorrhage at the time of injury, and an immediate want of sensibility in the leg and foot. When examined on the 7th of December, the whole limb was found warm and the collateral circulation had been established; but there was no pulsation in either of the tibial arteries. At the superior margin of the wound of exit there was a small tense swelling, which pulsated synchronously with the systole of the heart. An aneurismal thrill, resembling the loud purring of a cat, was distinctly felt, extending along the course of the vessels into the pelvis, but not communicating laterally. The little finger was introduced into the wound at the time of the operation, and the pulsation and thrill were found to be closely localized and confined to the divided ends of the femoral vessels. There was no extensive effusion of blood into the tissues of the thigh, and hence this was not in the strict surgical sense of the word a traumatic aneurism. It was concluded that the sac was composed only of the sheath, which had been united by inflammation after the division and retraction of its vessels, and had then been somewhat distended after the heart had regained its force. It was also suggested by Surgeon Lidell, who kindly saw the case with me, that there was a free communication between the divided artery and vein in this sac which permitted the arterial blood to return freely by the vein, as evinced by the pulsation communicating with such force backward toward the heart in the line of the vessels. It was unmistakable that there existed a wound of the femoral artery sufficient to cause its obliteration, that an aneurism was being developed at the divided proximal extremity, and that the proper surgical procedure would be to secure the ends of the vessel at the point of the injury. It was determined to emulate the example of Mr. Syme, to lay open boldly the sac by a free incision and search for and secure the bleeding orifices. It was hoped that the profunda had escaped injury, and every precaution was to be used to secure the femoral below its origin. A small hæmorrhage on December 9th rendered immediate interference necessary, and the following operation was then done with the assistance of Surgeon Lidell and the medical officers of the hospital. After the patient had been fully etherized and the femoral artery thoroughly compressed on the pubes by the thumb of a reliable assistant, as evinced by the loss of pulsation in the tumor, an incision four inches in length was made through the skin and fasciæ, immediately over the tumor and including the gunshot wound, in a line parallel with the sartorius. A second incision was now made into the tumor, which was dilated instantly by the finger to the size of the first. Distal hæmorrhage was anticipated, and it caused but little surprise when a most profuse dark colored torrent poured out from the incision. The lower angle of the incision was rapidly searched in vain for the source of the hæmorrhage, and it was feared that it might come from the dark softened depth of the track of the ball. No pressure on the artery had the least controlling effect upon it. The removal of the sponge was followed instantly by a boiling dark torrent of venous blood, which so quickly filled the cavity as to prevent any examination. So profuse and uncontrollable was the flow that visions of ligating the external iliac were vividly presented to the mind. When the flow was found to arise from the superior angle of the incision numerous and ineffectual efforts were made to secure the vessel, but the parts were so hardened by local inflammation that the forceps glided over them as it would over a cartilaginous surface. This point, from whence the dark blood seemed to flow, was finally compressed by the point of the left index finger, and by means of the nail of the small finger of the right hand a vessel was isolated, a ligature passed around it with an aneurism needle, and this hæmorrhage, most embarrassing because uncontrolled by pressure, was finally suppressed. The first ligature was applied at the superior angle of the incision to the proximal extremity of the divided femoral vein, from which this unexpected and most annoying hæmorrhage escaped by regurgitation from the saphena. The blood found its way into the limb by means of arteries arising from the iliac above the point compressed, was finding its way back by the saphena, enlarged to compensate for the occlusion of the femoral, was poured into the femoral a short distance above its divided proximal extremity, and then regurgitated through the stump of the femoral into the superior angle of the incision. The proximal end of the femoral artery, from which a crimson tide escaped on relieving the pressure slightly, was now easily found, and this was ligated. The wound was now thoroughly cleansed of all clots of blood. The femoral artery and vein, denuded of their sheath for a distance of two inches, were clearly seen at the bottom of the wound, their divided extremities having become adherent to the neighboring tissues during the inflammatory action of the previous ten days. As a precautionary measure a ligature was cast around the femoral artery at the lower angle of the wound, and some little difficulty was experienced in discriminating between the artery and vein, owing to the fact that from ten days' disuse the vein in becoming an impervious cord had become similar in size, color, and consistency to the artery. A small orifice was observed in the vein near its distal extremity, and from this occurred a free black flow on moving the limb. This was also included in a ligature. The wound was now closed by one or two sutures and the patient placed in his bed. A brief recapitulation may give clearness to the above account. The first vessel tied was, therefore, the proximal extremity of the femoral vein near the entrance of the saphena; the second, the femoral artery a short distance below the origin of the profunda, both at the superior angle of the incision; the third, the femoral artery at the lower angle of the incision and two inches from its distal extremity; the fourth, the femoral vein near its distal extremity at the centre of the incision, and to control a flow from an incision through its coats, which may have been made accidentally. The profunda had not been seen, and it was hoped that it would suffice to keep up the circulation. No important arterial channels had been interfered with by the operation, and a successful issue might be expected. The man was stimulated, took morphia, and his leg was covered closely in bed with blankets to preserve the animal warmth. This man had lost blood freely at the time of the injury; he had been subjected to a very long and fatiguing transport in ambulances and cars before reaching the hospital, and for seven days his food had not been as good or sufficient as might have been desired for one about to undergo such an operation. He was pallid and haggard looking, and iron, nutrients, and stimulants were freely ordered. There was great pain and restlessness during the ensuing night, and large quantities of morphia were required to procure sleep. December 10th, no interference with the circulation; leg and foot both warm. The whole limb is swollen, and bloody serum escapes freely at the point of

FIG. 19.—Ligation of femoral artery and vein. *Specs.* 2249, 2250.

the injury. December 12th, the restlessness has been the most marked symptom, caused seemingly by constant and severe but indescribable pain in the limb. The pulse is 120, the countenance pale and haggard, the tongue dry and coated, and the general symptoms indicate great nervous prostration. Large quantities of morphia have been found requisite. The whole limb and foot are much swollen and œdematous. On the evening unmistakable signs of sphacelus appeared, the foot became cold, and a hue of purple discoloration was observed as high up as the ankle. The neuralgic pain and restlessness still continued. On December 13th, all the symptoms were worse. The discoloration, the dark purple hue of gangrene, extended rapidly upward, particularly on the inside of the limb. The whole thigh became crepitant, the pulse more rapid and feeble. He became more and more depressed, and finally died at 12 o'clock at night. These final scenes all surgeons can imagine. The *post-mortem* revealed nothing interesting in the great cavities. The whole thigh and leg were found gangrenous as far as the point of the injury. The vessels were dissected, spread upon a board, and a most faithful picture was made of them by the artist under Dr. Brinton's direction. Only the proximal extremities of the vessels were found in the softened gangrenous mass; but they threw light upon the history of the case. The artery was divided below the origin of the profunda, which was uninjured, but not enlarged, as one would expect if the whole force of the circulation had been directed toward it by the obliteration of the main artery. In ten days the profunda should here have been as large as the femoral, if all the blood brought to the divided femoral had been seeking a passage through its calibre. Its undilated condition gives color to the idea that most of the blood brought to the divided femoral extremity found its way quickly back by the divided femoral vein; that the pressure was thus relieved, and that the profunda received only its usual supply of blood. That the limb was nourished by a collateral circulation, arising above the brim of the pelvis, is clear from the fact that no pressure on the external iliac would restrain the flow of blood from the saphena through the femoral vein. The saphena vein is normal, and its relation with the femoral indicates how easily the regurgitating hæmorrhage was caused, as no valves are there to prevent it. For several days—from the 9th to the 12th—there were no signs of an interference with the circulation, but at that time gangrene appeared and spread with great rapidity. This may have been due to the recent phlebitis of the profunda vein, which is now filled with a pink firm coagulum. The irritation caused by the operation, or due to the passage of the ball, may have induced the inflammation of this vein, now so vital to the support of the circulation. This seems to have been a wound of an artery, resulting in an aneurism the sac of which was composed of the re-united sheaths and enlarged probably by some dissection upward, in which a free passage of blood took place from the artery to the vein. No question as to the propriety of the operation now exists in my mind, since, as the sequel shows, no digital compression over the femoral would have sufficed to prevent or control a secondary hæmorrhage." The two specimens were contributed by the operator, Dr. William Thomson (see FIG. 19). The case is cited by Dr. Lidell.[1]

FIG. 20.—Unsuccessful proximal ligation of the right femoral artery for traumatic aneurism. *Spec.*509.

CASE 99.—Lieutenant R. W. Smith, Co. I, 5th Pennsylvania Reserve Corps, was wounded at the battle of Bull Run, Virginia, August 30, 1862, in the right thigh. He was conveyed to Alexandria in a rough wagon, and thence brought to Washington, and admitted to Douglas Hospital, September 5, 1862, with a circumscribed false aneurism of the femoral artery. The vessel was ligated in the continuity on September 7th. Secondary hæmorrhage followed, and the patient died September 8, 1862. At the autopsy it was ascertained that the hæmorrhage had been temporarily restrained by the direction of the wound and coagula in the large aneurismal sac. Recurrent hæmorrhage had led to the fatal result. The preparation is well represented in the accompanying wood-cut (FIG. 20) reduced to one-half.

CASE 100.—Private J. Hübner, Co. K, 5th Michigan, aged 29 years, was wounded at Fair Oaks, May 31, 1862, and conveyed to New York City one week afterwards. Dr. F. T. Foster, of the New York (Civil) Hospital, reported the following history: "He was admitted on June 8th, having been wounded by a musket ball, which entered the posterior fleshy part of the right thigh and had not been removed. The case presented nothing peculiar, and under simple treatment progressed well until June 27th, when there occurred from the wound a copious arterial hæmorrhage, controlled with difficulty by the application of lint and pressure. On the same day he was etherized and the wound opened; but the source of the hæmorrhage was not discovered. The wound was again stuffed with lint and the limb bandaged, after which Dr. T. M. Markoe tied the femoral artery a short distance below the origin of the profunda. The ligature came away on the 8th of July, and the incision and the original wound soon began to close by granulation. On the 29th the ball could be felt encysted beneath the integument on the anterior aspect of the thigh, but he declined to have it removed. On September 3d he was discharged from the hospital with the wound entirely healed and the limb in good condition." The man was discharged from service, at Fort Hamilton, New York Harbor, October 1, 1862, and pensioned. Examiner H. F. Montgomery, of Rochester, New York, certified, February 2, 1863: "A ball entered the right thigh in middle third, over the femoral artery, and was not abstracted. There is a long cicatrix in this region, and another behind, on the inside of the bone. His foot is benumbed, and, on exercise, swells and is painful. He is apparently in good health. He has a buckshot in the right leg below the knee." Examiner J. J. Lutze, of East Saginaw, Michigan, reported, March 4, 1874: * * "Large tender cicatrices on outer and inner posterior thigh, points of entrance and incision. Adductor brevis and longus muscles impaired and injured." This pensioner's rate of compensation was reduced from five-eighths to one-fourth on March 4, 1873, since which date he has not drawn any pension.

Besides the cases of ligation of the femoral artery above detailed, numerous other cases have been narrated at length in journals or elsewhere, to which references are given further on. In TABLE III, the entire series of thirty-six recoveries and ninety-one fatal cases are noted alphabetically, and the principal facts regarding them are concisely recorded.

[1] LIDELL (J. A.). *On the Wounds of Blood-Vessels, Traumatic Hæmorrhage, Traumatic Aneurism, and Traumatic Gangrene, in Surgical Memoirs of the War of the Rebellion, collected and published by the United States Sanitary Commission*, 1870, Vol. I (Surgical), p. 143.

TABLE III.

Summary of One hundred and Twenty-seven Cases of Ligation of the Femoral Artery for Hæmorrhage from Shot Injuries unattended by Fractures.

No.	Name, Military Description, and Age.	Dates.	Injury, Operator, and Result.
1	Ambrose, T. L., Chaplain, 12th New Hampshire, age 35.	July 25, Aug. 15, 1864.	Right thigh; hæm.; femoral lig.; hæm. from branch of profunda—large branch tied. Died Aug. 20, 1864.
2	Archibald, T., Pt., G, 24th Mass., age 18.	April 2, 12, '65.	Right femoral artery wounded and ligated; one end tied. Died April 26, 1865, pyæmia.
3	Atwood, L. D., Pt., B, 32d Mass., age 31.	Sept. 30, Oct. 31, 1864.	Left thigh, middle third; ligation of femoral, both ends tied. Died November 9, 1864.
4	[1]Ayres, B., Pt., A, 5th Iowa, age 40.	May 22, June 1, 1863.	Left thigh; hæm.; wound opened and a darning needle removed from sheath of vein; artery ligated. Died June 1, '63, pyæmia. *Specs.* 2020, 2085, A. M. M.
5	Bailey, J., Pt., I, 55th Penn., age 26.	June 18, Jul. 9, '64.	Left thigh; ligation of femoral. Died July 10, 1864.
6	Banfill, T., Serg't, C, 19th Indiana, age 20.	May 12, June 12, 1864.	Left thigh; femoral ligated, by Surg. T. R. Crosby, U. S. V. Died June 12, 1864, pyæmia.
7	Barkeloo, J., Pt., M, 2d Ohio Cav., age 28.	July 19, 1863.	Right popliteal artery severed; primary lig. of femoral artery; amp. thigh. Disch'd Mar. 17, '65.
8	*Bedingfield, J. T.*, Capt., G, 60th Georgia, age 25.	Mar. 25, April 15, 1865.	Both thighs; left femoral ligated, by A. A. Surg. N. A. Robbins. Died April 25, 1865, exhaustion.
9	Bell, J. C., Pt., E, 34th Iowa, age 23.	April 6, 17, '65.	Left leg, cutting post. tib. artery; fem. lig., by Surg. A. McMahon, U. S. V.; amp. thigh for recurrent hæm. Died Ap. 23, '65, exhaus'n.
10	Bills, C., Pt., K, 17th New York, age 20.	Aug. 30, Sept. 26, 1862.	Wound of thigh, involv. profunda artery; both ends femoral tied; sloughing. Died Oct. 4, 1862.
11	Blake, G., Pt., I, 3d West Virginia.	Aug. 26, Sept. 9, 1863.	Shot wound of left femoral artery; vessel tied, by Surgeon W. D. Stewart, U. S. V. Furloughed Nov. 12, 1863. Wounds healed.
12	Brown, S., Pt., G, 134th New York, age 16.	Aug. 30, Nov. 28, 1862.	Left leg; fem. lig. in lower third, by Asst. Surg. W. A. Connor, U. S. V. Died Dec. 7, 1862, pyæmia. *Spec.* 1024, A. M. M.
13	*Brown, W.*, Serg't, 1st Maryland Artillery.	Dec. 10, —, '63.	Left thigh; femoral ligated. Recovered.
14	[2]*Check, M.*, Pt., I, 61st North Carolina.	July 30, Aug. 3, 1864.	Femoral artery severed; femoral artery ligated, by Surg. D. F. Wright, P. A. C. S. Recovered.
15	*Clark, W. L.*, Pt., H, 25th North Carolina, age 20.	April 1, 10, '65.	Shot wound lower third right femoral artery; artery tied, by A. A. Surg. J. Morris. Died April 19, 1865, gangrene.
16	Claypole, S., Pt., D, 62d Penn., age 27.	May 30, June 8, 1864.	Right leg; femoral lig., by Asst. Surg. W. F. Norris, U.S.A. Died Aug. 4, '64, asthenia and pleuro-pneumonia.
17	Clelland, W., Pt., A, 8th New York Heavy Art., age 18.	June 1, July 24, 1863.	Left thigh; one end of femoral tied. Died July 24, '64, typhoid fever.
18	Clover, B., Civilian, age 16.	Aug. 23, Sept. 1, 1864.	Left fem. artery injured; aneurism; femoral tied. Recovered.
19	Clymer, J., Pt., B, 104th Pennsylvania.	May 31, June 16, 1862.	Left popliteal space; femoral lig., by A. A. Surg. M. K. Cleveland. Died June 16, 1862.
20	[3]*Coble, J. A.*, Pt., F, 45th North Carolina, age 20.	Nov. 27, '63, Jan. 23, '64.	Left thigh; diffused trau. fem'l aneurism; fem. lig. above and below; femoral vein also tied. Recovered.
21	Colgan, W., Pt., C, 2d Mass. Cavalry, age 21.	Sept. 14, 25, '64.	Left thigh; fem. lig. in continuity, by A. A. Surg. J. C. Shrimer. Died Sept. 28, '64, loss of blood and exhaust. *Spec.* 3972, A.M.M.
22	Connell, M., Pt., K, 2d New York Heavy Art., age 34.	April 7, June 15, 1865.	Right thigh; one end of fem. tied, by A. Surg. O. P. Sweet, U.S.V. Died June 16, 1865, exhaustion.
23	Coultes, W. H., Lieut., C, 61st New York.	June 1, 18, '62.	Middle of thigh; both ends femoral tied, by A. A. Surg. W. Hunt. Died June 23, 1862, shock.
24	Coy, J. H., Serg't, K, 6th Maine, age 28.	Nov. 7, 24, '63.	Left thigh; femoral lig., by A. A. Surg. J. C. W. Kennon; hæm. recurred; religated, by A. A. Surg. T. O. Bannister, Dec. 1; again on Dec. 23, by Surg. D. W. Bliss, U. S. V. Died Dec. 23, 1863.
25	*Crowder, D. J.*, Pt., Stamford's Bat'ry, age 23.	Dec. 16, '64, Jan. 9, '65.	Right thigh; ligation of femoral, by A. A. Surg. D. D. Talbot. Died Feb. 3, 1865, gangrene.
26	Cummings, J. M., Pt., D, 49th Indiana.	Dec. 28, 1862.	Shot wound right femoral artery; vessel ligated. Died Jan. 29, '63.
27	Cummins, H., Pt., A, 7th West Virginia, age 21.	May 8, 25, '64.	Right thigh; femoral tied above profunda. Died May 29, 1864.
28	Curler, L., P., G, 6th Michigan.	May 31, June 10, 17, '62.	Right thigh; fem. and profunda lig.; hæm. recurred; profunda relig. Died June 17, 1862. *Spec.* 1004, A. M. M
29	Darling, S. G., Pt., D, 32d Maine, age 19.	May 12, 1864, On field.	Fem. artery severed; vessel lig.; May 26th, thigh amp., by Surg. R. B. Bontecou, U. S. V. Died May 26, 1864, hæmorrhage.
30	Delamater, M., Corp'l, G, 7th Michigan Cavalry, age 20.	May 28, July 10, 1864.	Right thigh; lig. of femoral, by A. Surg. H. M. Sprague, U.S.A. July 12th, thigh amputated. Died Aug. 7, 1864, pyæmia.
31	Dier, W., Corp'l, A, 129th Pennsylvania, age 23.	Dec. 13, '62, Feb. 22, '63.	Left popliteal space; femoral lig. Died Mar. 4, 1863, pyæmia.
32	Doyle, L., Pt., K, 8th Maine, age 34.	May 20, June 1, 1864.	Right thigh; femoral and several branches ligated above and below wound, by Surg. A. Heger, U. S. A. June 6th, thigh amp. Died June 6, 1864, exhaustion.
33	*Dunn, G. R.*, Serg't, E, 25th S. Carolina, age 20.	May 16, 29, '64.	Right thigh; femoral ligated. Recovery.
34	Edwards, J. W., Pt., B, 28th Illinois, age 18.	Mar. 26, April 20, 1865.	Right leg; femoral ligated, by A. A. Surg. H. B. Cole. Recovery.
35	Edwards, R., Pt., G, 98th Illinois.	June 25, Jul. 6, '63.	Both thighs; femoral ligated. Died July 11, 1863.
36	Elliott, E., Pt., H, 118th Pennsylvania, age 21.	June 3, 13, '64.	Right thigh; femoral ligated, by Asst. Surg. H. Allen, U. S. A. Died June 21, 1864, gangrene.
37	Freeman, C. A., Serg't, B, 37th Mass., age 22.	April 6, 15, '65.	Left thigh; femoral art'y ligated, by Surg. B. A. Vanderkieft, U. S. V. Died April 18, '65, anæmia.
38	*Gardner, R. T.*, Pt., A, 1st Md. Battal'n, age 19.	July 2, 23, '63.	Both thighs; left femoral ligated. Doing well November 30, 1863.
39	Gilley, M., Pt., I, 9th N. York State Militia, age 37.	May 5, —, '64.	Right thigh, involving femoral artery; femoral ligated. Died May 27, 1864, of pyæmia.
40	Goodwin, A., Pt., B, 2d New Hampshire.	July 2, 20, '63.	Left thigh; femoral ligated above and below. Died Aug. 8, 1863.
41	Graham, J. A., Serg't, H, 116th Penn., age 21.	June 1, 10, '64.	Right thigh; hæm.; profunda lig.; hæm. recurred; fem. lig. Died June 13, 1864.
42	Gray, J., Pt., D, 2d Pennsylvania Heavy Art'y, age 17.	June 18, 30, '64.	Left thigh; femoral tied in continuity, by Surg. N. R. Mosely, U. S. V. Died July 12, 1864.
43	[4]Gross, C., Pt., K, 6th Pennsylvania Cavalry, age 26.	May 30, 31, '64.	Left femoral artery divided; ligatures placed above and below. Died June 8, 1864, exhaustion.
44	[5]Hagan, J., P., G, 76th Pennsylvania.	July 17, 23, '64.	Right thigh; fem. tied at proximal extrem. and accompanying vein at prox. and distal ends; gang. Died July 27, 1864.
45	Hamilton, E., Capt., G, 15th New Jersey, age 19.	May 6, 15, '64.	Right femoral vein and branch of profunda divided; femoral tied, by Surg. H. W. Ducachet, U.S.V. Died May 16, 1864; exhaustion.
46	Harbaugh, H., Serg't, K, 7th Wisconsin, age 22.	July 2, Sept. 13, 1863.	Left thigh; femoral ligated. Discharged July 21, 1864, atrophy of thigh and leg.
47	Harrington, W. J., Pt., C, 16th Wisconsin.	July 5, 16, '64.	Left thigh; both ends of femoral tied, by Surg. G. F. French, U. S. V. Died July 20, 1864.
48	Harris, J. M., Corp'l, C, 14th Iowa, age 20.	July 15, 27, '64.	Right fem. art. injured; aneurism; art. ligated above and below sac, by Surg. J. G. Keenon, U. S. V.; amp. leg, by A. A. Surg. R. W. Coale. Died Aug. 3, '64, pyæmia.
49	Harrison, E., Serg't, P, 10th New York.	May —, 1864.	Right thigh; ligation of femoral, by Surg. M. Rizer, 72d Penn. Died May 22, 1864.
50	Hickey, T., Pt., G, 73d Pennsylvania, age 53.	Aug. 30, Se. 27, '62.	Right thigh; common femoral tied in continuity. Died Sept. 27, '62.
51	*Horn, S.*, Pt., H, 53d North Carolina, age 21.	Mar. 25, July 9, 1865.	Left thigh; femoral ligated, by A. A. Surg. J. Morris. Died July 14, 1865, hæmorrhage.

[1] LIDELL (J. A.), *On Wounds of Veins*, in *Surg. Mem. of the War of the Rebellion, coll. and pub. by U. S. San. Comm.*, 1870. Vol. I, p. 141.

[2] DUDLEY (J. G.), *Case of Diffused Traumatic Aneurism*, in *Confederate States Medical and Surgical Journal*, 1865, Vol. I, p. 35.

[3] WRIGHT (D. F.), *The Effects of the Hunterian Method of Ligation*, in *Confed. States Med. and Surg. Jour.*, 1864, Vol. I, p. 177, and *Richmond Med. Jour.*, 1866, Vol. I, p. 309.

[4] LIDELL (J. A.), *op. cit.*, p. 53.

[5] MUNN (C. E.), *Post-mortem Examinations of Cases*, etc., in *Boston Med. and Surg. Jour.*, 1864, Vol. LXXI, p. 113.

No.	Name, Military Description, and Age.	Dates.	Injury, Operator, and Result.
52	Houser, P., Serg't, H, 76th Pennsylvania, age 26.	Aug. 16, Sept. 10, 1864.	Left thigh; femoral ligated in continuity, by A. A. Surg. J. H. Packard. Disch'd May 20, 1865, and pensioned. Lameness.
53	Hübner, J., Pt., K, 5th Michigan, age 29.	May 31, June 27, 1862.	Right thigh; femoral ligated. by Dr. T. M. Markoe. Discharged Oct. 1, 1862; pensioned.
54	Huggins, W., Serg't, G, 50th Illinois, age 25.	Mar. 16, April 3, 5, '65.	Right thigh; hæm.; profunda lig., by A. A. Surgeon H. Sanders; hæm. recur.; fem. tied, by A.A. Surg. E. DeWitt. Died April 8, 1865.
55	Hunt, J. L., Pt., G, 57th New York, age 41.	May 5, July 9, 1864.	Left thigh; femoral ligated; dry gangrene of toes; Sept. 5th, amp. toes. Disch'd June 6, 1865.
56	Hurlbut, G. Q., Pt., G, 109th N. York, age 37.	May 17, June 8, 1864.	Both thighs; hæm.; fem. lig. in continuity; hæm.; profunda lig.; hæm.; vessel religated. Died June 8, 1864.
57	Jones, W. H., Pt., C, 14th New York Heavy Artillery.	June 9, July 5, 1864.	Right thigh; fem. tied in wound, by Surg. H. Palmer, U. S. V. Died Sept. 25, 1864, chronic diarrhœa.
58	*Jones, W. W.*, Ensign, Thomas's Legion, age 25.	Sept. 19, Oct. 2, 1864.	—— thigh, involving fem. artery; ligation of femoral artery. Died Oct. 5, 1864, hæmorrhage.
59	Judd, I. E., Lieut., K, 49th Mass., age 25.	May 25, June 12, 1863.	Right thigh; fem. art. tied at both ends, by Med. Insp. P. Pineo, U. S. A.; fem. vein included in a ligature. Died June 13, 1863.
60	Karlmyer, F., Pt., K, 48th New York, age 37.	June 1, 9, '64.	Right thigh; femoral ligated, by Surgeon E. Bentley, U. S. V. Discharged May 20, 1865.
61	Kimber, W., Pt., D, 36th Illinois, age 33.	Nov. 29, '64, Jan. 20, '65.	Left thigh; both ends of femoral tied. Died January 26, 1865.
62	Landon, L., Lieut., H, 6th Colored Troops, age 20.	Sept. 29, Oct. 9, 1864.	Left thigh; also fract. left radius; both ends of fem. tied in wound. Died Oct. 28, '64, pyæmia.
63	Lang, W. M., Pt., C, 40th New York, age 34.	April 2, 13, '65.	Right leg; femoral ligated. Died April 16, 1865, mortification.
64	Lapp, C., Pt., I, 22d Wisconsin, age 21.	July 28, Aug. 11, 1861.	Left fem. art'y wounded; vessel lig., by A.A. Surg. J. M. Brown. Died Aug. 11, '64, hæmorrhage.
65	*Layne, J. H.*, Pt., B, 19th Virginia, age 18.	April 6, 25, '65.	Right thigh; fem. vein rupt.; fem. lig. at middle portion, and vein above and below rupt., by A.A. Surg. J. Morris; hæm. recurred May 6, fem. relig. abo. profunda. Died May 7, 1865.
66	*Lee, J. A.*, Pt., I, 17th Mississippi, age 25.	July 2, 21, '63.	Left leg; femoral artery ligated. Transferred to prison at Fort McHenry, Md., March 2, 1864.
67	Leline, G., Serg't, C, 8th Michigan, age 27.	Nov. 28, Dec. 5, 1864.	Right fem. art'y injured; ligature applied, by A. A. Surg. S. T. Williams. Died Dec. 5, 1864, shock and hæmorrhage.
68	[1]Lenneghan, P., Serg't, B, 88th New York, age 30.	April 6, 20, '65.	Right thigh; femoral ligated in continuity, by Surg. J. Aiken, 71st Penn. Disch'd July 26, '65; pensioned. Died Nov. —, 1875.
69	Lesler, J., Pt., K, 148th New York, age 28.	June 6, July 28, 1864.	Left leg; both ends femoral tied, by A. A. Surg. W. P. Moore. Disch'd January 11, 1865.
70	Lund, E. T., Pt., C, 4th New Hampshire, age 20.	June 30, Aug. 12, 1864.	Left thigh, and fract. right knee joint; left fem. tied above and below, by Asst. Surg. W. Thomson, U. S. A. Died Aug. 23, '64, pyæmia. *Spec.* 3592, A.M.M.
71	McNally, J., Pt., G, 69th New York, age 24.	June 16, July 4, 1864.	Right thigh; femoral tied in continuity, by A. A. Surg. O. P. Sweet. Furloug'd Nov. 1, '64.
72	McReynolds, J., Corp'l, 60th Ohio S. S., age 20.	Aug. 19, Sept. 5, 1864.	Both thighs; femoral tied, by A. A. Surg. H. B. Maben; hæm. recur. Sept. 11th; artery relig., by A. A. Surg. E. De Witt. Died Sept. 17, '64, hæmorrhage.
73	Mason, J. W., Pt., I, 12th New York, age 21.	Aug. 30, —, '62.	Right femoral artery; ligature applied. Died Sept. 28, 1862.
74	Miller, G. H., Pt., F, 3d Iowa, age 23.	May 18, June 3, 1863.	Both thighs, dividing right profunda artery; right fem. ligated. Died June 10, '63, hæmorrhage. *Spec.* 2086, A. M. M.
75	Mills, J., Pt., D, 4th Missouri Cavalry.	Jan. 16, Feb. 7, 1864.	Left fem. artery wounded; ligature applied. Died February 17, 1864.
76	*Moore, W.*, Pt., G, 5th North Carolina, age 27.	Oct. 19, 20, '64.	Right fem. artery wounded; lig. applied, by Surg. J. F. Pearson, 5th N. C. Exch'd Feb. 16, '65.
77	Moserip, W. S., Serg't, K, 19th Wis., age 35.	Aug. 22, 27, '64.	Left fem. artery injured; femoral ligated. Died Sept. 14, '64, hæm.
78	[2]O'Keefe, J., Major, 2d New York Cavalry, age 24.	Mar. 31, —, '65.	Right fem. art'y injured; femoral tied, and, hæm. recurring, vessel religated. Died May 31, 1865.
79	*Pack, J. R.*, Pt., D, 39th North Carolina, age 17.	April 8, 27, '65.	Right fem. artery wounded; ligated, by A. A. Surg. H. B. Cole. Died April 27, 1865, cong. chill.
80	Paden, W., Corp'l, G, 10th Pennsylvania Reserves, age 22.	May 23, June 1, 1864.	Great laceration right thigh; fem. tied in continuity, by Surg. G. L. Pancoast, U.S.V.; leg gang.; amp. leg by same operator. Died June 26, 1864, gangrene.
81	Palmer, J. C., Pt., G, 10th Conn., age 18.	April 2, 10, '65.	Right thigh; femoral tied at both ends. Disch'd July 5, '65; pen'd.
82	[3]*Paschal, J.*, Pt., I, 2d N. Carolina Cavalry.	Aug. 16, 27, '64.	Right thigh; femoral ligated, by Surg. D. F. Wright, P. A. C. S. Retired February 22, 1865.
83	Pennsyl, E., Pt., H, 93d Pennsylvania.	May 31, J'e 16, 62.	—— fem. artery wounded; vessel tied. Died July 5, '62, pyæmia.
84	Perry, T., Serg't, D, 16th Michigan, age 30.	Sept. 30, Nov. 19, 1864.	Right thigh; femoral tied at both ends, by A.A. Surg. G.B.R. Robinson. Died Nov. 21, '64, exh'n.
85	Peters, W. C., Pt., C, 68th Penn., age 19.	July 2, 15, '63.	Left thigh; artery secured. Died July 15, 1863, hæmorrhage.
86	Pickett, J., Pt., F, 8th Illinois Cavalry, age 21.	June 20, 20, '63.	Right fem. artery severed; artery secured. Disch'd June 9, '64.
87	Pope, P. P., Pt., M, 67th Ohio, age 22.	May 9, 21, '64.	Right thigh; fem. tied in continuity. Died May 22, '64, exh'n.
88	Pope, W., Pt., I, 2d N. York Artillery, age 19.	June 3, 20, '64.	Left thigh; one end of artery tied. Died June 24, '64, hæmorrhage.
89	[4]Rapp, D., Pt., K, 7th Indiana, age 20.	Nov. 30, 1863.	Left thigh; fem. art. and vein divided; double lig. placed upon fem. art. and vein. Died Dec. 13, 1863. *Specs.* 2249, 2250, A. M. M.
90	*Reed, J. P.*, Pt., 19th Alabama, age 20.	April 6, May 29, 1862.	Right thigh; fem. artery ligated, by Surg. J. T. Hodgen, U. S. V. Died June 20, 1862.
91	Ringer, O., Pt., C, 60th Ohio, age 21.	July 6, Aug. 24, 1864.	Right thigh; femoral ligated, by A. A. Surg. J. P. Holt. Died Aug. 25, 1864, hæmorrhage.
92	Roberts, A. F., Pt., I, 127th Illinois, age 20.	May 19, J'e 5, '63.	Left popliteal space; fem. artery tied. Died June 7, 1863.
93	Rodgers, S. J., Pt., A, 2d Michigan, age 21.	June 17, July 26, 1864.	Right thigh. July 22d, aneurism; fem. tied, two ligatures, by A.A. Surg. O. W. Peck. Died July 30, 1864, hæmorrhage.
94	*Ross, A. G.*, Corp'l, I, 12th Mississippi, age 21.	Oct. 19, —, '64.	R't and left thighs; fem. wounded and lig.; Nov. 8, amp. right leg above ank. Retired Mar. 14, '65.
95	Rowe, J. B., Pt., G, 12th N. Hampshire, age 22.	May 14, June 12, 1864.	Right thigh; gang.; fem. artery lig. in wound, both ends tied, by Surg. A. Heger, U. S. A., and A.A. Surg. T. Liebold. Disch'd June 5, 1865; pensioned.
96	[5]S——W——, —, I, 17th New York.	Sept. 1, 12, '64.	Right thigh; proximal end of fem. artery tied, by Surg. E. Batwell, 14th Michigan. Sent to rear ten weeks after injury.
97	Sager, W., Serg't, E, 188th N. York, age 19.	April 1, 22, '65.	Right thigh; both ends of femoral tied, by Asst. Surg. W. F. Norris, U.S.A. Died Ap'l 29, '65, pyæm.
98	Sassaman, L. H., Pt., E, 12th Penn. Reserves, age 24.	May 8, June 4, 1864.	Right leg, wounding ant. tibial artery; femoral tied, by A. A. Surg. J. S. Cohen. Disch'd July 21, 1865; pensioned.
99	*Self, J.*, Pt., H, 11th Alabama.	——, July 11, '62.	—— thigh; femoral ligated. Died July 11, 1862.
100	Sharpe, A., Pt., D, 11th Pennsylvania.	June 21, 21, '64.	Both thighs; both ends of —— femoral tied. Died June 26, '64.
101	Sheaffer, C., Pt., D, 1st New York Cavalry.	June 5, July 8, 1864.	Right fem. artery injured; vessel secured, by Surg. R. F. Baldwin, P. A. C. S. Died J'y 21, '64, gang.
102	Sheffer, G. W., Pt., C, 5th U. S. Art., age 22.	May 24, 24, '64.	Left fem. artery severed; ligated, by Surg. N. Hayward, 20th Mass. Disch'd Jan. 30, 1865.
103	Simmons, T., Pt., F, 97th New York, age 26.	June 18, July 27, 1864.	Left thigh; femoral ligated in continuity and wound. Died August 3, 1864, gangrene.
104	*Smith, H.*, Pt., F, 21st Virginia, age 41.	Oct. 19, Nov. 10, 1864.	Both thighs, scrotum, right fem. artery severed; vessel tied, by Surg. W. W. Wilkerson, C. S. A. Retired from service Mar. 14, '65.
105	Smith, J., Pt., D, 97th Pennsylvania, age 22.	May 18, June 2, 1864.	Both thighs; hæm. from circumflex; right femoral tied. Died June 5, 1864, hæmorrhage.
106	Smith, R. W., Lieut., G, 5th Penn. Reserves, age 24.	Aug. 30, Sept. 7, 1862.	Right thigh; fem. art'y wounded; lig. in contin'y. Died Sept. 7, '62, loss of blood. *Spec.* 509, A.M.M.

[1] LIDELL (J. A.), *op. cit.*, p. 262. [2] *Ibid.*, p. 233.

[3] BLACKMAN (G. C.), *On the Treatment of Inflammation of the Limbs by the Compression, or Ligature, of their Main Arterial Trunk*, in *Cincinnati Lancet and Observer*, 1868, Vol. XI, p. 77, and *Richmond Med. Jour.*, 1866, Vol. I, p. 307.

[4] LIDELL (J. A.), *On the Wounds of Blood-vessels*, etc., in *Surgical Memoirs of the War of the Rebellion, collected and published by the U. S. Sanitary Commission*, 1870, Vol. I, p. 143. [5] BATWELL (E.), Surgeon, 14th Michigan, in *Med. and Surg. Reporter*, 1865, Vol. XIII, p. 50. Probably the case of M. Shaw, Pt., I, 17th New York, age 19. Died Nov. 16, 1864.

No.	Name, Military Description, and Age.	Dates.	Injury, Operator, and Result.
107	Smith, W. F., Major, 1st Delaware.	Oct. 27, 27, '64.	Right thigh; fem. lig. above and below, vein also tied; amp. thigh, Surg. A. N. Dougherty, U.S.V. Died Nov. 6, 1864.
108	Sockwell, C. L., Pt., K, 13th N. Jersey, age 22.	May 6, 6, '64.	Right thigh; femoral secured. Disch'd June 30, '65; pensioned.
109	[1]*Spivey, D.*, Pt., C, 5th N. Carolina, age 46.	——, July 8, '63.	Left thigh, also right leg; aneurismal tumor of left fem. art.; fem. tied, by Surg. E. B. Haywood, C. S. A. Recovered Jan. 10, '64.
110	Story, F., Pt., E, 38th Ohio, age 22.	July 23, Sep. 9, 64.	Right thigh; gangrene; both ends of fem. tied. Died Sept. 10, '64.
111	Sweeney, J. L., Serg't, D, 12th Mass., age 25.	May 15, 30, '64.	Right fem. artery injured and lig. Disch'd from hospital Oct. 15, 1864; pensioned.
112	Thorn, H. C., Pt., I, 14th West Virginia, age 19.	July 20, Aug. 7, 1864.	Right thigh; fem. ligated; hæm. recurred from profunda; thigh amp., by Surg. J. B. Lewis, U. S. V. Died Aug. 12, 1864.
113	Tompkins.—, substitute, age 21.	July 28, 29, '63.	Right leg and left arm; femoral ligated; gang. Aug. 3d, trismus. Died Aug. 4, 1863, tetanus.
114	*Unknown*.....	Sept. 17, 22, '62.	Wound of fem. art.; proximal end tied in wound. Died Sept. 22, '62.
115	Yearing, W., Pt., G, 12th Missouri, age 30.	May 22, June 22, 1863.	Right thigh; small aneurism of femoral artery; femoral tied. Returned to duty Dec. 16, 1863.
116	[2]Vickery, R. S., Asst. Surgeon, 2d Michigan.	July 30, 30, '64.	Left thigh; femoral tied, by Surg. W. B. Fox, 8th Mich. Disch'd Mar. 14, '65; pens'd. Appointed Asst. Surg. U.S.A., May 14, 67.
117	*Wakeham, J. E.*, Corp'l, E, 18th Virginia, age 27.	Mar. 31, April 10, 1865.	Left fem. artery involved; lig. of artery above profunda, by A. A. Surg. J. Morris. Hæm. recur'd; relig. just below Poupart's lig. Died April 28, '65, exhaustion.
118	Wilder, E., Corp'l, A, 100th N. York, age 19.	Aug. 16, Sept. 21, 1864.	Left leg; hæm. from post. tibial artery; fem. tied in continuity, by A. A. Surg. J. C. Morton. Deserted March 23, 1865.
119	Williams, C., Pt., F, 5th Colored Troops, age 23.	Sept. 29, Oct. 15, 1864.	Laceration left thigh; both ends of fem. tied in wound, by A. A. Surg. O. Warner; hæmorrhage recurred. Died October 21, 1864, phlebitis.
120	Williams, G., Pt., E, 9th N. York, Heavy Art., age 31.	July 9, Aug. 3, 1864.	Left thigh; art'y tied below origin of profunda, by A. A. Surg. J. C. Shimer. Died August 4, 1864, exhaustion.
121	Willis, jr., A., Pt., I, 7th Rhode Island, age 25.	Dec. 13, 25, '62.	Right femoral artery injured and ligated. Died Dec. 28, 1862, from previous bleeding.
122	[3]Wilson, J., Pt., 27th N. York Battery, age 26.	May 26, July 16, 1863.	Left thigh; ball passed close to femoral vessels; large aneurism of fem. artery; fem. tied above and below, by A. A. Surg. G. B. Hammond. Duty July 31, 1863.
123	Winchell, C. D., Pt., K, 38th Wisconsin, age 19.	April 2, 12, '65.	Left thigh; fem. lig. in continuity, by Surg. J. C. McKee, U. S. A. Disch'd July 3, 1865; pensioned.
124	Winchester, D. W., Pt., I, 1st Mass. H'vy Ar'y, age 21.	May 19, 28, '64.	Left thigh; sloughing; femoral tied in continuity, by Surg. T. R. Crosby, U. S. V. Duty Febru ary 10, 1865.
125	Witham, A., Pt., A, 1st Maine Heavy Art'y, age 20.	May 19, June 29, 1864.	Left thigh; fem. ligated, by A. A. Surg. J. Newcombe. Died July 2, 1864, loss of blood.
126	Wood, W. R., Pt., H, 81st Indiana.	Dec. 31, '62, Jan. 17, '63.	Right thigh; femoral tied. Duty June 22, 1863; pensioned.
127	Worley, S., Pt., A, 139th Pennsylvania, age 20.	May 5, 20, '64.	Right thigh; fem. ligated. Died June 2, 1864.

Of this series of one hundred and twenty-seven cases with ninety-one deaths, the mortality rate of 71.7 per cent. of the aggregate scarcely varies from that of the smaller series of ligations for direct shot injury of the femoral adverted to on page 16.

Ligations of the Profunda Artery.—Six instances were reported of ligation of the profunda in addition to the cases in which that vessel was tied in connection with ligations of the femoral. Brief abstracts of the two successful and four fatal cases are subjoined:

Cases 101–106.—Sergeant *R. W. Bedingfield*, Co. G, 60th Georgia, age 18 years, wounded at Monocacy, July 9, 1864; admitted into hospital at Frederick; conoidal ball passed through upper third of left thigh and lodged near the inner side of right femur, wounding the right profunda artery; traumatic aneurism, sac five inches in length, containing at least a pint of clotted blood. August 15th, Acting Assistant Surgeon J. H. Bartholf laid open the aneurismal sac. Bleeding came from the profunda artery; a ligature was applied above and below the wound of the artery by an incision four inches along the sartorius muscle; the patient was in good condition though irritable and depressed; brandy was given every hour during the day after the operation; hæmorrhage did not recur. August 25th, ligature came away; the wound healed, and the patient was transferred to Point Lookout, October 25th, for exchange.—Private J. H. Beun, Co. E, 45th Pennsylvania, aged 18 years, wounded at the Wilderness, May 6, 1864. Admitted into Campbell Hospital, Washington; shot wound of thigh. May 28th, bleeding to amount of forty-eight ounces from profunda artery; profunda ligated at one end in wound; hæmorrhage recurred June 14th, and death on the same day.—Lieutenant J. T. Lowe, Co. D, 12th New Jersey, wounded at Bristoe Station, October 14, 1863; admitted into Third Division Hospital, Alexandria; gunshot wound of left thigh by conoidal ball; hæmorrhage to extent of twenty-four ounces from profunda artery; both ends of profunda femoris tied in the wound. Patient died October 30, 1863.—Corporal T. Machelent, Co. B. 140th New York, aged 27 years, wounded at the Wilderness, May 8, 1864; admitted into Mower Hospital, Philadelphia; missile entered middle of posterior surface of upper third of right thigh, passed in a direct line and emerged from inner surface; slight wound. July 4th, hæmorrhage to the extent of thirty ounces from the profunda artery; the proximal end of the artery was ligated in the wound. Patient was discharged May 31, 1865.—Private M. Murphy, Co. G, 5th Kentucky; wounded at Mission Ridge, November 25, 1863; admitted into hospital No. 4, Chattanooga; contused shell wound of left thigh. On January 1, 1864, gangrene appeared, which was checked, but reappeared on the 17th and 20th, and spread. On January 26th, the profunda gave way and was ligated by Surgeon A. H. Stephens, 6th Ohio. The patient died January 27, 1864.—Corporal T. Patterson, Co. D, 5th Michigan, aged 32 years, wounded at the Wilderness, May 5, 1864; admitted into the hospital at Chester, Pennsylvania; shot flesh wound of upper third of both thighs. On July 13th, bleeding occurred from a branch of the left profunda; one end of the artery was tied in the wound; hæmorrhage recurred on July 16th, and death ensued July 20, 1864, from pyæmia.

[1] Haywood (E. B.), *Aneurism of Femoral Artery cured by Ligature*, in *Confederate States Med. and Surg. Jour.*, 1864, Vol. I, p. 36.

[2] Hamilton (F. H.), *A Treatise on Military Surgery and Hygiene*, 1865, p. 639.

[3] Lidell (J. A.), *On Gunshot Wounds of Arteries, Traumatic Hæmorrhage and Traumatic Aneurism*, in *Am. Jour. Med. Sci.*, 1864, Vol. XLVII, p. 110, and *San. Comm. Mem.*, Vol. I, p. 119.

There were also a few examples of ligations of large branches of the profunda involving very difficult and troublesome dissections; instances in which the external circumflex, posterior perforating, and anastomotica arteries were tied are here briefly noted. In several cases it was impracticable to determine what particular branch was severed:

CASE 107.—Private S. Michaels, Co. E, 9th Maine, aged 35 years, wounded at Petersburg, June 23, 1864. Surgeon J. J. Craven, U. S. V., reported his admission into the 2d division hospital of the Tenth Corps with a "gunshot wound of both thighs." Assistant Surgeon E. McClellan, U. S. A., reported from Hampton Hospital, Fort Monroe: "On July 30th, bleeding occurred from the descending branch of the external circumflex artery; six ounces of blood were lost. Assistant Surgeon E. Curtis, U. S. A., applied ligatures at both ends of the bleeding vessel in the wound—the injury was about the middle of the thigh. On August 4th, a hæmorrhage occurred from the femoral artery of the left thigh of about one pint; it was arrested by pressure, but the patient died from exhaustion a short time after."

CASE 108.—Private Theodore B. Benedict, Co. D, 7th Connecticut, age 32 years, wounded at Drury's Bluff, May 10, 1864. Assistant Surgeon E. McClellan reported from Hampton Hospital, Fort Monroe: "Gunshot wound of right thigh, flesh. On June 9th, hæmorrhage to the extent of eight ounces occurred from one of the posterior perforating arteries. The bleeding vessel was ligated in the wound at one end. The hæmorrhage did not recur." On July 25th, the patient was sent north. He was subsequently treated in McDougall Hospital, New York, and Knight Hospital, New Haven. Surgeon P. A. Jewitt, U. S.V., reported from the latter hospital that the patient died May 3, 1865, of pneumonia.

CASE 109.—Corporal Thomas Haglemeyer, Co. D, 41st Ohio, aged 49 years, was wounded at Nashville, December 16, 1864. Surgeon C. N. Hoagland, 71st Ohio, reported from the 3d division, Fourth Corps: "Gunshot wound of hip; simple dressings." Surgeon J. E. Herbst, U. S. V., reported that the patient was admitted into hospital No. 2, Nashville, December 22, 1864, with a "gunshot wound of the upper third of the right thigh. Wound gangrenous from Scarpa's triangle to the popliteal space. December 29th, separation of the slough caused hæmorrhage from the superior perforating and anastomotica arteries—oozing surface. The patient was much exhausted from repeated hæmorrhage—blood defibrinated. Acting Assistant Surgeon S. Blackwood applied proximal ligatures to the bleeding arteries in the wound and lint to the oozing surface. Simple dressings were applied, and iron and ale ordered. The patient died January 15, 1864."

Ligations of the Popliteal Artery.—Of seventeen cases of ligation of the popliteal for shot flesh wounds of the leg, thirteen were fatal, or 76.5 per cent. Five patients succumbed after amputation of the thigh following ligation of the popliteal. The series is enumerated in TABLE IV, and a case is detailed:

TABLE IV.

Summary of Seventeen Cases of Ligation of the Popliteal Artery for Hæmorrhage from Shot Injuries unattended by Fractures.

NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	INJURY, OPERATOR, AND RESULT.
1	Dittus, W., Pt., H, 42d Illinois, age 27.	May 14, June 6, 1864.	Right popliteal region; sloughing; both ends of popliteal art'ry tied in wound, by Ass't Surg. B. E. Fryer, U. S. A. Disch'd Aug. 16, 1865; pensioned.
2	Elliot, J. E., Corp'l, E, 2d Pennsylvania Cavalry, age 24.	April 1, 29, '63.	In'r side left leg; poplit'l art. lig., lower portion; hæm. recurred; thigh amp. May 5th. Died from shock two hours after operation.
3	Fletcher, J. M., Corp'l, C, 39th Massachusetts, age 28.	June 18, Aug. 14, 1864.	Flesh wound up. third right leg; sloughing; both ends artery tied in wound, by A. A. Surg. J. M. McGrath. Died Aug. 24, 1864, typhoid fever.
4	Gray, W., Pt., E, 18th Infantry, age 20.	Dec. 31, '62, Jan. 12, '63.	Near popliteal region; both ends artery tied in wound. Died Jan. 22, 1863, gangrene.
5	Kausche, G., Pt., D, 20th New York, age 35.	Sept. 17, 17, '62.	Laceration of right poplit'l space; up. end art. tied in wound; hæm. recurred. Disch'd Aug. 13, '63.
6	Kraher, J. P., Pt., D, 6th New York Heavy Artillery, age 35.	June 1, July 24, 1864.	Left thigh near knee; gang.; one end of artery tied in wound. Disch'd Mar. 15, '65; pensioned.
7	Leonard, J., Pt., L, 7th New York Heavy Artillery, age 21.	May 30, July 3, 1864.	Left leg; art. tied beh. knee; hæm. recur'd; thigh amp. just above knee July 8. Died July 23,'64.
8	Lynch, J., Corp'l, K, 146th N. York, age 34.	May 10, 17, '64.	Left popliteal region; lig. poplit'l, by Ass't Surg. C. A. McCall, U. S. A. Died May 23,'64, pyæmia.
9	*Selden, B.*, Pt., H, 9th Virginia Cav., age 23.	July 8, 27, '63.	Left post. tib. art. wounded; popliteal tied, by A. A. Surg. W. S. Adams. Died Aug. 2,'63, pyæm.
10	Smith, A. M., Serg't, F, 20th Maine.	May 15, 15, '64.	Wound of popliteal artery; art'y tied. Died May 22, 1864.
11	Smith, F., Pt., B, 1st Mass. Heavy Artillery.	May 23, June 29, 1861.	Rt. and l'ft thighs; hæm. from post. tib.; rt. post. tib. lig. in continuity; hæm. recurred; poplit'l lig. Died June 29, 1864.
12	Smith, P. D., Pt., C, 8th Iowa Cavalry, age 20.	Mar. 19, May 6, 1864.	Right ankle; gang.; hæm. from post. tib. art'y; poplit'l art'y lig. in continuity, by A. A. Surg. D. McLean. Disch'd Mar. 21, 1865.
13	Taber, J. A., Serg't, E, 5th Michigan, age 23.	Mar. 31, April 12, 1865.	Right leg; poplit'l art'y lig. in contin'ty, by Surg. J. C. McKee, U.S.A. Died April, 18, '65, hæm.
14	Vann, D., Pt., B, 8th New York Artillery, age 18.	June 3, 16, '64.	Left poplit'l art y injured; art'y lig., by Surg. R. B. Bontecou, U. S. V.; hæm. recurred; new lig. applied June 20; same day amp. thigh. Died June 22, 1864, gangrene.
15	Walker, M., col'd servant, K, 58th Penn., age 13.	June 3, 26, '64.	Right poplit'l art'y injured; vessel tied above bleeding point, by Surg. R. B. Bontecou, U. S. V. Died July 3,'64, diarrhœa. [See CASE 107.]
16	Wick, J. C., Pt., C, 155th Pennsylvania, age 22.	Mar. 25, May 23, 1865.	Both thighs; left poplit'l art'y tied above and below, by Ass't Surg. A. Delany, U. S. V.; June 14, amp. thigh. Died June 20, '65.
17	Wild, C. B., Corp'l, E, 114th New York.	Sept. 19, Oct. 1, 1864.	Right thigh thro' poplit'l space; lig. of poplit'l; hæm. recurred; Oct. 12, amp. thigh. Died Oct. 13, 1864, of exhaustion.

[1] This is probably the case referred to by Prof. A. C. POST, in the *Addendum to Section I of the Surg. Mem. of the War of the Rebellion, pub. by the U. S. San. Comm.*, 1870, Vol. I, p. 262.

CASE 110.—M. Walker, a colored servant of the 58th Pennsylvania Volunteers, aged 13 years, was wounded at Cold Harbor, June 3, 1864, by a minié ball, which entered on the inner side of the lower third of the right thigh, passed through the popliteal space, injuring the popliteal artery, and making its exit latterly. Twelve days after the reception of the injury he was admitted to Harewood Hospital, Washington. Hæmorrhage to the amount of from three to five ounces took place on June 25th, and was controlled by pressure. On the following day hæmorrhage recurred, and the popliteal artery was ligated by Surgeon R. B. Bontecou, U. S. V., by enlarging the wound of entrance, the patient being under the influence of sulphuric ether. The leg was placed in Smith's anterior splint with a fenestra opposite the wound to facilitate dressing, and a supporting treatment was ordered. The patient exhibited typhoid symptoms with very profuse diarrhœa until death, which occurred July 3, 1864. An autopsy showed that the coats of the artery had been injured by the ball, causing sloughing and the subsequent hæmorrhage. The history was reported by the operator.

Ligations of the Posterior Tibial Artery separately.—In a series of seventeen ligations of the posterior tibial artery for shot wounds of the soft parts of the leg and foot, thirteen recovered, or 76.5 per cent. Three patients submitted to consecutive amputation, of whom one died. The cases are enumerated in TABLE V:

TABLE V.

Summary of Seventeen Cases of Ligation of the Posterior Tibial Artery for Hæmorrhage from Shot Injuries unattended by Fractures.

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	INJURY, OPERATOR, AND RESULT.	No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	INJURY, OPERATOR, AND RESULT.
1	Ball, J. D., Corp'l, A, 125th New York, age 24.	May 12, 28, '64.	Right post. tib. artery wounded; artery tied in wound, by Ass't Surg. A. Ingram, U. S. A. Discharged Dec. 29, '64; pens'd.	9	Ingalls, H. B., Pt., L, 1st Maine Cavalry, age 25.	Mar. 31, April 9, 1865.	Right leg; post. tib. artery lig., by Surg. E. Griswold, U. S. V. Disch'd Aug. 12, 1865; pens'd.
2	Brown, W. H., Bugler, 5th New Jersey Battery, age 25.	May 24, June 10, 1864.	Left leg; posterior tibial art. tied. Died July 7, 1864, pyæmia.	10	Maran, M., Pt., A, 2d New Jersey Cavalry, age 20.	Feb. 11, 27, '64.	Right leg; gang.; posterior tibial art. ligated on ulcerated surface, by A. A. Surgeon S. S. Jessop. Disch'd Oct. 21, 1865; pens'd.
3	*Bucker, J. F.*, Pt., B, 1st Confederate, age 21.	April 6, 16, '62.	Right leg; posterior tibial artery tied. Recovered.	11	Oakley, C. N., Pt., A, 85th New York, age 32.	March 8, 8, 1865.	Left leg; lig. post. tib. and peroneal arteries. Died Mar. 23, '65.
4	Dow, J. A., Pt., E, 136th New York, age 20.	June 20, 20, '64.	Right posterior tibial art. severed; vessel tied, by Surgeon I. N. Himes, 73d Ohio. Disch'd June 13, 1865; pensioned.	12	Rigbey, T., Pt., C, 9th N. Hampshire, age 23.	June 20, J'y 3, '64.	Left leg; post. tib. artery tied at wound. Furl'd Aug. 11, 1864.
5	Emery, R., Pt., D, 5th Vermont, age 33.	May 5, Aug. 4, 1864.	Left leg; gang.; ends of art'y tied in wound, by A. A. Surg. J. B. Crandall. Disch'd Dec. 16, '64; pens'd; Aug. 28, '65, amp. leg.	13	[1]Ritter, D. T., Corp'l, F, 208th Pennsylvania, age 19.	Mar. 25, April 7, 1865.	Left post. tib. art. wounded; both ends of vessel ligated, by Surg. G. L. Paneoast, U. S. V. Discharged June 27, 1865; pens'd.
6	Flannagan, H. A., Sergeant, H, 16th Penn. Cav., age 25.	April 7, May 14, 1865.	Left posterior tib. art'y wounded; vessel tied at its middle third. Died June 15, 1865, erysipelas.	14	Sherdan, J., Pt., D, 68th Pennsylvania, age 31.	July 3, 25, '63.	Right leg; posterior tibial artery tied at both ends. Discharged Feb. 6, 1865; pensioned.
7	Gilmore, M., Pt., B, 96th Illinois, age 22.	Aug. 3, 3, '64.	Left leg, involving posterior tib. artery; vessel tied, by Surgeon S. H. Kersey, 36th Indiana. Disch'd Jan. 10, 1865; pens'd.	15	Thompson, S., Pt., E, 4th N. Jersey, age 23.	Sept. 22, Oct. 19, 1864.	Right leg; both ends of posterior tibial artery ligated in wound, by A. A. Surg. J. W. Kerr. Duty March 30, 1865.
8	Hagey, J. D., Pt., I, 138th Pennsylvania, age 24.	April 2, May 8, 1865.	Left posterior tibial art. opened; one end of artery tied in wound, by A. A. Surg. H. M. Bellows; sloughing; May 19, amp. leg, by A. A. Surg. H. A. Drane. Discharged July 26, 1865; pens'd.	16	Trowbridge, D. A., Corporal, L, 5th Illinois Cavalry.	July 8, Sept. 23, 1863.	Right leg; artery ligated in wound. Disch'd Nov. 17, 1863.
				17	Wright, E., Pt., F, 119th Pennsylvania, age 18.	May 5, 23, '64.	Ball cutting right post. tibial art.; gang.; art. tied in wound, by Surg. E. Bentley, U. S. V.; May 25, hæm. recur'd; leg amp. Died May 28, '64, usthenia and pyæm.

Ligations of the Anterior Tibial Artery.—Of ten cases of ligation in which the anterior tibial was separately tied, seven were successful, one after consecutive amputation. The cases are here briefly noted:

CASES 111–120.—Captain C. C. Brewster, Co. D, 10th Connecticut, aged 45 years; wounded at Bermuda Hundred, May 16, 1864; shot flesh wound of left leg. Admitted into Chesapeake Hospital, Fort Monroe, May 21st. Bleeding from the anterior tibial artery to the amount of eight ounces occurred. The vessel was ligated in the wound at the cardial end. Hæmorrhage did not recur. Discharged September 19, 1864, and pensioned. Examiner C. C. Jarvis, of Hartford, reported, August 24, 1869: "The wound is now an open, deep ulcer; occasionally pieces of bone come out from some part of the sore." Pensioner died June 17, 1873, of phthisis pulmonalis.—Private W. Brommel, Co. E, 15th New York Artillery, aged 30 years; wounded at Boydton Plank Road, March 31, 1865; shot wound of left leg, lower third. Admitted into Columbian Hospital, Washington. Hæmorrhage from anterior tibial artery; vessel ligated by Acting Assistant Surgeon S. W. Briggs. Died May 2, 1865, from exhaustion from loss of blood.—Corporal T. Condon, Co. C, 2d New York Artillery, aged 21 years; wounded at Deep Bottom, August 16, 1864; shot flesh wound of the middle third of the right leg; the ball entered the posterior portion of the leg and made its exit at a corresponding point anteriorly. Admitted into Satterlee Hospital, Philadelphia. Hæmorrhage, August 26th, Ligation of anterior tibial artery above and below bleeding orifice by Acting Assistant Surgeon W. F. Atlee. Collateral circulation re-established in twenty-four hours. Discharged July 26, 1865, and pensioned. The New York Examining Board reported, March 4, 1876: "There is a cicatrix three and a half inches in length on anterior surface of right leg; the ball emerged through

[1] The case numbered 13 in TABLE V is detailed by Professor A. C. POST in the *Surg. Memoirs of the U. S. San. Comm.*, Surgical Vol. I. p. 262.

the calf. Both cicatrices are adherent and interfere with locomotion and the strength of the limb."—Sergeant M. C. Glass, Co. F, 16th Michigan, aged 24 years; wounded at Hatcher's Run, February 7, 1865; shot wound of right anterior tibial artery. Admitted into Jarvis Hospital, Baltimore. Ulceration and hæmorrhage; six ounces of blood lost. Ligation of anterior tibial artery in continuity, February 20, 1865. Died February 28, 1865, of hæmorrhage.—Private J. L. Renshaw, Co. H, 191st Pennsylvania, aged 28; wounded at Petersburg, June 24, 1864; shot flesh wound of left leg by a conoidal ball; sloughing and hæmorrhage from anterior tibial artery to extent of eight ounces. Ligation of artery above and below wound. The patient recovered, and was discharged May 18, 1865.—Private S. Riley, Co. H, 92d New York, aged 24; wounded at Cold Harbor, June 1, 1864; conoidal ball passed through the integument of the left leg one inch below the knee. June 25th, sloughing and erysipelas. July 8th, recurrent hæmorrhage to the extent of six ounces from the anterior tibial artery. The artery was tied in the wound. The patient was discharged February 9, 1865, and pensioned. Examiner H. O. Hitchcock, of Kalamazoo, reported, June 8, 1867: "Ball passed below the patella and under the ligament. The wound was followed by gangrene and large sloughing, and now there is an extensive cicatrix, causing lameness and great weakness of the knee." Examiner J. A. Brown, of Detroit, reported, September 28, 1869: "Gunshot wound of left knee, the ball striking the inner condyle of the tibia and the patella, causing weakness and impaired motion of the knee, mostly from contraction of the cicatrix." Examiner D. F. Wooley, of Big Rapids, reported, April 1, 1875: "Ball entered at upper and inner third of the tibia, passing directly in front and under the patella and out, severing the attachment of the lower end of the patella and fracturing the upper end of the tibia; resulting in loss of part of upper portion of the tibia and weakening of knee joint to a serious extent, with slight adhesions of the muscles; on the whole seriously impeding locomotion and requiring care to maintain a standing position upon it." The pensioner was paid March 4, 1876.—Corporal I. Sampson, Co. F, 1st Massachusetts Cavalry, aged 35, was wounded during Sheridan's raid, May 11, 1864; shot wound of right leg, middle third, outside. Admitted into Hammond Hospital, Point Lookout. Gangrenous sloughing set in, destroying the coats of the anterior tibial artery. June 28th, hæmorrhage to the extent of four ounces from the anterior tibial artery. Both ends of artery tied in the wound by Acting Assistant Surgeon T. Liebold. The bleeding did not recur. The patient recovered, and was mustered out October 16, 1864. Examiner W. H. Page, of Boston, reported, April 11, 1865: "Ball struck about the middle of the left leg, fracturing and splintering the tibia, a large part of which, at seat of injury, has been removed, and there is a deep cicatrix three inches by one and a half. The whole leg is much swollen and œdematous, and there is probably more dead bone to be removed." The Boston Examining Board reported, December 2, 1874: "Ball entered middle third of leg anteriorly and passed directly through. The tibia was shattered, and necrosis has resulted therefrom. The leg is weak and the wound is still open, an ulcer at the time of examination existing the size of a five-cent piece, surrounded by an areola four inches in diameter and somewhat eczematous. His leg is painful and weak upon long standing, and this interferes with the performance of manual labor." In September, 1875, the Board reported: "Large adherent cicatrix, inflamed and very tender; anchylosis of ankle." Pensioner paid June 4, 1876.—Private W. Saulsbury, Co. K, 39th U. S. C. T., aged 36; wounded at Petersburg, July 30, 1864; flesh wound of lower third of right leg. He was admitted into Summit House Hospital, Philadelphia. Secondary hæmorrhage; ligation of anterior tibial artery January 19, 1865. Amputation of right leg at lower third by double-flap method. Transferred to hospital at Beverly, and discharged May 26, 1865. He died July 16, 1871.—Private J. Skiffington, Co. I, 2d New York Heavy Artillery, aged 28; wounded at Petersburg, June 16, 1864; flesh wound of lower third, right leg. Admitted into Satterlee Hospital, Philadelphia; wound sloughing. Acting Assistant Surgeon W. F. Atlee ligated both ends of the anterior tibial artery in the wound, on account of hæmorrhage, July 28, 1864. The patient died August 29, 1864, of pyæmia.—Private *L. Weaver*, Co. G, 4th Virginia, aged 23; wounded at Gettysburg, July 3, 1863. Admitted into Twelfth Corps Hospital. Shot flesh wound of both legs and face. July 13th, bleeding of eight ounces from the anterior tibial artery, which recurred on the 14th, sixteen ounces of blood being lost. The anterior tibial artery was tied above and below the point of division. The patient was paroled November 12, 1863.

Ligations of the Anterior and Posterior Tibial Arteries.—There were two instances in which the posterior and anterior tibial arteries were conjointly tied for shot flesh wounds:

Cases 121–122.—Private J. Hoar, Co. G, 144th New York, aged 22 years, wounded at White Plains, July 24, 1863. Shot wound of right foot; admitted into Douglas Hospital, Washington; hæmorrhage to the extent of six ounces occurred from the metatarsal artery on August 1st. Assistant Surgeon W. Thomson, U. S. A., ligated the anterior tibial artery in the continuity at the instep and the posterior tibial behind the malleolus. The wounds healed well, and the patient was returned to duty from Central Park Hospital, New York, April 11, 1864. He is not a pensioner.—Private J. Kercher, Co. D, 7th Michigan Cavalry, wounded at Gettysburg, July 2, 1863. Shot wound of right leg and of anterior and posterior tibial arteries; admitted into McDougall Hospital, New York Harbor. July 29th, ligation of anterior and posterior tibial arteries. August 10th, hæmorrhage, amounting to thirty-two ounces of blood. Died August 10, 1863.

Ligation of Veins.—Six cases in which the femoral vein was tied simultaneously with the artery are noted on page 38. Specimens from two of the cases are shown in Figures 15 and 19. A case of ligation of the saphenous vein is detailed:

Case 123.—Private A. Kendig, Co. B, 97th Pennsylvania, aged 31 years, wounded at Bermuda Hundred, May 18, 1864. Assistant Surgeon E. McClellan, U. S. A., reported from Hampton Hospital, Fort Monroe: "Gunshot wound of left thigh, inner surface, upper third; the ball entered near the apex of Scarpa's space, passed through the adductor longus muscle, and made its exit over the upper third. Gracilis muscle wounded; phagedæna. On May 24th, hæmorrhage to the extent of six ounces occurred from the saphenous vein. Both extremities of the vein were ligated in the wound. The hæmorrhage did not recur, but the patient sank and died of exhaustion June 4, 1864."

Amputations following shot flesh wounds will next be considered.

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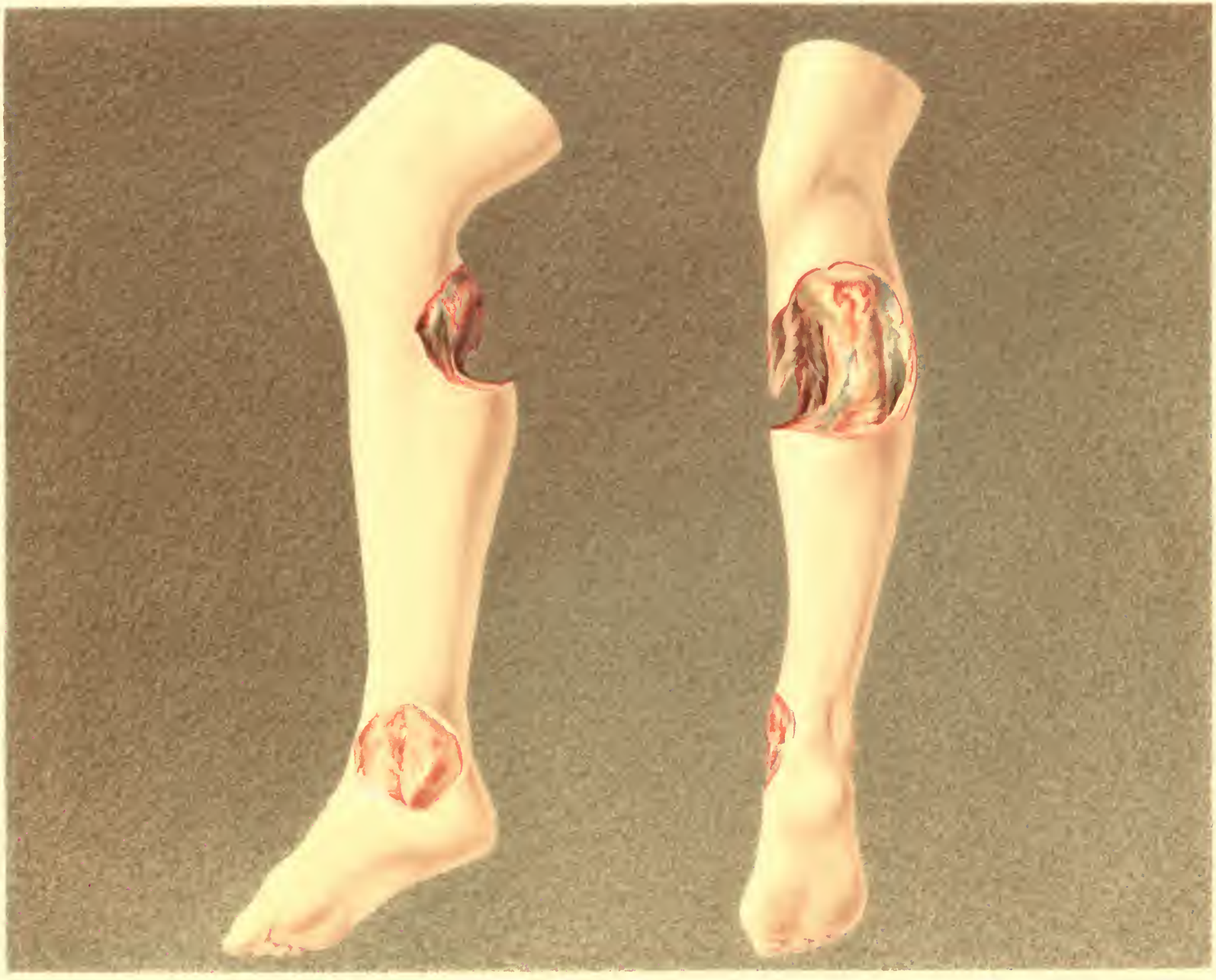

EFFECTS OF HOSPITAL GANGRENE

Amputations in the Lower Limbs after Shot Flesh Wounds.—Two hundred and one cases were reported of amputations in the lower extremity for shot wounds involving only the soft parts, comprising one hundred and thirty-one amputations in the thigh, six disarticulations at the knee, sixty-three amputations at the leg, and one of the toes.

Amputations in the Thigh.—In the hundred and thirty-one cases of this series, ninety-four or 71.7 per cent. were fatal. The cases are enumerated in TABLE VI. Ten of the operations were primary, with only two recoveries. Fifty-seven intermediary operations, with forty-eight deaths, gave a mortality rate of 84.2 per cent.; sixty-four secondary operations, with thirty-eight deaths, had a death-rate of 59.4 per cent. The amputations were necessitated for the most part by complications of consecutive hæmorrhage, gangrene, or secondary disease of the bone or joints, and in some instances were resorted to after ligations, removals of sequestra, or other interference had been unavailingly employed:

CASE 124.—Private H. Root, Co. B, 104th New York, aged 26 years, was wounded at Petersburg, June 22, 1864, and admitted to the field hospital of the 3d division, Fifth Corps. Surgeon L. W. Read, U. S. V., noted, "buckshot flesh wound of right leg, slight." On June 30th, the patient entered the Harewood Hospital, Washington, whence Surgeon R. B. Bontecou, U. S. V., contributed the specimen (FIG. 21), with the following brief history: "Gunshot wound of right leg, middle third, injuring soft parts. On admission the constitutional state of the patient was very poor; condition of injured parts tolerably good, but wound very painful. The parts subsequently became gangrenous, with rapid sloughing of soft parts; about one half of the lower third, and three-fourths of the upper third, and all of the middle third of the tibia exposed and denuded of periosteum. The tibia became necrosed throughout its whole extent, and at this time the patient became jaundiced. On October 29th, about ten inches of necrosed bone was extracted by Acting Assistant Surgeon D. I. Evans. The general condition of the patient improved soon afterwards, under a supporting treatment throughout, and was doing tolerably well, parts improving, when transferred to hospital at Elmira, January 4, 1865." Two weeks after his transfer the patient obtained a furlough and proceeded to his home in Tioga County, New York, where his limb was subsequently amputated at the middle third of the thigh. Dr. S. Knapp, his attending physician, certified that "he found him suffering from a badly cared for and neglected wound," etc., and that "on February 28, 1865, it became necessary to amputate the leg," which operation he performed, being assisted by Dr. E. Daniels. About two months afterwards the patient returned to the hospital, and on July 21, 1865, he was discharged from service and pensioned. He died July 25, 1870, of consumption, resulting from the wound and its effects, more than five years after the amputation. The parts removed by the amputation at mid-thigh by Dr. Knapp were not transmitted to the Museum; but the large sequestrum comprising the greater part of the diaphysis of the tibia is represented in the wood-cut (FIG. 21), and, as mounted, is nine inches in length (see *Catalogue of the Surgical Section of the Army Medical Muesum*, Washington, 1866, p. 405).

FIG. 21.—Sequestrum of right tibia. *Spec.* 3601.

In a grave case of hospital gangrene following a shot wound at the ankle, the lamented artist, Hospital Steward E. Stauch, made a colored drawing of the appearances after the sloughing surfaces had cleaned off under the applications of fermented cataplasms. The drawing is copied in the chromolithograph opposite, PLATE XXVII.

CASE 125.—Corporal C. H. Dudley, 11th Indiana Battery, received at Chicamauga, September 20, 1863, a wound of the right foot, a conoidal ball entering the under portion just below ankle joint. He was taken prisoner, conveyed to Richmond, and on October 29, 1863, was admitted to Division No. 1 hospital, Annapolis, from the steamer New York. The wound had sloughed extensively. On October 30th and 31st there was hæmorrhages from the dorsalis pedal artery, which was promptly arrested by the use of styptics. Soon after admission a phagedenic ulcer made its appearance on the posterior face of the right leg, immediately below knee joint, and an examination, made November 19, 1863, revealed a deeply excavated sloughing wound. Yeast poultices were applied to the sloughing tissues, and when the gangrenous masses had cleaned off a colored drawing was made of the parts by Hospital Steward E. Stauch. November 23d, hæmorrhage amounting to eight ounces occurred from this wound, and was restrained by finger compression on the femoral artery; tourniquet was loosely applied on limb, and stimulating draughts given. On November 24th, Assistant Surgeon W. S. Ely, U. S. V., who had charge of the case, reports that the "wound from which the hæmorrhage proceeded was thoroughly examined and the diseased tissues found more extensive than had been supposed; the finger could be passed beneath superficial border of ulcer to a considerable extent, and the popliteal artery was found to be divided by the extent of the ulcerative process, and the ligamentous structures of the knee joint were found extensively destroyed. Amputation was determined on as the only rational treatment. It was immediately performed, after the circular method, directly above the knee joint, by Surgeon T. A. McParlin, U. S. A., assisted by Surgeon B. A. Vanderkieft, U. S. V. Patient bore the operation well, and the tissues at seat of amputation appeared healthy. No sutures were used to approximate the flaps, wet straps being the only retentive treatment employed." The case progressed favorably until December 2d. Acting Assistant Surgeon C. Hayes kept the further record of the case. On December 8, 1863, hæmorrhage, amounting to eight ounces, occurred from the stump. He failed rapidly after this, and died December 11, 1863. *Surgical Series of Drawings*, Nos. 59, 60, S. G. O., PLATE XXVII.

TABLE VI.

Numerical Statement of One Hundred and Thirty-one Amputations in the Thigh for Shot Injury unattended by Fracture.

No.	Name, Military Description, and Age.	Dates.	Injury, Operator, and Result.
1	Atwood, H., Pt., K, 14th New Hampshire.	Sept. 19, 23, '64.	Right fem. art. injured; circulat'n destroyed; gang.; circ. amp. at low. third thigh, by A. Surg. W. Fritz, 12th Mo. Died Sept. 30, '64.
2	Baker, J., Pt., A, 11th Connecticut, age 32.	June 15, 26, '64.	Sheath of right fem. art. wounded; hæm. from branch of profunda; flap amp. thigh, by A. A. Surg J. S. Hill. Died June 29, 1864.
3	Barkeloo, J., Pt., M, 2d Ohio Cavalry, age 28.	July 19, 26, '63.	Right popliteal artery severed; fem. art. ligated; flap amp. thigh at up. third. Disch'd Mar. 17, '65.
4	Barnum, C. F., Pt., E, 187th Penn., age 30.	June 18, Sept. 7, 1864.	Left leg; amp. bel. tubere. of tibia; hæm.; amp. thigh, circ., lo. third, by A. A. Surg. J. Morris. Died Oct. 13, '64. *Spec.* 3132, A. M. M.
5	Barry, E., Pt., A, 82d Penn., age 24.	June 3, Aug. 11, 1864.	Left leg; flap amp. at mid. third, by Dr. J. Shields. Discharged Sept. 2, 1865.
6	Blaker, J. P., Pt., E, 15th Infantry, age 18.	Aug. 7, Sept. 16, 1864.	Left leg; gang.; ant. post., lower third thigh, by A. A. Surg. R. W. Forrest. Died Sept. 18, 1864, exhaustion.
7	Brasted, A. A., Serg't, H, 96th New York, age 22.	June 1, Nov. 7, 1864.	Right knee joint; gang.; joint opened; circ., low. third thigh, by A. A. Surg. A. J. Smith. Died Nov. 30, 1864, exhaustion.
8	Bell, J. C., Pt., E, 34th Iowa, age 23.	April 6, 18, '65.	Left posterior tibial artery cut by ball; gang.; hæm.; lig. of fem. artery; amp. at low. third thigh, by A. A. Surg. L. M. Cowan. Died April 23, '65, exhaustion.
9	Belt, W. H. H., Pt., A, 10th Ohio Cavalry, age 21.	Feb. 10, April 21, 1863.	Shot perforation left thigh; erysipelas; flap amp. at mid. third, by Surg. J. R. McClurg, U.S.V. Disch'd Sept. 2, 1863.
10	Bishop, J., Pt., M, 22d New York Cavalry, age 20.	Aug. 25, Sept. 6, 1864.	Right leg, destroying post. tibial artery, vein, and nerve; hæm.; thigh amp. at low. third, by A. A. Surg. W. J. Mellench. Died Sept. 15, 1864, pyæmia.
11	Black, J. M., Corp'l, D, 35th Ohio, age 21.	July 20, Aug. 15, 1864.	Right leg; gang.; flap amp. thigh, low. third, by A. A. Surg. J. E. Crowe. Died Aug. 18, '64, exh'n.
12	Blaisdell, H., Pt., H, 58th Pennsylvania.	April 20, June 28, 1863.	Right leg near knee; no fracture; thigh amp. at middle third, by Surg. J. F. Gallowpe, 17th Mass. Died July 10, 1863.
13	Boies, J. A., Lieut., H, 13th Infantry, age 22.	May 22, June 18, 1863.	Left knee, by spent shot; pyæmia; amp. of thigh at upper third. Died June 28, 1863.
14	Brockman, H., Pt., I, 6th Kentucky.	April 6, June 26, 1862.	Right femoral artery cut; double flap amp. thigh. Disch'd Aug. 9, 1863.
15	[1]*Burke, W.*, Pt., B, 24th Alabama.	Sept. 19, 23, '63.	—— thigh; gangrene; thigh amp. Died Sept. 23, 1863.
16	*Burroughs, H. C.*, C, 7th C. S. Cavalry.	April 1, May 15, 1865.	Poplit'l space, r't leg; gang.; circ. amp. thigh, by Surg. W. Hayes, U.S.V. Died May 17, '65, gang.
17	Butler, H., Pt., H, 1st New York Artillery, age 21.	June 1, Aug. 5, 1864.	Left leg just below poplit'l space; gang; amp. thigh, by A. A. Surg. W. C. Way. Died Aug. 6, '64.
18	Cameron, J., Serg't, K, 31st Maine, age 27.	June 20, '64, July 5, '66.	Right thigh; ch. arthritis; double flap, thigh, by Ass't Surg. H. E. Brown, U. S. A. Recovery.
19	*Carroll, R. A.*, Pt., F, 3d Alabama, age 19.	July 3, Nov. 29, 1863.	Right leg; doub. flap amp. thigh, by A. A. Surg. J. E. Steele; hæmorrhage; fem. art'ry ligated. Died Feb. 17, 1864, pyæmia.
20	Case, E. F., Pt., G, 13th Michigan.	Sept. 19, 26, '63.	Left fem. artery severed; gang.; Sept. 24, amp. leg four inches below knee; 26th, thigh amp. at upper third. Died Sept. 27, '63.
21	Chapman, C. H., Serg't, E, 15th New Hampshire, age 26.	Sept. 30, '64, Apr. 7, '65.	Right thigh; gang., destroying profunda art'y; hæm.; circ. amp. up. third, by Surg. R. I. P. Goodwin. Died five hours after ope'n.
22	Chapman, J. S., Pt., E, 4th Maine, age 33.	June 18, July 5, 1864.	Left knee; amp. post. flap, thigh, by Surg. E. Bentley, U. S. V. Died July 6, 1864, exhaustion.
23	Chawgo, M. W., Pt., H, 40th New York, age 21.	May 13, 17, '64.	Right leg; gang.; hæm.; amp. at low. third, by Asst. Surg. C. A. McCall, U. S. A. Died May 19, 1864, pyæmia.
24	Cheseltine, W. C., Pt., C, 1st Maryland Cavalry, age 22.	May 27, June 4, 1864.	Right thigh, severing fem. vein; gang.; circ. amp. thigh, by Asst. Surg. W. F. Norris, U. S. A. Died June 9, 1864, exhaustion.
25	Christ, J., Corp'l, M., 198th Penn., age 27.	Mar. 25, April 7, 1865.	Right thigh; circ. amp. thigh, by A. A. Surg. J. H. Gillman. Died April 25, 1865, pyæmia.
26	Cook, L., Serg't, C, 26th Ohio, age 25.	June 18, Aug. 10, 1864.	Right thigh. Aug. 9, hæm.; amp. post. flap, mid. third, by A. A. Surg. E. H. Sands. Died Aug. 11, 1864.
27	Cooper, T., Pt., C, 4th Penn. Reserves, age 18.	June 22, '64, May 3, '76.	Left thigh and leg; contraction of muscles; Dec. 31, hamstring tendons divided. Disch'd June 23, '65; leg deform'd and paraly'd; amp. above knee, by Surg. O. Pemberton, F. R. C. S., of Birmingham, England.
28	Curtis, J. A., Pt., D, 101st Ohio, age 25.	June 27, Aug. 7, 1864.	Right thigh; gang.; flaps of skin, cir. of muscles, by Surg. S. E. Fuller, U. S. V. Died Aug. 15, 1864, pyæmia.
29	Curtis, G., Pt., A, 1st Colored Troops, age 23.	Oct 27, Nov. 19, 1864.	Shell contusion of right thigh and leg; gang.; amp. thigh, by Asst. Surg. J. H. Frantz, U. S. A. Died Jan. 13, 1865, pyæmia.
30	Danielson, H. A., Pt., G, 7th Minnesota, age 23.	Dec. 16, '64, Feb. 11, '65.	Left thigh; gang.; amp. thigh, by A. A. Surg. S. W. Thompson. Disch'd August 16, 1865.
31	Darling, S. G., Pt., D, 32d Maine, age 19.	May 12, 26, '64.	Right fem. artery severed; artery tied on field; gang.; thigh amp. by Surg. R. B. Bontecou, U.S.V. Died May 26, '64, hæmorrhage.
32	Decker, E., Pt., H, 81st Ohio.	July 22, 1864.	—— fem. art. wounded; primary amputation of thigh. Died Aug. 3, 1864.
33	Deinlein, D., Pt., C, 5th Ohio, age 43.	May 25, July 10, 1864.	Right popliteal space, producing aneurism; amp. thigh, by A. A. Surg. O. D. Norton. Died Aug. 1, 1864, in low typhoid condition.
34	Delamater, M., Corp'l, G, 7th Mich. Cavalry, age 20.	May 28, July 12, 1864.	Right thigh; gang.; hæm.; July 10, femoral ligated; amp. thigh, by Asst. Surg. H. M. Sprague, U.S.A. Died Aug 7, '64. py'mia.
35	Deniker, D. H., Pt., E, 2d Maryland, age 20.	Sept. 26, 28, '64.	Right leg; thigh amp. at lower third, by A. A. Surgeon M. M. Townsend. Died Sept. 29, '64.
36	Dodge, W. M., Serg't, F, 137th New York, age 45.	July 2, 10, '63.	Right leg; gang.; hæm.; amp. thigh, by Surg. H. E. Goodman, 28th Penn. Died July 13, '63.
37	Doyle, L., Pt., K, 8th Maine, age 34.	May 20, June 6, 1864.	Right thigh perforated; June 1, hæm; fem. ligated; recurred; amp. thigh, by Asst. Surg. W. H. Gardner, U. S. A. Died June 6, 1864, exhaustion.
38	Drilling, H., Pt., C, 124th New York, age 30.	Oct. 26, Nov. 1, 1864.	Right fem. vein and art'ry wounded; hæm.; amp. thigh, by Surg. D. W. Bliss, U.S.V. Died Nov. 21, 1864, pyæmia.
39	Dudley, C. H., Corp'l, 11th Indiana Battery.	Sept. 20, Nov. 24, 1863.	Right foot; gang., involving popliteal artery; hæm.; amp. thigh, by Surg. T. A. McParlin, U.S.A. Died Dec. 11, '63, hæm., debility.
40	[2]Dutcher, J. H., Pt., M, 2d New York Heavy Artillery.	May 31, June 5, 1864.	Left popliteal artery divided near end; gang.; thigh amp., by Surg. J. A. Lidell, U.S.V. Died June 8, '64, exhaustion.
41	Dyer, G. A., Serg't, G, 6th Maine, age 21.	Nov. 7, '63, Feb. 19, '64.	Right thigh; amp. thigh, by Surg. D. W. Bliss, U. S. V. Disch'd April 19, '64. *Spec.* 2047, A.M.M.
42	Edwards, C. S., Pt., G, 57th Indiana.	Dec. 31, '62, May 26, '63.	Left leg; amp. thigh, by A. A. Surgeon J. B. Burns. Disch'd Aug. 23, 1863.
43	Elliot, J., Corp'l, E, 2d Pennsylvania Cavalry, age 24.	April 2, May 5, 1863.	Left leg; hæm.: April 29, popliteal artery ligated: hæm. recurred; amp. thigh. Died May 5, 1863, from shock, 2 hours after amp.
44	*Farder, J.*, Pt., 1st N. Carolina Cavalry, age 25.	June 20, Sept. 1, 1864.	Right thigh and left leg; amp. left thigh, by Surg. H. L. W. Burritt, U. S. V. Died Sept. 2, '64.
45	Feary, G. M., Pt., B, 108th New York.	July 2, 14, '63.	Right thigh, severing fem. artery; hæm.; gangrene; amp. of thigh. Died July 24, 1863.

[1] FERRY (C.), *Report of Wounded treated in Field Hospital of Hindman's Division*, etc., in *Confederate States Med. and Surg. Jour.*, 1864, Vol. I, p. 77. [2] LIDELL (J. A.), *Wounds of the Arteries*, in *Surg. Mem. of the War of the Rebellion, by the U. S. Sanitary Commission*, 1870, Vol. I, p. 59.

No.	Name, Military Description, and Age.	Dates.	Injury, Operator, and Result.
46	Fenton, C., Serg't, E, 1st Penn., age 25.	May 6, 22, '64.	Left thigh, wound'g profunda art.; frequent hæms.; amp. thigh, by Surg. R. B. Bontecou, U. S. V. Died May 22, '64, exhaustion.
47	Foss, A. J., Pt., F, 13th N. Hampshire, age 21.	April 27, M'y 8, '63.	Right leg; gang.; amp. thigh. Died May 8, 1863.
48	*Foust, J.*, Pt., —, North Carolina Artillery, age 37.	Mar. 27, June 17, 1865.	Left knee, not involv'g joint; extensive suppurat'n involv'g joint; amp. thigh, by A. A. Surg. J. Gilman; hæm.; artery lig.; July 10, pyæmia. Died J'y 25, '65, exh'n.
49	Gardner, G. W., Serg't, H, 12th Illinois Cavalry, age 29.	Oct. 11, 29, '63.	Right fem. artery injured; gang.; amp. thigh, by A. A. Surg. W. H. Ensign. Died Dec. 5, 1863, debility. *Spec.* 1760, A. M. M.
50	Goldsborough, H. J., Pt., B, 31st Illinois.	June 26, Dec. 16, 1863.	Left knee; ulceration of articular surface of bone; amp. thigh, by A. A. Surg. J. D. Davis. Died April 15, 1864.
51	Gooding, H. P., Pt., H, 10th Michigan Cav'ry.	Jan. 30, Feb. 27, 1865.	Left knee; extensive suppurat'n, joint disorg'zed; flap, low. third, by A. A. Surg. T. W. Branch. Died March 4, 1865; pyæmia.
52	Hasey, W. H. H., Serg't, E 20th Maine, age 23.	July 1, 30, '64.	Right leg; gang. and hæm.; amp. thigh, by A. A. Surg. H. B. Maben. Died Sept. 28, '64, exh'n.
53	Haskell, A. M., Corp'l, K, 12th Maine, age 23.	Oct. 19, Nov. 15, 1864.	Right knee; amp. post. flap, junc. lower third, by A. A. Surg. W. Kempster. Nov. 21, hæm.; lig. fem.; hæm. 27th and 30th. Died Dec. 1, 1864, exhaustion.
54	*Haynes, A.*, Major, 29th Virginia.	May —, 27, '64.	Right fem. art. injured; single flap amp. of thigh. Died May 30, '64.
55	[1]*Hembery, A. J.*, —, K, 4th Alabama.	Sept. 19, Oct. 1, 1863.	Lower portion popliteal space; hæm. from poplit'l art.; amp. just above knee. Died end third day.
56	Hickey, J., Pt., C, 22d Massachusetts, age 19.	July 2, Aug. 5, 1863.	Right leg, follow'd by trau. aneur. of ant. and post. tibial arteries; hæm.; gang.; amp. thigh, by Surg. C. W. Jones, U. S. V. Died Aug. 16, '63. *Spec.* 1698, A. M. M.
57	Hogstead, F., Corp'l, A, 187th New York, age 21.	Feb. 7, 26, '65.	Left leg; amp. thigh, by A. A. Surgeon R. Westerling. Died March 8, 1865.
58	Hopper, B., Pt., F, 64th New York, age 28.	May 12, June 16, 1864.	Left knee; destructive inflammation in joint; amp. thigh, by A. A. Surg. J. E. Dexter. Died June 21, 1864, pyæmia.
59	Hubbach, H., Corp'l, F, 68th New York, age 42.	Aug. 30, '62, Oct. 6, '65.	Left thigh. Disch'd Nov. 20, '63. Contract'n of flex. of thigh, and atrophy; flap amp. thigh seven inches from body, by Dr. L. Bauer, of Brooklyn. Recovered.
60	Hyatt, J. B., Pt., E, 7th Indiana Cavalry, age 18.	July 9, 19, '64.	Left popliteal art. inj.; gang.; amp. thigh, by Surg. J. G. Keenon, U. S. V.; gang. of stump and left lung. Died Aug. 11, '64, pyæmia.
61	Jenkins, W. H., Pt., C, 39th Illinois.	Oct. 13, 1864. May 5, 1868.	Right thigh. Disch'd. May 18, '65, three large exostoses rem., bone scraped; Oct. 24, rem. large sequestrum; May 5, '68, thigh amp. at base of trochanter, by Surg. C. M. Clark, late 39th Ill. Recovered, Oct. 2, 1869.
62	Johnson, P., Pt., E, 2d Penn., age 27.	June 27, Oct. 19, 1864.	Right knee; sloughing; amp. thigh, by A. A. Surg. W. P. Moon. Died Oct. 21, 1864.
63	*Johnson, W.*, Pt., G, 31st Alabama, age 22.	June 15, J'y 1, '64.	Left gastrocnemius; amp. thigh. Died July 12, 1864, pyæmia.
64	Jones, J. T., Pt., H, 8th Wisconsin, age 21.	Dec. 16, '64, Feb. 26, '65.	Left leg; gang.; amp. thigh, by A. A. Surg. C. F. Barnard. Transfer'd Sept. 20, '65, for muster out.
65	Keep, M., Pt., E, 36th Massachusetts, age 23.	May 19, June 4, 1864.	Left popliteal space; knee joint ope'd by suppurat'n; amp. thigh, by Surg. D. P. Smith, U. S. V. Died June 9, 1864, pyæmia.
66	Keller, B., Pt., F, 1st Mich. Cavalry, age 36.	May 11, July 2, 1864.	Right thigh; circ. amp. of thigh, by Surgeon A. Heger, U. S. A. Died July 3, 1864, exhaustion.
67	Kenyon, B. G., Corp'l, H, 11th New Hamp.	Je. 16, '64, Jan. 3, '67.	Left leg; amp. thigh, by Prof. A. H. Crosby. Disch'd Sept. 27, '65.
68	Kintner, S. L., Corp'l, A, 24th Iowa.	July 12, —, '63.	R't thigh; amp., Surg. J. L. Dickey, 47th Ind. Died July 16, '63.
69	[2]Kegel, C., Pt., D, 15th New York H'vy Art'y, age 39.	May 30, June 6, 1864.	Right leg; gangrene; amp. thigh, by A. A. Surg. C. H. Osborne. Died June 16, 1864, pyæmia.
70	Lane, D., Pt., K, 14th Ohio, age 34.	June 14, Aug. 7, 1864.	Left knee; sloughing; amp. thigh, by Asst. Surgeon B. E. Fryer. Died Aug. 16, 1864, pyæmia.
71	Larkin, T., Pt., K, 4th Mass., age 18.	June 23, '63, June 15, '64.	Left thigh and wrist. Disc'd Aug. 20, '63. Atrophy and exc. pain; amp. at up. third thigh, by Dr. C. H. Stedman, Boston. Rec'd.
72	*Lauch, H.*, Pt., Braxton's Artillery, age 34.	Sept. 19, 28, '64.	Left thigh, severing fem. art. and vein; hæm.; amp. thigh, by Surg. G. M. Burditt, P. A. C. S. Died Sept. 28, shock oper'n and gang.
73	Lee, W. H., Corp'l, F, 32d Colored Troops, age 26.	Feb. 10, Mar. 14, 1865.	Right thigh; exten. suppu n, knee joint inv.; circ., lower third, by Surg. A. H. Thurston, U. S. V. Died March 14, 1865, irritative fever, shock.
74	Leonard, J., Pt., L, 7th New York H'vy Art'y, age 21.	May 30, July 8, 1864.	Left leg; July 3, hæm.; ligation of posterior tibial artery; amp. thigh. Died July 23, 1864.
75	Lloyd, R., Pt., B, 1st Kentucky.	Dec. 31, '62, Ap'l 4, '63.	Left thigh; amp. thigh at lower third. Disch'd Aug. 26, 1863.
76	Lyon, H. J., Serg't, H, 40th Illinois, age 24.	July 21, 28, '64.	Left popliteal space; gang.; amp. of thigh, by Surg. E. J. Buck, 18th Wis. Disch'd April 26, '65.
77	McCarthy, D., Pt., C, 2d Mass., age 22.	Aug. 9, Sept. 15, 1862.	Right popliteal space; amp. right thigh, by A. A. Surg. T. B. Townsend. Disch'd June 17, '64.
78	McClure, R., Pt., L, 15th Kansas, age 18.	Jan. 21, 24, '64.	Right leg, severing ant. tibial art. and nerve; mortification; amp. thigh, by Surg. A. C. Van Duzen, U. S. V. Disch'd Nov. 14, '64.
79	McMahon, E., Lieut., D, 80th New York, age 21.	Aug. 30, '62, Feb. 7, '63, Jul. —, 1864.	Left knee; circ., lower third, by Asst. Surg. E. J. Marsh, U. S. A. Re-amp., by Prof. W. Parker. Recovery. *Spec.* 1054.
80	Maher, L., Pt., C, 69th New York.	Sept. 17, Nov. 24, 1862.	Right knee; amp. post flap, up. third, by Surg. H. S. Hewit, U. S. V.; necrosis. Disch'd April 12, 1864. *Spec.* 754.
81	Martin, J. H., Pt., E, 100th Pennsylvania.	May 12, 12, '64.	Left leg, injuring saphenous vein; gangrene; amp. thigh at lower third. Died May 18, '64.
82	Martin, M., Pt., H, 1st Artillery, age 24.	June 24, Aug. 14, 1864.	Left knee; circ., mid. third, by Surg. E. Bentley, U. S. V. To duty Dec. 9, 1864.
83	[3]McCreary, S. C., Pt., F, 100th Pennsylvania.	Sept. 1, 14, '62.	Right leg, perforat'g ant. tib. art'y; amp. thigh. Disch'd Dec. 4, '62.
84	Mather, H. G., Pt., H, 90th Penn., age 20.	June 17, July 20, 1864.	Left leg; gang.; amp. thigh, by A. A. Surg. G. Badger. Died July 20, 1864.
85	Mathers, W. D., Pt., I, 6th Vermont, age 28.	Oct. 19, Nov. 13, 1864.	Left leg; gang. and hæm.; amp. thigh, by A. A. Surg. F. F. Murdock. Died Dec. 16, '64, pyæmia.
86	Meyer, M., Pt., L, 15th New York Artillery, age 44.	Aug. 18, Oct. 6, 1864.	Left leg; gang.; amp. thigh, by A. A. Surg. J. P. Arthur. Died Oct. 7, '64. *Spec.* 3280, A. M. M.
87	Miller, P., Pt., A, 64th Ohio, age 40.	Dec. 16, Jan. 22, 1865.	Left leg; gang.; thigh amp., by Surg. R. H. Gilbert, U. S. V. Died Feb. 9, '65, pyæmia.
88	*Moore, T.*, Pt., E, 51st Virginia, age 19.	Sept. 19, Nov. 14, 1864.	Right knee; abscess; circ., lower third, by Surg. B. M. Cromwell, C. S. A. Died Nov. 14, 1864.
89	Moss, B. F., Corp'l, B, 101st Illinois, age 43.	July 25, Nov. 11, 1864.	Left leg; gang.; amp. leg, by A. Surg. W. B. Trull, U. S. V. Nov. 9, diffused aneur. in poplit'l region; hæms.; amp. thigh, by Dr. Trull; hæms. from and ligation of fem. artery. Disch'd June 25, '65.
90	Nichols, M. S., Pt., G, 91st Ohio, age 23.	Sept. 19, Nov. 14, 1864.	Left leg; knee joint opened by ulceration; amp. thigh, by Asst. Surg. N. F. Graham, U. S. V. Died Dec. 7, '64, pyæmia.
91	Nobler, B., Pt., F, 85th Illinois, age 21.	June 30, Aug. 4, 1864.	Right leg; sloughing and hæm.; amp. thigh at lower third, by A. A. Surg. S. C. Ayres. Died Aug. 14, '64, anæmia.
92	[4]Nottingham, G. M., Pt., I, 56th Ohio.	May 1, 20, '63.	Left popliteal region secondarily involv'g popliteal artery; hæm.; amp. thigh, by A. A. Surg. L. Dyer. Died May 29, '63.
93	[5]*Page, A. C.*, Capt., D, 21st Virginia.	Sept. 16, 16, '62.	Post. tib. art. cut by ball; incip. mort.; amp. thigh, by R. T. Coleman, chief surg. Gen. Stonewall Jackson's Corps. Recovered.
94	Percel, J., Pt., —, 148th Pennsylvania.	May 3, 21, '63.	Thigh; aneurism; amp. up. third, by Surg. C. S. Wood, 66th New York. Died May 21, 1863.
95	Pittee, R., Corp'l, F, 50th New York.	Dec. 11, 11, '62.	Popliteal space, destroying popliteal vessels and nerves; hæm.; amp. thigh. Died Dec. 12, 62.
96	Ports, I. A., Pt., D, 27th Ohio.	Oct. 3, 12, '62.	Perfor. right poplit'l space; gang.; amp. thigh. Disch'd April 7, '63.
97	Price, G., Pt., C, 2d Delaware.	July 2, 2, 1863.	Left foot and leg; gang.; primary amp. thigh, by Surg. C. S. Wood, 66th N. Y. Died July —, '63.
98	Rayser, J. J., Pt., B, 14th Penn. Cav., age 40.	Oct. 19, Nov. 8, 1864.	Right knee; joint opened by inflam.; amp. post. flap, mid. third, by A. A. Surg. A. W. Emery. Died Nov. 8, 1864.

[1] Eve (P. F.), *Cases of Secondary Hæmorrhage, etc.*, in *Surg. Mem. of the War of the Rebellion, U. S. San. Comm.*, 1870, Vol. I *(Surgical)* p. 210.
[2] Lidell (J. A.), *op. cit.*, p. 61. [3] *Ibid.*, p. 57. [4] Bryan (J). *Amputation of Left Thigh, upper third*, in *Am. Med. Times*, Vol. VII, p. 5. Coleman (R. T.), *Items of Army Experience*, in *Virginia Clinical Record*, 1872, Vol. II, p. 141.

NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	INJURY, OPERATOR, AND RESULT.
99	Rennick, L., Pt., I, 26th Missouri.	Sept. 19, Dec. 30, 1862.	Right thigh: profuse suppurat'n: amp. thigh. Died Dec. 31, '62. pyæmia.
100	Rickard, J. H., Pt., D, 1st Alabama Cavalry.	Jan. 27, Feb. 28, 1864.	Right thigh: ulceration popliteal art.: hæm.: thigh amp., by Surg. J. G. Keenon, U.S.V. Died Feb. 29, '64, exhaustion from hæm.
101	Robericht, C., Pt., B, 48th New York, age 44.	July 18, '63, Mar. 15, '65.	Extens. lace. right leg. Disch'd Aug. 22, '64: flap amp. thigh, by Dr. L. Bauer, of Brooklyn. Died Aug. 23, 1871.
102	Rolf, L. F., Pt., M, 1st Maine Artillery.	June 18, '64, June 30, '66.	Left leg: necrosis: thigh at mid. third, by Dr. J. C. Manson. Recovery.
103	Roork, E. P., Pt., F, 3d Pennsylvania Cavalry, age 22.	Nov. 27, Dec. 6, 1863.	Right popliteal nerve and artery severed; thigh amp., by Surg. E. Bentley, U. S. V. Disch'd June 18, 1864.
104	Root, H.V., Pt., B, 104th New York, age 26.	June 22, '64, Feb. 29, 65.	Right leg: gang.: necrosis: Oct. 29, remov. of 10 inches necrosed tibia; thigh amp. Disch'd July 21, '65. *Spec.* 3601, A. M. M.
105	*Rowe, G.*, Pt., B, 61st Georgia, age 32.	July 9, Aug. 5, 1864.	Right knee: gangrene, involving joint; thigh amp., by A.A. Surg. J. H. Coover. Died Aug. 7, '64. *Spec.* 3809, A. M. M.
106	*Royster, J. M.*, Pt., C, 47th North Carolina, age 29.	July 1, 26, '63.	Left thigh; amp. thigh, by A. A. Surg. G. M. Paullin. Died July 29, 1863. *Spec.* 3261, A. M. M.
107	[1] Schatt, H., Corp'l, H, 64th New York, age 30.	Mar. 25, April 2, 1865.	Left thigh, dividing popliteal art.; amp. thigh, by A. A. Surg. H. Craft. Disch'd Sept. 26, 1865. *Specs.* 171, 2283, A. M. M.
108	Shugert, J. L., Corp'l, B, 49th Penn., age 20.	April 1, May 20, 1865.	Right knee: second. disease joint; amp. thigh at low. third, by A. A. Surg. W. B. Chambers; hæm.; May 21, lig. femoral. Died May 25, '65, exh'n from hæmorrhage.
109	Shupe, J., Pt., E, 49th Ohio.	Dec. 15, 15, '64.	Left leg, amp. thigh. Died Jan. 1, 1865, gangrene.
110	Simpson, P., Pt., F, 36th Colored Troops, age 23.	Sept. 20, 1864.	Left thigh: amp. thigh. Died Oct. 22, '64, exhaustion.
111	Slanker, J., Pt., C, 162d Ohio N. G.	June 19, July 2, 1864.	Left thigh, injuring poplit'l art'y; gang.; amp. thigh, by A. A. Surg. W. H. Drury. Died July 2, '64, 12 hours after oper'n, from shock.
112	Sloss, A., Pt., A, 5th Penn., age 35.	Dec. 10, '64, June 10, '65.	Left knee: destruc. of tissue; amp. junct. low. thirds, by Asst. Surg. J. H. Frantz. Dis. Nov. 2, '65.
113	Smith, J. A., Pt., C, 4th Maryland, age 18.	May 14, June 9, 1864.	Right knee; second. involv. joint; amp. of thigh, by A. Surg. A. Ingram, U. S. A. Disc'd Mar. 23, '65.
114	Smith, W. F., Major, 1st Delaware.	Oct. 27, 27, '64.	R'ht thigh: lig. fem. art. and vein: amp. th., by Surg. A. N. Dougherty, U. S. V. Died Nov. 6, 1864.
115	Spalding, J. E., Pt., C, 35th New York, age 30.	Aug. 30, Sept. 12, 1862.	Left popliteal artery severed; amp'n thigh. Died same day, from hæmorrhage.
116	Spencer, C., Capt., I, 1st Michigan.	July 2, Dec. 28, 1863.	Right thigh, injur'g sciatic nerve; amp. thigh, by A. A. Surg. D. O. Farrand. Disch'd May 16, '64.
117	Stark, O. H., Serg't, H, 13th New Hampshire, age 36.	Sept. 29, '64, Jan. 3, '65.	Right leg; sloughing; Dec. 25, amp. leg; reamp. in thigh, by A. A. Surg. H. H. James; hæm.: art'y lig. Died Jan. 13, '65, pyæm.
118	Sultz, S. A., Pt., B, 1st Missouri, age 25.	Nov. 30, '64, Feb. 7, '65.	Right thigh; gang.; popliteal art. sloughed; amp. thigh, by Surg. B. B. Breed, U. S. V. Died Feb. 16, 1865, exhaustion.
119	Taylor, James, Pt., K, 7th New York Heavy Artillery, age 22.	June 16, '64, Jan. 17, '65.	Left leg; thigh amp., by A. A. Surg. E. J. Farwell. Disch'd July 6, 1865.
120	Thorn, H. C., Pt., I, 14th West Virginia, age 19.	July 20, Aug. 7, 1864.	Right thigh; Aug. 7, hæm.; lig. fem.; amp. thigh, by Surg. J. B. Lewis, U S. V. Died Aug. 12, '64.
121	Townsend, E., Pt., F, 5th New Hampshire, age 35.	June 2, 21, '64.	Left knee; joint ope. by ulcerat'n; amp. post. flap, upper third, by Surg. E. Bentley, U.S.V.; hæm.; lig'n. Died July 1, '64, asthenia.
122	Trees, J., Corporal, D, 188th Penn., age 21.	June 2, 28, '64.	Right knee. June 20, hæm.; popliteal flaps, mid. third. Disch'd Dec. 8, 1864.
123	Vann, D., Pt., B, 8th N. York Artillery, age 18.	June 3, 20, '64.	Left thigh, injuring popliteal art.: hæm.; June 16, popliteal lig.; hæm. recurred; amp. thigh, by A. A. Surg. E. Vogel. Died June 22, '64, gangrene.
124	Waller, J. R., Corp'l, A, 19th Infantry, age 17.	July 30, Oct. 25, 1864.	Right knee; gang.; thigh amp., by A. A. Surgeon M. L. Herr. Died Nov. 5, '64, pyæmia.
125	Watson, J. H., Pt., B, 10th N. Jersey, age 36.	June 4, 24, '64.	Left knee; joint ope. by suppu'n; muscular flaps, mid. third, by Surg. E. Bentley, U.S.V. Died June 28, 1864, exhaustion.
126	*White, J. L.*, Guerilla, age 38.	May —, 1863. Primary.	Both legs perforated; left post. tibial art. and nerve completely sev'd; gang.: amp. thi. Recov'd.
127	Wick, J. C., Pt., C, 155th Penn., age 22.	Mar. 25, June 14, 1865.	Both thighs: May 23, hæm from left popliteal; lig'n; amp. thigh, by A. Surg. A. Delaney, U.S.V. Died June 20, '65, exhaustion.
128	Wild, C. B., Corp'l, E, 114th New York.	Sept. 19, Oct. 12, 1864.	Right popliteal space: Oct. 1, hæm. from popliteal artery; lig.; amp. thigh, by Asst. Surg. B. A. Fordyce, 160th N. York. Died Oct. 13, 1864, exhaustion.
129	Wing, J. W., Pt., H, 27th Mass., age 45.	Mar. 14, April 7, 1862.	Right leg; gangrene; amp. thigh, by Surg. G. A. Otis, 27th Mass. Died April 17, 1862, exhaustion.
130	Wolf, J., Corp'l, D, 4th New York Cavalry.	Oct. 12, Nov. 26, 1863.	Left thigh: gang.: amp. thigh, by A. A. Surgeon J. F. Thompson. Disch'd Oct. 11, 1864.
131	Wright, D., Pt., A, 57th New York, age 23.	Sept. 17, Dec. 2, 1862.	Right thigh: gang.; amp. thigh, by A. A. Surg. A. V. Cherbonnier. Died Dec. 20, '62, gang. *Spec.* 888, A. M. M.

Amputations at the Knee.—But one of the six disarticulations at the knee for complications involving shot flesh wounds of the leg had a favorable result. Three of the operations were intermediary, three secondary:

TABLE VII.

Numerical Statement of Six Disarticulations at the Knee Joint for Complicated Shot Injuries unattended by Fracture.

NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	INJURY, OPERATOR, AND RESULT.
1	Cole, D. D., Corp'l, A, 2d New York Cavalry, age 23.	April 7, Aug. 1, 1865.	Left leg: gang.: amp at the knee joint, patella retained, by Ass't Surg. G. M. McGill, U. S. A. Disch'd Nov. 22, 1865.
2	Dempsey, M., Pt., I, 17th Vermont, age 18.	Oct. 5, Dec. 27, 1864.	Left leg: obliteration of fem. art., sloughing, and recurrent hæm.; amp. at knee joint, by Ass't Surgeon W. A. Harvey, U. S. V. Died March 26, 1865.
3	Grimes, F. A., Pt., C, 4th Vermont, age 22.	April 16, 22, '62.	Right leg, injuring popliteal art.: hæm.: amp. at knee joint, by Surg. R. B. Bontecou, U. S. V.: gang. Died April 28, 1862.
4	Huntington, L., Pt., B, 92d New York, age 29.	June 3, Aug. 2, 1861.	Left leg; slough g: recur't hæm.: amp. at knee joint, by Surg. R. B. Bontecou, U. S. V. Died Aug. 8, 1864, exhaustion. *Card Phot.*, Vol. III, p. 23.
5	Leonard, J., Pt., G, 5th Ohio, age 22.	July 3, 16, '63.	Right leg, injur'g post. tib. nerve; tetanus; amp. at knee joint, by Ass't Surg. H. C. May, 115th N. Y. Died July 16, '63, tetanus.
6	Taggart, S. D., Serg't, G, 150th Pennsylvania, age 25.	Feb. 6, 20, '65.	Left leg; gang.: recurrent hæm.: amp. at knee joint, by Ass't Surg. J. Vansant, U. S. A. Died February 20, 1865.

[1] LIDELL (J. A.), *op. cit.*, p. 47.

Amputations in the Leg.—Of sixty-three operations in this category thirty-three proved fatal, or 52.3 per cent Two primary cases were successful; of twenty-four intermediary operations, seventeen, or 70.8 per cent., proved fatal; of thirty-seven secondary amputations, sixteen, or 43.2 per cent., proved fatal. The Museum possesses pathological specimens from some of the cases. Two of the cases are detailed, and all are enumerated in TABLE VIII:

FIG. 22.—Six inches of shaft of the left tibia, carious and eroded. *Spec.* 858.

CASE 126.—The late Dr. Bodisco Williams, of Georgetown, D. C., who served in the Confederate Army, presented Acting Assistant Surgeon F. Schafhirt, of the Army Medical Museum, with the specimen figured below, with the accompanying history: "Rev. J. L———, a young priest from New Orleans, acting voluntarily as field chaplain, tried to persuade a company of Irish railway laborers to take up arms to fight against the Yankees in front of Fredericksburg, December 12, 1862; but during his speech a large shell exploded close in front of the group and killed three and wounded eight, including the priest, who received a small skin wound over the inner surface of the left tibia, about five inches above the tarsal articulation. Rev. L——— did not take much notice of the wound until the leg was in full inflammation up to the knee. He had returned to Lynchburg, where he applied bread and milk poultices for several weeks, but afterwards he sent for a physician, who exerted all his knowledge to save the leg. But nothing would avail, and caries of the bone having supervened, gangrene at last reminded the attendant of amputation, which was performed by Dr. Pearson, of Virginia, who took the leg off one inch below the tuberosity of the tibia, August 25, 1863. But even this remedy did not improve the physical health of the patient; and his soul left Lynchburg, September 2, 1863, for that great and blissful haven, it may be hoped, which he had promised to those Irishmen in front of Fredericksburg." The specimen represented in the adjacent wood-cut (FIG. 22) presents great erosion, as though from caustic applications made to arrest the progress of gangrene, and there are neighboring evidences of extensive periosteal thickening with osseous exudations and deposits. See *Cat. Surg. Sect., Army Medical Museum*, 1865, p. 394.

CASE 127.—Private G. Brown, Co. C, 97th Pennsylvania, aged 18 years, was wounded at Petersburg, June 17, 1864, and was admitted to hospital at Fort Monroe two days afterwards. Assistant Surgeon E. McClellan, U. S. A., reported: "Gunshot wound of right foot, flesh." From Fort Monroe the wounded man was transferred to Knight Hospital, New Haven, where amputation was performed but not recorded. Subsequently the patient was transferred to McDougall Hospital, and lastly, on January 19, 1865, to Central Park, New York City, whence Surgeon B. A. Clements, U. S. A., reported; "Gunshot wound of right foot; a minié ball passed through the metatarsus, entering on the dorsum of the foot. Mortification supervened and the condition of the injured parts became very bad; constitutional condition of patient feeble; loss of appetite; unable to sleep from pain in wound. On July 11th, amputation (apparently circular) of the leg just above the ankle joint was performed at the Knight Hospital, New Haven, by Acting Assistant Surgeon C. Lindsley. Two ligatures were applied, and ether was used as the anæsthetic. Healing progressed well for three weeks, when the stump sloughed, which was arrested in four or five days." The specimen represented in the annexed wood-cut (FIG. 23) was contributed by Acting Assistant Surgeon S. Teats, who performed re-amputation on April 16, 1865, on account of "a sloughing ulcer and a cold and blue condition of the stump." The stump healed at the end of five weeks after the last operation, and the patient was supplied with an artificial leg about two months afterwards. He was discharged from service August 17, 1865, and pensioned. In his application for commutation, dated 1875, the pensioner described the stump as being in good condition. He was paid his pension June 4, 1876.

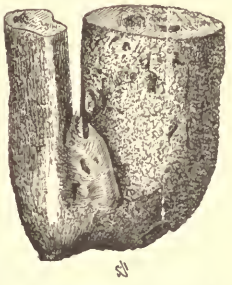

FIG. 23.—Two and a half inches of stump of right leg. *Spec.* 4329.

TABLE VIII.

Summary of Sixty-three Cases of Amputations of the Leg for Complicated Shot Injuries unattended by Fracture.

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	INJURY, OPERATOR, AND RESULT.	No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	INJURY, OPERATOR, AND RESULT.
1	Addington, J., Serg't, A, 84th Indiana, age 25.	June 20, July 20, 1864.	Right ankle; gangrene; amputation leg, by Surg. R. M. S. Jackson, U. S. V. Died Sept. 2, 1864, pyæmia.	6	Batherie, N. T., Corp'l, A, 15th Mass., age 34.	June 6, 24, '64.	Left leg; gang.; amp. leg, by A. A. Surgeon M. F. Price; hæm. Died June 30, '64, asthenia from wound, and diarrhœa.
2	Ainsworth, W. H., Serg't, K, 42d New York, age 22.	May 6, June 20, 1864.	Right leg; amp. leg, by Surg. W. D. Stewart, U. S. V. Disch'd Nov. 3, 1865.	7	Becker, H., Pt., F, 50th Penn., age 23.	May 9, Aug. 10, 1864.	Right leg; sloughing; amp. leg, by A. A. Surgeon G. E. Galen. Disch'd May 22, 1865.
3	Alexander, E. J., Corp'l, B, 110th New York.	June 14, —, '63.	Right leg; amp. of leg. Died July 2, 1863.	8	Bell, J., Corp'l, G, 62th Penn., age 40.	Dec. 13, '62, Mar. 19, '63.	Left leg; sloughing; hæm.; amp leg, by A. A. Surg. F. H. Getchell. Disch'd Dec. 14, 1863.
4	Barnum, C. F., Pt., E, 187th Penn., age 30.	June 18, Aug. 27, 1861.	Left leg: amp. leg, by A. A. Surg. J. P. Arthur; hæm.; Sept. 7, amp. thigh. Died Oct. 13, 1864. *Spec.* 3132, A. M. M.	9	Bickley, H., Serg't, E, 10th New Jersey, age 21.	May 14, Aug. 13, 1864	Left: slough; amp. leg, by A. A. Surg. G. W. Webb; hæm. Died Aug. 23, '64. *Spec.* 3665, A. M. M.
5	Barron, C., Pt., D, 14th Connecticut, age 45.	May 12, Sept. 10, 1864.	Left foot; gang.; amp. leg, by A. A. Surgeon S. Smith. Disch'd June 18, 1865.	10	Bloomer, A. S., Pt., G, 55th Ohio, age 20.	May 15, July 21, 1864.	Right foot; gang.; amp. leg, by Ass't Surg. J. A. Freeman, U. S. V. Disch'd Feb. 10, 1865.

No.	Name, Military Description, and Age.	Dates.	Injury, Operator, and Result.
11	Brown, G., Pt., C, 97th Penn., age 18.	June 17, July 11, '61, Ap'l 16, '65.	Right foot; gang.; amp. just above ankle, by A. A Surg. Lindsley; sloughing; reamp. leg. Disch'd Aug. 18, '65. *Spec.* 4329, A.M.M.
12	Burke, M., Serg't, C, 155th N. York, age 51.	June 3, Aug. 26, 1864.	Right leg; sloughing; amp. leg, by A. A. Surgeon M. Lampen. Died Aug. 27, 1864, pyæmia.
13	Burley, M. D., Pt., G, 45th Penn., age 17.	May 6, Sept. 13, 1864.	Right leg; amp. leg, by A. A. Surg. B. Wilson, gang.; hæm. Disch'd Jan. 22, 1865.
14	Burns, T., Pt., D, 8th N. York H. Art'ry, age 34.	June 17, 17, '64.	Right leg; amp. leg. Discharged June 20, 1865.
15	Case, E. F., Pt., G, 13th Michigan.	Sept. 19, 24, '63.	Left thigh, seve'g fem. art.; gang.; amp below knee; gang. extending; Sept. 25, amp. at up. third thigh. Died Sept. 27, '63, gang.
16	Cousins, J. A., Corp'l, I, 1st Maine H'vy Art., age 24.	May 19, June 16, 1864.	Left foot; sloughing and erysipelous; flap amp. at up. third, by Dr. McConnor. Disch'd July 10, 1865.
17	Cross, G. P., Pt., F, 1st Mass. Heavy Artillery, age 19.	June 16, Aug. 18, 1864.	Right leg; gang.; hæm.; amp. leg, by Surg. E. Bentley, U. S. V.; two ounces of blood injected into veins. Disch'd June 9, '65.
18	*Dixon, J. H.*, Pt., F, 24th N. Carolina, age 24.	Mar. 25, April 12, 1865.	Right leg; gang.; amp. leg, by A. A. Surg. J. P. Arthur. Died May 4, 1865, exhaustion.
19	Downey, J., Pt., F, 29th Penn., age 30.	May 15, July 13, 1864.	Left leg; caries; amp. leg, by Ass't Surg. H. T. Legler, U.S.V. Disch'd Sept 1, 1864.
20	Emery, R., Pt., D, 5th Vermont, age 33.	M'y 5, '64. Aug. 23, 1865.	Left leg; gang.; hæm.; Aug. 4, 1864, post. tibial lig'n. Disch'd Dec. 16, '64; leg amp.
21	Gilbert, G. H., Lieut., B, 122d New York.	Nov. 8, Dec. 7, 1863.	Both feet contused by spent ball; gang. left foot; amp. left leg, by Surg. H. W. Ducachet, U. S. V. Disch'd May 23, 1864.
22	Gooch, A. B., Pt., F, 12th Ohio, age 21.	May 9, Nov. 19, 1864.	Left ankle; caries inv. ank. joint; flap amp. mid. third, by Surg. N. Gay, U. S. V. Disch'd Feb. 13, 1865.
23	Goodell, E. D., Corp'l, D, 25th Massachusetts, age 21.	June 3, July 22, 1864.	Right foot; gangrene; amp. leg, by A. A. Surg. B. F. Butcher. Disch'd Oct. 31, '65. *Spec.* 3332, A. M. M.
24	Goodrich, J., Pt., G, 148th N. York, age 40.	May 9, June 5, 1864.	Both ankles; gang.; amp. right leg, by Ass't Surg. H. C. Roberts, U. S. V. Died June 5, '64, exh'n.
25	Green, J. A., Serg't, E, 2d Connecticut Art'ry, age 25.	June 7, 28, '64.	Left foot; circ. amp. up. third leg, by A. A. Surg. P. Wilson. Died July 7, 1864, pyæmia.
26	Gutting, A., Pt., D, 11th Mich. Cavalry, age 26.	Oct. 2, Nov. 9, 1864.	Right leg; amp. leg, by Surg. J. B. Murphy, U. S. A. Disch'd Sept. 14, 1865.
27	Hagey, J. D., Pt., I, 138th Penn., age 24.	April 2, May 19, 1865.	Left leg; artery opened; hæm. from post. tibial artery; art. tied; amp. leg, by A. A. Surg. H. A. Drane. Disch'd July 26, '65.
28	Harris, J. M., Corp'l, C, 14th Iowa, age 20.	July 15, 27, '64	Right thigh: aneurism; sphaeclus: au'mal sac probed; exces. hæm; fem. tied; amp. leg, by A. A. Surg. R. W. Coale. Died Aug. 3, 1864, pyæmia.
29	Hays, A., Corp'l, F, 3d Delaware, age 29.	June 18, Aug. 10, 1864.	Right foot; slough'g ulcer; amp. leg, by A. A. Surgeon W. W. Sharpley. Disch'd May 18, '65. *Spec.* 3668, A. M. M.
30	James, A., Pt., I, 2d Tennessee Cavalry, age 20.	Dec. 17, '64, Feb. 4, '65.	Left ankle; ball removed; gang.; circ. amp. lower third leg, by Ass't Surg. W. B. Trull, U. S. V. Died May 16, 1865.
31	Kane, H., Pt., A, 24th Iowa, age 25.	Sept. 19, Dec. 30, 1864.	Left leg; gangrene; amp. leg, by A. A. Surg. J. W. H. Baker. Discharged May 29, 1865.
32	[1]Knoble, H., Pt., D, 149th New York, age 27.	Nov. 27, Dec. 14, 1863.	Both thighs, ball impinging on sheath of left fem. artery; gang.; amp. left thigh. Died Jan. 14, '64, pyæmia. *Spec.* 2114, A.M.M.
33	Kuentzler, J., Pt., H, 56th Penn., age 24.	June 18, July 23, 1864.	Right leg; sloughing; amp. leg, by A. A. Surg. E. K. Tell. Died Aug. 6, 1864, pyæmia.
34	Leasure, J., Pt., F, 62d Penn., age 23.	May 12, June 2, 1864.	Left leg; hæm.; amp. leg, by A. A. Surg. John Priestley. Died June 15, '64, hæm. and pyæmia.
35	*L—— J——*, Chaplain (field).	Dec. 11, '62, Aug. 25, '63.	Left leg; gang.; amp. leg, by Dr. Pearson. Died Sept. 2, 1863. *Spec.* 858, A. M. M.
36	McCurley, H., Pt., D, 1st Maine, age 18.	June 21, July 23, 1864.	Right ankle; gang.; circ. amp. mid. third, by A. A. Surg. G. E. Brickett. Died Aug. 28, 1864, pyæmia.
37	Maguire, E., Pt., I, 8th Conn., age 26.	Sept. 29, 1864. Mar. 22, 1865.	Right leg; gang.; ulceration of ante. tibial art.; amp. leg, by A. A. Surg. W. B. Casey. Disch'd Nov. 28, 1865.
38	Mangan, J., Pt., F, 82d Ohio, age 28.	July 20, 22, '64.	Left leg; amp. leg, by Surg. H. K. Spooner, 61st Ohio; hæm.; lig. of anterior tibial artery Aug. 15, '64. Disch'd May 23, '65.
39	Mendenhall, J., Pt., B, 97th Penn., age 30.	May 20, July 22, 1864.	Right leg; sloughing; amp. leg, by A. A. Surgeon A. D. Hall. Died July 29, 1864, pyæmia.
40	Moser, C., Pt., K, 5th Michigan, age 43.	June 18, July 19, 1864.	Left ankle and thigh; gang.; amp. leg, by A.A. Surg. F. D Weisse. Died July 26, 1864, pyæmia.
41	Moss, B. F., Corp'l, B, 101st Illinois, age 43.	July 25, Aug. 24, 1864.	Left leg; gang.; amp. leg, by A. Surg. W. B. Trull, U. S.V.; diffused aneurism; hæm.; Nov. 11, amp. thigh; hæm.; Dec. 15, lig. fem. Disch'd June 25, 1865.
42	Mott, J., Pt., E, 105th Illinois, age 37.	June 26, July 26, 1864.	Left leg; slough. ant. tibial; hæm.; amp. leg, by Ass't Surg. B. E. Fryer, U. S. A.; July 27, transfusion. Died Aug. 5, '64, hæm.
43	Paden, W., Corp'l, G, 16th Penn. Reserves, age 22.	May 23, June —, 1864.	Right thigh; May 29, 31, hæm.; June 1, femoral tied; amp. leg, by Surg. G. L. Pancoast, U.S V. Died June 26, 1864, gangrene.
44	Parmenter, J. D., Pt., G, 67th Penn., age 16.	April 6, June 21, 1865.	Left foot; gangrene and necrosis; amp. leg, by Surg. R. B. Bonteeou, U.S.V. Disch'd Nov. 23, '65.
45	Prather, B., Corp'l, D, 103d Ohio, age 18.	Dec. 15, 27, '64.	Right foot; exc'n half in. post. tib. nerve; Dec. 26, amp. great toe; amp. leg, by A. A. Surg. S. G. Ayres. Died Dec. 29, '64, tetanus.
46	Reed, J., Corp'l, F, 101st New York.	June, '62. Intermediary.	Shot flesh w'nd of ank. joint; circ. amp. at junct. of low. third leg, by Ass't Surg. P. S. Connor, U. S. A. Died July 29, 1862.
47	*Ross, A. G.*, Corp'l, I, 13th Mississippi, age 21.	Oct. 19, Nov. 8, 1864.	Right fem. art. injured; also w'd of left thigh; gang.; lig. of fem.; amp. right leg three ins. above ankle. Retired March 14, 1865.
48	Saulsbury, W., Pt., K, 39th Colored Troops, age 36.	July 30, 1864. Jan. 19, 1865.	Right leg; sloughing; hæm. ant. tibial art.; art. lig. in w'nd; hæm. recur'd; art. relig.; amp. leg, by A.A. Surg. O. Shittler. Disch'd May 26, '65. Died July 16, '71.
49	Smith, W., Pt., D, 17th Infantry, age 22.	May 12, July 8, 1864.	Right ankle joint; suppurative inflam'n, caries; amp. leg, by A. Surg A. Ingram, U. S.A. Died July 20, '64. *Spec.* 2865, A. M. M.
50	Stark, O. H., Serg't, H, 15th New Hampshire, age 36.	Sept. 29, Dec. 25, 1864.	Right; slough.; amp. leg, by A.A. Surg. H. H. James; sloug'g; Jan. 3, 1865, amp. thigh; hæm.; lig. Died Jan. 13, '65, pyæmia.
51	Stebbins, E., Serg't, L, 3d New York Cavalry, age 26.	Sept. 6, Oct. 12, 1862.	Left leg; hæm.; amp. leg. Discharged June 15, 1863.
52	Stultz, G., Serg't, K, 5th New Jersey, age 26.	June 16, '64, Jan. 9, '65.	Left leg; gang. and necrosis; amp. leg, by Surg. E. Bentley, U.S.V. Left hospital April 18, 1865.
53	Sullivan, D., Pt., F, 1st Penn. Rifles, age 23.	Dec. 13, 29, '62.	Left foot; extensive inflammat'n; amp. leg, by A. A. Surg. C. H. Bowen. Discharged.
54	Tawney, A., Pt., D, 74th Indiana, age 38.	Sept. 19, Nov. 29, 1863.	Left leg; hæm.; amp. leg, by Surg. G. Grant, U. S. V.; gang. Died Dec. 6, 1863, gangrene.
55	Tewksbury, D., Pt., F, 73d Ohio, age 22.	July 2, '63, Ap'l 8, '64.	Left leg.; gang.; amp. leg, by Surg. A. M. Speer, U.S.V. Died May 8, 1864, pyæmia.
56	Thompson, J. A., Corp'l, K, 10th Indiana, age 27.	Aug. 3, Sept. 3, 1864.	Left leg; gang.; amp. leg, by A. A. Surg. A. L. Rice; hæm. from popliteal artery; artery tied. Died Oct. 4, 1864.
57	Thornton, R. M., Serg't, K, 4th Rhode Island, age 26.	July 30, Sept. 28, 1864.	Left leg; hæm.; amp. leg, by A. Surgeon S. A. Orton, U. S. A. Disch'd January 28, 1865.
58	Tillotson, C. A., Pt., E, 39th Iowa, age 32.	Oct. 5, Dec. 25, 1864.	Right ankle; slough'g and hæm.; ant. post. flap amp. at mid. third, by Ass't Surg. B. E. Fryer, U. S. A. Died Jan. 6, '65, pyæmia.
59	Tryan, N., Pt., E, 4th Ohio, age 26.	May 5, July 3, 1864.	Left foot; gang.; amp. leg, by A. A. Surg. A. McLetchie. Died Aug. 10, 1864, asthenia.
60	Wares, D., Corp'l, 22d Massachusetts, age 31.	May 5, 20, '64.	Right leg; amp. leg, by Surg. D. W. Bliss, U. S. V. Discharged October 25, 1864.
61	Williams, G., Pt., H, 29th Colored Troops, age 37.	Sept. 27, Oct. 22, 1864.	Left leg; hæm.; amp. leg, by A. A. Surgeon J. H. Buchanan. Died Oct. 25, '64, exhaustion.
62	Wolf, C., Corp'l, D, 5th Minnesota, age 31.	Dec. 16, '64, Jan. 5, '65.	Left leg, also wound of right leg; amp. left leg, by A. A. Surg. L. E. Tracy. Died Jan. 19, 1865, gangrene.
63	Wright, E., Pt., F, 119th Penn., age 18.	May 5, 25, '64.	Right leg, cutting post. tibial art.; gang.; hæm.; May 22, lig.; hæm. recur'd; amp. leg, by Surg. E. Bentley, U. S. V. Died May 28, 1864, asthenia and pyæmia.

[1] LIDELL (J. A.), *Wounds of the Arteries*, in *Surg. Mem. of the War of the Rebellion, coll. and pub. by the U. S. San. Comm.*, 1870, Vol. I, pp. 27, 551.

Amputations of the Toes.—There was a single example of amputation of the great and second toes for gangrene following ligation of the femoral artery for a shot wound of the thigh. (CASE 55 of TABLE III, p. 48.)

CASE 128.—Private J. L. Hunt, Co. G, 57th New York, aged 42 years, was wounded at the Wilderness, May 5, 1864. Assistant Surgeon J. C. McKee, U. S. A., reported his admission to Lincoln Hospital, Washington, May 26th, with "gunshot wound of left thigh." Two weeks afterwards the patient was transferred to Camden Street Hospital, Baltimore, and on October 23d he entered Mower Hospital, Philadelphia, where Acting Assistant Surgeon F. W. Saunders recorded the following: "A minié ball entered the thigh at the inner side, upper third, and, passing backward and outward behind the femur, emerged just below the tuberosity of the ischium. Deficient circulation from ligature or otherwise of the great trunks occasioned mortification in the foot, rendering necessary the amputation, previous to admission, on September 5th, of the first and second toes at the second joints." The patient was subsequently transferred to McDougall Hospital, New York Harbor, whence he was discharged June 5, 1865, Assistant Surgeon S. H. Orton, U. S. A., certifying, "the wound has been gangrenous; extensive cicatrix remaining, causing great contraction of muscles; little use of leg." On June 1, 1866, the pensioner was supplied with a supporting and extensor apparatus by Dr. E. D. Hudson, of New York, who in his statement reports the ligation as having been performed on "July 9." The New York City Examining Board certified, December 8, 1875: "There is a cicatrix five inches by four on inner side of left thigh, middle third, which is adherent and radiated. The femoral artery has been cut and tied. There is great loss of muscular substance. The great and second toes have sloughed away; foot poorly nourished. Has to wear an artificial appliance to enable him to walk. There is considerable atrophy of muscles of the limb. The disability is equal to the loss of the limb." The pensioner was paid March 4, 1876.

Tenotomy.—There were five examples of tenotomy for the relief of deformities resulting from shot wounds of the lower extremities. The case of Sergeant Louis Morell (CASE 243, *Med. and Surg. Hist. of the War*, Part II, Vol. II, Chap. VI, p. 80, and PLATE V, Fig. I) has been detailed. In the case of Private H. B. Franklin, Co. E, 52d Indiana, aged 21, Surgeon A. Hammer, U. S. V., divided the tendo Achillis at the Marine Hospital, St. Louis, November 5, 1864, and relieved talipes of several months' standing. He was returned to duty January 24, 1865.

CASE 129.—Private J. H. Armidon, Co. I, 49th New York, aged 19 years, was admitted to Satterlee Hospital, Philadelphia, June 21, 1863. Acting Assistant Surgeon M. J. Perry reported: "The patient was received from hospital at Washington, suffering from diarrhœa. He had previously received a gunshot wound of the leg at the battle of Antietam. Leg bent almost on to thigh. The hamstring tendons were cut by Acting Assistant Surgeon T. G. Morton, formerly in charge of the ward. October 30th, leg much straighter; is obliged to walk with crutches. November 20th, is able to walk about with a cane; leg still a little bent. December 13th, wound nearly healed; general health good. January 1, 1864, patient returned to duty, cured." Several weeks afterwards the man entered Augur Hospital, whence he was discharged for disability, February 10, 1864, Surgeon S. B. Hunt, U. S. V., certifying to "Shell wound of popliteal space of right leg, received at Chancellorsville, May 3, 1863, causing permanent lameness; still discharging." The Washington hospital records show that Armidon was "admitted to Lincoln Hospital on February 27, 1863, with intermittent fever," and that he "deserted June 20, 1863," but no note was made of the wound. He is not a pensioner.

CASE 130.—Private T. Caswell, Co. C, 6th New Hampshire, aged 30 years, was wounded in the right leg, at Bull Run, August 29, 1862. He was admitted to the Georgetown College Hospital, subsequently transferred to Satterlee, Philadelphia, and lastly to Lovell, Portsmouth Grove. Assistant Surgeon W. F. Cormick, U. S. A., in charge of the latter, reported: "Wound healed with severe contraction of the tendo-achilles, resulting from extensive and repeated sloughing. On October 5, 1863, tenotomy was performed, by dividing the tendo-achilles, by Acting Assistant Surgeon J. W. Cushing. The wound caused by the operation healed by November 25th, and the splints, etc., were removed, the foot and ankle resuming their former positions and functions. On December 15th the patient was able to walk without crutch or cane. He was discharged from service December 30, 1863." Examiner W. G. Perry, of Exeter, N. H., February 17, 1864, certified: "Ball entered the outside about midway between the knee and ankle joints, passing directly across the leg. * * There is contraction of the tendo-achilles, which has been partially relieved by division, but he cannot bring his heel entirely down. Standing causes pain." In October, 1869, he reported that contraction in the use of the leg had produced irritation of the eschar, resulting in ulceration. Examiner E. B. Hammond stated, September 11, 1875: "The foot is reduced in size, the leg is weak, etc." The pensioner was paid June 4, 1876.

The fifth case in which tenotomy was practised has been already noted as 27 of TABLE VI, on page 54, amputation being resorted to twelve years after the reception of the injury on account of the uselessness of the limb.

CASE 131.—Private T. Cooper, Co. C, 4th Pennsylvania Reserves, aged 18 years, was wounded near White Sulphur Springs, June 22, 1864. He was admitted to the Post Hospital at Beverly, and, on August 8th, transferred to the Grafton Hospital. Surgeon S. N. Sherman reported: "Gunshot wound of left thigh; ball entered two inches above knee, on outer side, exit near tuberosity of the ischium; also flesh wound of middle of leg. December 31st, leg flexed at nearly right angle to the thigh, caused principally by contraction of the semimembranosus and semitendinosus; motion of knee joint perfect; consid-

erable talipes varus, though without anchylosis. Subcutaneous division of the hamstring tendons performed by Surgeon S. N. Sherman, U. S. V.; chloroform used. Patient reacted promptly, being in good health, though of rather delicate constitution. After division of the tendons the leg was forcibly extended and secured to a straight splint, extending from nates to heel. Twenty-four hours after operation patient rested quite easy and entirely free from pain." The patient was furloughed on April 11, 1865, and admitted to the Emory Hospital, Washington, several weeks afterwards. On June 23, 1865, he was discharged by reason of "paralysis and deformity of the left leg caused by the wound," and pensioned. The man subsequently removed to Birmingham, England, where, in December, 1870, he was seen by Mr. J. B. Gould, the U. S. Consul, who described his condition as follows: "His left leg and foot are withered, the foot icy cold and curled up like a bird's claw, and the leg withered and dead to the hip joint," etc. About this time the pensioner was also examined by Surgeon Jos. Morris, M. R. C. S., who certified: "I find him suffering from the effects of a gunshot wound of the left thigh. The sciatic nerve has been injured, and the entire limb rendered permanently and entirely useless. He suffers great pain in the injured limb," etc. This certificate was corroborated by Surgeon Jordan, F. R. C. S., and Professor of Surgery at Queen's College, at a subsequent examination on March 4, 1871. Surgeon Oliver Pemberton, F. R. C. S., in charge of the General Hospital at Birmingham, certified, on June 6, 1876: "On the third day of May, 1876, I amputated the left leg of Thomas Cooper above the knee, the said limb having become useless on account of a gunshot wound," etc. The pensioner was paid June 4, 1876.

A case of shot injury of the foot in a distinguished general officer may conclude the illustrations selected for this section:

CASE 132.—Major-General J. Hooker, U. S. V., was wounded at the battle of Antietam, September 17, 1862. The injury was reported by Assistant Surgeon B. Howard, U. S. A., as follows: "He was wounded in the right foot by a minié ball while leading his command, being on horseback at the time, and standing in the stirrups with his weight thrown on his right foot, which was turned outward. The ball struck the inner side of the foot inferiorly to the middle of the scaphoid bone, passing between the first and second layers of the plantar muscles, almost transversely across the plantar portion of the foot, and emerging inferiorly to the anterior border of the cuboid bone. The bones of the foot were uninjured. On the morning of September 18th, I was sent by the Medical Director of the Army of the Potomac to attend General Hooker, * * then lying in a farm-house near the battle-field. Warm-water dressings had been applied previous to my visit. There was no constitutional disturbance, but the foot was hot and inflamed. By means of a syringe I thoroughly washed out the wound with warm water, and finding it most agreeable to the patient, substituted cold- for warm-water dressings. The next day I found the patient very comfortable; the appearance of the foot had greatly improved and the inflammatory symptoms had disappeared. I then ordered a lotion of plumbi instead of cold-water dressings as being more likely to allay any irritation that might arise in the parts. Before the General left that evening, for Washington, I advised him to resume the use of tepid water as soon as all tendency to active inflammation should cease. On October 25th, I heard that tetanic symptoms had manifested themselves, but received a letter from the General a few days afterwards stating to the contrary. On November 25th the General, who had returned to duty in the field, requested me to look at his wound, which still troubled him somewhat. I found the newly formed cicatrices somewhat tumefied; they were painful on pressure, and the General was still unable to mount his horse unaided, though he persisted in being on active duty. On November 30th, I found there had been a steady improvement, and, although the step had not its former elasticity, the wound had left no serious inconvenience behind." General Hooker remained in active service until the close of the war, and was ultimately retired October 15, 1868.

Wounds of the soft parts of the lower extremities, though constituting the largest group of injuries received in action, have seldom been much commented on by authors.[1]

[1] In addition to the bibliographical references cited in previous pages of this section the following may be consulted with interest: PARE (A.) (*Œuvres complètes*, éd. MALGAIGNE, Paris, 1840, T. II, Chap. XXXVII, p. 110) remarks: "Les plaies faites au dedans des Cuisses sont souvent cause de mort subite, quand elles penetrent en la grosse veine Saphene, ou grosse artere, et aux nerfs qui les accompagnent: ce que j'ay veu souvent advenir" . . and "Mais quand elles penetrent profondément, souvent advient grands accidens, comme inflammation, aposteme, et pourriture aux membranes qui couvrent les muscles, qui causent que l'ulcere jette une tres-grande quantité de matiere, de façon que le malade meurt en atrophie, et tout desseiché." . . . RAVATON (*Chir. d'armée, ou Traité des plaies d'armes a feu*, Paris, 1768, p. 321 *et seq.*) dwells on the importance of flesh wounds of the lower extremities, and cites many and exceedingly interesting examples of extensive lacerations, lodgement of missiles and other foreign substances. He details six cases of shot flesh wounds of the thigh (*Obs.* 81, 83, 84, 85, 86, 87), an instance (*Obs.* 90) of shot wound of the knee, the missile opening the joint without lesion (sans toucher) of bone, and four cases of shot flesh wounds in the leg (*Obs.* 91, 93, 94, 95), one of which (*Obs.* 94) was followed by amputation of the leg. . . . LE DRAN (H. F.) (*Obs. de Chir.*, Paris, 1731, T. I, p. 347) records a case of shot flesh wound of the thigh followed by repeated hæmorrhages. . . . WILLIAMSON (G.) (*Military Surgery*, London, 1863, p. 133), in a subsection on *Simple Flesh Contusions and Wounds of the Lower Extremities*, records 130 cases of this kind from the mutiny in India, 1857–58; 117 were slight, 13 severe. Of the 130 cases, 90 were returned to duty, 15 to modified duty, and 25 were invalided. . . . THOMPSON (JOHN) (*Report of Obs., etc., after the Battle of Waterloo*, Edinburg, 1816, p. 125) refers to several cases of extensive lacerations of the soft parts by large missiles. . . . NEALE (JOHN) (*Chirurgical Institute*, London, 1805, p. 247 *et seq.*). . . . GORDON (C. A.) (*Lessons on Hygiene and Surgery*, London, 1873, pp. 152, 153) cites several examples of flesh wounds of the thigh, and on page 157 gives three cases of recovery after periarticular wounds of the knee joint. . . . KLEBS (E.) (*Beiträge zur Path. Anatomie der Schusswunden*, Leipzig, 1872, pp. 42, 58) cites six obductions in cases of shot flesh wounds of the lower extremities—3 of the thigh and 3 of the leg. . . . CHENU (J. C.) (*Aperçu hist. stat. et clin. pendant la guerre de* 1870–71, Paris, 1874, T. I, p. 278) very briefly adverts to two cases of flesh wounds of the thigh, one of the leg and a penetrating flesh wound of the knee joint, followed by traumatic arthritis. . . . FISCHER (H.) (*Kriegschir. Erf.*, 1872, p. 164) says: "The wounds of the soft parts of the leg, as a rule, progressed very favorably. . . Much worse proved the wounds of the soft parts of the foot. Nearly always circumscribed or diffuse phlegmonous abscesses developed necessitating repeated incisions. . . . MACCORMAC (W.) (*Notes and Recollections of an Ambulance Surgeon*, London, 1871, p. 129) tabulates 63 cases of wounds of the soft parts of the thigh without fracture, with 6 deaths, and 36 cases of wounds of the soft parts of the leg, with 1 death. . . . LÜCKE (ALBERT) (*Kriegschir. Fragen und Bemerk.*, Bern, 1871, pp. 6–9) details six cases of shot flesh wounds of the lower extremities complicated by secondary bleeding, among them three cases of ligation of the crural artery, and remarks: "In recent injuries we yet ligate now and then successfully the crural artery, but we will more and more come to the conclusion rather to tie the external iliac than the crural artery." . . . SCHÜLLER (M.) *Kriegschir. Skizzen*, Hannover, 1871, p. 18) tabulates 136 cases of shot flesh wounds of the lower extremities. All recovered. . . . SCHINZINGER (A.) (*Das Reserve-Lazareth Schwetzingen*, Freiburg i. Br., 1873, p. 68) notes the gravity of shot wounds of the soft parts of the thigh after the battle of Weissenburg.

SECTION II.

WOUNDS AND INJURIES OF THE HIP JOINT.

In the important class of injuries of the joints, those of the hip joint are preëminently hazardous to life, obscure in diagnosis, and difficult in treatment. In the Surgical History of the War of the Rebellion, a comprehensive and systematic classification of this group of wounds and injuries should include the contusions and sprains and dislocations and simple fractures at the articulation, shot wounds involving the tendinous and ligamentous structures about the joint, or laying open the capsule, and shot fractures implicating the acetabulum or head, neck, and trochanters of the femur, examples of secondary coxitis from extension of inflammation, or septic infection from injuries of the upper part of the shaft, and lastly, cases in which operative interference at the hip is imperative from the extension of lesions of the upper part of the shaft to the articulation. Yet, in this Section, it is proposed to treat mainly of shot fractures involving the hip joint,[1] and of operations at the hip following shot injuries, except in a single instance.[2] There appear on the records notes of about thirty-five examples of luxations at the hip, fifteen simple fractures believed to implicate the hip joint, and forty-four cases returned as contusions or sprains at the hip; but these cases will be referred to in subsequent chapters of this volume, as more in accordance with the classification heretofore adopted. Examples of coxitis from periarticular wounds, in which the primary lesions were believed to be confined to the membranous or ligamentous or other adjacent soft tissues, were discussed in the last Section, and of instances of secondary coxitis from extension of lesions of the shaft we shall find many in the following Section on shot fractures of the shaft of the femur.

In the preceding Section (pp. 26, 28) all pains has been taken to collect the observations that were recorded of periarticular shot wounds at the hip, and details are referred to of all the facts that could be collected of forty-nine cases that were reported. Professor H. H. Smith[3] and other systematic authors believe that shot wounds of the hip joint, unattended by injury of the bone, are very rare; but there seems to be a growing conviction among military surgeons that, owing to the extreme difficulties of diagnosis, many such cases may escape observation, or be misinterpreted until late in their progress. The early recognition of the precise extent of wounds of the hip joint is of the utmost practical

[1] JOHN HENNEN, in his classical treatise, remarks: "The injuries occasioned by balls lodging near or about the joint of the hip are among the most serious of military surgery. The fever, the profuse discharges, the tedious exfoliations, all tend to sink the patient, and are but too often fatal. In some of these cases the course of the ball is so obscure, and its place of lodgement so uncertain, that it can only be detected after death. I have seen balls lodged in almost every part of the trochanters, neck, and head of the bone, and yet the most accurate examination during life did not lead to a discovery of their situation."—*Principles of Military Surgery*, 2d ed., Edinburgh, 1820, p. 155.

[2] Among the coxo-femoral disarticulations one example will be cited where the operation was a re-amputation following an amputation in the continuity of the thigh for a bayonet stab in the knee joint, the only case to be adverted to not connected with shot wounds.

[3] Professor H. H. SMITH (*Princ. and Pract. of Surgery*, 1863, Vol. I, p. 526) remarks that "wounds of the hip joint, uncomplicated by injuries of the bone, are seldom seen. The joint lies quite deep, and is protected by the shelving outward of the ilium and by the prominence of the great trochanter. An injury reaching it is almost necessarily associated with some fracture of the bones."

importance, and demands a careful and prompt examination to determine whether conservative measures are admissible or if operative interference is advisable. Yet here the greatest obstacles present themselves. It must still be admitted, and cannot be too much impressed on the minds of surgeons, that far greater attention and care and trouble are requisite in these than in the injuries of other joints. Until comparatively recent years shot injuries of the hip were regarded as almost inevitably hopeless, and military surgeons enquired into them but little;[1] but now it is agreed that recoveries may be obtained in this group of cases, either under conservative measures or by operative interference, and the

[1] In the section on the surgical literature of shot wounds of the hip joint with which Professor B. von LANGENBECK prefaces his essay *Ueber die Schussverletzungen des Hüftgelenks*, read before the second session of the German Surgical Congress, April 19, 1873, and printed in the *Archiv*, B. XVI, S. 264, the learned professor observes that in ancient military surgical literature we find wounds of this joint seldom mentioned. This is emphatically true. Not only in SCHENCKIUS, of Græffenburg, who laboriously summarized the labors of his predecessors in chronicling rare cases, in PLATER, in FABRICIUS HILDANUS, in the monumental BONETUS, and in other collectors of curious pathological observations, one searches in vain for instances of wounds of the hip; but we scan the writings of the early teachers who treated specially of shot injuries with as little success. MAGGIUS, FERRIUS, ROTA, and the excellent BOTALLUS, VIGO, FELIX WURTZ, HIERONYMUS of Braunsweig, GERSDORF, and even the so-called father of modern army surgery, AMBROISE PARÉ, are silent on this subject. At last, toward the end of the seventeenth century, we find a detailed example of recovery from a shot wound of the hip. MATTHIAS GOTTFRIED PURMANN (*Funfftzig Sonder- und Wunderbahre Schusswunden Curen*, Frankfurt, 1721, Obs. XLIII, p. 324) relates the case of Pt. S. Kirsky, of the regiment Götz, wounded at the siege of Stettin, 1677, in the right hip by a falconet ball, injuring ilium and upper portion of femur. Recovery in twenty weeks, with complete anchylosis of hip. In the writings of English surgeons of the time, in GALE, WISEMAN, BROWN, and RANBY; among the Germans who were then eminent for treating of shot wounds, HEISTER, THEDEN, and SCHMUCKER; and of French authors who refer particularly to shot wounds of the joints, like LEDRAN, GARENGEOT, and FAUDACQ, we look in vain for instances of shot injuries implicating the hip. MORAND and RAVATON, it is true, in the middle of the eighteenth century, advocated coxo-femoral amputation for shot fractures high up in the femur, but do not allude to any fractures at or above the trochanters. BILGUER, who cites (*Chirurgische Wahrnehmungen*, Berlin, 1763, p. 398 *et seq.*) 117 cases of shot injuries of the lower extremities during the years 1756–62, among them cases of wounds of knee and ankle joints, gives not a single instance of a shot injury of the hip joint. JEAN MÉHÉE (*Traité des plaies d'armes à feu*, Paris, An. VIII—1800), who systematically divides the wounds of the joints into three classes, those of the lower joints (ankle and wrist), middle joints (knee and elbow), and upper joints (hip and shoulder), and who cites numerous examples, only gives examples of wounds of the shoulder joint in the last-named class, and entirely omits wounds of the hip joint. The next definite instance of shot injury of the hip joint found in surgical annals is remarkable on several accounts. The case is recorded by Dr. JAMES JOHNSTONE, of Worcester, in the *London Medical Journal*, 1786, Vol. VIII, pp. 135–140. Dr. JOHNSTONE took pains to have prepared a drawing the size of nature, representing the exfoliated fragment of the head of the femur, which is accurately copied in the annexed wood-cut, FIGURE 24. The case was attended by Mr. JOSEPH BRANDISH, a "deserving surgeon and apothecary, at Alcester," and has been sometimes cited as an early example of excision at the hip for shot injury. Mr. BRANDISH treated a lad aged 12, who had accidentally shot himself December 23, 1783. The contents of the gun "passed into the upper part of the thigh, adjoining to the middle of the groin, and came out about the middle of the glutæus maximus." Several successive abscesses were formed, and several exfoliations came away; one, in particular, which appeared to be a considerable portion of the head of the thigh bone with a shot sticking in it. Much as Baron LARREY has to say of operations at the hip joint, he only once describes a case of shot fracture involving the hip. It appears in the *Clinique Chirurgicale* (1836, T. V, p. 242): A young officer of the 9th demi-brigade of Infantry of the army of Egypt, at the siege of Alexandria, was wounded at the outer and upper part of the left thigh, the ball embedding itself in the neck of the femur. The officer recovered with anchylosis of the hip. The presence of the missile was not recognized until after the death of the patient, at Bruxelles, twenty years after the injury. The specimen was presented to Baron LARREY by Dr. SEUTIN, and ultimately was deposited in the Museum at Val-de-grace. Professor LEGOUEST had a drawing made of it, which is copied in the adjacent wood-cut (FIG. 25). The chief British surgical authorities in the great Napoleonic wars, HENNEN, GUTHRIE, and BALLINGALL, cite no cases of shot wounds of the hip. HENNEN, in his classical *Observations*, dwells (3d ed., 1829, p. 158) on the extreme difficulties of detecting the course of balls lodged in this region. "I have seen," he remarks, "balls lodged in almost every part of the trochanters, neck and head of the bone, and yet the most accurate examination during life did not lead to a discovery of their situation." Dr. JOHN THOMSON (in his *Report of Observations made in the British Military Hospitals in Belgium after the Battle of Waterloo*, 1816, p. 123) refers to a case of wound of the hip joint, in which the ball lodged; paralysis was produced, and great swelling of the foot and leg supervened; and to another case, in which the head and neck of the thigh bone together with the acetabulum were, at the autopsy, found in a diseased state; and to one or two other cases which seem to have progressed favorably but were not followed up to the final issue; and to other instances where the ball, without penetrating the capsule of the joint had injured the parts around it, inducing abscesses in the joint and ulceration of the articular cartilages, with softening and absorption of the head and neck of the femur. Writers on more recent wars have cited but few cases and very few of recovery. MÉNIÈRE (P.) (*L'Hotel-Dieu de Paris en Juillet et Aout*, 1830, Paris, 1830, p. 16) gives the case of M. Firer, aged 23, shot fracture of head of femur. Death August 30, 1830. JOBERT (A. J.) (*Plaies d'armes à feu*, Paris, 1833, p. 247) cites two cases of recovery after shot wounds of the hip joint received in the Paris Revolution of 1830. BAUDENS (M. L.) (*Clinique des Plaies*, etc., Paris, 1836, p. 445) relates a fatal case, in which the ball had perforated the head of the femur, in Algiers, November 15, 1835, and adds: "Had I remained at the Algiers Hospital I should have practised disarticulation or resection." ALCOCK (J.) (*Obs. on Injuries of the Joints*, in *Med.-Chir. Transact.*, 1840, Vol. XXIII, p. 261) tabulates four cases of shot wounds of the hip; but in two only the joint was primarily involved; both were fatal. MACLEOD (G. H. B.) (*Notes on the Surgery of the War in the Crimea*, London, 1858, p. 309) relates the case of A. McPhail, aged 33, wounded at Dubba, March 24, 1843, by a matchlock ball, which entered anteriorly above the great trochanter of the right limb. The wound in the skin cicatrized; but the patient died of tetanus, May 9, 1843. The ball was found embedded in the head of the femur, having fractured the brim of the acetabulum. The specimen is preserved in the Fort Pitt Museum, and numbered 2604. HYRTL (J.) (*Handbuch der topog. Anatomie*, Wien, 1865, p. 534) relates the case of a member of the national guard, wounded in 1848; the neck of the femur was fractured; the

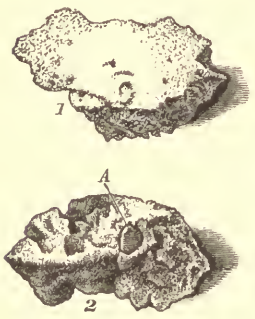

FIG. 24.—Carious fragment of the head of the femur: 1. Outer surface of exfoliation; 2, same bone, showing cancellous surface with (A) lead shot sticking in it. [After JOHNSTONE, *op. cit.*]

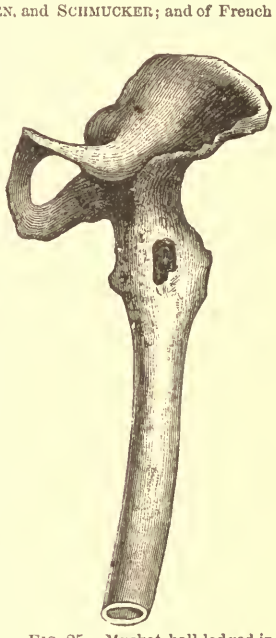

FIG. 25.—Musket ball lodged in the neck of the left femur. [After LEGOUEST.]

credit of surgery, and still more the interests of humanity, imperatively require that the most favorable periods and conditions of treatment should be diligently sought. Drs. H. H. Smith,[1] H. Fischer,[2] E. Klebs,[3] B. Langenbeck, and other modern writers on military surgery, have dwelt on the inaccessibility of the parts to exploration through the long narrow shot tracks produced by missiles of comparatively small calibre, on the frequent absence of shortening or displacement, or escape of synovia, or indeed with scarcely any serious disturbance of the functions of the joint, until the inflammatory and infiltration

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patient recovered. STROMEYER (L.) (*Maximen, u. s. w.*, Hannover, 1855, p. 756) tabulates five cases of shot fractures of the neck of the femur from the Danish War, 1848–1850; all were fatal. Two of these five cases are detailed by Dr. H. SCHWARTZ (*Beiträge zur Lehre von den Schusswunden*, Schleswig, 1854, p. 143). J. J. COLE (*Military Surgery*, etc., London, 1852, p. 136) cites a case of fracture of the neck of the femur during the war in India, 1848–49, but the result is not recorded. BERTHERAND (A.) (*Campagnes de Kabylie*, Paris, 1862, p. 301) relates the case of Mohammed ben Achmed, shot in the right hip joint at Icheriden, June 25, 1857; death, August 31st. MATTHEW (T. P.) (*Med. and Surg. Hist. of Brit. Army*, London, 1858, Vol. II, p. 351) refers to three cases of wounds of the hip joint in the Crimean War, which proved fatal in a few hours. CHENU (J. C.) (*Rapport au Conseil de Santé des Armées de Campagne d'Orient*, Paris, 1865, p. 372) tabulates 30 cases of shot wound of the hip joint, of which two recovered. The same author (in *Rapport, etc., de Campagne d'Italie*, Paris, 1869, T. II, p. 690) groups 26 cases of shot wounds of the coxo-femoral region, of which 16 recovered, but it is not even indicated whether the wounds were fractures or simple flesh wounds. DEMME (H.) (*Mil. Chir. Studien*, Würzburg, 1861, p. 252) details two cases of recovery after shot fractures of the bones of the hip joint. HEINE (C.) (*Die Schussverletzungen der Unteren Extremitäten*, Berlin, 1866, p. 365) records four cases of shot wounds of the hip joint from the Schleswig-Holstein War of 1864; all proved fatal. STROMEYER (L.) (*Erfahrungen über Schusswunden im Jahre* 1866, Hannover, 1867, p. 8) tabulates four fatal shot fractures of the hip joint treated at Langensalza. LANGENBECK (B. v.) (*Über die Schussverletzungen der Hüftgelenke*, in *Arch. für Klin. Chir.*, 1874, B. XVI, p. 270) relates the case of Major J. Preuss, wounded in the hip joint at Münchengratz, June 28, 1866. The patient died September 13, 1867; and another fatal case of a soldier wounded in 1864. In the latter instance, the autopsy showed that the ball had entered the outer point of the left trochanter major and passed through the neck of the femur in its length into the acetabulum. BRUCE (A.) (*Observations in the Military Hospitals of Dresden*, London, 1866, p. 24) describes the case of a Prussian wounded at Sadowa, July 3, 1866, which terminated fatally. BIEFEL (R.) (*Im Reserve-Lazareth*, in LANGENBECK'S *Archiv*, B. XI, p. 441–2) treated a case of shot fracture of the hip joint at Landeshut, in 1866, which proved fatal on the 17th day. In the *Archiv für Klinische Chirurgie*, Berlin, 1874, B. XVI, p. 309, B. v. LANGENBECK tabulates 25 cases of recovery and 63 fatal cases after shot wounds of the hip joint, during the Franco-Prussian War, 1870, collected from various sources. Among the cases of recovery he cites the case of R. Rousseau (CASE 12, p. 313), observed by Dr. SCHINZINGER, although the latter (*Das Reservelazareth Schwetzingen*, Freiburg, i. Br. 1873, p. 56) distinctly states "hip joint intact" *(Hüftgelenk intact);* also the case of Schæfer (CASE 19, p. 315), observed by SOCIN (*Kriegschir. Erf.*, Leipzig, 1872, p. 135), who remarks that the patient died, on the 188th day, of exhaustion. Of the ten cases treated by himself, Professor LANGENBECK had the satisfaction of recording eight recoveries. Stabsarzt DEININGER, of the Railway Battalion *(Beiträge zur den Schussfracturen des Hüftgelenks unter besonderer Berücksichtigung der Erfahrungen aus dem Feldzuge* 1870–71, *und Benutzung der Acten des Königlichen Kriegsministeriums*, in *Deutsche Militairärztliche Zeitschrift*, 1874, B. III, p. 314), in his statistics describes 66 cases of shot wounds of the hip joint, of which 13 recovered. All but 15 of these cases are contained in von LANGENBECK'S enumeration. Of the 15 cases not contained therein (CASES 5, 6, 7, 8, 31, 32, 33, 37 [Recovery], 38 [Recovery], 49, 50, 51, 54 [Recovery], 56, 58), 12 were fatal while only 3 recovered. Besides the cases collected by Professor von LANGENBECK and Dr. DEININGER I have found the following from the Franco-Prussian War of 1870–71, not contained in the tables of either. Assistant Surgeon EVERS, Saxon train battalion No. 12 (*Gelenkwunden und ihr Ausgang*, in *Deutsche mil-ärztl. Zeitschrift*, 1874, B. III, p. 381), gives the case of Fröde, wounded August 29, 1870; ball penetrated the right hip joint; patient recovered but is totally disabled. LOSSEN (H.) (*Kriegschir. Erf. etc.*, in *Deutsche Zeitschrift für Chir.*, 1873, B. II, p. 64), case of Th. Margaillon, 22d French Infantry, shot wound of neck and trochanter of left femur, August 18, 1870; died September 4, 1870. MAYER (L.) (*Kriegschir. Mitth., etc.*, in *Deutsche Zeitschrift für Chir.*, 1873, B. III, p. 47), case of Sommerfeld, 3d Prussian Jægers, shot fracture of head and neck of femur; fatal. The cases referred to in this note give a total of 173 cases with 38 recoveries, 134 deaths (a fatality of 77.9 per cent.), and one result unknown.

[1] SMITH (H. H.) (*The Principles and Practice of Surgery*, 1863, Vol. I, p. 526) says: "The diagnosis is difficult, as the joint lies so very deep as to be almost beyond the reach of the finger. There may be neither shortening of the limb nor eversion, and at first the patient may be able to move the limb without very much pain."

[2] Professor H. FISCHER, of Breslau, in his *Kriegschirurgische Erfahrungen Vor Metz* (Erlangen, 1872, p. 201), remarks on the difficulties encountered in diagnosticating wounds of the hip joint: "The deep position of the hip joint, strongly protected by thick layers of muscles; the generally long wound-canal, the termination of which is so difficult to determine; the absence of all severe disturbance of the functions of the joint, and the very trivial subjective complaints of the patient, render it often impossible to determine precisely the lesion soon after the injury. All authorities, from LARREY and GUTHRIE to contemporary surgeons, agree in this. LEGOUEST relates (*Chirurgie d'Armée*, 2e éd., 1872, p. 449) that a zouave, who, at the Alma, received a shot in the hip, traversing from the groin to the buttock, and completely fracturing the upper rim of the cotyloid cavity, yet still walked about for ten days, escaping all our explorations," and adds that this apparent innocuity or benignity led into error our young surgeons and the patients themselves; the former not daring to propose, and the latter utterly rejecting, the sole means of averting the almost inevitably-fatal termination. "In the case of our patient Emmerich," Dr. FISCHER continues, "the ball had lodged in the shattered head in the hip joint. He moved about for some time after the injury and even from one bed to another a short time before his death, from syncope. The wounded man, Henkel, also reported that he had walked a considerable time on his injured limb. This remarkable insensibility in the hip joint immediately after shot injury, if one reflects on the ordinary painfulness at the head of the femur in coxitis, appears to be explained only by the supposition of a contusion-paralysis, or direct severing of the sensory nerves of the hip joint. In the course of time a view of the injury generally becomes clearer and the diagnosis easier. In Henkel's case, the characteristic pains at the knee joint set in, and the local pains at the hip joint were also present; but with other patients these highly important diagnostic symptoms remained entirely absent. In Henkel's case the head of the femur was intact and its sensibility therefore undisturbed. Profuse suppuration, early septic infection and prostration, and the necessity of making counter openings, always led us, unfortunately too late, to the diagnosis. But here the question may be asked of what use is an accurate diagnosis if no help can be rendered when attained. It is for this reason that I deplore the difficulty, nay, impossibility, of the same so much, because I believe that primary excision at the hip would be the best method of treatment for shot fractures at the hip, no matter how difficult the operation might be. All later operative interference is frustrated by the exhaustion and septic infection of the patients, by extensive and profuse suppuration, and by phlegmonous and gangrenous processes in deep tissues about the pelvis."

[3] KLEBS (E.) (*Beiträge zur Pathologischen Anatomie der Schusswunden*. Leipzig, 1872, p. 29) observes: "The shot injuries of the hip joint that I had occasion to observe had this in common, that they proved fatal at a comparatively early date, viz: at from thirteen to twenty-four days; and also that even in the more protracted cases no vestige of a healing process was apparent." And, on page 34, he adds: "As you may surely depend upon the fact, that in all cases where the ball does not perpendicularly strike the spongy substance of the neck considerable fracture, generally into the joint, exists, and that these fissures, even after four weeks, show no inclination towards reparation; but that they offer the most favorable conditions for infection, namely thrombus of the veins; a cure without operation, according to my judgment, is absolutely not to be expected, and the dictum of the American Circular No. 6, 1865, S. 61, in which, on account of the absolute incurability of these fractures 'when abandoned to the resources of nature,' the excision of the head of the femur was recommended, has again been sadly confirmed by the experience of this war."

period arrived. The dictum of Hennen, cited at the outset of this Section,[1] that the difficulties of early precise diagnosis in shot injuries of the hip joint are sometimes insuperable, is corroborated by Dr. F. H. Hamilton[2] in reviewing the surgical experiences of the American civil war, and by Drs. Billroth[3] and Deininger[4] in recording their personal observations and the contemporaneous surgical literature of the Franco-German War of 1870–71.

The evidence regarding shot injuries of the hip joint presented in the annals of the protracted American civil war is numerically very imposing; yet attempts to analyze it with a view to learn the principles that should govern the treatment of these grave injuries are beset with difficulties. The abstracts of the individual cases are for the most part wanting in precision, still the material must be classified and consolidated as systematically as practicable, and permitted by the character of the reports.

In the preliminary surgical report made by me in 1865, in *Circular* 6, S. G. O.,[5] at page 31, ninety-seven cases of shot fractures involving the hip joint were tabulated, and some of the more remarkable cases were detailed and several were illustrated by drawings. In 1867, in a monograph on amputations at the hip joint,[6] fifty-three examples of that operation practised during the civil war in America were described, and seven cases were narrated that resulted favorably under conservative measures, although it was alleged, though not absolutely demonstrated, that the shot lesions described involved the articulation at the hip. In 1869, in a report of excisions of the head of the femur for shot injury,[7] I detailed sixty-three instances of this operation performed during the American civil war, with minutes of a number of doubtful or not well authenticated cases; and narrated the facts collected respecting two hundred and seventy-four examples of shot wounds believed to implicate the hip joint and treated either by extracting fragments or by strictly expectant measures. In 1871, in a report on surgical cases treated in the army of the United States from 1865 to 1871,[8] the histories of four examples of shot fractures involv-

[1] HENNEN (JOHN) (*Principles of Military Surgery*, 2d ed., 1820, p. 155, cited in foot-note 1, p. 61, *ante*.). He asserts emphatically: "In some of these cases the course of the ball is so obscure, and its place of lodgement so uncertain, that it can only be detected after death. I have seen balls lodged in almost every part of the trochanters, neck, and head of the bone, and yet the most accurate examination during life did not lead to a discovery of their situation."

[2] Professor FRANK H. HAMILTON (*Princ. and Pract. of Surgery*, 1872, p. 407), while regarding the results of excisions at the hip as favorable in comparison with those obtained in amputations at the hip joint, and possibly when compared with the results of the expectant plan, concludes: "I see, in the probable inaccuracy of diagnosis, in both classes of cases many sources of error. Indeed, in my opinion, the surgeon is still justifiable in exercising a considerable amount of discretion as to the course to be pursued. If, for example, he has reasons to believe that the comminution is not extensive, and the patient is in a favorable condition as to health; if he is neither very fat nor very muscular; if the limb can be kept at rest and moderate extension continuously applied, I believe an attempt may be properly made to save the limb without excision."

[3] BILLROTH (TH.) (*Chirurgische Briefe aus den Kriegs-Lazarethen*, u. s. w., Berlin, 1872, S. 238). In the foot-note No. 3, on page 26, of the preceding Section, some of Professor BILLROTH'S emphatic declarations on the occasional impossibility of diagnosticating direct shot injury of the capsule or bones of the hip joint have been cited. The length of the shot canals and the great variety of direction in shot perforations of the muscular masses about the coxo-femoral articulation, greatly modified by the changing postures of the soldier, are great obstacles to satisfactory explorations, and, owing to the form of the pelvic bones and ligaments, the course of the missile is very liable to be deflected. The index finger is generally too short to reach the projectile or fracture, and a sound or catheter is but a poor substitute. Moreover, the surgeon is puzzled by the absence of symptoms he has been taught were pathognomonic. In none of the cases examined by BILLROTH and CZERNY was found the displacement and peculiarity of position usually ascribed to fractures implicating the hip; and the characteristic intense pain in the hip and knee, aggravated on motion, was missing in many instances. Space forbids further citations, but the reader may profitably consult the comments of the Viennese professor on this difficult subject.

[4] DEININGER (*Beiträge zu den Schussfracturen des Hüftgelenks*, u. s. w., in *Deutsche Mil.-ärztl. Zeitschrift*, 1874, Jahrg. III, p. 237): "The difficulty of diagnosing a hip joint fracture in its first stages is very great, and frequently it can only be ascertained in the subsequent course whether the joint is really injured, and, sometimes, the fracture is not ascertained until after death. For instance, in the preparation exhibited by TRENDELENBURG in the Second Congress of the *Deutsche Gesellschaft für Chirurgie*, the *Langblei* ball had comminuted the head and neck of the left femur and lodged among the fragments of the head of the bone; a slight fissure existed in the acetabulum. The patient died in consequence of purulent infiltration; during life it was not possible to determine with certainty an injury of the joint. The fragments had been held together by the periosteum, and a dislocation was not indicated. Even walking on the injured limb is no proof that the hip joint has not been fractured." Dr. DEININGER (*l. c.*, pp. 238 and 245) refers to 12 cases in which the injured limbs could be used for some time after the injury, although the autopsy subsequently proved fracture of the joint.

[5] *Surgical Report* of "*Reports on the Extent and Nature of the Materials available for the Preparation of a Medical and Surgical History of the Rebellion.*" Printed at Philadelphia, 1865. CIRCULAR No. 6, War Department, Surgeon General's Office, Washington, November 1, 1865, 4to, pp. 88.

[6] *A Report on Amputations at the Hip Joint in Military Surgery.* CIRCULAR No. 7, War Department, Surgeon General's Office, July 1, 1867, 4to, pp. 88, PLATES 9.

[7] *A Report on Excisions of the Head of the Femur for Gunshot Injury.* CIRCULAR No. 2, War Department, Surgeon General's Office, Washington, January 2, 1869, 4to, pp. 142.

[8] *A Report of Surgical Cases treated in the Army of the United States from* 1865 *to* 1871. CIRCULAR No. 3, War Department, Surgeon General's Office, Washington, August, 1871, 4to, pp. 296.

ing the hip joint were detailed, one resulting fatally under expectant measures, and three treated by formal excision, of which two recovered and one had a fatal result.

Three hundred and eighty-six cases of shot fracture directly involving the articular surfaces at the hip are found recorded in the returns of the Union and Confederate armies. Though the reports are, in many instances, very imperfect, they permit an approximate analysis of the cases in TABLE IX following, according to the particular portion of the articulation injured, and also with reference to the treatment of the cases, either by rest and suitable position, with splints and extension and other expectant measures, or by freely incising the joint and removing, if necessary, fragments of bone, projectiles, or other foreign bodies, cases numbering three hundred and four,[1] and grouped as treated by conservation; and then follow two groups treated by formal operative interference, a series of fifty-five cases of excisions at the hip, and a series of twenty-seven cases of amputations at the hip.

TABLE IX.

Tabular Statement of Three Hundred and Eighty-six Shot Fractures of the Hip Joint.

PARTS INJURED.	CASES.	TREATED BY CONSERVATION.			FOLLOWED BY EXCISION AT HIP JOINT.			FOLLOWED BY AMPUTATION AT HIP JOINT.		
		Cases.	Recov.	Died.	Cases.	Recov.	Died.	Cases.	Recov.	Died.
Acetabulum without fracture of the Femur	11	11	1	10	.....	.....	.....	.....	.....	.....
Acetabulum and Head of Femur	35	33	1	32	2	.....	2	.....	.....	.....
Acetabulum, Head, and Neck of Femur	19	14	.....	14	4	.....	4	1	.....	1
Acetabulum, Head, Neck, and Trochanter Major of Femur	3	2	.....	2	1	.....	1	.....	.....	.....
Acetabulum, Head, Neck, and Shaft of Femur	2	1	.....	1	1	.....	1	.....	.....	.....
Acetabulum and Neck of Femur	4	3	.....	3	1	.....	1	.....	.....	.....
Head of Femur	34	34	11	23	.....	.....	.....	.....	.....	.....
Head and Neck of Femur	23	12	1	11	10	1	9	1	.....	1
Head, Neck, and both Trochanters of Femur	5	.....	.....	.....	2	.....	2	3	.....	3
Head, Neck, and Trochanter Major of Femur	9	6	.....	6	2	.....	2	1	.....	1
Head, Neck, and Shaft of Femur	1	.....	.....	.....	1	.....	1	.....	.....	.....
Neck of Femur	108	96	26	70	10	.....	10	2	.....	2
Neck and both Trochanters of Femur	35	16	2	14	10	1	9	9	1?	8
Neck and Trochanter Major of Femur	37	27	2	25	9	.....	9	1	.....	1
Neck and Trochanter Minor of Femur	2	2	.....	2	.....	.....	.....	.....	.....	.....
Neck and Shaft of Femur	11	8	1	7	1	.....	1	2	1?	1
Trochanter Major, involving the Hip Joint	2	2	.....	2	.....	.....	.....	.....	.....	.....
Upper portion, Upper part or Upper Extremity of Femur	5	.....	.....	.....	.....	.....	.....	5	.....	5
Parts not specified	40	37	10	27	1	.....	1	2	.....	2
Aggregate	386	304	55	249	55	2	53	27	2?	25

In discussing the two series of excisions and of amputations at the hip, eleven instances must be added to the first, and thirty-nine to the second, in which the operations were practised for shot fractures of the shaft of the femur that did not primarily implicate the hip, or for injuries of the knee joint, thus giving a total of four hundred and thirty-six

[1] In *Circular* No. 2, S. G. O., 1869, from pages 65 to 106, two hundred and seventy-four abstracts of shot wounds at the hip joint were recorded as treated on the expectant or conservative plan, with forty-nine recoveries. Of these, forty-seven, with fifteen recoveries, are omitted from TABLE IX. Of this category of forty-seven, 22, with 7 recoveries (CASES 165–186, inclusive, of *Circular* 2, pp. 90–92), and 12 cases, with 2 recoveries (CASES 187–198, inclusive, of *Circular* 2, pp. 92–94), are discarded, the former as uncomplicated by fracture, and the latter as examples of secondary traumatic arthritis. These thirty-four cases have already been referred to in SECTION I, at page 26, *ante*., under the head of *Peri-articular Wounds*. Twelve cases, with two recoveries (CASES 216–227, inclusive, of *Circular* 2, pp. 96–98), are postponed for consideration in SECTION III, as instances of fractures of the trochanteric region, in which the hip joint became secondarily involved. One case of recovery (CASE 224, *Circular* 2, p. 100) has been transferred to a future chapter, later information having proved that the injury was not inflicted by shot. On the other hand there were added to the cases summed up in *Circular* 2, 66 cases, with 18 recoveries, since discovered and not heretofore published; 4 cases, with 1 recovery, already published in the *Second Surgical Volume* (CASES 859, p. 295, 920, p. 317, 922, p. 318, and 935, p. 324); 5 cases, with 1 recovery, referred to in *Circular* 2, but not included in the enumerated list (CASES of Swanson, Greenwood, p. 113, Scott, p. 114, and CASES of Drs. AVENT and BRUNS, p. 57); 1 case of recovery (CASE of Sweeney, noted in *Circular* 7, S. G. O., 1867, p. 73); and 1 fatal case (*Circular* 2, p. 92, CASE 184), reported in *Circular* 2 as a case in which the hip joint was involved but uncomplicated by fracture. The specimen, since received (*Specimen* 2994, A. M. M.), conclusively proves the fracture.

cases to be considered in the three following subsections. If the conclusions deducible from these numerous examples are in many respects unsatisfactory, it may be borne in mind that the surgical experiences of the Six Weeks' Prusso-Austrian War of 1866, of the Franco-German War of 1870–71, and of the Russo-Turkish War of 1876–77, have not so far proved more fruitful in results tending to solve the difficulties that beset the subject.

SHOT FRACTURES AT THE HIP TREATED BY CONSERVATION.—Three hundred and four cases in which shot wounds at the hip were believed to have been attended with fracture of the articular surfaces were treated on the expectant plan,[1] or with such incisions and removals of fragments or foreign bodies as was consistent with a true conservative treatment.

Five modern writers on military surgery,[2] the late Dr. H. Demme, of Berne, Professor

[1] Professor B. VON LANGENBECK, in seeking for examples of recoveries after shot wounds of the hip joint (*Ueber die Schussverletzungen des Hüftgelenks*, in *Archiv für Klin. Chir.*, 1874, B. XVI, p. 265) finds none recorded prior to recent wars, "apart from a case communicated by HENNEN, in his classical work (*Observations on Some Important Points of Military Surgery*, Edinburgh, 1818, p. 172), and several cases mentioned by THOMSON (*Report of Observations made in the British Military Hospitals in Belgium*, Edinburgh, 1816, p. 123) of hip joint wounds which seemed to have progressed favorably, but were not followed up to the final issue;" but it can hardly have escaped Professor LANGENBECK'S notice, in HENNEN'S account of his CASE XXVII, of Spontaneous Luxation of the Hip Joint, that HENNEN says: "Whether the luxation in this case was produced from a primary injury of the bone, or of the cartilages, and sebaceous glands of the joints, or from a secondary scrofulous affection, it is impossible to say with certainty," and by no means cites this instance of the mounted officer, wounded July 22, 1812, as an instance of recovery from shot wounds of the hip joint. In a later portion of his work, Dr. JOHN THOMSON (*Report of Observations * * after Waterloo*, Edinburgh, 1816, p. 275) observes: "The proportion of cures which has been obtained from amputation at the hip joint is, I believe, much greater than of cures from gunshot fractures of the head or neck of the thigh bone. Indeed, of recoveries from these injuries I know of none which have been recorded. Those who, for a time, seem to do well, in the end sink under the hectic which supervenes. This has been the fate, I believe, of the two cases which I have mentioned in the account of injuries of the hip joint as having put on a favorable appearance." With such examples, the propriety of caution in admitting recoveries after shot wounds at the hip as incontestable is apparent. Dr. RICHARD M. HODGES (*The Excision of Joints*, Boston, 1861, p. 94) observed: "The extent of injury, and the condition of the parts after a gunshot wound of the hip joint, are as notoriously difficult to determine as the cases are certain to terminate fatally. Even when the upper part of the femur has been shot through, shortening, rotation outwards, and crepitus are not always present, and sometimes a very considerable power of flexion and extension remains." After citing GUTHRIE'S famous picture (*Commentaries, etc.*, 6th London ed., 1855, p. 77) of "a man lying with a small hole either before or behind in the thigh,—with no bleeding, no pain, nothing but an inability to move the limb, to stand upon it,—and think that he must inevitably die in a few weeks, worn out by the continued pain and suffering attendant on the repeated formation of matter burrowing in every direction, unless his thigh be amputated at the hip joint, or he be relieved by the operation of excision, which, I insist upon it, ought first to be performed," Dr. HODGES declared that: "By following an expectant course and trusting to the resources of nature, an almost invariable mortality will ensue. A case occurring at the battle of Solferino, diagnosticated as fracture of the neck of the femur, and another seen at Nantes, in 1830, by M. BOINET, are the only recoveries I am aware of which have followed gunshot wounds of the hip joint." Dr. HODGES refers to the two exceptional recoveries after Solferino and Nantes in *L'Union Médicale*, 28 Juin, 1860. The discussion of the *Société de Chirurgie* here given, from p. 605 of *L'Union Médicale*, is, in that journal, erroneously attributed to May 30, 1860. The discussion was on June 6, 1860, and is correctly reported in the *Bulletin de la Société de Chirurgie de Paris*, 1861, 2me sér., T. I, p. 326. The Solferino case refers to a soldier, wounded June 24, 1859, and presented before the *Société de Chirurgie* June 6, 1860, by M. LEGOUEST. This soldier, after receiving shot wounds of the left shoulder and of the neck of the left femur, the latter ball entering anteriorly and passing out through the sciatic notch, entered the hospital at Cremona. Numerous and large splinters were extracted. The neck of the femur perfectly consolidated, with three centimetres shortening. M. BOINET mentioned "a man wounded at Nantes, in 1830, by a shot fracture of the neck of the femur with grave complications, now perfectly cured, and able to take long walks notwithstanding the anchylosis that had followed the accident." (See *Circular* 2, S. G. O., 1869, p. 65.) Professor RICHARD VOLKMANN (*Die Resectionen der Gelenke*, in his *Sammlung Klinischer Vorträge*, Leipzig, 1873, No. 51, p. 301), speaking of the American statistics of excision and exarticulation at the hip for shot injury, declares that they "demonstrate that after both operations only exceptionally a patient survives; but that also, under a purely conservative treatment, the result is invariably none better, on the contrary, rather still somewhat worse. The wounded with shot fractures of the hip joint about nearly all perish. This is also the experiences which we, who participated in the two last great wars, the Austro-Prussian and Franco-German, alas, could only confirm. I myself saw only fifteen instances of this injury. Three times I performed resection, twice after the battles of Beaumont and Sedan, once in Dijon. All three patients died; two, as I believe, chiefly from the consequences of a coexisting decubitus; in a third an extensive comminution of the pelvis was found at the resection; but the remaining, about twelve cases treated conservatively, also perished. Among them also one in which the head of the femur, separated by the ball and split in two halves, was extracted by an incision opening the joint. Only one patient I see still now and then, who, at Toul, received an undoubted intracapsular shot fracture of the neck of the femur, but which had not been diagnosticated, and who recovered, after exfoliation of several pieces of bone with relatively little shortening, and with anchylosis of the joint." LOHMEYER (C. F.) (*Die Schusswunden und ihre Behandlung*, Göttingen, 1859, S. 198) remarks: "An operation for the simplification of the wound, in cases where the acetabulum has been crushed, is naturally out of the question; but, in cases of comminution of the head or neck of the femur with injury of the capsule, one is called upon to operate, as such injuries, without artificial help, uniformly prove fatal after the patients have undergone terrible suffering." LÖFFLER (F.) (*Grundsätze und Regeln für die Behandlung der Schusswunden im Kriege*, Berlin, 1859, Erste Abtheilung, p. 66), speaking of shot injuries of the hip joint, remarks: "The conservative treatment of this injury, according to the experience hitherto acquired, gives no prospect of saving life. Even if pyæmia does not supervene, death ensues sooner or later from exhaustion following endless suppuration." With such testimony as the foregoing, together with that of Drs. H. FISCHER and E. KLEBS, in the foot-note to page 63, *ante*, we are indisposed to concur in the declaration of Dr. SAMUEL W. GROSS (*Military Surgery*, in *Am. Jour. Med. Sci.*, 1867, Vol. LIV, p. 447) that "those surgeons who pointedly condemn all efforts to save the limb after gunshot fracture of the surgical or anatomical neck of the thigh bone, exercise, in our judgment, but little discrimination, when they declare, as does the surgical historian of the late American War, that 'experience has demonstrated the uniform fatality of gunshot fractures of the head or neck of the femur when abandoned to the resources of nature.'" and that "*no statement can be farther from the truth.*" The compiler of the surgical report in *Circular* No. 6, S. G. O., 1865, might have said "*almost* uniform fatality," but his statement, if lacking qualification, was assuredly not widely apart from the truth.

[2] DEMME (H.), *Spec. Chir. der Schusswunden*, Würzburg, 1864, S. 348. PIROGOFF (N.), *Grundzüge der Allg. Kriegschir.*, Leipzig, 1864, p. 814. GROSS (S. W.), *Military Surgery*, in *Am. Jour. Med. Sci.*, 1867, Vol. LIV, p. 447. SPILLMANN, *Étude Anal. et Crit. d'un Rapport sur la Resection de la Tête du Fémur*, Paris, 1870, Extrait du *Rec. de Mém. de Méd. de Chir.* et de *Pharm. Mil.*, 3me sér., T. XXVIII, 1870, p. 48. LANGENBECK (B. VON), *Ueber die Schussverletzungen des Hüftgelenks*, in his *Archives für Klin. Chir.*, Berlin, 1871, B. XVI, p. 263, and translated as *Surgical Obs. on Gun-shot Wounds of the Hip-Joint*, by JAMES F. WEST, F. R. C. S., in *Birmingham Med. Review*, Vol. V, 1876, pp. 29, 88, 167.

Hospital on May 10, 1862. A conoidal musket ball had entered the right groin, passed slightly downward, traversed the line of union between thigh and trunk, fractured the neck of the femur in its transit, and emerged posteriorly at the fold of the buttock. On flexing or rotating the thigh crepitus was plainly distinguished. His limb was suspended by Smith's anterior splint, and this treatment was continued for two months. The case progressed without a single untoward symptom, and in the middle of July, 1862, consolidation of the fracture was sufficiently firm to permit the patient's removal to the house of a friend. The limb was shortened one and a half inches. In October Captain Bugh was able to move about on crutches, and the wounds were entirely healed. About this time he took a journey to Washington, and was promoted to a lieutenant colonelcy in the 32d Wisconsin and placed on recruiting service. He served until April 25, 1863. His recovery was so rapid and uninterrupted that he reluctantly assented to the opinion of his surgeon, Dr. Edmund G. Waters, that he would be incapable of active duty in the field. A letter was received from Lieutenant Colonel Bugh, dated June 12, 1867, more than five years subsequent to his injury, in which he stated that he had partial anchylosis of the hip joint and was unable to perform any labor in a stooping posture. Otherwise his condition was satisfactory, though he was more readily fatigued and debilitated than before he was wounded. He suffered no inconvenience from the slight shortening of the femur. His death occurred eight years afterwards, on August 19, 1875, of phthisis pulmonalis. Examining Surgeon N. M. Dodson, of Berlin, Wisconsin, informed this office on December 13, 1878, that "no *post-mortem* was had in the case of Captain Bugh. The wound healed in 1866, and the limb remained sound afterwards. Bugh filled the position of postmaster, was much upon his feet, and residing for some years three-quarters of a mile from the post office, he walked to and fro three times a day with very little inconvenience, using only a cane. The joint was firmly anchylosed. He suffered from pain of a neuralgic character in the whole limb, and at night frequently with cramps in leg and foot."

CASE 138.—Private *J. T. Elliott*, Co. H, 22d Georgia, of Sorrell's Brigade, aged 24 years, received, at the engagement at Deep Bottom, Virginia, August 16, 1864, a gunshot fracture of the neck of the left femur. He was conveyed to Richmond and admitted to the Jackson Hospital. He recovered with three inches shortening of the limb, and being permanently disabled and totally disqualified for any military duty, he was retired from the Confederate States service on February 17, 1865. The case is reported by Surgeons A. J. Semmes, Thomas F. Maury, and W. D. Hoyt, members of the medical examining board of the Jackson Confederate Hospital, at Richmond, Virginia, in February, 1865.

CASE 139.—Private Charles Miller, Co. A, 9th Illinois, aged 26 years, was wounded at the battle of Shiloh, Tennessee, April 6, 1862, apparently by a small rifle ball entering at a point midway between the left trochanter major and the tuberosity of the ischium and fracturing the neck of the left femur. He was conveyed to the general hospital at Savannah, and a month afterward was transferred by steamer to Quincy, Illinois, and admitted to hospital on May 7th. An unsuccessful search for the missile was made, and Buck's apparatus was applied. The bone united and the wound healed. He was discharged from service on October 14, 1862, having limited motion at the hip joint. The case is reported by Surgeon R. Nicholls, U. S. V. On April 7, 1864, Dr. John C. Hupp, Pension Examining Surgeon at Wheeling, West Virginia, stated that the limb was shortened by about two inches, a partial luxation of the head of the femur upward apparently having been produced. Any movement of the thigh created severe pain. The cicatrices were firm and there were no fistulous orifices. In December, 1870, Examining Surgeon C. Griswold, of Fulton, Illinois, reported: "The ball entered posteriorly through the glutei muscles, and fracturing the femur near the socket, resulted in partially stiffened joints both at hip and knee of left leg. The hip joint will admit of only a little forward motion and rotation outward. The knee joint allows only partial flexion, and cannot be crossed over the right leg in a sitting posture. The leg is shortened about one-quarter of an inch. He cannot walk without limping." In August, 1873, Examiner P. J. Farnsworth, of Clinton, Iowa, stated: "The bullet remained in for four years, and was found under the superficial fasciæ three inches below the wound. Motion of hip joint impaired. Contraction of abductor muscles, causing stiffening and retraction of knee joint. Constant neuralgic pain of thigh and leg, and considerable atrophy of muscles. Thigh two inches less in circumference than right at upper third. The original disability has increased." On May 1, 1878, the Davenport, Iowa, Examining Board reported: "There is shortening of the thigh to the extent of three-quarters of an inch, whence it is inferred that fracture of the upper portion of the acetabulum, or neck of femur, occurred; there is partial anchylosis of the knee joint. The patient walks with a cane with considerable impairment of motion."

CASE 140.—Private *T. L. Lomax*, Co. K, 30th Virginia, wounded at Antietam, September 17, 1862, and admitted to hospital No. 5, Frederick, on October 20th. Dr. A. V. Cherbonnier communicated, in June, 1869, that "it was supposed, when *Lomax* was admitted to hospital, he was merely suffering with a fracture of the thigh, high up, with no accurate knowledge of the extent. He was removed to a private residence, and after removal his limb was explored and a full knowledge and extent of the injury was ascertained. The injury was found to be serious, involving the upper portion, the trochanter, and, if I remember correctly, the neck. In the presence and with the assistance of Surgeon H. S. Hewit, U. S. V., and Assistant Surgeon J. H. Bill, U. S. A., I removed all the fragments of bone, and with the gouging forceps removed a considerable portion of dead and rough bone. The operation was repeated a couple of weeks after. The whole of the trochanter major was removed, going deep into the shaft, and leaving, if I remember correctly, but a shell of bone. When I left Frederick I had the satisfaction of seeing young *Lomax* on crutches. I cannot, with no notes, do justice to what I consider a most interesting case," etc. Surgeon Hewit, in a note dated July 26, 1869, stated: "It was *a case of comminution of the hip*. Three secondary operations by gouging were performed by myself, in which nearly *all the head, neck, and trochanteric portion* of the femur were removed. He subsequently made a good recovery." Dr. G. Johnson, of Frederick, subsequently, on October 21, 1869, furnished the following details of the case: "Mr. *Lomax* was wounded in the left hip. The ball struck the femur, shattering it by his account, but producing no solution of the continuity. He remained in the temporary hospital near the battle-field for weeks, was then brought to Frederick, and on October 31st was transferred to a private residence and came under my charge. His strength at this time was gradually succumbing to profuse suppuration and pain, and although he rallied somewhat at first by the change of circumstances and improved hygiene, it soon became apparent that surgical interference was demanded to arrest the downward tendency. Until this time his only treatment had been the abstraction of detached pieces of bone, detergent washes to the wound, and anodynes and tonics. Carious bone in considerable extent being evident to the probe, it was determined to attempt its removal, and on

November 15th Drs. Hewit and Charbonnier operated for that purpose, under chloroform. A large quantity of diseased bone was removed from the outer part of the upper third of the femur. There was but trifling hæmorrhage, but much depression and irritability of stomach succeeded the operation, yielding, however, in a few days, to stimulants and effervescing draughts. For a fortnight the patient steadily improved under nourishing diet and tonics. He then again began to deteriorate under increasing suppuration, and on December 15th it was determined to again operate for the removal of diseased bone. This was accordingly done on that day by Dr. Hewit, the patient being under chloroform. The great trochanter and about two-thirds in circumference of the shaft of the femur were removed for several inches. The depression consequent was not so great as before, but on December 17th congestion of the right lung occurred, with expectoration of a quantity of typhoid pneumonic sputa. I painted the chest thoroughly with iodine tincture, and gave hydrochlorate of ammonia, with milk punch and animal soup. No consolidation of the lung occurred, and after a few days his chest gave no further trouble. I will not weary you with a detailed account of his symptoms and treatment during the four months ensuing. There was at no time any inflammation of the hip joint. Erysipelas twice gave much trouble, as also the usual disposition in such cases to form purulent sinuses. On January 23, 1863, I noted hard and excessive swelling of the limb, with grave constitutional disturbance attributed to lymphatic inflammation, and after this subsided much œdematous infiltration. Pieces of carious bone became from time to time detached, and were removed as soon as detected; the feeble circulation was supported by careful bandaging; the wound was kept thoroughly clean and his hygiene perfect. He took exercise in the open air in carriage and on crutches as soon as strength permitted, and in May was quite convalescent. June 8th, he left Frederick for exchange, still on crutches and wound discharging slightly, but looking healthy—almost robust. A year after, he wrote that he was perfectly well and walked comfortably with a cane. In mentally reviewing this case some points of interest occur to me: As to the cause of so extensive a caries—this was a true bone ulcer. The several operations did not consist of merely removing sequestra or detached portions of dead bone, but in paring and pinching off the diseased bone from that which was still sound. The ulceration was progressive. The second operation was more extensive than the first and at a month's interval. These facts are consistent with the theory (suggested, I think, by Dr. Hewit) that the caries depended upon osteitis, and this probably caused by the peculiar velocity with which the minié ball strikes. The amount of callus effused after the final operation was immense, fully equalling the new bone of a prolonged case of necrosis, and soon allaying the fear at first felt of fracture of the continuity of the bone through muscular action or otherwise. As regards the statistical value of the case it ended well; but after an illness in which his life was in extreme jeopardy several times, and under circumstances rarely attainable in private practice, and I should think impossible in military life. The patient had full advantage of every circumstance that affection could prompt and pecuniary means procure. He was in the prime of life and entirely free from constitutional taint. He was free from depressing influences of every kind, while in his medical and surgical treatment I had the counsel and assistance of scientific and thoroughly experienced men. Among them, both he and I are under lasting obligations to Dr. Hewit, to whose operative skill, no less than to his humanity in permitting his removal from hospital, is due whatever credit may pertain to the issue of the case." The bone removed at the two operations referred to consists of a number of fragments, and was subsequently contributed to the Museum by Dr. Johnson, and constitutes *Spec.* 5652 of the *Surgical Section*.

CASE 141.—Private *M. M. Phillips*, Co. F, 42d Mississippi, aged 23 years, was wounded at the battle of Gettysburg, Pennsylvania, July 3, 1863, by a musket ball, which entered the posterior and outer aspect of the left buttock, fractured the neck of the femur, and emerged in the left groin. He was captured and removed to the hospital for Confederates, and was treated by the expectant plan. On July 22d he was transferred by rail to the De Camp Hospital, in New York Harbor. The wounds of entrance and exit had healed. He was able to walk by the aid of a crutch or cane and suffered no pain. The limb was shortened one and three-quarter inches. By flexing and rotating the limb true osseous crepitus was obtained. There was no inversion or eversion. The patient, much against his will, was placed upon a fracture-bed, where extension was produced for six weeks by a twelve-pound weight acting over a pulley. He was then permitted to rise and directed to use passive motion and friction. On September 20, 1863, he was paroled, being able to walk without assistance of any kind. The limb was shortened one and a quarter inches. The case is reported by Acting Assistant Surgeon George Edwards.

In the next case, as in the case of Private Charles Miller (CASE 139, page 71), partial anchylosis of the knee joint had supervened many years after the injury:

CASE 142.—Private James Vanderbeck, Co. F, 145th New York, aged 21 years, was wounded at the battle of Chancellorsville, May 3, 1863, by a conoidal musket ball, which entered the left thigh above and behind the trochanter major, passed forward and inward, fractured the neck of the femur, and made its exit at the groin. He was made a prisoner and remained in the hands of the enemy eleven days. He was then exchanged and conveyed to the Twelfth Corps Hospital, at Aquia Creek. The injured limb was simply placed in a comfortable position without any attempt at extension. On June 14th the patient was removed on a hospital transport to Alexandria and placed in the First Division Hospital. He was in good condition. The suppuration was comparatively slight, and no bone splinters were found loose and none had come away. Three days subsequently he was transferred to Philadelphia, and thence, on October 12th, to New York, where he was admitted to the Ladies' Home Hospital. The wounds were closed at this date. The patient was discharged from the hospital and from the service of the United States on November 19, 1863. On that date he walked with crutches. His limb was shortened two inches, with eversion. He was allowed a pension. On August 2, 1866, Dr. E. Bradley, Examining Surgeon of the Pension Bureau, reported that Vanderbeck's general health was good, but that there was much lameness. The fracture was firmly consolidated. Commissioner C. C. Cox reports that Vanderbeck received his pension at the agency in New York City on March 4, 1868, and that his disability was then rated by the examining surgeon as total. On September 9, 1873, Examining Surgeon T. F. Smith, of New York City, states: "Ball entered left nates and emerged beneath left popliteal ligament, fracturing the femur; there is union with deformity and three inches shortening." On September 7, 1875, the New York Examining Board, Surgeons T. F. Smith, J. F. Ferguson, and M. K. Hogan, report "that the knee is anchylosed and the patient is obliged to wear a sole on his shoe three inches thick, and to walk with a cane; the leg is useless for purposes of labor."

CASE 143.—Private T. C. Garvin, Co. H, 94th New York, aged 43 years, was wounded at Hatcher's Run, February 7, 1865, and admitted to the field hospital of the 3d division, Fifth Corps. Surgeon D. C. Chamberlain, 94th New York, noted: "Gunshot wound of genitals." Four days after the reception of the injury the man was admitted to the Newton University Hospital, Baltimore, whence Surgeon R. W. Pease, U. S. V., reported: "Gunshot wound of penis and right testicle, ball emerging from right gluteal region, fracturing the femur." In a case book it is recorded that Buck's apparatus and counter-extension were used, also that there was free suppuration from the wound, and that evidence of union of the bone set in about March 10th. Assistant Surgeon D. C. Peters, U. S. A., reported that the patient was admitted to Jarvis Hospital May 23d, and described the injury as follows: "Gunshot wound of penis, right testicle, and fracture of femur involving the neck. Urine escapes through the lower opening of the penis. He had some union of limb, with about three inches shortening." The patient was discharged from service June 11, 1865, and pensioned. Examiner G. W. Cook, of Syracuse, New York, certified, April 25, 1866: "Bullet struck the glans penis, passing downward and backward through the urethra, producing hypospadia, through which the urine is voided, thence into the right testicle, which is destroyed, thence into the right thigh, fracturing the same." The pensioner died January 3, 1869. Dr. A. Welch, his attending physician, certified that "to the time of his death Garvin was laboring under severe pain and difficulty from a wound which he received in the hip of the right side, passing through the joint and through the testicle, destroying the hip joint, and producing shortening of the limb, and an open wound from which pus and portions of the joint, consisting of splinters of bone, were discharged to the time of his death."

CASE 144.—Corporal Daniel Bachler, Co. G, 82d Illinois, aged 23 years, was wounded in the battle of Chancellorsville, Virginia, May 2, 1863, by a round ball, which, entering just above the right trochanter major, fractured the neck of the femur, and emerged beneath Poupart's ligament about two inches from the symphysis pubis. He stated that he lay thirteen days on the plank road unattended. He was admitted May 15th to the field hospital of the 3d division, Eleventh Corps, and was transferred thence, by steamer, to Alexandria, and admitted May 25th into the First Division Hospital. The patient had been informed that the wound involved the soft parts only; cold-water dressings had been applied. The limb was shortened about three inches. A fracture through the neck was discovered. Partial union had taken place. There was little suppuration and the pus was healthy; the parts were but little swollen. Smith's anterior splint was applied and moderate extension made by weight and pulley. He was furloughed on July 14th for sixty days, and went to Chicago, Illinois. On September 10th Bachler was received into the City General Hospital in Chicago. A gunshot wound of the right hip joint was recorded. He was transferred to the 2d battalion of the Veteran Reserve Corps on August 7, 1864. The case is reported by Surgeon Norman S. Barnes, U. S. V. The patient was discharged on July 15, 1865. The Chicago Examining Board, Drs. Wm. C. Lyman, E. D. F. Roler, and F. A. Emmons, report on September 10, 1873: "The pensioner was shot through the hip close to the joint; there was loss of some small pieces of bone, and half an inch shortening of the limb." On April 3, 1878, the Board state: "There is partial loss of flexion and of power of leg, with neuralgic pains; the neuralgia is increasing."

CASE 145.—Private James McCabe, Co. A, 12th Massachusetts, was wounded on September 17, 1862, at the battle of Antietam, by a musket ball, which entered just below the right groin and made its exit at the buttock, fracturing the neck of the femur in its passage. He was conveyed to hospital No. 5, at Frederick, Maryland, and was treated with the limb in an extended position. On November 9th he was transferred to Frederick Hospital No. 1. In December a large metastatic abscess formed about the right shoulder, which was laid open by Assistant Surgeon R. F. Weir, U. S. A., a large quantity of pus escaping. After the healing of the abscess there was much weakness of the muscles of the acromial and humeral region, and the patient could not raise his hand above his chin. On June 16th he was sent in good condition to the Jarvis Hospital at Baltimore, and thence to Point Lookout Hospital, where he remained until July 25, 1864, when, the wound being healed, he was discharged. He was mustered out of service August 5, 1864. On June 10, 1867, he was examined at the office of Surgeon General Dale, of Massachusetts. The fracture was firmly consolidated. There was but a slight limp in walking. His general health was excellent. He received a pension and was employed in the Soldiers' Messenger Corps. He experienced no pain, except on change of weather or when his walk was extended beyond two miles. He considered his injury but a slight disability in his business, since he had free passes on all the lines of horse cars in Boston.

CASE 146.—Sergeant *Edward G. Gilliam,* Co. C, 11th Virginia, aged 24 years, was wounded in the engagement at Drury's Bluff, Virginia, May 16, 1864, by a rifle ball, which, entering the upper portion of the right thigh in front, fractured the neck of the femur, and lodged. He was conveyed the same day to Richmond and admitted into Chimborazo Hospital. There was eversion of the limb, but no shortening. On placing the finger upon the seat of fracture and rotating the thigh it was observed that the trochanter major moved with the shaft. There appeared to be but little comminution, and there was no escape of synovial fluid. The parts were but little tumefied. The limb was comfortably adjusted on pillows. The patient complained of severe pain in the thigh, especially along its inner aspect, and had frequent twitchings of the muscles. The pulse was 80, the tongue clean, the appetite poor. Half an ounce of whiskey was directed every fourth hour, and a nourishing diet, with one-third of a grain of morphine given at bedtime. During the latter part of May there was severe local pain, with rapid emaciation, and a bed-sore formed over the sacrum. On June 15th the limb was swung in a Smith's anterior splint. The patient's appetite soon began to improve, the pulse about 96. On June 27th he yet suffered severe pain in the hip and along the inner part of the thigh. On July 1st synovial fluid in large amount issued from the wound, after which the pain subsided. His appetite continued to improve, and he now slept well at night. One or two small spiculæ of bone were eliminated in the discharges. On July 10th he was stronger and had no pain; the bed-sore was healing; the discharge from the wound was small in quantity, and the œdema was disappearing. For several days, about July 20th, he suffered pain at the knee, and the splint was removed. On July 30th the bed-sore was healed and his health was greatly improved; but any movement of the hip joint continued to create severe pain. By August 10th he had become stout and fleshy and could suffer the limb to be moved, and August 22d it could be moved freely without producing pain. At this date a small spicula of bone was removed. There was only a slight discharge from the wound. On September 5th he was able to raise the limb a short distance from the bed, and September 14th he sat up in a chair. There was limited motion of the hip joint. He was furloughed for sixty days on September 20, 1864. The case is reported by Surgeon E. M. Seabrook, C. S. A.

CASE 147.—Surgeon B. W. Avent reports that an officer received a gunshot fracture of the neck of the femur; two fingers at entrance and exit fully explored the wound; date of injury unknown. The wound was dilated at entrance and spiculæ was removed with saw and forceps. He lingered for months, but finally recovered with a limb four inches short, but able to walk with the assistance of a cane.

CASE 148.—Private R. Yerger, Co. I, 11th Pennsylvania, aged 31 years, was wounded at Antietam, September 17, 1862, and entered the Broad and Cherry Streets Hospital, Philadelphia, on December 12th. Surgeon J. Neill, U. S. V., reported: "He was admitted to this hospital with an undetected fracture of the neck of the right femur. A minié ball entered on the front of the thigh on a vertical line with the anterior superior spinous process of the ilium and four inches below it, and, passing obliquely upward and backward, was cut out on a line with and about two inches below the posterior superior spinous process by the surgeon of the regiment on the field. At the time of his admission the wound had entirely healed, but the patient was unable to bear weight on the limb without pain. The tissues over and above the trochanter were flattened, and the fold in the buttock was absent. Rotation was imperfect, and when an attempt was made to bear weight on the limb distinct crepitus could be felt in the neck of the bone, and he complained of pain at that point. Measurement from the xiphoid cartilage revealed two and a half inches shortening of the injured side, and from the anterior superior spinous process of the ilium it was three-fourths of an inch. The fracture appeared to be impacted, and the whole of the right innominate bone was considerably elevated above its normal position. The posterior superior spinous process of that side was also more prominent than that on the other side, giving the idea that the sacro-iliac symphysis had been injured and in that way accounting for the marked amount of shortening by measurement from the xiphoid cartilage. He stated that when shot he fell, the right hip striking the ground, and any attempt to move the limb gave rise to severe pain in the hip joint; also that the surgeon told him it was only a flesh wound and would soon be well. He remained in a field hospital for nine days, when he was removed to Chambersburg and treated for nine weeks, during which time he was allowed to get up to go to stool. The wound healed about two weeks before admission to this hospital. No fragments of bone were removed; crepitis is not so distinct, and his general condition is good. The amount of shortening from the anterior superior spinous process has increased from three-fourths to a full inch since admission." The patient was discharged from service April 27, 1863, and pensioned. Examiner J. J. McCormick, of Irwin Station, Pennsylvania, certified, September 5, 1873: "Ball entered right thigh in front of trochanter major and came out one inch from lower end of sacrum, fracturing the neck of the femur. The limb is two and one-half inches shorter than the other; strength so much impaired that he cannot walk without a cane. Muscles of limb are atrophied." In an examination for increase of pension, in April, 1880, Examiner McCormick reports: "There is great impairment of the strength and usefulness of the limb. The pensioner cannot work at all, nor can he set on a chair except a little on the left hip. The injury is nearly equivalent to the loss of the limb."

In five instances of recovery after alleged shot fracture of the hip joint the "neck and trochanters" or "the neck and shaft" of the femur were reported to have been fractured. Three of the cases[1] are here given in detail:

CASE 149.—C. F. Beyland, Q. M. D., aged 26 years, was wounded December 8, 1861, by a conoidal musket ball, which fractured the great trochanter and neck of the right femur. Excision was proposed and refused. The fracture was treated by Hagedorn's apparatus. After protracted and profuse suppuration the patient recovered with a limb shortened two inches. In July, 1863, he had dispensed with crutches and walked quite well. Assistant Surgeon C. K. Winne, U. S. A., reported the case.

CASE 150.—Corporal Luke English, Co. E, 2d Wisconsin, aged 21 years, was wounded at the battle of Gettysburg, Pennsylvania, July 1, 1863, by a conoidal musket ball, which entered at a point between the left trochanter major and the tuberosity of the ischium, emerging near the anus, penetrated the right thigh and fractured its trochanters, and lodged. He was admitted the next day into the Seminary Hospital at Gettysburg. Search for the missile was unsuccessful. Two fragments of bone were extracted. Cold-water dressings were applied. On July 17th he was transferred by railroad to York Hospital. Early in August the average discharge of pus was about four ounces. The wound of entrance had nearly closed. On November 4th he could walk a little, the wound, however, discharged considerably. He was discharged from the service of the United States on June 23, 1864. Surgeon Henry Palmer, U. S. V., reports the case. His attorney, John Hancock, of Oshkosh, Wisconsin, reports that English died in 1867.

CASE 151.—Private Philip Sweeney, Co. C, 3d New York, was wounded in the affair at Big Bethel, June 10, 1861, by a conoidal musket ball, which shattered the trochanters of the right femur. He was admitted to Hygeia Hospital, Fort Monroe, on June 13th, and was treated by Surgeon R. B. Bontecou, U. S. V., by moderate extension and dilatation of the wound by sponge tents in order to facilitate the extraction of primary sequestræ, of which many were removed. Suppuration and exfoliation persisted until March, 1862. In April there were two severe attacks of erysipelas, involving the entire limb, which greatly reduced the patient, but he quickly rallied, and in May was able to run a race on crutches with his wounded companions. He was transferred to Albany in June, 1862; but his name does not appear upon the hospital reports until March, 1863, when he was admitted to the Ladies' Home, in New York City, where a number of necrosed fragments were removed. On May 25, 1863,

[1] The remaining two cases were: 1. Serg't P. Casserleigh, A, 38th Illinois; Chickamauga, Sept. 19, 1863; conoidal ball entered behind the right great trochanter, passed inward and forward, fractured the apophysis, and, it was believed, injured the anterior crural nerve. It was considered possible, though not probable, that the joint was injured. He was discharged July 11, 1863. Examiner T. S. HENING, of Springfield, reported, in May, 1865, that a ball entered the right hip a little posterior to the great trochanter, passed into the hip and remained concealed in the tissues; limb one and a half inches shortened; motion and power of joint destroyed; and in November, 1866, that "the ball fractured the head and neck of the femur." The Springfield Examining Board reported, in August, 1874: "The limb is anchylosed in a semiflexed position and shortened four inches (*Circ.* 2, p. 94, CASE 201).—2. Pt. T. Purcell, F, 96th Pennsylvania, aged 22; Chancellorsville, May 3, 1863; a conoidal ball was stated to have produced a fracture of left femur in upper third, extending into hip joint. From a field hospital of the Sixth Corps he was transferred to Armory Square Hospital, Washington, and subsequently to Cuyler Hospital, Germantown, Pennsylvania. No mention was made at either of the latter hospitals of the involvement of the hip joint. At Mower Hospital, Philadelphia, the injury was noted as a "gunshot wound of upper third of left thigh with loss of four inches of bone." He was discharged July 8, 1865. Examiner J. T. CARPENTER, of Pottsville, reported, in September, 1873: "Entrance of wound about four inches below anterior superior spinous process of ilium, upper third of femur shattered; five inches shortening; no power; wasting of limb." (*Circ.* 2, p. 95, CASE 211.)

PLATE XXXIII. CONSOLIDATED GUNSHOT FRACTURE OF THE FEMUR.

Case of Private Philip Sweeny, 3rd New York Volunteers.

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he was discharged, being able to walk without a crutch and the limb being but slightly shortened. He soon afterwards engaged himself as a laborer at an iron foundry in Troy, New York, where he has since worked without intermission. On July 20, 1866, he was examined by Brevet-Colonel R. B. Bontecou, who found him in perfect health, the injured limb a trifle shortened, and the knee rather stiff, owing to the destruction of connective tissue about the extensor muscles of the thigh during the suppuration following the erysipelatous attacks, and, doubtless, the formation of adhesions. The knee joint was in good condition and had sufficient motion to allow a firm, good gait. In a letter dated November 23, 1868, Dr. Bontecou states that Sweeney is at work at Troy in a spike factory, and was able to sit at and run a machine. His knee was stiff from agglutination of the sheath of the extensor muscles of the thigh, otherwise the limb was useful. The Albany Examining Board, Drs. W. Craig, R. B. Bontecou, and C. H. Porter, record, in September, 1873: "Gunshot wound through the trochanters, fracturing the femur at the neck, leaving adhesions of all the muscles of the thigh from deep-seated sloughing, the result of erysipelas, making knee joint stiff in the extended posture." In September, 1875, Examining Surgeon R. B. Bontecou certified that "adhesions have rendered the knee immovable and the limb comparatively useless."

The parts injured were not particularly specified in ten instances of recovery after alleged shot fracture of the hip joint. Two are here detailed, and eight are briefly recorded in the foot-note.[1]

CASE 152.—"Private William C. Watson, Co. A, 4th Michigan, was struck in the left hip, at the battle of Malvern Hill, Virginia, July 1, 1862, by a conoidal musket ball. A fracture through the trochanteric region, with fissures probably extending to the joint, was reported. He was conveyed to Philadelphia and admitted into the Episcopal Hospital July 30th, transferred to Master Street Hospital on March 18th, and to South Street Hospital May 11th. The patient stated that for weeks his life was despaired of in consequence of the excessive suppuration which took place. Abscesses formed in the upper third of the thigh. Spiculæ of bone escaped at intervals for months from the wound and through the incisions made for the evacuation of the abscesses. On January 1, 1864, suppuration had nearly ceased. The limb was shortened several inches and there was much deformity. On March 24th he was admitted into Christian Street Hospital, where he was discharged from service May 5, 1864. He received a pension in September, 1868, and his disability was rated as total and permanent." Surgeon Paul B. Goddard, U. S. V., reports the case.

CASE 153.—Private Samuel Hensel, Co. H, 114th Pennsylvania, aged 31 years, was wounded at the battle of Chancellorsville, Virginia, May 3, 1863, by a musket ball, which entered the central portion of the left buttock. The soldier was conveyed by steamer to Washington, where, on May 8th, he was received into Armory Square Hospital. The wound was probed daily in search of the missile, which, at the end of two weeks, presented itself at the point of entrance and was extracted by the patient. He states that it was a round ball, but was flattened on one side, and had, in this surface, a clean cut filled with osseous matter. The treatment consisted of rest, position, and the application of cold-water dressings. On June 16th the patient was transferred to McKim's Mansion Hospital, in Baltimore. About the middle of July the nurse, while dressing the wound, discovered in it a foreign substance, which, upon removal, proved to be a portion of the haversack. The patient was soon afterwards transferred to Mower Hospital, Philadelphia. Early in September a spicula of bone, nearly two inches in length by one in width in its

[1] Cases of: Corp'l *J. J. Atkenson*, B, 1st Tennessee; wounded at Murfreesboro'; he was examined at Lauderdale, Mississippi, by Surgeons J. T. KENNEDY, D. W. WHIMPER, and H. YANDELL, P. A. C. S., who certified that he was suffering from a shot wound of left hip, fracturing bone, and wound of left hand, loss of use of two fingers; shortening and deformity of leg; retired to Confederate Invalid Corps (*Circ.* 2, p. 98, CASE 228).—2. Sergeant Albert G. Beebe, A, 85th Illinois, received, in the engagement near Perryville, Kentucky, October 8, 1862, a gunshot wound of the right hip, which was believed to involve a fracture of the joint. He was conveyed to hospital No. 7, in Perryville. He was discharged from service on February 15, 1863. His disability was rated as total. He is a pensioner. Examiner P. L. DIFFENBECHER, of Havana, Illinois, reported, May 29, 1876: "Wound of right leg; ball entered on the anterior aspect about three and a half inches below the groin, passed posteriorly and wounded trochanter major, superior aspect. Exit just posterior to the thigh joint; bones and muscles destroyed; also large cicatrix at point of ingress. Hip joint and leg affected by rheumatism aggravated by fatigue and exposure." The case is reported by Assistant Surgeon H. S. WOLFE, 81st Indiana.—3. Pt. *D. J. C. Campbell*, E, 3d Virginia, aged 36; Payne's Farm, November 27, 1863; shot wound left hip, ball entering near the trochanter major and lodging in the bone in the vicinity of the hip joint; retired from service, unfitted for any duty (*Circ.* 2, p. 98, CASE 229).—4. Corp'l H. Koch, F, 7th Missouri, aged 26; Chickamauga, September 20, 1863; conoidal ball splintered left femur above the shaft; discharged May 16, 1864. The St. Louis Examining Board reported, June 3, 1874: "Ball struck left thigh near trochanter major, shattering the bone" (*Circ.* 2, p. 100, CASE 245).—5. Pt. A. C. Woodall, G, 55th Pennsylvania, aged 17; Drury's Bluff, May 16, 1864; fracture left hip, involving the articulation; mustered out June 8, 1865, and pensioned (*Circ.* 2, p. 101, CASE 254).—6. Corp'l T. Gallagher, F, 165th New York, aged 30; Port Hudson, May 27, 1863; canister ball entered two and a half inches below great trochanter, passed backward and upward, and lodged three inches from place of entrance; projectile and several fragments of bone removed; discharged December 19, 1863, and pensioned. The New York Examining Board reported in October, 1872: "Ball struck outer aspect upper third left hip, fracturing or splintering the femur, and leaving two well-marked cicatrices; interferes with locomotion" (*Circ.* 2, p. 103, CASE 261).—7. Pt. *R. F. Carter*, B, 20th North Carolina, aged 21 years, was wounded at Gettysburg, July 1, 1863. His injury is entered on the register of the Gettysburg field hospital as a "gunshot wound of thigh and hip, with compound comminuted fracture of hip joint." On September 4th the patient was admitted to Camp Letterman, where Surgeon H. JANES, U. S. V., recorded: "A minié ball entered outer side of upper third of left thigh, lodging in the left groin and fracturing the femur in its course. When admitted the general health of the patient was good; leg a little swollen. On September 12th a small piece of bone was removed. October 10th, wound discharging freely, and fracture united with firm callus thrown out. November 8th, improving slowly. Patient can bear about one-tenth of the weight of his body on the limb. November 10th, transferred convalescent." Surgeon A. CHAPEL, U. S. V., reported that the man was admitted to West's Buildings Hospital, Baltimore, with "gunshot wound of left hip," and that he was paroled November 12, 1863.—8. Pt. H. Marlatt, G, 12th Illinois Cavalry, aged 19 years, was wounded at Upperville, June 21, 1863. He was admitted to a Cavalry field hospital, where Surgeon J. B. W. MITCHELL, 8th Pennsylvania Cavalry, noted: "Wound of left thigh by a pistol ball." Surgeon J. A. LIDELL, U. S. V., recorded his admission to Stanton Hospital, Washington, June 23d, with "wound of thigh," and his "return to duty on November 25, 1863." It is believed, however, that the man did not return to active field service, but was discharged from the hospital only to accompany his command when changing station from the Army of the Potomac to the Western armies. He was subsequently admitted to Camp Gamble, whence he was transferred to the Lawson Hospital, St. Louis, on February 15, 1864. Surgeon C. T. ALEXANDER, U. S. A., reported: "Gunshot wound of left thigh two inches below Poupart's ligament; ball passing downward, inward, and lodging. Wound healed when admitted. General condition good; uses crutches. Patient discharged from service February 27, 1864." Examiner C. HAY, of Warsaw, Illinois, certified, December 20, 1865: "A pistol ball entered the anterior upper third of the thigh, ranging towards the hip joint. The joint was in all probability injured, as he has not been able to move the limb upward since the casualty. The ball was lodged in or near the hip joint, upon the thigh bone, and still rests there. The bones composing the hip joint are now carious. The urinary organs are much deranged in their functions."

central portion, was extracted from the wound. Flaxseed poultices were applied. Subsequently ten other pieces, varying in size from one-fourth to one inch in length, were eliminated. The wound soon closed and the patient was able to get about on crutches. On September 24th he was transferred to McClellan Hospital, Philadelphia, where, on May 13, 1864, he was discharged from service "because of a compound fracture of the left thigh, upper third, incapacitating him for duty." Pension Examining Surgeon H. L. Hodge, of Philadelphia, reported, May 26, 1864: "On account of a gunshot fracture, probably of the os innominatum (left), there is a luxation of the head of the femur, which destroys the usefulness of the whole limb." On November 1, 1866, an apparatus was fitted to the disabled limb by Gemrig, of Philadelphia. Examining Surgeon James Cummiskey reported, April 6, 1867: "Was wounded by a ball entering the left buttock and lodging for a time in the left groin, fracturing the head of the femur badly, and resulting in shortening of the limb about three and a half inches and much wasting and feebleness of the limb. He is obliged to wear constantly an iron instrument to support the limb in walking. He suffers much pain at night." In a communication to this office dated Philadelphia, February 13, 1868, Mr. Hensel states that he is unable to walk without the use of the apparatus and a cane, but by the aid of these he can walk from a half to three-quarters of a mile, being obliged, however, to rest for two or three minutes once or twice by the way on account of pain and weakness in the limb. The Philadelphia Examining Board, Drs. H. E. Goodman, T. C. Rich, and James Collins, reported, September 4, 1875: "Has had a ball enter the left buttock, which was extracted from the wound of entrance. Has lost bone from head of femur, and the limb is nearly three and a half inches shortened. He has to wear a support with a high heel and sole shoe. Motion of hip joint limited to one-eighth degree. Spine curved from short limb."

Details of twenty-one of the reported cases of recovery after alleged shot fractures of the hip joint have been cited in the preceding pages, and the remaining thirty-four cases have been briefly alluded to in the foot-notes. The hip joint was undoubtedly involved in three of the fifty-five cases, viz: CASE 134, of Lieutenant Colonel H. C. Strong, 38th New York Volunteers; CASE 140, of Private *T. L. Lomax*, 30th Virginia; and CASE 143, of Private T. C. Garvin, 94th New York Volunteers. The latter died four years after the injury, but the opportunity was not improved of ascertaining unequivocally the precise nature of the injury to the articulation. Twelve cases[1] were probably examples of fractures of the trochanteric region or base of the neck of the femur, without the capsule. In thirteen cases the evidence is, to say the least, contradictory as to the seat of injury.[2] In five cases the evidence adduced is compatible with the supposition that the fractures were extracapsular.[3] In five other cases it is not proven that the articulation was directly injured.[4] The case of Private A. C. Woodall (*Note* 1, page 75) seems to have been a periarticular injury only. In the case of Private J. W. Galyean, 10th Indiana Volunteers (*Note* 1, page 70), the Pension Examining Surgeon, years after the injury, diagnosticated an injury to the joint. In the case of Private *J. Hughes*, 1st Alabama Cavalry, the evidence consists of an affidavit of an unknown surgeon before an "Association for the relief of maimed soldiers." In thirteen cases[5] the evidence is entirely insufficient to prove that the injuries were intracapsular shot fractures of the joint. In the case of Private W. C. Watson (CASE 152, page 75), 4th Michigan Volunteers, there remains room for argument, but the weight of evidence is adverse to the supposition that the hip was implicated.

Of the fifty-five cases of alleged recoveries after shot fractures of the hip joint treated without operative interference, eighteen were Confederate and thirty-seven Union soldiers. In the cases of the Confederate soldiers no information subsequent to the close of the war could be obtained. Of the thirty-seven Union soldiers four had died previous to 1880, one had not been heard from since 1866, and thirty-two were pensioners.

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[1] Cases of: Pt. Philip Sweeney (CASE 151, p. 74, *ante*); Pt. Charles Miller (CASE 139, p. 71); Pt. *M. M. Phillips* (CASE 141, p. 72); Pt. James Vanderbeck (CASE 142, p. 72); Pt. J. Doody (*Note* 1, p. 70); Corp'l D. Bachler (CASE 144, p. 73); Serg't *E. G. Gilliam* (CASE 146, p. 73); Pt. J. Wright (CASE 135, p. 69); Corp. L. English (CASE 150, p. 74); Serg't A. G. Beebe (*Note* 1, p. 75); Corp. T. Gallagher (*Note* 1, p. 75); Pt. S. Hensel (CASE 153, p. 75).

[2] Cases of: Pt. J. Kivel, Pt. W. Swank, and Pt. O. Wilson (*Note* 1, p. 69); Pt. J. W. Britton, Pt. A. G. Cotton, Pt. F. Kimball, Pt. R. P. McCutchen, Lieut. C. P. Stoneroad, Pt. *D. Strickler*, and Pt. J. Weber (*Note* 1, p. 70); Serg't P. Casserleigh and Pt. T. Purcell (*Note* 1, p. 74); and of Pt. H. Marlatt (*Note* 1, p. 75).

[3] Cases of: Capt. W. A. Bugh (CASE 137, p. 70); Pt. *J. T. Elliott* (CASE 138, p. 71); Surgeon B. W. Avent's case of an unknown officer (CASE 147, p. 74); Pt. R. Yerger (CASE 148, p. 74); and C. F. Beyland (CASE 149, p. 74).

[4] Cases of: Pt. J. McCabe (CASE 145, p. 73); Pt. S. T. Hook, Pt. W. Miles, and Pt. T. Winans (*Note* 1, p. 70); and Corp'l H. Koch (*Note* 1, p. 75).

[5] Cases of: Pt. *J. L. Harvey* (CASE 133, p. 67, *ante*); Pt. *G. A. Crymes*, Serg't *F. M. Hunter*, Colonel *L. S. Slaughter*, Pt. *I. S. Smith*, Pt. R Finkle, and Pt. *C. Wilson* (*Note* 1, p. 69); Serg't *J. M. Adams* (CASE 136, p. 69); Pt. *W. V. Trail* and Pt. *W. B. Reynolds* (*Note* 1, p. 70); Corp'l *J. J Atkenson*, Pt. *D. J. C. Campbell*, and Pt. *R. F. Carter* (*Note* 1, p. 75).

Shot Fractures at the Hip Joint unsuccessfully treated by Conservation.—Two hundred and forty-nine fatal cases of shot fractures of the bones of the hip joint treated by conservation were found on the various reports and hospital registers. In ten instances the acetabulum was recorded to have been fractured:

CASE 154.—Private G. W. Gentle, Co. E, 5th Ohio, was wounded at Antietam, September 17, 1862, and admitted to hospital No. 3, Frederick, October 1st. Assistant Surgeon J. H. Bill, U. S. A., reported: "The ball entered to the outside of the right pyramidalis muscle, passed outward and downward in front of the femur, and emerged at a spot in the integument corresponding to the insertion of the gluteus maximus. Nothing happened in this case, and no injury of a grave character was suspected. On the 23d of October, however, a hæmorrhage from both wounds took place. It was dark in color and readily checked by a tampon. Accordingly no action was taken, and, on the 25th, it recurred. It was now found that the thigh and hip were much swollen, an abscess present, seated in the track of the wound, and hæmorrhage evidently due to the ulceration of some vessel. In consultation with Surgeon H. S. Hewit, U. S. V., ligation of the external iliac was determined on. The man, however, refused the operation, and as the hæmorrhage externally had ceased, it was considered proper to wait. On October 27th, the hæmorrhage returned and the man wanted the artery tied. He was nearly moribund, and the case otherwise being unpromising still, the operation was undertaken by an incision parallel to but outside of the epigastric artery. The external iliac was found and tied without any difficulty. Previous to tying the ligature it was intended to lay open the abscess and search for the bleeding vessel, knowing that the circulation could be controlled. But at this stage of the operation the shock to the patient was so severe that it was necessary to finish all operative interference as soon as possible. The patient survived the operation only twenty-four hours. The autopsy showed the external iliac tied a quarter of an inch below the internal iliac, and the vein and peritoneum uninjured. A syringe was introduced into the femoral artery below the origin of the profunda and water thrown upward, but the bleeding vessel was not discovered, notwithstanding a careful dissection and prolonged search. The syringe was now introduced into the internal iliac and the water thrown downward, but with no better result. Failing thus to discover an ulcerated vessel on the cadaver, what likelihood would there have been of a successful search for the bleeding point on the living patient? The operation performed was unquestionably the proper one, as it checked the hæmorrhage, and was the only feasible method of doing this." The specimen represented in FIG. 26 was contributed by Assistant Surgeon J. H. Bill, and consists of "the right os innominatum and head of the femur. The joint was opened and the ischium at the lower border of the acetabulum contused by a musket ball which escaped through the glutæus maximus. The articular surfaces are eroded, but the implication of the joint was not suspected during life."—(*Cat. Surg. Sect.*, A. M. M., 1866, p. 235.)

FIG. 26.—Erosion of right os innominatum and head of femur after shot contusion. *Spec.* 758.

The remaining nine cases of fatal shot fracture of the acetabulum have been detailed; seven in *Circular* No. 2,[1] and two in the *Second Surgical Volume*.[2] The ten patients belonging to this group survived the injury 10, 11, 28, 31, 31, 32, 41, 46, 85, and 160 days respectively, and in two instances fragments of bone were removed.[3] Autopsies verifying the injury to the hip joint were made and recorded in nine of the ten cases, and in seven instances the specimens are preserved in the Army Medical Museum. *Specimen* 1285 (FIG. 27) is from the case of Private Joseph D——, Co. E, 129th Pennsylvania, aged 20 (*Circular* No. 2, S. G. O., 1869, p. 90, CASE 161). A conoidal ball had chipped the upper edge of the cotyloid cavity, causing slight exfoliation. The head of the femur and the acetabulum were deprived of periosteum. The injury to the bone was very trivial. The patient survived the injury thirty-one days. *Specimen* 694 (FIG. 28) is from the case of Private C. H.

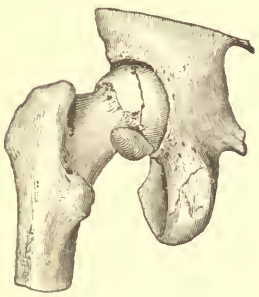

FIG. 27.—Bones of left hip joint with conoidal ball. *Spec.* 1285.

FIG. 28.—Carious bones of left hip joint. *Spec.* 694.

[1] *Circular* No. 2, p. 88: CASE 150, Pt. Wm. P. F——, 121st New York, *Spec.* 3525, A. M. M. CASE 160, p. 89, Pt. J. Brandon, 119th New York, *Spec.* 1843. CASE 161, p. 90, Pt. J. Donegan, 129th Pennsylvania, *Spec.* 1285. CASE 162, p. 90, Pt. T. McGowan, 121st New York. (See *Boston Med. and Surg. Jour.* 1863, Vol. 68, p. 439.) CASE 163, p. 90, Pt. C. H. Roberts, 1st New Jersey, *Spec.* 694. CASE 164, p. 90, Pt. Wm. H W——, G, 4th New York. CASE 257, p. 102, Capt. S. J. Alexander, B, 9th New Hampshire.

[2] *Med. and Surg. History of the War of the Rebellion*, Part II, Vol. II, p. 317: CASE 920, Pt. L. M. B——, I, 1st Massachusetts, *Spec.* 116; CASE 922, p. 318, Serg't T. A——, C, 119th New York, *Spec.* 1183.

[3] CASE of J. Brandon, F, 119th New York, *Circular* 2, p. 89, and CASE of Capt. S. J. Alexander, B, 9th New Hampshire, *Circular* 2, p. 102.

Roberts, Co. C, 1st New Jersey Volunteers, aged 19 (*Circular* No. 2, p. 90, CASE 163). The point of impact of the missile appears to have been at the lowest margin of the acetabulum, where a square inch of the ischium is necrosed and nearly separated.

The acetabulum and head of femur were recorded as having been fractured in thirty-two of the two hundred and forty-nine fatal cases of shot fractures of the hip joint. Autopsies are recorded in twenty instances, and in thirteen cases the specimens are preserved in the Army Medical Museum. *Specimen* 1908 (FIG. 29) is from the case of Private Joseph W——, K, 6th Maryland, aged 45 (*Circular* 2, p. 89, CASE 154). Death occurred in thirteen days. The lower margin of the acetabulum was chipped by the ball, which lodged in the summit of the head of the right femur, splitting it perpendicularly. *Specimen* 1248 (FIG. 30) is from the case of Corporal G. Greenwood, D, 13th Massachusetts (*Circular* 2, p. 113). The patient survived the injury thirteen days. The ball had shattered the head of the left femur and lodged in the pelvis.

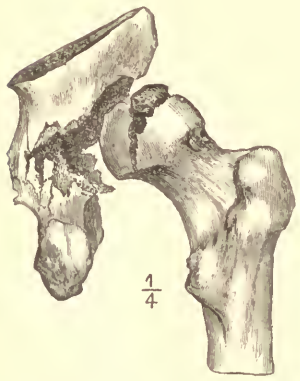

FIG. 29.—Bones of right hip joint. Ball impacted in head of femur. *Spec.* 1908.

FIG. 30.—Shattered head of the left femur. *Spec.* 1248.

Twenty-five of the cases have been published in detail in *Circular* No. 2,[1] and seven will here be recorded:

CASE 155.—Lieutenant C. F. Bailey, Co. D, 6th Vermont, aged 40 years, was wounded at Lee's Mills, April 16, 1862. Surgeon J. B. Brown, U. S. A., described the injury as a "wound of the groin." Surgeon R. B. Bontecou, U. S. V., reported: "He was admitted into the Hygeia Hospital, Fort Monroe, on April 22d, having been wounded by a round ball, which entered the left groin, passing between the femoral artery and anterior crural nerve, then entering the ramus of pubis and acetabulum, furrowing deeply the head of the femur, and passing through the acetabulum into the pelvis and resting by the left side of the rectum, about four inches above its termination. On admission, he was suffering much pain when the limb was moved. Wet applications and soothing treatment, with perfect rest, made him for some days comfortable. Fever of a low form occurred, and a yellow condition of the skin followed, with delirium, and death on May 1, 1862."

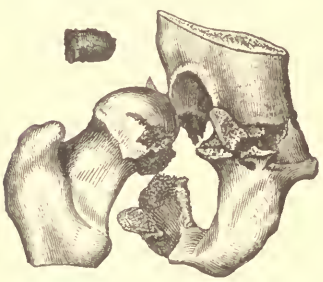

FIG. 31.—Grooved head of left femur, with portion of ilium and ischium. *Spec.* 3205.

CASE 156.—Private H. U. Cady, Co. K, 207th Pennsylvania, was wounded at Petersburg, April 2, 1865, by a conoidal ball. He was carried to the field hospital of the Ninth Corps, and remained there until April 5th, when he was taken on board the hospital steamer State of Maine. He died April 6th, during the trip to Alexandria, and was buried from the Third Division Hospital. Surgeon E. Bentley, U. S. V., who presented the injured upper extremity of the left femur, with portions of the ilium and ischium, to the Museum, furnishes the following description of the specimen, No. 3205, A. M. M., represented in the adjoining wood-cut (FIG. 31): "The bullet entered one inch above the symphisis and to the left of the median line, shattered the ramus of the pubes, left the obturator vessels untouched, passed through the acetabulum, grooving the head of the femur, and lodged in the loose tissue beyond. The ramus of the ischium appears to have been fractured by indirect violence. The bony fragments in the track of the ball are thoroughly necrosed."

CASE 157.—Private W. Hobbs, Co. C, 22d Indiana, was wounded at Mission Ridge, November 25, 1863, and entered the General Field Hospital at Chattanooga, December 4th. Acting Assistant Surgeon C. E. Ball reported: "He was wounded by a minié ball in the right inguinal region just above Poupart's ligament, the missile passing downward, toward and into the thigh apparently. The patient has double pneumonia. The bullet was in the wound, and the surgeons could not find it. The wound granulated well. Patient was in a recumbent position from the first. December 30th, has pneumonic symptoms still; wound granulating finely. Gangrene appeared in the wound January 3d. Bromine was applied and scissors used, also stimulants on poultice. Most of the wound granulated healthily again, but in spite of stimulants and iron, carefully given, the patient died January 23, 1864." Acting Assistant Surgeon G. E. Stubbs contributed the specimen (*Cat. Surg. Sect.*, 1866, p. 240, *Spec.* 2105), with the following account of the *autopsy*: "A sloughing wound, circular in form, and five and a half inches

[1] *Circular* No. 2, 1869: CASE 40, p. 70, Corp'l Wm. Francks, G, 24th Iowa (*Boston Med. and Surg. Jour.*, 1865, Vol. 72, p. 29), *Spec.* 3793. CASE 123, p. 85, Corp'l H. Achley, G, 2d New York H. A. CASE 125, p. 85, Pt. J. H. Brown, A, 19th Mass. CASE 126, p. 85, Pt. *C. H. Calhoun*, H, 7th North Carolina. CASE 127, p. 85, Pt. J. H. Carlon, D, 184th Pennsylvania. CASE 128, p. 85, Pt. G. H. C——, F, 59th Mass., *Spec.* 3582. CASE 131, p. 86, Pt. *H. De Cour*, Depeak's Confederate Battery. CASE 133, p. 86, Pt. J. S. Fabus, I, 169th New York. CASE 134, p. 86, Pt. David F——, G, 111th New York, *Spec.* 1616. CASE 135, p. 86, Sergeant S. Garver, K, 89th Indiana. CASE 136, p. 86, Pt. F. Geyser, F, 1st Minnesota. CASE 138, p. 86, Serg't W. N. Hinds, D, 152d New York. CASE 141, p. 87, Pt. W. D. Little, G, 100th Indiana. CASE 144, p. 87, Pt. Royal S. N——, A, 26th Mass., *Spec.* 3726. CASE 146, p. 88, Pt. C. Robinson, C, 2d District Columbia. CASE 147, p. 88, Pt. C. R——, 49th New York, *Spec.* 1247. CASE 148, p. 88, Pt. Z. S——, K, 2d Ohio Cavalry, *Spec.* 3904. CASE 149, p. 88, Pt. H. H. Sturdivant, A, 179th New York. CASE 152, p. 89, Corp'l J. P. White, H, 115th Illinois. CASE 151, p. 89, Pt. Joseph W——, K, 6th Maryland, *Spec.* 1908. CASE 153, p. 89, Pt. J. Wiley, A, 155th New York. CASE 156, p. 89, Pt. J. B. Wilson, E, 20th Mass. CASE 157, p. 89, Pt. L. Winslow, A, 67th Ohio. CASE 239, p. 100, Pt. D. A. Brewer, E, 37th Kentucky. CASE 275*a*, p. 113, Corporal G. Greenwood, D, 13th Mass., *Spec.* 1248.

in diameter, occupies the right inguinal region. The ball entered two inches from the anterior superior spinous process of the ilium, descended behind the cæcum, one and a half inches from the ramus of the pubis, passing through the bone and laying open the acetabulum, and fractured the tuberosity of the ischium, where it lodged. The head of the femur is denuded. The left lower extremity is much larger than the right and pits under the finger. The femoral glands are enlarged and prominent; the tissues about them infiltrated with serum. The right femoral vein is filled with a thrombus more or less attached to its wall, which may be detached without impairing the integrity of the lining of the vein. This thrombus consists in the main of greyish granular matter with portions of black coagulum, and extends to the junction of the iliac veins. A similar thrombus is found in the left iliac and femoral veins."[1] The specimen consists of the bones of the right hip joint. Much of the head of the femur is eroded, but a small circular portion of sound bone remains on the anterior aspect, surrounded by diseased tissue.

CASE 158.—Sergeant *M. B. Pendley,* Co. E, 6th North Carolina, aged 36 years, was wounded at Gettysburg, July 1, 1863. He remained at a field hospital until August 7th, when he was admitted to Camp Letterman. Acting Assistant Surgeon D. R. Good reported: "Gunshot wound of right hip joint. A minié ball passed through his pocket book, and entered the right iliac region one and a half inches inside of the anterior superior spinous process of the ilium, passed directly in the region of the joint and remained. The patient's general health has been very good, though he has suffered constant and severe pain from the injury and cannot endure the least motion of the limb. There has been comparatively very little inflammation and swelling of the surrounding parts. Simple dressings were applied and generous diet given. August 15th, for some time the limb has been flexed and drawn over and in front of the other leg. Administered chloroform and straightened the limb, and applied splint to keep the leg at rest. 22d, patient is comfortable so long as his limb is not moved, and is doing well. The general treatment is continued. 27th, general health not so good; limb more swollen. Administered tonics and some stimulants. 30th, has slight diarrhœa; opiates prescribed. September 4th, diarrhœa continues; ordered opiates and astringents. 10th, considerably better; treatment continued, with tonics and stimulants. 12th, diarrhœa still troublesome at times; his strength failing considerably. 16th, greatly prostrated; evidence of pyæmia. 17th, gangrene in the parts about the wound. Died September 17, 1863, at 10 o'clock P. M. *Post-mortem:* The ball had passed directly into the joint, slightly fracturing the head of the femur, and was buried in the acetabulum. The cavity was filled up with bone, and a large quantity of pus was found to have accumulated in and about the joint." The os innominatum and the upper portion of the femur were forwarded to the Museum by Acting Assistant Surgeon E. P. Townsend. The specimen shows a fracture extending through the acetabulum at the point of impact, which is necrosed, nearly the entire remainder of the articular surface being carious. A large portion of the head of the femur has been absorbed. Slight osseous deposits exist on the outer margin of the acetabulum.—(*Cat. Surg. Sect.* 1866, p. 242, *Spec.* 1942.)

FIG. 32.—Portion of right innominatum, with fracture of base of the acetabulum. *Spec.* 2488.

CASE 159.—Corporal *G. W. Stepps,* Co. C, 20th North Carolina, aged 20 years, was wounded at Spottsylvania, May 12, 1864, and entered Lincoln Hospital, Washington, on May 22d. Assistant Surgeon J. C. McKee, U. S. A., reported: "Gunshot wound of right groin, a minié ball entering half an inch below and exterior to the middle of Poupart's ligament, fracturing the head of the femur and the acetabulum, and escaping at the middle of the right nates. Death occurred on June 10, 1864." A portion of the os innominatum, represented in the wood-cut (FIG. 32), was contributed by Acting Assistant Surgeon H. M. Dean.—(*Cat. Surg. Sect.*, 1866, p. 236, *Spec.* 2488.)

CASE 160.—Private G. S. Turner, Co. I, 19th Maine, aged 18 years, was wounded at Gettysburg, July 3, 1863. He remained at the field hospital of the 2d division, Second Corps, until July 14th, when he was transferred to the Jarvis Hospital at Baltimore. Assistant Surgeon D. C. Peters, U. S. A., reported: "Gunshot wound of left hip joint. The anterior wound was about the middle, and above Poupart's ligament; the posterior near the tuberosity of the ischium. Blood oozed almost continuously from the wound in front, and twice alarming hæmorrhages occurred. He had a bad and colliquative diarrhœa, and was nearly pulseless when admitted. No reaction came on such as would warrant so formidable an operation as tying the common iliac. Constant pressure by compresses was made. Death occurred on July 19, 1863. The *post-mortem* revealed an immense traumatic aneurism and abscess about the hip joint. The femoral artery was lacerated and a mass of decomposed tissue. The musket ball struck the acetabulum and the head of the femur, gouging them, and subsequent disorganization denuded them of periosteum. The structures around were in an advanced state of decomposition, and it is a wonder the patient lived so long as he did."

CASE 161.—Private *H. West,* Co. A, 3d North Carolina, aged 20 years, was wounded at Antietam, September 17, 1862, and admitted to the hospital at Locust Springs, November 22d, where Surgeon T. H. Squire, 89th New York, recorded: "The patient came to this hospital from Sharpsburg. He was wounded by a musket ball, which entered the right gluteal region midway between the summit of the trochanter and the crest of the ilium and lodged in some unknown part of the body. There is a general fullness, and some hardness and redness in the groin and region of Poupart's ligament, and possibly the ball may be in that neighborhood. The patient's general health is tolerable." On January 19th he was transferred to the Smoketown Hospital, and, on May 11th, to hospital No. 1, at Frederick. Assistant Surgeon R. F. Weir, U. S. A., reported that he died, July 6, 1863, of "gunshot wound of hip, involving the joint." Acting Assistant Surgeon G. M. Paulin contributed the os innominatum and the head of the femur of this case to the Museum. The specimen shows that a round bullet entered obliquely from the right front, fractured the superior portion of the head of the femur, perforated the acetabulum, and lodged in the body of the ilium without derangement to its own form. One half of the head of the femur has been absorbed; the anterior superior third of the acetabulum is carious and partially detached; near the fundus of the acetabulum ulceration has perforated the bone, and the bullet communicates with the head of the femur by a carious channel. The missile is encircled with a wall of new bone thrown out from the irritation of its presence; there is also considerable deposit of callus on the ilio-pubic region, which caused, during life, a prominence in the region of Poupart's ligament. The dorsum ilii and the posterior surface of the body of the ischium show evidence of periosteal inflammation.—(*Cat. Surg. Sect.*, 1866, p. 242, *Spec.* 3865.)

[1] LIDELL (J. A.), in *Memoirs of U. S. Sanitary Commission*, New York, 1870, Surgical Vol. I, p. 551, describes the thrombosis with pyæmia.

In twenty of the two hundred and forty-nine cases with fatal terminations after shot fractures of the hip joint, the acetabulum with the head and neck or trochanters and shaft were injured. *Post-mortem* examinations are recorded in seventeen instances, and the Army Medical Museum possesses eight specimens belonging to cases of this group. Fifteen of the cases have been detailed in *Circular* No. 2;[1] five will here be given in full:

CASE 162.—Private R. Snyder, Co. K, 13th Illinois, was wounded at Ringgold, November 27, 1863, and admitted to the general field hospital at Chattanooga on the following day, where Surgeon J. Perkins, U. S. V., recorded: "Gunshot wound of left hip." Two weeks afterwards the patient was transferred to Nashville, where he was admitted to hospital No. 19. Surgeon W. Foye, U. S. V., described the case as follows: "Admitted December 15th, with gunshot fracture of left femur; the ball, which proved to be a large minié, entered about one and a half inches to the left and below the anterior superior spinous process of the ilium and had not emerged. The wound was quite small, and discharging a small quantity of pus of a somewhat serous character; pulse weak, about 90, and feverish. Simple dressings, supporting diet, and tonics were ordered. The following day the discharge was of a fair character and the patient feeling better. As the ball had been searched for twice without success, it was deemed best not to disturb the parts unless rendered necessary. On December 18th the discharge was very profuse, amounting to nearly a quart of sanious and watery matter of very fetid odor. The wound was laid open and probed; the path of the ball was apparently along the inner side of the femur, yet that was not sufficiently large for so profuse a discharge; but no other path or sac was found, though the neck of the femur was ascertained to be much comminuted. He seemed more feverish during the day, and had some dyspnœa and cough; pulse 100. Treatment continued. On December 19th the patient was evidently failing; pulse 110, and weak; discharge more profuse and of the same character. On the 20th the symptoms were all aggravated. He died on December 21, 1863. The *autopsy* showed that the ball had entered at the point above described and struck the neck of the femur, completely severing it and partially dividing the head, comminuting the lower part of the acetabulum and passing through the ilium, and lay about an inch within the cavity of the pelvis. It was surrounded by coagula, but had done no injury to the intestines. A smaller track was made along the inner side of the femur. No piece of ball was found in this path. Intestines normal; liver and spleen considerably enlarged and friable. The right lobe of the lungs was inflamed but not hepatized. There were no abscesses in any of these organs. The heart and other organs were in good condition." The bones of the injured hip joint were contributed to the Museum by Surgeon Foye. (*Cat. Surg. Sect.*, 1865, p. 242, *Spec.* 2174.) The specimen (FIG. 33) shows the borders of the bony wound to be necrosed.

FIG. 33.—Bones of the left hip joint. Head of femur shattered at junction with the neck. *Spec.* 2174.

CASE 163.—Private A. Kibble, Co. C, 81st New York, aged 26 years, was struck in the right hip by a cannon ball during the engagement near Petersburg, May 19, 1864. He was admitted to the General Hospital at Fort Monroe, where he died May 25, 1864. Assistant Surgeon E. McClellan, U. S. A., reported: "Both the os innominatum and the femur were fractured and much comminuted, all the bones entering into the formation of the joint being literally crushed by a solid shot."

CASE 164.—Private C. Cook, Co. F, 18th Illinois, aged 41 years, is reported by Surgeon J. Simons, U. S. A., as having died of "gunshot wound," at the General Hospital at Cairo, December 4, 1861. In a report of surgical cases transmitted in April, 1873, by Dr. J. H. Brinton, late Surgeon U. S. V., the injury is described as follows: "Cook was shot while drunk, by a guard, on December 1st, at 6 o'clock P. M., at a distance of thirty yards. The missile, a Maynard rifle ball, entered in left side on a line with the crest of the ilium, passed outward and downward, and emerged at the posterior part of the left buttock. I saw him shortly after the injury in a state of collapse from the shock, pulse 132, feeble and thready; skin cold, white and waxy; cold sweat on forehead; constant venous dribbling from both openings. December 2d, no discharge from his bowels since being shot; passes his urine; is in a very prostrate condition; has reacted but very little. Stimulants have been freely given. A few spiculæ were extracted from near the exit orifice. December 3d, patient failing fast; pulse feeble and not to be counted; urine scanty; pulse imperceptible; skin hot and dry; urine voided involuntarily; bowels have not been moved. Died at 9 o'clock A. M., on December 4th. *Post-mortem* two hours after death: Tissues around wound of entrance dissected up all around for an inch. Ball had passed obliquely outward and downward, grazing the anterior lip of acetabulum, passing through head of femur, splintering it and the neck, and destroying the posterior lip of the acetabulum. The extravasation of blood had passed down from wound of entrance, along and superficial to tendon of external oblique muscle as far as the external ring, then up the inguinal canal through the internal ring, and was collected in a clot of three or four drachms around the internal ring. Both rings were enlarged; a hernia came down after injury, which was reduced; no wound of the peritoneum. The tissues were loosened around the wound of entrance in a circumference of one and a half inches." In addition to this case Dr. Brinton makes the following remarks: "This loosening of tissues around the entrance wound of a conoidal ball I have since observed in hundreds of cases. It is undoubtedly peculiar. Usually the point of a finger passed through the wound can be hooked under the skin and swept around without encountering resistance sufficient to impede its motion. The earlier the wound is examined the more perfectly will this phenomenon be observed, as clots, etc., afterwards block up the disintegrated zone."

[1] *Circular* No. 2, 1869: CASE 80, p. 77, Pt. Wm. O. M——, C, 24th Iowa, *Spec.* 3792. CASE 124, p. 85, Pt. F. Baker, I, 3d Vermont. CASE 129, p. 85, Pt. D. Combe, K, 209th Penn. CASE 130, p. 86, Pt. Ch. Cushion, 179th New York. CASE 132, p. 86, Pt. S. N. E——, G, 40th Indiana, *Spec.* 3390. CASE 137, p. 86, Corp'l J. T. Glancy, F, 2d Rhode Island. CASE 139, p. 86, Pt. *D. M. Johnson*, I, 13th Alabama. CASE 140, p. 86, Pt. *George L*——, D, 5th Louisiana, *Spec.* 3946. CASE 142, p. 87, Pt. L. L. Lowe, E, 101st Ohio. CASE 143, p. 87, Pt. Peter M——, A, 28th Mass., *Spec.* 4227. CASE 145, p. 87, Serg't Charles G. P——, G, 13th Penn., *Spec.* 3632. CASE 151, p. 88, Pt. G. F. Tilton, E, 1st Mass. Cav. CASE 153, p. 89, Serg't William Whitney, K, 147th New York. CASE 158, p. 89, Pt. *A. Wormack*, G, 48th North Carolina. CASE 159, p. 89, Corp'l M. F. Yoder, G, 51st Ohio.

CASE 165.—Private *M. C. Lesueur*, Co. C, 3d Georgia, was wounded at Liberty Gap, June 25, 1863, and admitted to hospital at Murfreesboro' two days afterwards. Assistant Surgeon W. P. McCullogh, 78th Pennsylvania, recorded: "Gunshot wound of right thigh, ball entering trochanter and passing inward and backward. The missile was traced through the trochanter but could not be found." The treatment is noted as having consisted of water dressings, morphia, stimulants, and tonics, and, in the latter stage, astringents were given to control the diarrhœa. On July 8th, the wound was suppurating freely and the leg was bandaged. On August 1st, an incision was made and some spiculæ of bone removed, a discharge of pus to the amount of eight ounces taking place. On August 9th the patient was slowly sinking, and, on the 16th, he was failing rapidly. He died August 19, 1863. An *autopsy* was held eight hours after death, and is recorded as follows: "The ball entered the trochanter major, passing through it and entering the capsule of the joint, carrying away a portion of the head of the femur and ligamentum teres, and posterior portion of acetabulum, and was found lodging in the lower attachment of the latissimus dorsi. A large abscess was found in the locality of the iliacus internus and psoas muscle, the cartilage and bone of the joint much absorbed, and the cancellated structure infiltrated with sanious pus."

FIG. 34.—Bones of the left hip joint. *Spec.* 1659.

CASE 166.—Private M. J. H. Perkins, Co. K, 6th Maine, aged 21 years, was wounded at Chancellorsville, May 3, 1863. He was admitted to Judiciary Square Hospital, Washington, May 7th, and transferred to McDougall Hospital, Fort Schuyler, New York Harbor, one month afterwards. Assistant Surgeon R. Bartholow, U. S. A., contributed the specimen (*Cat. Surg. Sect.*, 1866, p. 235, *Spec.* 1659), represented in the adjacent wood-cut (FIG. 34), with the following description: "A minié ball entered the left hip, striking the neck of the femur within the capsule, passing through the obturator foramen and between the rectum and urethra without injuring either, and escaped behind the ramus of the right ischium. Inflammation of the prostate gland, and priapism set in. The patient died June 13, 1863." The specimen consists of the bones of the hip joint, the articular surfaces being entirely eroded.

Of the two hundred and forty-nine fatal cases of shot fractures of the hip joint, twenty-three were limited to the head of the femur alone. In ten instances autopsies were performed, and six specimens are preserved in the Army Medical Museum. Two are represented in the adjoining wood-cuts. *Specimen* 1968 (FIG. 35) was obtained from Corporal *J. E. G*——, Co. I, 2d South Carolina, aged 22 years, wounded at Gettysburg, July 2, 1863. The head of the femur was slightly fractured; the acetabulum became carious, and the patient died from exhaustion on Oct. 12, 1863, one hundred and two days after the injury (*Circular* 2, page 71, CASE 42). *Specimen* 2198 (FIG. 36) shows the bone of the left hip joint. The head of the femur is carious and the articular surface has been roughened by ulceration. The history of the case from which the specimen was obtained is given in detail in *Circular* No. 2, page 82, CASE 104. Besides the specimen cases here referred to, fifteen have been detailed in *Circular* No. 2.[2] The histories of the remaining six cases will here be recorded:

FIG. 35.—Bones of the right hip joint. Head of femur nearly absorbed. *Spec.* 1968.

FIG. 36.—Bones of the left hip joint with carious head of femur. *Spec.* 2198.

CASE 167.—Private I. Conduri, Co. D, 1st Michigan Cavalry, aged 22 years, was shot in the right thigh while on scout near Culpeper, April 24, 1864. He was admitted to the Third Division Hospital, Alexandria, whence Surgeon E. Bentley,

[1] MOSES (J.), *Surgical Notes*, etc., in *Am. Jour. Med. Sci.*, 1864, Vol. XLVII, p. 337.

[2] *Circular* No. 2, 1869: CASE 9, p. 66, Pt. C. Benjamin, 118th Pennsylvania. CASE 14, p. 67, Pt. F. Bowman, F, 1st U. S. Sharpshooters. CASE 25, p. 69, Pt. J. A. Deyo, B, 20th Indiana. CASE 53, p. 73, Pt. J. Harrigan, K, 36th Mass. CASE 57, p. 73, Pt. Robt. N. H——, D, 1st New Jersey Cav., *Spec.* 3636. CASE 70, p. 76, Pt. J. Lawler, B, 12th New York Cav. CASE 74, p. 76, Pt. Chas. H. M——, G, 2d Maryland, *Spec.* 3923. CASE 85, p. 78, Pt. John M——, I, 61st New York, *Spec.* 1602. CASE 101, p. 82, Pt. H. Sault, I, 5th New York. CASE 108, p. 83, Pt. J. Spangler, A, 38th Ohio. CASE 111, p. 83, Sergeant H. Stulter, D, 53d Pennsylvania. CASE 113, p. 83, Pt. Peter L. Swank, I, 38th Ohio. CASE 115, p. 83, Serg't V. Tidball, H, 122d Ohio. CASE 246, p. 100, Pt. *F. Kreegor*, B, 18th Georgia. CASE 251, p. 101, Pt. S. Sellers, I, 168th Ohio.

U. S. V., reported: "The treatment consisted of water dressings, tonics, stimulants, and extra diet. The patient died June 11, 1864. The *post-mortem* showed that the ball entered the thigh at its middle third, on its anterior aspect, passed upward and entirely through the articulation of the hip joint, and lodged in the body of the sacrum."

CASE 168.—Sergeant *M. D. Ensor*, Co. C, 20th North Carolina, aged 26 years, was wounded and captured at Winchester, September 19, 1864. On the following day he was admitted to the Prisoner's Hospital, where Assistant Surgeon H. B. Noble, 2d Ohio Cavalry, recorded: "Gunshot compound comminuted fracture of upper third of right femur; Desault's long splints applied and simple dressings." Surgeon A. Chapel, U. S. V., reported the man's admission to West's Buildings Hospital, Baltimore, January 19, 1865, from Winchester, with "gunshot wound, the ball entering near the trochanter of the thigh bone, producing fracture." On May 9th the prisoner was transferred to Fort McHenry. Surgeon W. Hays, U. S. V., in charge of the Post Hospital at the latter place, reported that the man "died from exhaustion, resulting from excessive suppuration caused by gunshot fracture of head of femur, June 3, 1865."

CASE 169.—Private *A. Fann*, Co. C, 18th Tennessee, was wounded at Stone's River, December 31, 1862, and admitted to hospital No. 4, Nashville, January 27th. Acting Assistant Surgeon F. L. Tower reported: "Gunshot fracture of head of left femur and wound of abdomen. Death on January 31, 1863."

CASE 170.—Private S. Irwin, Co. C, 10th Massachusetts, aged 25 years, was wounded at the Po River, May 12, 1864. Surgeon S. F. Chapin, 139th Pennsylvania, noted his admission to the field hospital of the 2d division, Sixth Corps, with "gunshot wound of left thigh." On May 24th the wounded man was admitted to Prince Street Hospital, Alexandria, whence Acting Assistant Surgeon J. Cass contributed the specimen (*Cat. Surg. Sect.*, 1866, p. 234, *Spec.* 2374) and the following report: "The patient suffered considerable pain, had chills, was very uneasy and anxious, had no appetite, hiccough, and great prostration, and died May 28, 1864. At the *autopsy* the left groin was found considerably discolored, and, on examination, it was discovered that the wound commenced just below the middle of Poupart's ligament, extending downward and inward, and terminating at the ischium, which was fractured. The ball was found near that bone, between it and the head of the femur, which was also fractured. The ligaments of the hip joint, the soft parts in the groin, and the upper part of the thigh were gangrenous." The specimen (FIG. 37) consists of a portion of the left ischium and the upper extremity of the femur. There is a partial fracture of the head of the femur at its articular border and of the ischium by a battered round ball, which is attached.

FIG. 37.—Portion of left ischium and upper part of femur. *Spec.* 2374.

CASE 171.—Lieutenant J. Snyder, Co. K, 83d Ohio, aged 33 years, was wounded at Fort Blakely, April 9, 1865, and admitted to the St. Louis Hospital, New Orleans, five days afterwards. Surgeon A. McMahon, U. S. V., reported: "Gunshot wound of right thigh and nates, fracturing the ischium and the femur at its neck. Death resulted from peritonitis following inflammation of the pelvic fascia."

CASE 172.—Private A. Underhill, Co. C, 10th New York, was wounded at the Wilderness, May 6, 1864, and admitted to the field hospital of the 2d division, Second Corps. Surgeon J. F. Dyer, 19th Massachusetts, reported: "Gunshot fracture of head of femur." The wounded man was conveyed to Fredericksburg, where he died May 15, 1864.

In seventeen of the fatal cases after shot fracture of the hip joint treated by conservation the head and neck, or head, neck, and trochanters of the femur were injured. Full details of fifteen of the cases, with illustrations of eight specimens, have been given in *Circular* 2.[1] Meager details of two cases will here be added:

CASE 173.—Private H. Peters, Co. D, 18th U. S. Infantry, was wounded at Chickamauga, September 19, 1863. He was admitted to hospital at Chattanooga ten days after the injury. Surgeon J. S. Woods, 99th Ohio, reported: "Fracture of head and neck of right femur. Patient in bad condition; several pieces of bone were removed." The man died October 11, 1863. On the list of casualties at the battle of Chickamauga, furnished by Surgeon G. Perin, U. S. A., Medical Director of the Army of the Cumberland, the injury in this case is reported as a "wound of privates and right side."

CASE 174.—Private F. Benda, Co. F, 26th Wisconsin, aged 19 years, was wounded at Gettysburg, July 1, 1863, and admitted to the field hospital of the 2d division, Eleventh Corps, where Surgeon W. H. Thorn, U. S. V., recorded: "Gunshot wound of left hip; ball extracted." On August 6th the patient entered Camp Letterman Hospital, where Surgeon H. Janes, U. S. V., recorded: "The patient suffers from a compound comminuted fracture of femur. The ball entered from the outside of the hip, crushing the bone from the trochanter major upward, then passing obliquely upward entered the pelvis near the sacrum. No history of this case could be procured previous to his admission to this hospital. August 12th, the patient suffers from diarrhœa and hectic fever and is sinking rapidly. He died from exhaustion, August 20, 1863. Treatment: Exhibition of tonics, stimulants, and anodynes."

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[1] *Circular* 2, 1869: CASE 6, p. 66, Pt. J. Barnes, B, 52d Indiana. CASE 8, p. 56, Pt. Anthony B——, C, 12th Illinois, *Spec.* 466. CASE 10, p. 66, Pt. Charles R. B——, E, 16th Maine, *Spec.* 598. CASE 17, p. 67, Pt. W. C——, 159th New York, *Spec.* 1291. CASE 21, p. 68, Pt. D. Curran, A, 5th Kentucky. CASE 45, p. 72, Major John J. G——, G, 47th Pennsylvania, *Spec.* 3789. CASE 52, p. 73, Corporal Benjamin H——, C, 9th West Virginia, *Spec.* 4267. CASE 76, p. 77, Corporal Donald McD——, E, 12th New York Cav., *Spec.* 2170. CASE 89, p. 79, Serg't S. W. N——, E, 15th New Jersey, *Spec.* 1253. CASE 91, p. 80, Captain Samuel Oakley, 77th New York. CASE 102, p. 82, Pt. *C. Saunders*, C, 6th Louisiana Cavalry. CASE 106, p. 82, Pt. *G. H. S*——, H, 2d North Carolina, *Spec.* 1967. CASE 118, p. 84, Pt. R. A. Walker, E, 2d New Hampshire. CASE 275, p. 113, Pt. A. Swanson, H, 3d Michigan. In the case reported by Dr. J. DICKSON BRUNS (*Circ.* 2, S. G. O., 1869, p. 57), a first attempt to remedy the injury by an operation was suspended, as the hæmorrhage was very great. Some ten days or two weeks after, an excision of the head of the femur was attempted, as an examination had shown that the neck was extensively split. After the primary incisions had been made, and several fragments of the neck had been removed, the operation was discontinued, as it became apparent that death was inevitable.

Seventy instances are recorded, among the two hundred and forty-nine fatal cases of shot fractures of the hip joint treated by conservation, in which the neck of the femur was stated to have been fractured. Fifty-six of the cases have been recorded in *Circular* 2;[1] fourteen will be recorded here. Autopsies were made in twenty-one of the cases, and eleven specimens are preserved in the Army Medical Museum. A specimen belonging to this group, represented in the adjoining wood-cut (FIG. 38), was received without history. It consists of the upper fourth of the femur, with a fragment of a round ball embedded in the neck within the capsule. There is no evidence of chronic articular disease. The specimen is a fair illustration of injury to bone by round balls at low velocities. A similar specimen is represented in FIG. 39, showing a round ball embedded in the neck of the femur near the trochanter major, fracturing the neck within the capsule. The history of this case has been detailed in *Circular* No. 2, p. 81, CASE 98.

FIG. 38.—Shot fracture of neck of left femur. *Spec.* 3951.

FIG. 39.—Shot fracture of neck of right femur. *Spec.* 1661.

CASE 175.—Private *J. Boaz*, Co. A, 1st Confederate States Cavalry, was wounded at Stone's River, December 31, 1862. He was admitted into No. 19 Hospital, Nashville, January 20, 1863. Surgeon J. Shrady, 2d East Tennessee, noted: "Gunshot compound fracture of the neck of the right femur." He died February 4, 1863.

CASE 176.—Private J. W. Connor, Co. D, 81st Pennsylvania, was wounded at Fredericksburg, December 13, 1862. Surgeon J. E. McDonald, 79th New York, recorded his entrance into the field hospital of the 1st division, Ninth Corps, with "Gunshot wound of left thigh." Surgeon J. A. Lidell, U. S. V., contributed the specimen represented in the adjoining wood-cut (FIG. 40) (*Cat. Surg. Sect.*, 1866, p. 243, *Spec.* 622), and reported the following history: "Admitted to Stanton Hospital, Washington, December 26th, with gunshot fracture of left thigh in upper third; ball not extracted. The injured limb was a good deal swelled; pus flowing from the wound. Exploration did not discover the ball; thigh found fractured high up; amount of displacement small. The case did pretty well till December 31st, when symptoms of pyæmia showed themselves. He grew rapidly worse, and died January 2, 1863. The necropsy showed inflammation of the femoral vein, pus in the femoral and iliac veins, a comminuted fracture in the neighborhood of the trochanters, and the ball firmly impacted in the ischium." The specimen consists of the bones of the hip joint with a portion of the ligaments, the head of the femur being dislocated. The track of the ball is necrosed, but a small quantity of callus has been thrown out on the anterior surface of the femur.

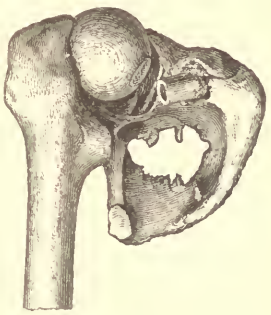

FIG. 40.—Bones of the left hip joint with dislocation of head of femur. *Spec.* 622.

CASE 177.—Private A. E. Davis, Co. E, 1st Maine Cavalry, aged 22 years, was wounded during the Richmond raid, March 2, 1864, and admitted to the General Hospital at Fort Monroe five days afterwards. Assistant Surgeon E. McClellan, U. S. A., reported: "Gunshot wound of right hip. The patient was admitted in good condition; wound healthy. Pyæmia was developed on March 12th, and death occurred within twenty-four hours. The *autopsy* discovered that the ball had pierced the neck of the femur. There were symptoms of inflammation of the femoral vein; six ounces of dark bloody fluid in left

[1] *Circular* 2, S. G. O., 1869: CASE 1, p. 65, Pt. A. Baker, 5th Maine Battery. CASE 3, p. 65, Pt. J. Balines, C, 26th Wisconsin. CASE 4, p. 66, Pt. W. Bancho, H, 3d New Hampshire. CASE 5, Corp'l M. Barden, K, 10th Mass. CASE 12, p. 67, Serg't G. Bond, A, 137th Illinois. CASE 18, p. 68, Pt. *P. C*——, G, 24th Alabama (see also *Confed. States Med. Jour.*, Vol. I, p. 76). CASE 19, p. 68, Pt. J. Connelly, C, 1st Louisiana (Colored) Cavalry. CASE 23, p. 68, Pt. H. Dambach, I, 17th Ohio. CASE 26, p. 69, Pt. J. Dice, 43d Missouri. CASE 27, p. 69, Pt. C. G. Dodson, C, 13th West Virginia. CASE 29, p. 69, Pt. E. H. Dunkleberg, F, 11th Infantry. CASE 30, p. 69, Pt. N. H. Eisenhower, F, 103d Ohio. CASE 33, p. 70, Pt. D. Elmer, M, 14th New York H. A. CASE 35, p. 70, Pt. A. E. Fields, B, 6th Maine, *Spec.* 2932. CASE 36, p. 70, Pt. S. Fleig, E, 45th New York. CASE 38, p. 70, Pt. *J. Foreman*, E, 5th Alabama. CASE 41, p. 71, Pt. S. F——, E, 111th New York, *Spec.* 1462. CASE 44, p. 71, Pt. J. G——, B, New Hampshire H. A., *Spec.* 3510. CASE 47, p. 72, Pt. B. F. Green, E, 125th New York. CASE 48, p. 72, Pt. T. Green, L, 12th Tennessee Cav. CASE 50, p. 72, Pt. D. Haley, B, 57th Mass. CASE 54, p. 73, Pt. L. P. Harvey, B, 11th New Hampshire. CASE 58, p. 74, Pt. *W. Huger*, D, 7th Virginia. CASE 62, p. 74, Pt. P. C. Johnson, H, 15th Ohio. CASE 65, p. 74, Pt. D. A. Kimble, G, 3d Minnesota. CASE 72, p. 76, Corp'l J. G. Mallory, C, 31st Indiana. CASE 75, p. 76, Pt. J. Matthews, A, 11th Louisiana (Colored). CASE 77, p. 77, E. McGee, Secret Service. CASE 78, p. 77, Lieut. T. H. McKinley, B, 29th U. S. C. T. CASE 81, p. 77, Pt. J. W. Moore, H, 6th Penn. Cav. CASE 82, p. 78, Pt. J. M——, F, 63d New York, *Spec.* 782. CASE 83, p. 78, Pt. J. R. Morrill, D, 184th Penn. CASE 84, p. 78, Pt. *P. M*——, B, 1st Virginia, *Spec.* 33. CASE 86, p. 79, Pt. J. B. Mullen, G, 13th Indiana. CASE 95, p. 81, Pt. *J. L. Riley*, I, 21st Mississippi. CASE 98, p. 81, Pt. L. R——, F, 48th New York, *Spec.* 1661. CASE 100, p. 81, Serg't F. Sailyards, A, 70th Ohio. CASE 107, p. 82, Corp'l H. F. Smith, B, 1st Wisconsin. CASE 109, p. 83, Corp'l *J. A. Staunton*, H, 1st Florida. CASE 110, p. 83, Pt. J. Stewart, B, 26th Ohio. CASE 112, p. 83, Pt. J. S——, B, 43d Ohio, *Spec.* 465. CASE 117, p. 84, Pt. J. Wagoner, F, 81st Illinois. CASE 119, p. 84, Pt. I. W. Winans, C, 3d Wisconsin. CASE 120, p. 84, Corp'l *G. W. Wright*, Blount's Virginia Battery. CASE 121, p. 84, Pt. *W. P. Yeargin*, E, 22d Georgia. CASE 212, p. 96, Pt. S. Randall, G, 118th New York. CASE 236, p. 99, Serg't S. R. Arrison, A, 118th Illinois. CASE 240, p. 100, Pt. *J. T. Cone*, 7th Virginia (see *Am. Med. Times*, 1864, Vol. VIII, p. 13). CASE 241, p. 100, Pt. W. A. Dibble, C, 106th Penn. CASE 249, Pt. *B. Page*, I, 51st North Carolina. CASE 255, p. 102, Corp'l *G. W. W*——, Virginia Battery. CASE 259, p. 102, Pt. *H. T. Elam*, A, 11th Virginia, *Spec.* 9. CASE 268, p. 104, Pt. E. Longyear, D, 72d Penn. CASE 269, p. 104, Pt. L. N. P. Rodenbough, D, 55th Illinois. CASE 271, p. 105, Pt. L. Schmidt, H, 8th Kansas. CASE 276, p. 114, Serg't C. Scott, A, 1st New Jersey Cavalry, *Spec.* 3520.

thorax, with an oily fluid floating on it; two ounces of light colored bloody fluid in pericardium; an oily substance collected on the blood from all parts of the body. Liver engorged and soft. No formation of pus discovered."

CASE 178.—Private G. W. Fierstine, Co. K, 93d Pennsylvania, was wounded at Fair Oaks, June 1, 1862, and admitted to the Fifth and Buttonwood Streets Hospital, Philadelphia, six days afterwards. Acting Assistant Surgeon A. C. Bournonville reported: "Fracture of neck of femur, tuberosity of ischium shot off and pelvic bones shattered; no wound of bladder or rectum. Prognosis fatal. Patient was most comfortable by having the limb elevated and supported by pillows. He died June 12, 1862."

CASE 179.—Private J. M. Hayse, Co. K, 14th Kansas Cavalry, was accidentally wounded May 19, 1864, and admitted to hospital at Fort Smith. Surgeon C. E. Swasey, U. S. V., reported: "Gunshot wound of left thigh into abdomen, with fracture of neck of femur. Death resulted, from perforation of the bowels, on May 20, 1864."

CASE 180.—Private F. M. Hayes, Co. A, 211th Pennsylvania, aged 21 years, was wounded at Fort Steadman, March 25, 1865. He was admitted to the field hospital of the 3d division, Ninth Corps, where Surgeon M. F. Bowes, 211th Pennsylvania, recorded: "Wound of right hip by conoidal ball." Two days afterwards the man was moved to the Depot Hospital at City Point, and ten days later he was conveyed on a hospital steamer to Alexandria, where he entered the Third Division Hospital. Surgeon E. Bentley, U. S. V., reported: "Gunshot fracture of right hip. Light cold-water dressings and a bandage were applied over the thigh to facilitate the discharge of pus from the wound. The limb was retained in position by means of an inclined plane, with slight extension and counter-extension. Alcoholic stimulants and nourishing diet were freely administered. He died April 14, 1865. *Autopsy* thirteen hours after death: Tissues of thigh very much disorganized by the extent of suppuration, involving the entire limb. The femur was fractured at the neck. The ball had passed under the pubis and was found in the pelvis, external to the peritoneum."

CASE 181.—Private C. Hambrecht, Co. E, 4th New Jersey, was wounded at South Mountain, September 14, 1862, and admitted to the field hospital at Burkettsville. Assistant Surgeon H. A. DuBois, U. S. A., reported: "Gunshot wound through os pubis and neck of femur. Secondary hæmorrhage occurred on October 18th. A ligature was applied to the external iliac and the femoral arteries. But little blood was lost, the surgeon being in the ward at the time the hæmorrhage commenced. The operation was difficult, it being necessary in order to stop the hæmorrhage to compress the artery on each side and close to the wound, which was directly below Poupart's ligament. The patient rallied after the operation and was able to read a letter, but died six hours after."

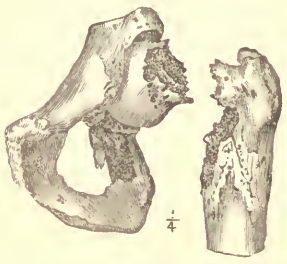

FIG. 41.—Bones of left hip joint. Neck of femur shattered. *Spec.* 2398.

CASE 182.—Private W. J. Little, Co. I, 57th Pennsylvania, aged 22 years, was wounded at the Wilderness, May 5, 1864, and admitted to the field hospital of the 3d division, Second Corps. Surgeon O. Evarts, 20th Indiana, noted: "Gunshot wound of left hip." Surgeon D. W. Bliss, U. S. V., forwarded the specimen (*Cat. Surg. Sect.*, 1866, p. 241, *Spec.* 2398) and reported: "The patient entered Armory Square Hospital, Washington, May 28th. He was wounded by a conoidal ball, which entered the right gluteal region on a line with the coccyx, two inches above the anus, passing under the fascia in a direct line and through the ramus of the ischium, comminuting the left femur at its neck, and making its exit over the great trochanter. Powerful stimulants were given but with no effect. The patient died from the effects of the injury, May 30, 1864." The specimen shown in the wood-cut (FIG. 41) consists of the bones of the left hip joint, and shows the head of the femur, with the exception of a slight fissure on its articular surface, to be uninjured.

CASE 183.—Private J. McAlpine, Co. C, 7th Illinois, was wounded at Allatoona, October, 5, 1864. Surgeon J. R. Zearing, 57th Illinois, reported his admission to the field hospital of the 4th division, Fifteenth Corps, with "gunshot fracture of neck of femur," and his death on October 8, 1864.

CASE 184.—Musician F. McNeil, Co. B, 17th Illinois, was wounded at Shiloh, April 6, 1862, and admitted to hospital at Quincy twelve days afterwards. Surgeon R. Niccolls, U. S. V., reported: "Compound comminuted fracture of right femur at the neck and transverse fracture of left femur at the middle third. Dr. Buck's weight and pulley were employed. Death took place on April 27, 1862. At the *post-mortem* a minié ball, split longitudinally, was removed from the neck of the femur."

CASE 185.—Private U. T. Palmer, Co. I, 1st Maine, aged 33 years, was wounded at Cedar Creek, October 19, 1864, and admitted to the field hospital of the 2d division, Sixth Corps. Surgeon S. F. Chapin, 139th Pennsylvania, noted: "Gunshot fracture of left thigh." On October 27th the wounded man was admitted to Camden Street Hospital, Baltimore, whence Surgeon Z. E. Bliss, U. S. V., reported as follows: "Gunshot wound of left gluteal region, with fracture of neck of femur. Smith's anterior splints were applied, and quinine and carbonate of ammonia, etc., were resorted to, but unsuccessfully. The patient died of pyæmia, November 3, 1864. At the *post-mortem* pus was found in the synovial cavities near the hip joint."

CASE 186.—Sergeant W. Peabody, Co. C, 10th Vermont, aged 22 years, was wounded at Monocacy, July 9, 1864, and admitted to hospital at Frederick the following day. Assistant Surgeon R. F. Weir, U. S. A., reported: "Gunshot fracture of neck of left femur and flesh wound of thigh and scrotum. Ball removed July 11th. Tonics, opiates, and stimulants administered; Buck's extension apparatus applied. Death, from exhaustion, July 23, 1864."

CASE 187.—Private *J. H. Smith*, Co. H, 12th South Carolina, appears on a report from the Confederate Hospital at Charlottesville as having died June 1, 1864, of "gunshot wound of left thigh; missile found in neck of femur."

CASE 188.—Captain *R. Ward*, Co. B, 33d Alabama, was wounded at Perryville, October 8, 1862. On a report of "Sick and Wounded Confederates left behind after the battle," signed by Surgeon C. Longenbecker, 13th Louisiana Regiment, C. S. A., his injury is described as a "gunshot fracture of left thigh through neck of femur into the joint and os ischii, ball in pelvis," and his death is stated to have occurred on October 27, 1862.

Of the two hundred and forty-nine fatal shot wounds of the hip joint treated by conservation fifty were instances of shot injuries of the neck and trochanters, or neck, trochanters and shaft of femur. Autopsies were performed in thirty-two instances, and twenty-five specimens are deposited in the Army Medical Museum. All of the cases have been reported in *Circular* No. 2,[1] and only a few of those in which interesting specimens are preserved will be here briefly noticed.

CASE 189.—Private C. H. Elliott, Co. D, 61st Pennsylvania, was wounded at the battle of Fair Oaks, May 31, 1862, by several musket balls. One entered near the right acromion process and emerged at the insertion of the deltoid muscle; another at the gluteal fold; a third passed through the upper part of the thigh; a finger was also shot away. He was conveyed to Portsmouth, and on June 5th was admitted into the Balfour General Hospital. A fracture of the head of the humerus was recognized, and, on June 14th, Assistant Surgeon Sheldon, U. S. A., excised the head and about three inches of the shaft (see *Second Surgical Volume*, p. 586, CASE 23). Abscesses formed in the left thigh. Pyæmia supervened, and the patient died on June 17, 1862. At the autopsy the upper third of the femur was found to be shattered. There was a collection of pus near the wound in the hip. Assistant Surgeon H. L. Sheldon, U. S. A., reports the case. The specimen, 4930, represented in FIG. 42, was contributed by Assistant Surgeon W. Thomson, U. S. A.—(*Circular* No. 2, p. 69, CASE 31.)

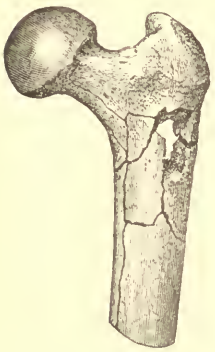

FIG. 42.–Comminuted fracture of upper third of left femur, with fissure extending into the neck. *Spec.* 4930.

FIG. 43.—Upper portion of left femur, with fragments of bone removed after shot fracture of the neck. *Specs.* 3143 and 67.

CASE 190.—Private Philo Wilbur, Co. I, 185th New York, aged 19 years, was wounded in action at the Southside Railroad, Virginia, March 25, 1865. A conoidal ball entered over the left trochanter major, produced a comminuted fracture of the process, and emerged at the lower and inner border of the left buttock. He was taken to City Point and Washington and admitted, on April 2d, into the Mount Pleasant Hospital. On April 7th there was febrile action and anorexia. On April 9th, Assistant Surgeon H. Allen, U. S. A., removed several detached fragments of bone. Irritative fever and anorexia continued. On April 14th he had a rigor; pyæmia appeared, with vomiting and diarrhœa. On April 18th secondary hæmorrhage of from six to eight ounces occurred from branches of the external circumflex, and was arrested by compression of the femoral. He died April 20, 1865. The history, with the specimens 3143 and 67 (FIG. 43), were contributed by Assistant Surgeon H. Allen, U. S. A.—(*Circular* No. 2, p. 106, CASE 274.)

CASE 191.—"Alfred G. R——, Adjutant 134th Pennsylvania, aged 24 years, was wounded in the upper part of the left femur by a round ball, which partially fractured the trochanter major, at the battle of Fredericksburg, December 13, 1862. The wound received no attention for some days, and was then dressed with side splints firmly bound by a roller, a plug of lint being tightly inserted in the wound. On the 20th of December he was admitted to E Street Infirmary, Washington. He stated that for some days he had experienced occasional twitchings in the limb, and had taken large doses of opium. The wound was a little behind the trochanter major. Upon removing the plug of lint about half a pint of blood and pus was discharged. There was no crepitus upon rotation, nor shortening. Owing to his weakened condition, no extended search was made for the missile. Simple dressings were applied, and half grain doses of sulphate of morphia were given. For the two succeeding days he seemed to improve. The twitchings of the limb occurred every few minutes, with occasional intermissions of a few hours. On the 23d the spasms became more violent and frequent, and it was deemed advisable to extract the missile. He was etherized, and the wound was enlarged two inches downward and backward. A gum catheter was made to follow the course of the missile behind and beneath the neck of the femur to the body of the pubis, where the ball was found in the scrotum near the spermatic cord. A flattened round musket ball was extracted through an incision at the base of the scrotum. A portion of it had

[1] *Circular* No. 2, 1869: CASE 15, p. 67, Pt. *T. B*——, 14th North Carolina, *Spec.* 548. CASE 20, p. 68, Pt. J. C——, I, 10th New Jersey, *Spec.* 3806. CASE 22, p. 68, Pt. J. C——, C, 5th New York Cav., *Spec.* 3189. CASE 24, p. 68, Pt. M. D——, H, 14th New York H. A., *Spec.* 3261. CASE 28, p. 69, Pt. A. D——, B, 43d New York, *Spec.* 3797. CASE 31, p. 69, Pt. C. H. E——, D, 61st Penn., *Spec.* 4930. CASE 34, p. 70, Pt. J. F——, H, 1st Mass. Cav., *Spec.* 2704. CASE 46, p. 72, Pt. *F. G*——, 1st Louisiana, *Spec.* 1300. CASE 49, p. 72, Pt. G. H——, D, 26th Michigan, *Spec.* 2839. CASE 51, p. 72, Serg't W. D. H——, A, 6th Iowa, *Spec.* 3488. CASE 55, p. 73, Pt. *W. Herold*, B, 6th Alabama. CASE 56, p. 73, Musician J. B. H——, A, 41st Ohio, *Spec.* 2178. CASE 61, p. 74, Pt. H. J——, F, 14th N. York, *Spec.* 2309. CASE 64, p. 74, Pt. M. K——, D, 65th N. York, *Spec.* 3419. CASE 66, p. 74, Pt. A. J. K——, E, 8th Florida, *Spec.* 1932. CASE 67, p. 75, Pt. L. P. L——, K, 91st Penn., *Spec.* 1343. Case 68, p. 75, Pt. J. Laner, F, 39th N. Jersey. CASE 69, p. 75, Capt. J. M. L——, I, 20th Indiana, *Spec.* 565. CASE 71, p. 76, J. McCarthy, E, 76th New York. CASE 73, p. 76, Capt. H. D. M——, K, 79th Illinois, *Spec.* 1747 (*Am. Jour. Med. Sci.*, 1864, Vol. XLVII, p. 337). CASE 88, p. 79, Pt. T. M——, C, 14th Maine, *Spec.* 1728. CASE 90, p. 79, Serg't W. Norton, I, 5th Wisconsin (*U. S. Sanitary Commission Memoirs*, Vol. I, p. 526). CASE 92, p. 80, Pt. W. O——, K, 2d U. S. Cav., *Spec.* 2528. CASE 94, p. 80, Adj't A. G. R——, 134th Penn., *Spec.* 545. CASE 96, p. 81, Pt. J. R——, C, 69th New York, *Spec.* 86. CASE 99, p. 81, Pt. T. R——, K, 210th Penn., *Spec.* 4168. CASE 103, p. 82, Capt. E. F. S——, K, 1st New York Cav., *Spec.* 4213. CASE 114, p. 83, Corp'l J. M. Thompson, B, 29th Mass. CASE 122, p. 84, Serg't D. Y——, H, 106th New York, *Spec.* 3931. CASE 199, p. 94, Serg't J. B. Bridwell, B, 87th Illinois Mounted Infantry. CASE 200, p. 94, Pt. W. Campbell, A, 23d Missouri. CASE 203, p. 95, Serg't W. G. Davis, H, 19th Ohio. CASE 205, p. 95, Pt. C. Falk, E, 26th New York. CASE 206, p. 95, Pt. *W. T. Fostner*, F, 28th Virginia. CASE 207, p. 95, Pt. H. B. Gardner, F, 38th Illinois. CASE 208, Pt. M. Haehl, A, 32d Indiana. CASE 209, p. 95, Capt. J. D. Irwin, C, 124th Ohio. CASE 213, p. 96, Pt. J. Scheets, I, 111th Ohio. CASE 214, p. 96, Pt. D. Schamill, H, 50th Penn. CASE 215, p. 96, Corp'l G. Williams, D, 11th Missouri. CASE 242, p. 100, Corp'l M. J. Fitzharris, E, 42d N. York. CASE 258, Pt. F. Beck, F, 115th Penn. CASE 263, p. 103, Pt. T. Hayward, F, 5th Penn., *Spec.* 592. CASE 265, p. 104, Corp'l W. Hermka, D, 1st Maryland Cav. CASE 266, p. 104, Pt. *J. Leehart*, C, 16th Mississippi. CASE 270, p. 104, Capt. H. A. Sand, 103d New York. CASE 273, p. 105, *J. T. Tindell*, K, 18th Mississippi Cav. (*Confed. States Med. and Surg. Jour.*, January, 1865). CASE 274, p. 106, Pt. P. Wilbur, I, 185th New York, *Spec.* 3143. *Second Surgical Volume*: CASE 859, p. 295, Serg't W. Spendlove, E, 1st New York Cav., and CASE 935, p. 324, Serg't C. Moulton, D, 2d Maryland.

been chipped off. The patient rested well that night, but on the following day the spasms were increased in intensity, commencing in the injured limb and extending over the body. Cloths saturated with chloroform and olive oil were applied to the limb, and an antispasmodic and anodyne mixture was prescribed. He rested quietly until the following morning, when clonic spasms returned and persistently increased. The patient's countenance became pinched, wan, and haggard, and expressive of fright. There was no pain nor trismus, and he partook freely of nourishment. At times there was complete opisthotonos. On December 25th he took four dozen pills of assafœtida of four grains each, and one half ounce of fluid extract of Cannabis Indica in divided doses, without any benefit. Sulphate of morphia in doses of one grain was then prescribed, to be administered every two hours, and a poultice of powdered opium and cinchona applied to the wound, but, as before, without apparent benefit. The mind, up to this time, continued clear and undisturbed, his pulse moderately full and strong, ranging at about 100. He now became drowsy, and at times lay in a semi-comatose condition. His pulse ran up to 150. Respiration was free, but at times hurried, from 25 to 28 per minute. The skin became bathed in sweat, which exhaled a peculiar pungent odor. The bowels were regular; the urine was scantily secreted and high colored, though voided without difficulty. The discharge from the wound was thin, bloody, and offensive. On December 27th opisthotonos recurred, and was temporarily relieved by the application of chloroform to the entire extent of the spine. Subsequently, violent epileptiform convulsions set in, and death resulted from exhaustion, on December 28, 1862." The pathological specimen is figured in the wood-cut (FIG. 44). and shows a fracture of the great trochanter of the left femur and a piece of a leaden ball embedded in the neck. The specimen and history were contributed by Surgeon C. L. Allen, U. S. V.—(*Circular* 2, S. G. O., 1869, p.80, CASE 94.)

FIG. 44.—Fracture of trochanter and neck of the left femur by a round musket ball. A fragment of lead is impacted in the neck. *Spec.* 545.

CASE 192.—"Sergeant David Y——, Co. H, 106th New York, aged 29 years, was wounded at the battle of Monocacy Junction, July 9, 1864, by a conoidal musket ball, which entered two inches posterior to and one inch above the right trochanter major, passed forward and inward, and lodged in the neck of the femur at its middle portion. He was admitted to General Hospital at Frederick, Maryland, on the same day, and the wound did well until the 12th of July, when it assumed an unhealthy appearance. A careful examination was made with the finger and by the probe, and the integuments and fascia were divided, giving free exit to sanious and fetid pus. Large quantities of stimulants and beef tea were given. On July 19th symptoms of pyæmia made their appearance, such as rigors followed by profuse perspiration and acceleration of the pulse and respiration, dryness of the tongue, and anorexia. Another examination of the wound was made, and the ball was found embedded in the femur, but, owing to the patient's condition, its removal was deemed inadvisable. On July 20th another rigor occurred, and gradual aggravation of all the symptoms followed. He died at 3 o'clock P. M., July 22, 1864." The pathological specimen and history (FIG. 45) were contributed to the Army Medical Museum by Assistant Surgeon R. F. Weir, U. S. A.—(*Circular* 2, p. 84, CASE 122.)

FIG. 45.—Fissure of right femur, caused by a conoidal ball lodging in the neck. *Spec.* 3931.

CASE 193.—"Captain James M. L——, Co. I, 20th Indiana, was twice wounded in an engagement in front of Richmond, on June 27, 1862. The first wound was through the lumbar muscles, and, while lying on the field, he was again struck by a conoidal musket ball, which entered on the outer side of the left thigh a little below the great trochanter, and, passing upward and inward, lodged. He was conveyed to Washington, and on June 29th was admitted to the Columbia College Hospital. A finger could be readily passed into the perforation of the femur, but the ball could not be reached. There was no shortening or eversion of the limb, interfering with the motion of the joint. Three formal attempts to ascertain the position of the ball and accomplish its removal were unsuccessfully made. The patient died from exhaustion, August 19, 1862." The specimen is represented in the adjoining wood-cut (FIG. 46). It shows the upper portion of the left femur perforated between the trochanters on the posterior surface. The track of the ball is carious. The great trochanter has been split off, but is reunited by callus. The space between the trochanters is bridged over by a displaced fragment of bone, attached in its new position by slight osseous deposits. The missile was found resting against the capsular ligament. Assistant Surgeon W. M. Notson, U. S. A., who attended and reported the case, is confident that the ball was external to the joint; but as the grooving of the neck extends upward nearly to the articular surface of the femur, it is hardly possible that the joint escaped.—(*Circular* 2, p. 75, CASE 69.)

FIG. 46.—Perforation of the neck of left femur by a conoidal musket ball. *Spec.* 565.

In twenty-seven of the two hundred and forty-nine shot fractures of the hip joint with fatal terminations the parts of the joint involved were not indicated. The details in the cases are very meagre, and no autopsies were made. Fifteen have been recorded in *Circular* No. 2;[1] such information as was obtainable of the remaining twelve will here be given:

CASE 194.—Private J. Cilley, Co. E, 19th Maine, aged 22 years, was wounded at Petersburg, June 22, 1864, by a conoidal ball. He was taken to the field hospital of the 2d division, Second Corps, where Surgeon J. F. Dyer, 19th Massachusetts, noted: "Shot fracture of the left hip joint." On July 1, 1864, he was admitted into the Carver Hospital, Washington, and he died August 30, 1864. Surgeon O. A. Judson, U. S. V., reports cause of death: "Exhaustion following shot fracture left ilium."

[1] *Circular* 2, 1869: CASE 2, p. 65, Corp'l J. A. Baker, C, 49th New York. CASE 7, p. 66, Pt. C. S. Bates, G, 27th Michigan. CASE 13, p. 67, Corp'l W. Bowen, K, 56th Penn. CASE 37, p. 70, Pt. J. Forbes, C, 31st Mass. CASE 39, p. 70, Pt. S. Fowler, 4th Michigan Battery. CASE 60, p. 74, Pt. W. Jackson, B, 106th New York. CASE 63, p. 74, Pt. H. Jones, I, 151st Penn. CASE 87, p. 79, Lieut. M. Mullen, G, 69th Penn. CASE 97, p. 81, Corp'l J. Robinson, I, 3d Maryland Cavalry. CASE 105, p. 82, Capt. R. Shaw, K, 56th Penn. CASE 184, p. 92, Pt. J. Welis, C, 1st Mass. H. A. CASE 202, p. 95, Pt. J. E. Clark, E, 23d Pennsylvania. CASE 210, p. 95, Pt. *A. Latten*, Morgan's Command (see *Confed. States Med. and Surg. Journal*, 1865, p. 9). CASE 250, p. 101, Pt. E. Powell, A, 3d U. S. C. T. CASE 252, p. 101, Pt. J. Shafer, A, 7th Maryland.

CASE 195.—Private J. Farrell, Co. B, 14th U. S Infantry, aged 35 years, was wounded at Spottsylvania, May 12, 1864, and admitted to the field hospital of the 2d division, Fifth Corps. Surgeon W. R. DeWitt, jr., recorded: "Gunshot wound of left thigh; severe." On May 18th the wounded man was received into Douglas Hospital, Washington. Assistant Surgeon W. Thomson, U. S. A., reported: "Gunshot wound of left hip; fracture of pelvis and femur. Hæmorrhage to the amount of two ounces occurred from a muscular branch on May 28th, and ceased spontaneously. The patient died of asthenia May 28, 1864.

CASE 196.—Colonel C. Knoderer, 167th Pennsylvania, was wounded at Suffolk, January 30, 1863. Surgeon D. M. Marshall, of the regiment, reported: "Wound of left hip produced by a piece of shell, completely shattering the hip joint and causing immediate prostration. Stimulants were given internally, and cold applications, combined with styptics, were used. Death occurred on February 15, 1863."

CASE 197.—Corporal E. W. Mulford, Co , E, 74th Illinois, was wounded at Chattanooga, November 25, 1863, by a conoidal ball, which fractured the right hip. He died December 10, 1863, in the 2d division, Fourth Corps, field hospital. Surgeon F. W. Lyth, 36th Illinois, records the case.

CASE 198.—Private M. Murphy, Co. D, 8th New York Heavy Artillery, was wounded at Cold Harbor, June 3, 1864, by a conoidal ball. He was taken to the field hospital of the 2d division, Second Corps, where Surgeon J. F. Dyer, 19th Massachusetts, records: "Shot fracture of the right hip joint and wound of both shoulders." He died June 6, 1864. The cause of death is given on the burial records as "shot wound of bowels."

CASE 199.—Private A. Olds, Co. F, 8th New York Heavy Artillery, was wounded at Cold Harbor, June 3, 1864, and admitted to the field hospital of the 2d division, Second Corps. Surgeon J. F. Dyer, 19th Massachusetts, reported: "Gunshot fracture of left hip joint. Died June 5, 1864."

CASE 200.—Private C. Pease, Co. C, 4th Michigan, was wounded in the left hip at Gettysburg, July 2, 1863. He was treated at a Fifth Corps field hospital until July 24th, when he was admitted to Camp Letterman. Surgeon H. Janes, U. S. V., reported that the man "died August 7, 1863, of gunshot fracture of left hip joint."

CASE 201.—Private H. Stratton, Co. B, 99th Pennsylvania, was wounded at Gettysburg, July 2, 1863, by a conoidal ball. He was taken to the field hospital of the 1st division, Third Corps, where Surgeon G. W. Lyman noted: "Gunshot compound comminuted fracture of the right thigh implicating the hip joint." He died July 4, 1863.

CASE 202.—Private J. J. Stumple, Co. A, 7th West Virginia, was wounded at Cold Harbor, June 3, 1864, by a conoidal ball. He was taken to the field hospital of the 2d division, Second Corps, where Surgeon J. F. Dyer, 19th Massachusetts, noted: "Shot fracture of the right hip." He was admitted into the Second Division Hospital, Alexandria, June 7th, where Surgeon T. R. Spencer, U. S. V., records "shot wound, right thigh." He died June 25, 1864.

CASE 203.—Private T. O. Tucker, Co. D, 61st Pennsylvania, aged 39 years, was wounded at Spottsylvania, May 15, 1864, by a shell. He was taken to the field hospital of the 2d division, Sixth Corps, where Surgeon S. J. Allen, 4th Vermont, noted: "Wound of the right groin." On May 26, 1864, he was admitted into the Second Division Hospital at Alexandria. He died the following day. Surgeon T. R. Spencer, U. S. V., reported the cause of death "shot wound of the right hip joint."

CASE 204.—Private J. Volkommer, Co. C, 46th New York, aged 19 years, was wounded at Petersburg, July 30, 1864, and admitted to the field hospital of the 3d division, Ninth Corps. Surgeon P. A. O'Connell, U. S. V., reported: "Gunshot wound of left hip; ball entered one and a half inches from the trochanter major, wounding the capsular joint." Three days after the reception of the injury the wounded man was transferred to the Depot Hospital at City Point, whence he was sent to De Camp Hospital, David's Island, New York Harbor, August 7th. Assistant Surgeon W. Webster, U. S. A., in charge of the latter, reported that the patient died November 19, 1864, of "gunshot wound of left hip, with fracture of femur."

CASE 205.—Private *S. Waisner*, Co. E, 28th North Carolina, was wounded and captured at Gettysburg, July 3, 1863, and entered Camp Letterman on July 23d. Surgeon H. Janes, U. S. V., reported: "Gunshot fracture of right hip joint. Death on August 18, 1863."

Of the series of two hundred and forty-nine cases of shot fractures of the hip joint unsuccessfully treated by conservation, fifty-two have been detailed in the preceding pages and one hundred and ninety-seven cases have been briefly noted, the details of the cases having been cited in *Circular* No. 2.

In one hundred and eighty-four cases the injuries were caused by small, and in fifteen cases by large projectiles, while in fifty instances the nature of the missile was not indicated. Fragments of bone were removed in twenty-one of the two hundred and forty-nine fatal cases of shot fracture of the hip joint treated by conservation. Pyæmia was indicated in thirty-eight instances, gangrene in thirteen, tetanus in one case, erysipelas in one case, peritonitis in five cases, and secondary hæmorrhage in fourteen cases. In one instance (CASE of John McCarthy, Co. E, 76th New York, *Circular* No. 2, p. 76, CASE 71, and foot-note 1, p. 85) the femoral artery was tied, and in two instances (CASES of: Corporal J. F. Smith, Co. B, 1st Wisconsin, *Circular* No. 2, p. 82, and 107, of Private C. Hambrecht, Co. E, 4th New Jersey, CASE 181, p. 84, *ante*) the external iliac artery was

ligated. In four instances the missile penetrated the abdomen; in nine cases the pelvic cavity was pierced, but apparently without injury to the viscera. In fifteen cases a shot fracture of either the ilium, ischium, or os pubis was reported; in two instances the bladder was involved,[1] and in twenty-two cases the injury to the hip joint was complicated by various other injuries of less gravity. Eleven patients died on the day of the reception of the injury; fifty-three survived the injury from one to ten days; seventy, from eleven to twenty days; thirty-two, from twenty-one to thirty days; twenty-one, from thirty-one to forty-days; the remaining sixty-two patients lived from forty-one to two hundred and sixty-three days, and one patient lingered for nearly two years and a half.[2] In eighty-three instances it was reported that the missile had lodged, in nineteen of which it was stated to have been extracted.

In seventy-eight of the two hundred and forty-nine fatal cases of shot fracture of the hip joint treated by conservation, the specimens indicating the bony lesion at the hip are preserved in the Army Medical Museum. Illustrations of forty of these seventy-eight specimens were given in *Circular* No. 2, pp. 66–114, and twenty-one have been represented by wood-cuts in the preceding pages.

In tabular statement IX, on page 65, *ante*, the total number of alleged shot fractures at the hip joint treated by the conservative expectant mode was given as three hundred and four, of which fifty-five were reported to have recovered; but, from an analysis of the cases, it becomes clearly evident that it would be impossible to arrive at just conclusions regarding the mortality of injuries of this nature from the total number of cases tabulated. It has already been stated on pp. 76, 77, *ante*, that in fourteen of the fifty-five cases of recovery after alleged shot fractures at the hip joint the evidence is contradictory, or adverse to the supposition that the hip was implicated; that in nineteen instances the evidence is vague and insufficient, and that in two cases the testimony consists solely of the statements of examining surgeons based upon examinations made long after the injury had healed. Deducting these thirty-five cases, there remain two hundred and sixty-nine cases with twenty recoveries, giving a mortality of 92.5 per cent. But it was further stated on pages 76 and 77, *ante*, that in twelve instances the evidence is compatible with the supposition that the fractures were probably in the trochanteric region, and that in five instances the fractures were extracapsular. Eliminating these seventeen cases, there remain only two hundred and fifty-two cases with three recoveries, or a mortality rate of 98.8 per cent. Of the three patients that recovered after undoubted intracapsular shot fracture of the hip joint, one, Private T. C. Garvin, Co. H, 94th New York (CASE 143, *ante*), died nearly four years after the reception of the injury, from which pus and portions of the joint, consisting of splinters of bone, were discharged to the time of his death. In the case of *T. L. Lomax* (CASE 140, *ante*), in which it remains a disputed point whether it should be regarded as an example of treatment by excision or by conservation, it was impracticable to ascertain whether the patient is still living. The third patient, Colonel J. C. Strong (CASE 134, *ante*), was in tolerably good health in December, 1878.

From the evidence recorded on the registers of this Office in the alleged examples of recovery after shot fractures of the hip joint treated by temporization, I must continue to share the unfavorable impression of the results in this class of injuries of Guthrie, and

[1] The details of these cases have been published with Injuries of the Parts Contained in the Pelvis, Section II, Chapter VII, *Second Surgical Volume*, viz: Sergeant T. A——, Co. C, 119th New York, CASE 922, p. 318; see also Note 2, p. 77, *ante*; and Sergeant W. Spendlove, Co. E, 1st New York Cavalry, CASE 859, p. 295, and Note 1, p. 85, *ante*.

[2] Case of Private Louis Schmidt, 8th Kansas, wounded at Chickamauga, Sept. 19, 1863, died Jan. 3, 1866. *Circular* No. 2, 1869, CASE 271, p. 105.

many of the older as well as more modern writers on military surgery, and can only reiterate the conclusion that I have already expressed in *Circular* No. 6, at page 61, and in *Circular* No. 2, at page 117, that shot injuries of the hip joint, when abandoned to the resources of nature, prove almost uniformly fatal.[1]

With regard to the twenty-five cases of recovery after shot injuries of the hip joint under conservative treatment in the Franco-German War, 1870–71, tabulated by Professor von Langenbeck, and alluded to on page 67, *ante*, it may be hoped, in the interest of surgical science, that the future histories of these patients will be noted, and that when death ensues it may be found practicable to have the extent of the injury to the hip joint precisely ascertained by *post-mortem* examination. The difficulties of such a task are apparent and have hitherto proved insurmountable. In five of the fifty-five cases of recovery after alleged shot fracture at the hip joint cited from the American civil war, the patients have since died; but so far the opportunity to verify the diagnosis by an autopsy has not been improved.

EXCISION AT THE HIP AFTER SHOT INJURY.—A large addition to our statistical information on this subject was afforded by the experience of the American civil war as indicated by the accompanying tabular statement:

TABLE X.

Numerical Statement of Sixty-six Cases of Excision at the Hip Joint for Shot Injury.

OPERATIONS.	CASES.			PER CENT. OF MORTALITY.
	Recovery.	Fatal.	Total.	
Primary Operations	1	32	33	96.9
Intermediary Operations	2	20	22	90.9
Secondary Operations	3	8	11	72.7
Aggregates	6	60	66	90.9

"Twelve cases of excision of the head of the femur for gunshot injury are all that are recorded in print, prior to 1861," is correctly asserted at page 17 of the report from this Office[2] published in 1869; but it is now known[3] that in the Italian Campaign of 1859 Dr. J. Neudörfer excised at the hip for shot injury four times, at least, which gives a total

[1] In note 1, of page 62, *ante*, it was attempted to give, in chronological order, the earliest references to cases of shot wounds of the hip in military surgical literature, and the first case adverted to was that of Private S. Kirsky, in 1677, related by PURMANN (M. G.) (*Funfftzig Sonder-und Wunderbahre Schusswunden Curen*, Frankfurt, 1721, Obs. XLIII, p. 324). After page 62 had gone to press, the following case, cited by Dr. JOSEPH SCHMIDT (*Speculum Chirurgicum oder Spiegel der Artzney*, Augspurg, 1656, p. 144), which antedates the case of PURMANN by 33 years, came to the editor's notice: "In the month of May, 1634, while the here-stationed Swedish regiment was being mustered in the castle-yard, a sergeant, whose quarters were with Mr. Peter Rehlinger, was accidentally shot through the hip. He was conveyed in a trough to his quarters. I was called upon to see the case, but found that there was great difficulty in the way of bandaging and that the thigh was greatly swollen, the wound of entrance being as large as a hen-egg. On probing the wound I readily discovered the bare bone, with every indication that the shaft must have been split. Great hæmorrhage had also taken place; his system was in a bad condition, unfavorable for a cure. The symptoms hourly grew more aggravated and became so severe as to terminate his life on the sixth day. After his death, I endeavored to obtain the consent of the officers to let him be opened, which was readily granted. When I did open him I discovered that the upper part of the femur, the head which enters the hip bone, was comminuted, as if it had been done with a hammer upon an anvil. There was also a long fissure in the shaft running down towards the knee; the great trunk of the artery was torn, and the condition of the soft parts, inwardly near the bone, was so offensive that I can hardly describe it. It was no wonder that he lost his life from so severe an injury. Should he have recovered he would have done so with a bad walk." An instance from the Turco-Russian War of 1877, is related by KADE (E.) (*Das temporäre Kriegslazareth der Anstalten der Kaiserin Maria im Kloster Mariahimmelfahrt by Sistowa*, in *St. Petersburger Medicinische Wochenschrift*, 1877, No. 45, p. 383): A soldier, on August 31, 1877, received a shot wound of the right coxo-femoral joint without separation of continuity of bone. The ball lodged with its point in the neck of the femur. On September 12th, the wound was enlarged and the missile extracted. The patient died September 17th, of septicæmia following suppuration of the joint.

[2] OTIS (G. A.), *A Report on Excisions of the Head of the Femur for Gunshot Injuries. Circular* No. 2, War Department, Surgeon General's Office, January 6, 1869, 4to, pp. 141.

[3] LONGMORE (T.), *Gunshot Wounds*, in T. HOLMES's *System of Surgery*, 2d ed., London, 1870, Vol. II, p. 230.

of sixteen examples of this operation in military surgery prior to our war. Of these, a primary excision by Mr. T. C. O'Leary, in the Crimea, in 1855, was successful. The patient died ten years afterwards of phthisis. A secondary excision, by Dr. Neudörfer, in 1859, was followed by amputation at the hip, which the patient happily survived. In the foot-note[1] instances of excision at the hip for shot injury are enumerated, in addition to those practised in the United States service.

At the date of the publication of *Circular* No. 2, S. G. O., January, 1869, the records of this Office contained sixty-three, as was then believed, authenticated cases of excision of the head, or of the head and neck, or head and neck and portion of the shaft of the

[1] 1. OPPENHEIM (F. W.) (*Die Extirpation des Schenkelkopfes aus der Gelenkhöhle*, in *Zeitschrift für die gesammte Medicin*, Hamburg, 1836, B. I, S. 137); a Russian chasseur wounded May 5, 1829, at the battle of Eski-Arna-Utlar; fracture of neck of left femur and rim of acetabulum. Primary excision May 5, 1829; death from plague May 23, 1829.—2. SEUTIN (*Resection de la partie supérieure du fémur*, in *Bulletin Général de Thérapeutique*, Paris, 1833, T. IV, p. 371); Private Lisieux, 25th Infantry; fracture of neck, trochanters, and upper fourth of right femur. Primary excision December 8, 1832; death on the fourth day, from gangrene.—3. C. TEXTOR (KARL TEXTOR, *Der Zweite Fall von Aussägung des Schenkelkopfes mit vollkommenem Erfolg*, Würzburg, 1858, S. 15, No. 12); Kaspar Artes, aged 44; caries of head of right femur consequent upon gunshot fracture. Secondary operation on November 8, 1847; death on November 18, 1847.—4. Dr. H. SCHWARTZ (*Beiträge zur Lehre von den Schusswunden*, Schleswig, 1854, p. 142); O——, Danish soldier; shot fracture of trochanters of left femur. Intermediary excision May 13, 1849; death, May 20, 1849.—5. Dr. G. ROSS (*Deutsche Klinik*, 1850, B. II, p. 451); Karl Engelking, aged 23, received, at Fredericia, May 8, 1848, a shot fracture of the left trochanter. Secondary excision, June 10, 1850; death, June 13, 1850.—6. Professor BAUM (LOHMEYER, *Die Schusswunden*, 1859, p. 199); a subaltern officer; shot comminution of neck of femur. Primary excision in 1854; death in twenty-two hours.—7. G. E. BLENKINS (G. H. B. MACLEOD, *Notes on the Surgery*, etc., London, 1858, p. 311, and G. J. GUTHRIE, *Commentaries*, London, 1855, p. 621); Private C. Mousterey, 3d Batt. Grenadier Guards; shell fracture of neck and trochanters of right femur. Primary excision in June, 1855; death in five weeks.—8. G. H. B. MACLEOD (*Notes on the Surgery of the War in the Crimea*, 1858, p. 338); Private Couch, of the Rifle Brigade; fracture of the neck of left femur, June 18, 1855. Intermediary excision July 5; death from cholera July 10, 1855.—9. Surgeon J. CRERAR (G. J. GUTHRIE, *Commentaries*, 6th ed., London, 1855, p. 622); Private W. Smith, 1st Royals; grenade fracture of trochanter and neck of left femur. Primary excision August 6, 1855; died August 21, 1855.—10. T. C. O'LEARY (T. P. MATTHEW, *Medical and Surgical History, etc., during the War against Russia*, 1854-'55-'56, London, 1858, Vol. II, p. 378); Private T. McKevena, 68th Regiment; shell fracture of trochanter and neck of left femur. Primary excision August 20, 1855; recovery.—11. Dr. GEORGE HYDE (MATTHEW, *l. c.*, Vol. II, p. 378); Corporal B. Sheehan, 41st Regiment; grapeshot comminution of trochanter and neck of femur. Primary excision September 8, 1855; death September 14, 1855.—12. Dr. COOMBE (MACLEOD, *loc. cit.*, p. 344); British artillery soldier; shot fracture of neck of femur. Intermediary excision in 1855; death in a fortnight.—13-19. J. NEUDÖRFER (*Das Endresultat der Gelenkresectionen*, in *Wiener Med. Presse*, 1871, B. XII, p. 407) remarks: "I have performed the hip joint resection for shot wounds seven times; six died from the eighth to the eleventh day, and the seventh I exarticulated at the hip after a few days on account of purulent infiltration of the excised joint. The patient recovered after the exarticulation, and lives here in Vienna." J. Schranz, 7th Jæger Bat., wounded at Palestro, May 30, 1859. Excision at left hip joint November 27th. Purulent infiltration followed, and, on December 1, 1859, amputation at the hip joint was performed by Professor NEUDÖRFER. The patient recovered, and lived in Vienna in 1868. During the Schleswig-Holstein War, 1864, Dr. NEUDÖRFER twice excised the hip joint, on Austrian soldiers, for shot fracture of the upper extremity of the femur. Intermediary operations. Both cases proved fatal (C. HEINE, *Die Schussverletzungen*, etc., 1866, p. 369). Of the remaining four operations by NEUDÖRFER I have been unable to find any details.—20. A successful secondary excision of the hip joint for shot wound received in the Austro-Prussian War, 1866, was performed by Dr. WAGNER in Königsberg. NEUDÖRFER (*Handbuch der Kriegschir.*, Leipzig, 1872, Zweite Hälfte, Abth. 2, p. 1458) states that he saw the patient in November, 1866, at Görlitz, when his recovery was yet doubtful, but that in 1872 the patient was living at Graz, entirely recovered. He could walk without a cane, and could ascend and descend stairs.—21-23. B. von LANGENBECK (*Über die Schussfracturen der Gelenke*, 1868, p. 16); Kucharsky, aged 18, fracture of left trochanter, March 22, 1863. Secondary excision July, 1863; death in fourteen days. Austrian soldier, wounded July 3, 1866; shot fracture of the neck of the right femur. Intermediary resection August 5, 1866; death August 12, 1866. Emil Bauer, 10th Saxon Infantry, wounded June 29, 1866; shot fracture of the neck of right femur. Secondary excision August 20th; death in September, 1866.—24. Dr. SCHÖNBORN (B. v. LANGENBECK, *loc. cit.*, p. 16); Maxim Glutschak, aged 24; wounded July 3, 1866, fracture of head of the right femur. Secondary resection August 22, 1866; recovery.—25. B. BECK (*Kriegschir. Erf.*, 1867, p. 351); A. F. S——, Würtemberg drummer, wounded July 24, 1866; shot fracture of neck of femur and trochanter major. Intermediary resection August 5th; died August 7, 1866.—26. L. STROMEYER (*Erfahrungen über Schusswunden*, 1867, S. 52); a debilitated subject; intracapsular shot fracture of the neck of the femur. Intermediary resection in 1866; death in two days.—Stabsarzt Dr. DEININGER, of the Railway Battalion (*Beiträge zu den Schussfracturen des Hüftgelenks unter besonderer Berücksichtigung der Erfahrungen aus dem Feldzuge 1870-71, und Benutzung der Acten des Königlichen Kriegsministeriums*, in *Deutsche Mil.-arztl. Zeitschrift*, 1874, Jahrgang III, pp. 237-335), gives a tabular statement of forty-five cases of resection of the head of the femur for shot injury, from the Franco-Prussian War, 1870-71. The cases are: 1 primary case fatal, 26 intermediary cases (all fatal), and 17 secondary (with 5 recoveries and 12 deaths), and 1 case in which the time of operation was not recorded. Brief details are given: 27. A. Stephan, 3d Pioneer Bat.; shot fracture of neck and trochanter major of left femur, September 20, 1870; excision same day, by Dr. B. BECK; died September 29, 1870.—28. Piurko, 22d Infantry; shot fracture of trochanter and neck of right femur, September 23, 1870; excision October 25, 1870, by SZMULA; recovered, with useless limb.—29. A soldier wounded at Orleans; comminution of head of femur; intermediary excision, by Dr. METZLER; died 4 days after operation.—30. J. B. Müller, 85th French Line; shot fracture of head of right femur and rim of acetabulum at Beaune la Rolande, November 28, 1870; excision, by Dr. RÜPPEL, December 2d; died December 7, 1870.—31. Corporal Heinartz, 75th Prussian, wounded at Orleans, December 9, 1870; ball fractured acetabulum and opened joint; excision, December 14th, by Dr. LANGENBECK; died of septicæmia, December 20, 1870.—32. A. Eichner, 2d Prussian Lancers; shot fracture of head of right femur, Orleans, December 4, 1870; excision, by Dr. LANGENBECK, December 12th; died December 18, 1870.—33. J. Schone, wounded at Weissenberg, August 4, 1870, splintering trochanter and head of femur; excision, by Dr. CZERNY, August 13th; died August 16, 1870.—34. M. Echterbruch, Corporal, 78th Infantry; shot fracture of left femur below the greater trochanter, August 16, 1870; excision, by Dr. MÜLLER, August 26th; died Sept. 7, 1870.—35. J. Pakowsky, 14th Inf., wounded December 3, 1870, in left hip joint; excision, December 14th, by Dr. NEWHAUS; died December 20, 1870.—36. J. Unterberg, Oldenberg Infantry No. 91; shot fracture of left trochanter, August 16, 1870; excision, August 27th, by Dr. A. EWALD; died Sept. 9, 1870.—37. J. Wiedener, 52d Infantry, shot wound in right hip joint, August 16, 1870; excision, by Dr. TRENDELENBERG, August 28th; died September 2, 1870.—38. F. Kopzinsky, 5th Artillery, shot fracture of left hip joint, Sept. 19, 1870; excision, October 2d, by Dr. WEGNER; died October 28, 1870.—39. J. Busse, 24th Infantry, shot fracture of the left femur, August 16, 1870; excision of hip joint, August 29th, by Dr. MARCUSE; died Sept. 7, 1870.—40. F. Patzwald, 9th Infantry, shot wound of left hip joint, December 2, 1870; excision, by Dr. BRASCH, December 16th; died December 21, 1870.—41. V. Vaillant, 42d French Line, shot fracture head of left femur, September 30, 1870; excision, October 14th, by Dr. GRANDIES; died October 17, 1870.—42. A. Dettki, 41st Infantry, shot comminution of neck of left femur, August 31, 1870; excision, by Dr. SACHS, Sept. 15th; died October 11, 1870.—43. P. Congacz, French Guards No. 3, shot fracture of head of left femur, August 18, 1870; excised, by Dr. LANGENBECK, September 1st; died Sept. 2, 1870.—44. C. C. Petit, French Infantry No. 67, comminution of left hip joint, August 16, 1870; excision, by Dr. LANGENBECK, September 1st; died September

femur, for shot injury. It has since been ascertained that in one of these cases the head of the femur was not removed;[1] but records of four additional cases[2] have since been obtained and added to the list of this operation, making a total of sixty-six cases of excision at the hip joint done for shot injuries received during the American civil war. As indicated in TABLE IX, at page 65, *ante*, fifty-five of these operations were performed for shot injuries of the hip joint, while in eleven instances the excision was practised for fracture of the shaft of the femur that did not primarily implicate the hip.

4, 1870.—45. C. Pacot, 50th French Infantry, shot fracture of neck of right femur, Weissenburg, August 4, 1870; excision, by Dr. BILLROTH, Aug. 20th; died August 20, 1870.—46. W. Liesegang, 24th Infantry, shot fracture of neck of left femur, Vionville, August 16, 1870; excision, September 2d, by Dr. GAEHDE; died September 3, 1870.—47. E. W. Hoffman, of the Prussian Guards, shot fracture of hip joint, St. Privat, August 18, 1870; excision, by Dr. LÜCKE, September 5th; died September 13, 1870.—48. A. Weinert, Corporal, 10th Dragoons, wounded in trochanter major, August 14, 1870; excision, by Dr. FISCHER, September 1st; died September 13, 1870.—49. B. Payant, 32d French Infantry, shot fracture of upper third of right femur, August 16, 1870; excision, September 4th, by Dr. NEUHAUS; died September 8. 1870.—50. A. Piasecki, 5th Infantry, comminution of neck of left femur, September 9, 1870; excision, by Dr. WAGNER, September 29th; died October 11, 1870.—51. P. Perrot, 13th French Infantry, comminution of right femur into joint, Gravelotte, August 8, 1870; excision, by Dr. BUSCH, September 12th; died September 23, 1870.—52. J. Pitzer, 83d Infantry, comminution of trochanter major and neck of left femur, Wörth, August 6, 1870; excision, by Dr. PAGENSTECHER, September 1st; died September 10, 1870.—53. Sergeant-major B——, 3d French Infantry, shot fracture of trochanter and neck of right femur, Wörth, August 6, 1870; excision, by Dr. BECK, at the end of August; died in the latter part of September.—54. C. Schnock, of the Guard Sharpshooters, shot wound in left hip joint, St. Privat, August 18, 1870; excised, by Dr. BENSBERG, September 14th; died September 19, 1870.—55. P——, 61st Infantry, comminution of neck of left femur, January 21, 1871; excision, by Dr. VOLKMANN, February 20th; died February 22, 1871.—56. J. Blanchet, French Garde Mobilier, shot fracture of head of left femur, November 28, 1870; excision, by Dr. HEINEMANN, December 29th; died January 12, 1871.—57. E. Paschke, 58th Infantry, comminution of neck and trochanter of right femur, October 2, 1870; excision, by Dr. BORETIUS, November 6th; died November 16, 1870.—58. A. Schoblock, 7th Würtemberg Infantry, shot fracture of femur high up, Champigny, December 2, 1870; excision, by Dr. HUETER, January 6, 1871; died January 13, 1871.—59. Bartsch, 2d Guards, shot fracture below trochanter, with fissuring of neck of left femur, August 4, 1870; excision, September 13th, by Dr. SCHILLBACH; died in a few hours.—60. D. Blennemann, 7th Infantry, shot wound of hip joint, Gravelotte, August 18, 1870; excision, about six weeks later, by Dr. WINDSCHEIDT; recovery, with good use of limb and one and a half inch shortening.—61. E. Geier, 9th Infantry, shot through left hip joint, Wörth, August 6, 1870; excision, by Dr. BILLROTH, September 28th; died October 27, 1870.—62. Schaal, 10th French Infantry, shot wound in right hip, August 16, 1870; excision, by Dr. JOSEPHSON, October 24th; death October 25, 1870.—63. F. John, 8th Infantry, shot wound of right hip, fracture of acetabulum, Saarbrücken, August 6, 1870; excision, by Dr. HUPEDEN, November 4, 1870; recovery, with moderately free use of limb and one inch shortening.—64. B——, 2d Zouaves, shot fracture of upper third of femur, Wörth, August 6, 1870; excision six months after injury, by Dr. WELKER; recovery.—65. French soldier, shot fracture of hip joint September 30, 1870; secondary excision; recovery, with comparatively good use of limb.—66. J. Pieper, 21st Infantry, shot wound of left hip; secondary excision of head of femur, February 19, 1871, by Dr. JACOBY; died Feb. 23, 1871.—67. G. Rossmanieck, 4th Infantry, shot in left hip in August, 1870; secondary excision of hip joint; died Sept. 7, 1870.—68. P——, 17th Infantry, shot wound of right hip joint; secondary excision of joint; died.—69. Unknown soldier; secondary excision, by Dr. BATTLEHNER; fatal.—70. Unknown soldier; shot fracture of neck of femur; secondary excision, three months after injury, by Dr. HEPPNER; death in two weeks.—71. Unknown soldier, shot fracture of neck and trochanter; resection three and a half months after injury; died a week afterwards. In a tabular statement of cases of resection of the hip joint performed during the same period, and collected by Professor B. v. LANGENBECK (*Über die Schussverletzungen des Hüftgelenks*, in *Archiv für Klinische Chirurgie*, Berlin, 1874, B. XVI, p. 263), I find 7 cases (2 intermediary fatal cases, CASES Nos. 2, 5, pp. 329, 330,)—1 secondary fatal (CASE No. 14, p. 334)—and 4 fatal cases, period of operation not stated (CASES 12, 20, 21, and 27, pp. 333, 335, 336), not contained in Dr. DEININGER'S tables. They are: 72. Lieut. Roma, 9th French Infantry, shot fracture of left hip joint, August 18, 1870; excision, by Dr. LANGENBECK, August 31st; died September 4, 1870.—73. Petit, 67th French Infantry, shot fracture of right hip joint, Mars la Tour, August 16, 1870; excision, August 30th, by Dr. LANGENBECK; died December 10, 1870.—74. Unknown soldier, shot fracture of hip joint; excision, by Dr. BILLROTH; died 24 hours after operation.—75. Unknown soldier, shot fracture of pelvis; secondary involvement of hip joint; secondary excision of head and neck, by Dr. KÜSTER; death eight days after the operation.—76, 77. Unknown soldiers; excisions, by Dr. VOLKMANN; fatal.—78. Unknown soldier; excision of head of femur, by Dr. GRAF; fatal.—79. Another intermediary case of excision of head of femur for shot injury during the late Franco-Prussian War, 1870–71, not reported by either Dr. DEININGER or Professor B. v. LANGENBECK, is reported by Dr. GEORGE FISCHER (*Dorf Floing und Schloss Versailles*, in *Deutsche Zeitschrift für Chirurgie*, Leipzig, 1872, B. I, S. 227); unknown, fracture of head of left femur, September 30, 1870; wound of exit and entrance on a level with the trochanter major. October 20th, resection; October 28th, death from pyæmia. An operation ascribed to Dr. LUTTER, in *Lancet*, 1870, Vol. II, p. 452, is identical with the case described by Dr. H. FISCHER (*Kriegschir. Erf. vor Metz*, Erlangen, 1872, p. 200), and included in cases collected by Drs. DEININGER and v. LANGENBECK (No. 48, *ante*).—80–97. CHENU (J. C.) (*Aperçu hist. stat. et clin., etc., pendant la guerre de* 1870–71, Paris, 1874, T. I, p. 493) tabulates eighteen cases of excisions of the hip joint for shot fractures, in the Franco-Prussian War, 1870–71, with three recoveries. The same author (*loc. cit.*, T. II, pp. 1–150) records, by name, the cases of recovery after amputations, disarticulations, and excisions; but, after a careful search, I have been able to find only one of the (3) successful cases of excisions at the hip joint among them. The case is detailed on p. 85: "Lande (P. F.), born June 6, 1849, at Valognes (Manche), 109th line. Fracture of head of femur for shot wound. Resection of head of femur." The case is duplicated and again appears, on p. 86, as Laude, giving same details in every respect. I find no record of the two other cases. There is nothing to indicate whether the cases are primary, intermediary, or secondary operations. The cases reported by Dr. DUBREIL (*Gaz. méd. de Paris*, 1871, T. XVI, p. 314) and Dr. ARNAUD (GRELLOIS, *Hist. méd. de blocus de Metz*, 1872, pp. 351–353) are undoubtedly included in CHENU'S (*loc. cit.*, p. 493) statistics.—98. ROBERTSON (J. B.) (*Resection at the Hip joint—Removal of the Head with Four Inches of the Femur—Tetanus—Cure by Physostigma*, in *Pacific Med. and Surg. Jour.*, 1878, Vol. XX, p. 500), excised, on April 8, 1876, the head and four inches of the shaft of the femur in the case of George Miller, aged 45, who had suffered for over a year from a sinus, evidently resulting from a rifle shot received two years previously. The wound healed by first intention. Tetanus, which supervened about three weeks after the operation, was successfully treated with physostigma. In February, 1878, Miller was "well and able to ride on horseback and herd cattle in the mountains."—99. Dr. RUDDUCK (MAUNOURI, *Rapport sur le mouvement de l'ambulance No. 5 du Croissant Rouge à Orchanie, du* 17 *Octobre au* 8 *Novembre* 1877, in *Le Progrès Medical*, 1878, No. 1, p. 6) excised, on October 21, 1876, the head of the left femur in the case of Mehemet-Osman, for shot wound received in the Turco-Russian War; secondary operation; pneumonia; death. Summing up the cases of resection of the hip joint referred to in this note we have a total of 99 cases with 86 deaths, a fatality of 86.8 per cent. Of these 99 cases 8 were primary operations with 7 deaths (87.5 per cent.); 37 were intermediary, all fatal; 27 were secondary with 18 deaths (66.6 per cent.); and in 27 instances with 24 deaths the time of operation was not specified.

[1] The case of Lieutenant Dwight Beebe, 3d New York, cited in *Circular* 2, at page 32. Information received since the publication of the case proves it to be an example of removal of three and a half inches of the upper portion of the femur just without the capsule. The case will be detailed with excisions in the continuity of the femur in the third section of this chapter.

[2] CASES of: 1. Private *J. W. Epton*, Co. I, 5th South Carolina, referred to in *Circular* 2, at p. 120, but not included in the tabular statements on pp. 59 and 137; 2. Private *C. Raines*, Co. E, 25th North Carolina; 3. Private G. W. Tilliston, 1st Ohio Light Artillery; and 4. Private T. W. Pease, Co. H, 19th Indiana.

Primary Excisions.—Of thirty-three well authenticated primary excisions at the hip practised during the War, twenty were performed upon Union and thirteen upon Confederate soldiers. The only successful result was in the case of Private *Cannon*, a young soldier of a Georgia regiment, on whom Dr. J. J. Dement, of Huntsville, Alabama, operated. The particulars of the case were communicated by Dr. Claude H. Mastin, of Mobile, formerly Inspector of Hospitals in the Confederate service, and by Dr. J. B. Duggan, of Toombsborough:

CASE 206.—Private *Cannon*, Co. A, 49th Georgia, aged 24 years, was wounded at the battle of the Wilderness, May 5, 1864, by a conoidal musket ball, which struck an inch below the left trochanter major, extensively comminuting the femur and lodging in the adductor muscles. The Confederate line being forced back, the wounded man lay on the ground all night until the early morning, when the Confederates recovered their wounded. In *Cannon's* case, the consultation at the field infirmary by Surgeons J. J. Dement, Holt, J. J. Wynne, and F. P. Henderson, it was determined to enlarge the wound and remove the detached fragments of bone. Accordingly, the patient having been chloroformed, Surgeon Dement made an incision two inches upward from the entrance wound, and extending from the wound downward four inches. On ascertaining the condition of the parts, it was decided to exarticulate the head of the femur. This was readily accomplished, and then the neck and upper extremity of the shaft were removed. The fragments of the upper extremity of the femur, when put together, measured four and a half inches. The hæmorrhage during the operation was trivial. All the medical gentlemen present remarked upon the slight degree of shock induced by the operation. The limb and body were confined by roller bandage to a straight splint extending from the axilla to the foot. A full dose of sulphate of morphia was then administered. In a few hours the patient was placed in an ambulance wagon and conveyed to Orange Court House, twenty-five miles distant, and thence by rail to Staunton, about seventy miles farther, where the after treatment was conducted at the general hospital. Little can be learned of the after treatment, save that the patient was supplied with rich diet, a liberal allowance of wine, and that no untoward complication occurred except the formation of abscesses attendant on an exfoliation of a ring of bone from the upper end of the shaft. When this was eliminated, the wound rapidly healed. At the end of nine months the cicatrix was firm. The limb was shortened three inches, and was useless for purposes of locomotion. The patient was in fine health, and moved about on crutches. He went to his home, in Toombsborough, Georgia, in February, 1865, and earned a livelihood by his trade of shoemaking. He enjoyed good health until November 12, 1865, when he had an attack of diphtheria which terminated fatally on November 23, 1865.

The thirty-two unsuccessful primary excisions at the hip may be arranged in three categories. The first comprises thirteen instances where the circumstances were favorable, the patients of mature and robust organization, the lesions of bone limited to the upper extremity of the femur, the important vessels and nerves intact; the injuries to the soft parts were not excessive; there were no complications of wounds in other regions, and the patients were not subjected to hazardous removals; yet all thirteen succumbed within two or three days, or in one case as late as the fourth day, from the conjoined shock of the injury and the operation.

CASE 207.—Captain Frederick M. Barber, Co. H, 16th Connecticut, aged 32 years, was wounded at Antietam, September 17, 1862, by a musket ball, which entered behind the right trochanter major and shattered the trochanters and neck of femur. He was conveyed to the field hospital of the 3d division of the Ninth Corps. His general health was good, and there was but little shock. There was no swelling of the soft parts; the fracture was accessible to exploration, and appeared limited to the epiphysis. The case was one in which excision seemed peculiarly applicable, and, after a consultation of several surgeons of the division, that operation was decided upon. On the morning of September 18th, the patient being anæsthetised by chloroform, Surgeon Melancthon Storrs, 8th Connecticut, made a straight incision four inches long, passing through the wound of entrance. The comminuted fragments of the neck and trochanter were extracted, the round ligament divided, the head of the femur removed, and the fractured upper extremity of the shaft was sawn off by the chain saw. The edges of the wound were then approximated by adhesive straps, and simple dressings were applied. Little blood was lost, and the patient rallied promptly from the operation, and appeared quite comfortable during the day. Surgical fever soon set in, however; the patient sank rapidly under the constitutional irritation, and died on September 20, 1862.

CASE 208.—Sergeant Edwin T. Brown, Co. C, 21st Massachusetts, aged about 30 years, was wounded in front of Petersburg, on July 23, 1864, by a ragged fragment of a mortar bomb, which struck the left thigh over the trochanter major and comminuted the upper extremity of the femur. The wounded man was immediately conveyed to the hospital of the 1st division of the Ninth Corps. Surgeon Whitman V. White, 57th Massachusetts, and Surgeon James Oliver, 21st Massachusetts, saw the patient a short time after his admission to the hospital. He was a strong, healthy man, five feet ten inches in height, weighing about one hundred and sixty pounds, with a constitution of iron, and was in perfect health when injured. The soft parts about the seat of injury were lacerated and torn, and the upper extremity of the femur, to an extent of five inches, was crushed to fragments. No important arteries or nerves were wounded. Excision of the fractured bone was decided upon. On the afternoon of the day on which the injury was received chloroform was administered, and Dr. White made a longitudinal incision and removed the shattered fragments. The ligamentum teres was divided and the head of the bone turned out. The broken extremity of the shaft of the femur was evened off with a chain saw. The patient reacted promptly from the shock of

the operation. The limb was placed in proper position, and stimulants were freely used. Dr. Oliver states that he saw the man several times on the following day, who was in excellent spirits, and talked and laughed, and did not complain of any pain. On the 26th his appetite failed and he began to sink. He died July 27, 1864.

CASE 209.—Private *Charles Beard*, 12th Mississippi, was wounded and made a prisoner in the engagement on the Weldon Railroad, August 23, 1864. With nearly two hundred other wounded Confederates he was received at the field hospital of the 1st division of the Fifth Corps at Reams's Station, where it was found that a conoidal musket ball had entered the front of the right thigh a little to the outside of the course of the great vessels, and had comminuted the neck of the femur and fractured the head, and lodged in the acetabulum, of which the lower portion of the rim was broken off. A few hours after the reception of the wound the patient was placed under the influence of chloroform, and, after a thorough examination, it was deemed expedient to excise the upper extremity of the femur. The operation was performed by Surgeon A. A. White, 8th Maryland. An incision, commencing a little below the anterior superior spine of the ilium, was carried downwards below and behind the prominence of the trochanter major. From the lower extremity of the first, another incision, Dr. McGill states, was carried backwards. The muscular attachments were then dissected aside, and the chain saw was passed around the bone, which was divided just above the lesser trochanter. The head of the femur was then readily exarticulated, and the ball and splintered fragments were removed. The wound was then approximated by sutures and adhesive strips, and the limb was suspended by Smith's anterior splint. The patient reacted favorably; but very soon after the operation there was a marked rigor, and on the following day there was extreme irritability of stomach and retention of urine. The case terminated fatally on August 25, 1864, two days after the reception of the injury. At the autopsy, it was found that the fracture of the acetabulum did not communicate with the interior of the pelvis; but the articular surface was intensely injected; its cavity was filled with offensive sanious pus. The sawn extremity of the femur was black. One report states that the patient's appearance was of one who had undergone great privations and was not in a favorable condition to undergo any severe operation. The excised portions of bone, represented in the accompanying wood-cut (FIG. 47), were sent to the Army Medical Museum without a memorandum; but were ultimately identified, and numbered 1410 in the Surgical Section.

FIG. 47.—Shot fracture of head of right femur. *Spec.* 1410.

CASE 210.—Private Bartholomew Dempsey, Battery I, 4th Artillery, was wounded February 25, 1864, at Buzzard's Roost, Georgia, by a piece of shell, which passed through the upper portion of the right thigh, crushing the trochanter and neck of the femur, and producing fissures which extended to the head of the bone. The wounded man was taken to a private house in the neighborhood, at a place called "Big Spring," or in another report "Burke's Spring," a place ten miles northwest of Dalton, where, shortly after the reception of the injury, it was decided, on the recommendation of Surgeon S. G. Menzies, 1st Kentucky, that excision should be performed. Chloroform having been administered, Surgeon Nathan W. Abbott, 86th Illinois, made an incision five inches in length, commencing two inches above the trochanter major. After dissecting aside the muscular attachments and removing many fragments of the neck and trochanteric portions of the femur, the shaft of the bone was smoothly divided by the chain saw at a point an inch or a little more below the lesser trochanter. Then, with a straight bistoury, the capsular and round ligaments were divided, and the fractured head of the femur was exarticulated. The wound was then approximated by sutures and adhesive strips. The patient rallied satisfactorily from the shock of the injury and operation, and his condition was encouraging on the following morning, when the Union forces retired, sending all the wounded who could be moved to the hospitals at Chattanooga. Private Dempsey alone was left at Big Spring. On the evening of February 26th Surgeon Menzies sent Assistant Surgeon P. F. Ravenot, 73th Illinois, with a cavalry escort from General Cruft's camp, to Big Spring, a distance of five miles, to learn of Private Dempsey's condition, and, if possible, to bring him off. The escort was dispersed and Dr. Ravenot was captured. The fate of Dempsey could not be definitely ascertained. He is dropped from the rolls of his company as "missing in action at Buzzard Roost Gap." Dr. Abbott afterwards heard, indirectly, that Dempsey survived the operation four or five weeks; but was not satisfied that this information was reliable. That the case had a fatal termination there can be no doubt. The excised portions of bone were preserved by Dr. Barnes, of Centralia, Illinois, who was present at the operation. A statement has been received from Brevet-Major E. B. Atwood, 16th Infantry, that he had learned from parties who attended Private Dempsey after he was wounded that he died on February 28, 1864, at the house of a Mr. Rogers, ten miles northwest of Dalton, Georgia.

CASE 211.—Private *T. J. Hobson*, Co. H, 32d Tennessee, aged 23 years, was wounded at Kenesaw Mountain, June 24, 1864, by a conoidal musket ball, which struck the femur and comminuted the neck and trochanters. The fracture extended within the capsular ligament. The shock was very great. The patient was seen by Surgeon J. F. Grant, P. A. C. S., who found that amputation was not practicable except at the hip joint, and deemed it expedient to undertake the operation of excision, as giving, in his judgment, the best chance for recovery. The army was then retreating, and if the patient was removed to the rear it was doubtful if surgical relief could be had. Accordingly, about twelve hours after the reception of the injury, the patient being placed under the influence of chloroform, Dr. Grant proceeded to operate, by making a linear incision ten inches long on the outside of the thigh over the trochanters. The articulation was exposed, the capsular ligament divided, and the head of the bone enucleated. The shattered fragments were then removed, and the shaft of the femur was divided by a straight saw just below the trochanter. The loss of blood was slight. Immediately after the completion of the operation the patient was placed upon a box-car and transported forty miles over a very rough road to the rear. Reaction was never complete, though the patient lingered three days, and died on June 27, 1864.

CASE 212.—Lieutenant John A. McGuire, Co. I, 148th Pennsylvania, was wounded on May 12, 1864, at Spottsylvania, by a musket ball, which smashed the trochanters and neck of the right femur. He was carried to the hospital of the 3d division of the Ninth Corps, where, after an exploration of the wound under chloroform and a consultation of the senior surgeons of the division, it was determined to excise the injured bone. The head, neck, and trochanters were accordingly removed through a longitudinal incision by Surgeon George W. Snow, 35th Massachusetts. The patient died on May 15, 1864.

CASE 213.—Private *O'Rourke*, 18th Mississippi, aged 24 years, healthy and of fine constitution, was wounded at the Wilderness, May 6, 1864, by a musket ball, which entered the right thigh a little behind the trochanter, shattered the neck of the femur, and lodged. There was little injury to the soft parts, and the important vessels and nerves were unharmed. He was taken to a field hospital, and his injury was examined under chloroform, by Surgeon J. T. Gilmore, Chief Surgeon, 1st division, Longstreet's Corps. The limb was everted and shortened, the fracture appeared to be confined to the epiphysis, and there was no bleeding. Believing that removal of the injured bone offered the best chance of preserving life, Surgeon Gilmore proceeded to excise the head and neck of the femur. A curvilinear incision four or five inches long, with its convexity backward, was carried downward from a point a little above and behind the trochanter, and was made to pass through the entrance wound. The muscles inserted in the trochanter were then divided, the head was readily disarticulated, and the femur was then smoothly divided through the trochanters by a chain saw. The operation was accomplished with the loss of but little blood. Yet the patient did not react, but gradually sank, and died May 9, 1864.

CASE 214.—Private Thomas G. Pease, Co. B, 117th New York, was wounded October 28, 1864, near Fair Oaks Station. The trochanters and neck of the right femur were shattered by a musket ball, which lodged against the head in the cotyloid cavity. The soft parts were not injured badly, and it was determined by surgeons on duty at the field hospital of the Tenth Corps that excision of the upper extremity of the femur was expedient. The operation was performed, a few hours after the reception of the injury, by Surgeon N. Y. Leet, 76th Pennsylvania. The patient died on October 29, 1864.

CASE 215.—Sergeant James M. Tolman, Co. H, 18th Wisconsin, aged 30 years, was wounded May 14, 1863, near Jackson, Mississippi, by a conoidal musket ball, which comminuted the head and neck of the left femur, lodging, and producing fissures which extended about two inches below the lesser trochanter. The important nerves and vessels of the region and the walls of the pelvis had escaped injury. The patient was a somewhat cachectic subject, debilitated by malarial disorders. It was deemed that the gravity of the injuries of the upper extremity of the femur rendered operative interference imperative. About twenty-four hours after the reception of the injury, the patient was placed under the influence of chloroform, and Surgeon Henry S. Hewit, U. S. V., exarticulated the head of the femur. The incision commenced a little above and anterior to the trochanter major and extended downward in a curved direction with the convexity backward, and passed through the wound of entrance. The splintered fragments of the head and neck and the ball were removed, and then the fissured upper extremity of the shaft was sawn two and a half inches below the lesser trochanter. The operation was well borne, and the patient was removed the same day to a hospital in the city of Jackson, where he was supplied with every comfort and provided with the most careful attendance. He did apparently well until the third day, when he began to sink, the wound from this time forward exhaling a faint cadaveric odor. He died four days after the operation, May 19, 1863.

CASE 216.—An unknown private soldier of the Fifth Corps, Army of the Potomac, was wounded in the engagement at Laurel Hill, near Spottsylvania Court House, on May 10, 1864, by a musket ball, which fractured the trochanteric portion of the left femur. He was conveyed to the field hospital of the Fifth Corps, at Cassin's, on the Block House road. He was placed under the influence of chloroform, and the head, neck, and trochanters of the left femur were excised. Assistant Surgeon J. S. Billings, U. S. A., saw him on the following morning, when he appeared to be in a comfortable condition. Dr. Billings recollects that he was a young and healthy looking man. The attendants mentioned the character of the operation and the name of the operator, but Dr. Billings cannot recall these particulars. On revisiting the hospital three days subsequently, Dr. Billings learned that the patient had died on that morning, May 13, 1864.

CASE 217.—An unknown soldier of the Eighteenth Corps was wounded, in the assault on the enemy's intrenched lines at Cold Harbor, June 3, 1864, by a fragment of shell, which completely comminuted the trochanter and neck of the right femur. Shortly after the reception of the injury he was conveyed to the field hospital of the Eighteenth Corps, and immediately anæsthetized and examined. Excision of the head, neck, and trochanters of the right femur was then practised. Assistant Surgeon Billings, U. S. A., saw the patient soon after the operation, and observed that he had rallied encouragingly, and was in a comparatively comfortable condition. On June 7th the wounded of the Eighteenth Corps were placed in wagons and sent to the rear. Dr. Billings visited the hospital with a view of preventing the removal of this patient, but was informed by the director of transportation that the man had died the previous night, June 6, 1864.

CASE 218.—A Confederate private soldier was wounded at the battle of Fredericksburg, December 13, 1862, by a fragment of shell, which struck the trochanter of the right femur and fractured it and the neck of the bone, and lacerated the soft parts, but without injuring any of the important vessels or nerves. He was conveyed to a field infirmary, where, a few hours after the reception of the wound, he was placed under the influence of chloroform, and Surgeon Hunter McGuire, Medical Director of Jackson's Corps, having ascertained the extent of the injury, decided that although the lesions of the soft parts rendered the case an unpromising one, yet excision was the only resource that offered any hope, and proceeded to excise the head, neck, and trochanters, dividing the shaft just below the trochanter minor with a chain saw. The wound was left open; the limb placed in a comfortable position by means of pillows, without splints, and the patient was treated at the temporary hospital at which the operation was performed. Notwithstanding the most careful attention to the after-treatment, he succumbed two or three days after the operation.

CASE 219.—A Confederate soldier of Kershaw's South Carolina Brigade was wounded at the battle of Chancellorsville, May 3, 1863, by a musket ball which shattered the neck of the femur. It having been decided, after an examination of the wound under chloroform, that the case was a favorable one for the operation of excision, the important nerves and vessels being intact, and the injury limited mainly to the neck of the bone, the operation was performed by Surgeon James, 16th South Carolina, on the day after the reception of the wound. The patient died May 6, 1863.

In a second category are placed nine cases of primary excision at the hip which resemble each other in that in each the operations were fairly indicated and offered favor-

able prospects of success. The patients, for the most part, were robust soldiers, and the lesions were limited to shot fracture of the upper extremity of the femur. All made a struggle for existence, several lived three or four weeks and one for sixty days, and the fatal results were due, in several instances, to the imperative military exigencies that necessitated the removal and inopportune and disastrous transportation of the patients.

CASE 220.—Private Robert Cole, Co. B, 29th Connecticut (colored troops), was wounded near Fair Oaks, October 27, 1864, by a musket ball, which shattered the upper extremity of the right femur without injury to any important vessels or nerves. He was conveyed to the hospital of the Tenth Corps, where the wound was explored, and it was decided to excise the head, neck, and trochanters of the femur. The operation was performed by Surgeon C. M. Clark, 39th Illinois, a few hours after the reception of the injury, by a longitudinal incision over the trochanter major, and division of the superior portion of the shaft by a chain saw. Dressings to secure the immobility of the limb were applied, and the patient was removed to the base hospital of the Army of the James, at Point of Rocks, where he was received on October 28th, and died on October 29, 1864.

CASE 221.—Private John Coon, Co. C, 60th Indiana, aged 20 years, a robust man, was wounded at Arkansas Post, January 11, 1863, by a conoidal musket ball, which entered the right buttock and passed forward and outward, striking the femur on the inter-trochanteric line and comminuting the neck and upper part of the shaft of the bone. A few hours after the reception of the injury the patient was conveyed to a hospital steamer, and a consultation was held, at which it was determined to excise the injured portions of bone. The loss of blood which had taken place and the patient's exposure to inclement weather were regarded as very unfavorable circumstances, but it was considered that on the whole an excision was the best thing to be done. An ounce of brandy and other restoratives were administered, and half an hour subsequently the wounded man was placed under the influence of chloroform, and Surgeon Milton T. Carey, 48th Ohio, made a semi-circular incision, beginning two inches above the prominence of the great trochanter downward in the direction of the shaft of the femur. The muscular attachments were then divided, and the capsular ligament freely incised. Some difficulty was then experienced in dividing the ligamentum teres; but this was finally accomplished, and the head of the femur removed. The extent of splintering having been determined, the shaft was sawn below the trochanter minor by means of a chain saw. The edges of the wound were then brought together, and a retentive apparatus was applied. After the operation the patient seemed much prostrated, but he rallied after a few hours, and was conveyed on the hospital transport D. A. January to Memphis, Tennessee, and placed in the military general hospital at that place, where he died ten days subsequently, January 21, 1863.

CASE 222.—Private *J. W. Epton*, Co. I, 5th South Carolina, was wounded at Deep Bottom, August 16, 1864, and was conveyed to the third division of the Jackson Hospital at Richmond. Surgeon J. G. Cabell, in charge, entered on the hospital register, page 214: "A minié ball penetrated the right hip joint, on account of which a primary resection of the head and neck of the femur was practised. The patient sank, and died September 2, 1864."

CASE 223.—Private Timothy Greely, Co. C, 74th New York, aged 20 years, was wounded October 5, 1861, by a round musket ball, which entered near the fold of the left natis, struck the left femur at the digital fossa, splintered the neck into the articulation, and made its exit outside the vessels anteriorly. He was conveyed to the E street Infirmary, Washington, on the same day. A stream of blood and another of clear and pellucid synovia issued from the wound of exit. There was but little constitutional irritation, the pulse was but slightly depressed, and the patient congratulated himself on having escaped with what he regarded as a slight injury. On the morning of October 6th Assistant Surgeon John W. S. Gouley, U. S. A., assisted by Surgeon C. H. Laub, U. S. A., Assistant Surgeon C. B. White, U. S. A., Surgeon T. Sim, and Assistant Surgeon H. E. Brown, proceeded to operate. Insensibility having been induced by chloroform, Dr. Gouley made an incision seven inches long, commencing above and behind the trochanter major and continued downward in the axis of the limb. The neck of the bone was found to be badly shattered, but the fracture did not extend to the shaft. A section through the great trochanter and base of the neck was made with the chain saw. The head of the bone was then disarticulated and removed, and the fragments of the neck were extracted. There was very little loss of blood. The wound having been approximated and dressed simply, the patient was put to bed, and the limb was kept in position by pads and cushions. Surgical fever set in soon after the operation; pyæmia was developed, and the patient gradually sank, and died on October 12, 1861. His friends would not permit an autopsy. The pathological specimen and Dr. Gouley's notes of the case were destroyed in the conflagration which shortly afterwards consumed the Infirmary.

CASE 224.—Sergeant Samuel Grimshaw, Co. H, 6th New York Cavalry, aged 31 years, was wounded at Cedar Creek, October 19, 1864, by a fragment of shell, which, after lacerating the scrotum, entered at the upper inner part of the left thigh near the femoral artery, making a wound one and a half inches in length, and passing upward and backward, shattered the head and neck of the femur and produced fissures extending four and a half inches in the shaft, and lodged in the acetabulum. The shock to the nervous system was great. The patient was desponding, and he complained of severe pain. He was conveyed to a field hospital, and two hours after the reception of the injury he was placed under chloroform, and Surgeon A. P. Clark, 6th New York Cavalry, made a straight incision seven inches in length over the trochanter major, and excised the head and four and a half inches of the shaft of the femur. The wound was then dressed, and the limb was supported by pasteboard splints. On the following day no bad symptoms were observed. Beef essence and stimulants were freely given, and afterwards sulphate of morphia was administered. He was removed to the Sheridan Field Hospital at Winchester on October 20th, and there died on November 5, 1864.

CASE 225.—Private *B. C. Johnston*, Co. B, 56th North Carolina, Ransom's Brigade, was wounded on the night of the 17th of June, 1864, in front of Petersburg, by a conoidal ball probably, in the right thigh. The ball entered on the inner aspect of the limb and passed obliquely upward and outward, producing a comminuted fracture of the neck of the femur and driving the fragments of bone into the surrounding tissues. The shaft of the bone was not shattered, and, as the man was very much

worn and exhausted, as most of the Confederate troops were at that time, it was considered advisable to perform resection of the head and neck of the femur, as offering a better chance of recovery than amputation. The operation was performed on June 18th, twelve hours after the reception of the wound, and the bone was sawn through the trochanters. He bore the operation well, and, although weak, was hopeful. He was sent to the Fair Grounds Hospital, from which he was removed in a few days, placed in a tent, and attended by Surgeon Ladd, 56th North Carolina, and Dr. C. J. O'Hagan. He survived the operation two months, and succumbed at last to suppuration, caused by the want of proper food and stimulants, and the general prevalence of pyæmic infection, which at that period intervened in nearly all the surgical cases in the neighborhood of that hospital. To this account Dr. J. D. Jackson adds: "I recollect very distinctly of being present at the operation of Dr. Ladd, being then of the same division with him, but not of the same brigade. It was on the 18th or 19th of June, 1864, that it was done, the place being an unfinished brick church in the centre of Petersburg, which we were then occupying as an hospital. There were also present some four or five other surgeons, among whom I recollect Surgeon C. J. O'Hagan, Dr. Wilson, of Virginia, then the senior Surgeon of Ransom's Brigade, Dr. Luckie, of the same brigade, and, if I mistake not, Dr. R. L. Brodie, then Medical Director of General Beauregard's army, was among the number. The man operated upon was of Dr. Ladd's own regiment; his age, and any other personal peculiarities, I have forgotten, though I think he was young and comparatively robust. The wound had apparently been done by a musket ball, and the range of the wound was, I think, from the inner and upper aspect of the thigh, and nearly transversely through, ranging slightly upward, the aperture of exit being over the trochanter major. If I recollect aright, the trochanter was torn off and most of the neck of the femur shattered to fragments, the shaft of the femur being entirely separated from the head. Chloroform was given, and Dr. Ladd operated by making a slightly curvilinear incision over the acetabulum and trochanter—the aperature of the wound being in its line—cut down upon the head of the femur, exarticulated and removed it, and cut off a sharp fragment of the remaining end of the femur. The difficulty of performing the operation seemed to be small. The hæmorrhage was trifling. I do not recollect that I saw the patient again, he being sent off to the General Hospital at what was then known as the "Fair Grounds Hospital," situated in the suburbs of Petersburg. But I further remember distinctly of hearing Dr. Ladd, Dr. O'Hagan, and probably others of Ransom's Brigade speaking of his death, which was on the sixtieth day after the operation, and which all agreed at the time in ascribing to want of good food in proper quantity. Owing to the scarcity of our supplies, and the immense number of wounded men then crowding the city in consequence of the battles fought in front of Petersburg on the 17th, 18th, and 19th of June, food really proper for wounded men was not obtained, and anything like delicacies were out of the question."

CASE 226.—Private Edward A. McDonald, Co. F, 149th Pennsylvania, aged 31 years, a robust, athletic man, was wounded on August 20, 1864, on the Weldon Railroad. A conoidal musket ball entered the upper anterior part of the right thigh and lodged in the head of the femur, after splintering its neck. He was carried to the hospital of the 1st division of the Fifth Corps, and placed under the influence of chloroform a few hours after the reception of the injury, and Surgeon F. C. Reamer, 143d Pennsylvania, assisted by Surgeon Thomas, 119th Pennsylvania, and others, proceeded with the operation. A V-shaped incision, arranged to traverse the entrance wound, exposed the muscular attachments of the neck and trochanter. These being divided, with the capsular and round ligaments, the head of the femur was exarticulated. Fragments of the neck were extracted, and then the femur was sawn through the trochanteric ridge by the chain saw. The wound was then partly closed by sutures and adhesive plasters, a pledget of lint being inserted at the lower end, and the limb was bandaged and suspended by a Smith's anterior splint. Little loss of blood had been incurred, and the patient reacted and his condition appeared hopeful. Two days afterwards it was deemed necessary to remove the severely wounded from the advanced position of the Fifth Corps, and McDonald was sent in an ambulance wagon several miles, over a rough road, to the railroad to the hospital at City Point. There he remained three days, and was placed on a hospital transport and sent to Philadelphia, entering Broad and Cherry Streets Hospital August 27th. The injured limb was extended by means of a weight and pulley, concentrated nourishment and stimulants were administered, with quinia and opium. August 31st, symptoms of pyæmia were noted and the complication made rapid progress. Death took place September 4, 1864. At the autopsy large metastatic foci were observed in both lungs.

CASE 227.—Private Charles Morrison, Co. C, 185th New York, was wounded on the Quaker Road, south of Petersburg, on March 29, 1865. A conoidal musket ball struck the outside of the left thigh, fractured the trochanter, and separated the neck from the shaft. In less than two hours after the reception of the injury he was placed on the operating table at the field hospital of the 1st division of the Fifth Corps, and his wound was examined while he was under the influence of chloroform. He was a robust man, in the best health. In the judgment of the operating staff, the case was a very favorable one for the operation of excision. Surgeon William Fuller, 1st Michigan, was requested to perform the operation, and proceeded with it without delay. He entered his knife an inch above the great trochanter and made an incision three and a half inches in length, divided the muscular attachments, and readily exarticulated the head of the femur. A fissure was found to extend downwards half an inch below the trochanter minor. The shaft was divided by a chain saw at this point. The ball could not be found, but, from the direction of its track, it was the opinion of the operator and his colleagues that it had entered the pelvis through the obturator foramen. There was scarcely any hæmorrhage during the operation, no artery requiring ligation or torsion. A tent was introduced into the wound, which was then approximated by two sutures and covered by a compress dipped in cold water. A full dose of morphia was then administered, and the patient was made as comfortable as possible in a bed in a hospital tent. In the middle of the night Surgeon Fuller returned to the hospital to visit his patient, but found that he had been removed to City Point, in compliance with orders from a superior authority. Dr. Fuller was subsequently informed by Surgeon Joseph Thomas, 118th Pennsylvania, that the man died on the way to the base hospital, about twelve hours after the operation. There was some hæmorrhage a few hours after the operation, but it was not considerable. The report of the patient's death was premature. The records of the City Point Hospital show that he was received there, and survived until April 26, 1865.

CASE 228.—A Confederate private soldier of Ewell's Corps was wounded at the battle of the Wilderness, May 5, 1864, by a conoidal musket ball, which broke the neck of the left femur into several fragments and lodged in the bone at the junction

of the head and neck. A few hours after receiving his wound he was placed under the influence of chloroform at a field hospital, and was examined by Surgeon Hunter McGuire, the Medical Director of the Corps, who decided that the case was well adapted for the operation of excision of the head of the femur, and proceeded to remove, through a longitudinal incision, the head and shattered fragments of the neck, and to smooth off with a saw the jagged upper extremity of the shaft. The operation was accomplished with but trifling hæmorrhage. It is Dr. McGuire's impression, but, owing to the loss of his notes he cannot state positively, that in the subsequent rapid movements of the army it was necessary to send the patient to the rear, and besides the disadvantages of removal, he failed to receive such nourishment and careful treatment as his case demanded. He died of pyæmia, May 22, 1864. As in the majority of the primary field excisions the shattered epiphysis removed was not preserved.

Ten fatal cases of primary excision at the hip are placed in a third category. These ten might almost be set aside in estimating the value of the operation, inasmuch as the interference would hardly have been undertaken, had the extent of the lesion been fully ascertained. Four of the cases were complicated by penetration of the pelvic cavity, inducing hopeless peritonitis; four were prostrated from excessive loss of blood; in two instances extensive longitudinal splintering of the shaft of the femur forbade the anticipation of a favorable result.

CASE 229.—Private *J. T. Goode,* Co. K, 6th Virginia, aged 21 years, was wounded before Petersburg, July 31, 1864, by a conoidal musket ball, which fractured the upper extremity of the left femur. A few hours after the reception of the injury he was anæsthetized by a mixture of chloroform and ether, and the wound being explored excision was decided upon. Surgeon G. S. West, C. S. A., proceeded to perform the operation, assisted by Dr. W. L. Baylor and others. Upon making a linear incision in the axis of the limb and exposing the fracture, it was found that it extended longitudinally much lower on the shaft than was anticipated. Dr. Baylor reports that one of the surgeons present thinks that fully one-third of the femur was excised. The patient never fairly rallied from the shock of the operation, but he lingered until August 2, 1864, when he died. Dr. Baylor adds that the circumstances were very unfavorable, the patient being fully nourished and nosocomial gangrene at the time pervading the surgical wards.

CASE 230.—Private John McCulloch, aged 35 years, a recruit at the depot for volunteers at Camp Dennison, Ohio, was wounded on August 30, 1861, by the accidental discharge of a musket. The ball, taking effect at the distance of a few yards only, severely shattered the upper part of the femur and lacerated the soft parts extensively. The patient was conveyed to St. John's Hospital, in Cincinnati, and on arriving was greatly depressed by loss of blood. Professor George C. Blackman determined that removal of the shattered bone offered the best resource for the preservation of life, and, the patient having been rendered insensible by chloroform, excision of the head, neck, and trochanters was practised without delay, through a vertical incision on the exterior of the thigh. The patient died August 30, 1861, four hours after the completion of the operation. This was the first excision at the hip for shot injury in this country.

CASE 231.—Private *G. W. Mayo,* Co. B, 25th Battalion Virginia Reserves, was wounded at the affair between Yellow Tavern and the outer defences of Richmond, Virginia, May 12, 1864, by a conoidal musket ball, at short range, which entered the right buttock and passed forward and outward through the thigh, striking the femur between the trochanters, and producing very extensive splintering of the neck and shaft. He was admitted to the Receiving and Wayside Hospital, at Richmond, early the next day, and his wound being examined under chloroform, Surgeon Charles Bell Gibson, C. S. A., determined to proceed at once with the operation of excision of the head and upper extremity of the femur. The injured bone being exposed by a long straight incision, the muscular and ligamentous attachments were divided, and the head of the femur was disarticulated. Numerous detached fragments were then removed, and the shaft of the femur was sawn at a point five or six inches below the trochanter minor. The operation was rapidly accomplished, but the shock, added to the depression already existing from the injury, was such that the patient did not react. He died at 9 o'clock A. M. on May 15, 1864, about forty-five hours after the operation. The pathological specimen was preserved, and has lately been contributed to the Army Medical Museum by Dr. W. F. Richardson. It is represented in the annexed wood-cut (FIG. 48).

FIG. 48.—Shot comminution of neck and trochanters of left femur. *Spec.* 5498.

CASE 232.—At the assault on Knoxville, Tennessee, on November 16, 1863, a soldier of a Michigan cavalry regiment was wounded and made a prisoner. He was a man about eighteen years of age, five feet eight inches in height, with light hair and blue eyes, and was in robust health when he received the injury. A minié ball entering about the centre of the nates, passed forward, shattering the head and upper part of the neck of the femur, but did not injure the acetabulum. No hæmorrhage of importance followed the wound. It was considered that the case demanded excision of the head of the femur, and the operation was performed on the day of the reception of the injury by Surgeon J. S. D. Cullen, P. A. C. S. "The operator made his incision posteriorly, directly through the thickest part of the gluteal muscles, on a line parallel with the *os femoris,* instead of laterally. In making his incision, which, at the least calculation, was ten inches in length, he cut the gluteal artery near its point of exit from the pelvis." The artery was ligated finally, though not until there had been much loss of blood. The head and neck of the femur were then excised. "When the siege was abandoned," another report states, "General Longstreet retired to Russellville, and this patient was left behind. I am positive that he could not have recovered, for the suppuration that followed the operation was immense, and he was suffering from hectic fever when I last saw him, some six days after the operation." There can be but little doubt that the patient referred to in this account was Private Isaac Melcar, Co. A, 8th Michigan Cavalry, aged 18 years, who was found abandoned on the retirement of the Confederate army from Knoxville, and

was taken to hospital No. 2, in that city, and entered as a case of "gunshot fracture of left hip." No other Michigan cavalry soldier is reported at the period referred to with this or any similar wound. This man died on December 2, 1863. The register of the Knoxville Hospital gives no particulars of the case.

FIG. 49.—Fissuring of upper extremity of the right femur. *Spec.* 5499.

CASE 233.—Private *J. J. Phillips*, Co. G, 61st Virginia, was wounded on the second day of the battle of the Wilderness, May 6, 1864, by a conoidal musket ball, which entered at the posterior upper portion of the left thigh, fractured the femur, and lodged. He was immediately conveyed to Richmond by rail, and was admitted to the Receiving and Wayside Hospital on May 7th. The wound was at once thoroughly explored under chloroform, and excision of the shattered bone was decided on. Surgeon Charles Bell Gibson, C. S. A., performed the operation. A long vertical incision over the trochanter major exposed the injured bone. It was found that the ball had produced extensive longitudinal splintering and had itself split, a small fragment lodging in the medullary canal, while a larger portion had buried itself in the gluteal muscles about two inches from the point of impact upon the bone. The muscles inserted into the trochanter having been divided, the head of the femur was exarticulated, and the upper extremity of the shaft was smoothed off with a saw. The operation was accomplished without much hæmorrhage, and the patient rallied promptly from the shock. He had an anodyne, and passed a good night, and, on the following day, May 8th, he appeared to be doing well. On the 9th, however, there was much constitutional irritation, and on the morning of the 10th it was apparent that the man was sinking. He died at 4 o'clock A. M., May 11, 1864. The pathological preparation was contributed by Dr. Richardson to the Army Medical Museum, and is a fine illustration of the characteristic longitudinal fissuring produced in the femur by conoidal balls. It is represented in the adjoining wood-cut (FIG. 49).

In a letter dated Chicago, September 18, 1869, Dr. C. M. Clark, late Surgeon 39th Illinois Volunteers, reports the following case of excision at the hip:

CASE 234.—"Private *C. Raines*, Co. E, 25th North Carolina, was wounded June 2, 1864, by a conoidal ball, which entered the right thigh at the upper and outer third, near the great trochanter, passing obliquely downward and inward, and making its exit near the junction of the middle with the upper third of the femur. This man was not seen until eight hours after the wound was received, being among the last to be brought from the field. When he reached the operating table he was almost exsanguinated and pulseless, having lost a large amount of blood. After free administration of milk punch and beef tea, with comfortable rest for two hours' time, he was placed on the operating table at 7 o'clock P. M., and the following operation performed: Chloroform was given (which added greatly to the stimulation of the system—pulse 80 and full), and a longitudinal incision made from the great trochanter down to the extent of six inches. The femur was found to be extensively comminuted, and some sixteen fragments were removed, leaving the periosteum behind. There was diffused ecchymosis with clots throughout the extent of the fracture. The lower fragment was turned out and smoothly sawn off, and then attention paid to the upper portion, which was found comminuted within the capsule to such a degree as warranted the removal of the head of the bone, which was done by extending the incision upward one inch, opening the capsular ligament, turning head of bone out and dividing the ligamentum teres. The parts were then thoroughly cleansed and brought together with eight interrupted sutures. Applied strip of lint to the wound, wet with solution of tannic acid and collodion, then bandaged with spica turns about hip and splint, etc. He rallied well from the operation and passed a comfortable night at the hospital. In the morning he was taken, per hospital transport, to the Chesapeake Hospital, and I have no knowledge of the case since that time, but presume the records of that hospital will furnish the result. The bone removed below the trochanter major measured three and a half inches." This case has been identified as that of "*C. C. Kaines*, a rebel prisoner," aged 23 years, who was reported by Assistant Surgeon E. McClellan, U. S. A., as having been admitted to hospital at Fort Monroe, June 4, 1864, with "shell wound of right side and abdomen," and as having died the same day of "exhaustion."

CASE 235.—Captain Thomas R. Robeson, 2d Massachusetts, aged 24 years, an athletic man, was wounded July 3, 1863, at Gettysburg, his regiment having become warmly engaged under a musketry fire at short range. A rifled musket ball struck him over the right trochanter major, shattering the neck and head of the femur, and, as was subsequently ascertained, fractured the pelvis and penetrated its cavity. He was carried a short distance to the rear, where the stretcher-bearers became exhausted and laid him down. Sergeant Francis O'Doherty, of his regiment, coming shortly afterwards wounded to the rear, impressed some stragglers and had the wounded man conveyed to a field station of medical officers of the Twelfth Corps. In the afternoon he was brought into the Twelfth Corps hospital, and was examined by Surgeon John McNulty, U. S. V. The sufferings of the patient were intense, and he urgently demanded some operative interference for his relief. Although the prospect was very discouraging, it was decided to comply with his request. An exploration of the wound indicated that there was some injury of the pelvic wall. The patient was placed under the influence of chloroform very soon after his admission to the hospital, and a few hours subsequent to the reception of the injury Dr. McNulty made an incision over the trochanter major six inches long, passing through the wound of entrance and continued downward in the axis of the limb, turned out the shattered superior extremity of the femur and sawed the bone just below the trochanters. The fragments of the head and neck were then removed. There was more bleeding in this than in Dr. McNulty's other operations of excision of the head of the femur, yet the hæmorrhage could not be called profuse. The patient survived the operation fourteen hours. During this interval he appeared to be unconscious.

CASE 236.—It has not been possible to learn the name and military description of the subject of this operation. He was a private soldier of the First Corps, and a Frenchman, for the operator recalls the broken English in which he begged for the operation, and expressed his relief and thanks after it was performed. He had a terrible comminution of the upper extremity of the left femur, inflicted by a fragment of shell at the battle of Antietam, September 17, 1862. Surgeon John McNulty, U. S. V., excised the head and neck of the femur, five hours after the reception of the injury, through a vertical incision six inches long,

under chloroform. As in two other operations performed by Dr. McNulty, it was found that the lesions extended into the pelvis. Consequently there could be little or no hope of a successful result. This patient survived the operation only ten hours.

CASE 237.—Private —— ———, of the First Corps, was wounded at the second battle of Bull Run, August 30, 1862, by a conoidal musket ball, which entered the left hip below and in front of the trochanters, and fractured the femur at the junction of the head and neck. He was conveyed to the hospital of General King's division of the First Corps in the brick house which had been occupied as the rebel headquarters at the first battle of Bull Run. The prostration from shock was great, yet it was thought that exarticulation of the femur was the only resource, and that excision would be less hazardous than amputation. Accordingly, fifteen hours after the reception of the injury, Surgeon John McNulty, U. S. V., proceeded to excise the head and neck of the left femur through a vertical incision on the exterior of the limb about six inches in length, the patient being under chloroform. On dividing the round ligament to enucleate the head of the bone, it was discovered that the ball had penetrated the pelvic cavity through the lower portion of the acetabulum. The femur was sawn through at the junction of the shaft and neck by a narrow-bladed saw. After the removal of the shattered fragments of bone, the patient suffered much less pain. There were no symptoms of peritonæal inflammation at the date of the operation, but they were subsequently developed. The patient died August 31, 1862.

CASE 238.—Private —— ———, was wounded on August 28, 1862, in the engagement between General Rufus King's division of the First Corps and the advance of General Jackson's column on the Washington turnpike, near Gainesville. A conoidal musket ball had splintered the neck and trochanters of the left femur, and was supposed to have lodged about the acetabulum, though the operator discovered in the sequel that it had penetrated into the cavity of the pelvis. The symptoms of shock were very grave and the prognosis very unfavorable; but the chief medical officer of the division, Surgeon Peter Pineo, U. S. V., determined to remove the upper extremity of the femur. The upper fourth of the femur was excised a few hours after the reception of the injury. The excision was done under chloroform, with little apparent loss of blood, through a vertical incision on the outside of the limb. The femur was sawn about two inches below the lesser trochanter. It was now discovered that the ball had passed through the innominatum, and that internal hæmorrhage was going on. During the night of August 28th General King's division was driven back to Manassas, and this patient with other wounded fell into the hands of the enemy. It is probable that he survived but a very short time. Dr. Pineo secured the specimen, and it is preserved in the Surgical Section of the Army Medical Museum as No. 71. It is figured at page 233 of the Catalogue of the Surgical Section, and another view is given in the accompanying wood-cut (FIG. 50). The trochanter major is separated into five fragments, and a long oblique fissure produces a complete solution of continuity in the shaft of the femur.—(*Circ.* 6, S. G. O., 1865, p. 62, CASE 5, and *Circ.* 2, S. G. O., 1869, pp. 21, 132.)

FIG. 50.—Perforation of trochanter and fissuring of the shaft of left femur. *Spec.* 71.

The successful primary excision at the hip and thirty-two unsuccessful operations will now be concisely tabulated in alphabetical order for convenience of comparison and reference:

TABLE XI.

Summary of Thirty-three Cases of Primary Excision at the Hip after Shot Injury.

NO.	NAME, AGE, AND MILITARY DESCRIPTION.	DATE OF INJURY.	NATURE OF INJURY.	DATE OF OPERATION.	OPERATION AND OPERATOR.	RESULT AND REMARKS.
1	*Cannon*, —, Pt., A, 49th Georgia, age 24.	May 5, 1864.	Conoidal ball comminuted left femur one inch below trochanter major and lodged.	May 6, 1864.	Head, neck, and upper extremity of shaft, through incision in wound six inches long, by Surg. J. J. Dement, P.A.C.S.	Recovered, February, 1865, shortening three inches; limb useless for locomotion. Died November 23, 1865, diphtheria. *Circ.* No. 2, pp. 26, 133.
2	Barber, F. M., Capt., H, 16th Connecticut, age 32.	Sept. 17, 1862.	Shot shattering trochanters and neck of right femur.	Sept. 18, 1862.	Head, neck, trochanters, and fract. upper extremity, thro' straight incision four ins. long, by Surg. M. Storrs, 8th Conn.	Surgical fever. Died September 20, 1862. *Circ.* 2, pp. 22, 133.
3	*Beard, C.*, Pt., 12th Mississippi.	Aug. 23, 1864.	Conoidal ball fractured head and neck of right femur and lodged in acetabulum.	Aug. 23, 1864.	Head and femur, just above lesser troch., thro' angular incision, by Surg. A. A. White, 8th Maryland.	Died Aug. 25, 1864. *Spec.* 1410, A. M. M. *Circ.* 2, pp. 31, 134, and *Circ.* 6, p. 70.
4	Brown, E. T., Sergeant, C, 21st Massachusetts, age 30.	July 23, 1864.	Fragment of bomb fractured upper extremity of left femur, five inches.	July 23, 1864.	Head and broken extremity of shaft, thro' longitudinal incision, by Surg. W. V. White, 57th Massachusetts.	Died July 27, 1864. *Circ.* 2, pp. 30, 134.
5	Cole, R., Pt., B, 29th Connecticut.	Oct. 27, 1864.	Musket ball shattering upper extremity of right femur.	Oct. 27, 1864.	Head, neck, trochanters, and portion of shaft by longitudinal incision over troch. major, by Surg. C. M. Clark, 39th Ill.	Died October 29, 1864. *Circ.* 2, pp. 33, 134.
6	Coon, J., Pt., C, 60th Indiana, age 20.	Jan. 11, 1863.	Conoidal ball comminut'g neck and upper part of shaft of right femur.	Jan. 11, 1863.	Head and shaft below troch. minor, through semi-circular incis'n, by Surg. M. T. Carey, 48th Ohio.	Died January 21, 1863. *Circ.* 2, pp. 23, 133.
7	[1] Dempsey, B., Pt., Battery I, 4th Artillery.	Feb. 25, 1864.	Fragment of shell crushing trochanters and neck of right femur.	Feb. 25, 1864.	Head, neck, and shaft an inch below trochanter minor, thro' longitudinal incis. five ins., by Surg. N. W. Abbott, 80th Ill.	Died February 28, 1864. *Circ.* 2, pp. 25, 133.
8	*Epton, J. W.*, Pt., I, 5th S. Carolina.	Aug. 16, 1864.	Conoidal musket ball wound of right hip.	Prim'ry.	Head and neck of right femur.	Died September 2, 1864. *Circ.* 2, p. 120.
9	*Goode, J. T.*, Pt., K, 6th Virginia, age 21.	July 31, 1864.	Conoidal ball fracture upper extremity of left femur.	July 31, 1864.	Head, neck, and nearly one-third of shaft, thro' linear incision, by Surg. G. S. West, C. S. A., and others.	Died August 2, 1864, from shock of operation. *Circ.* 2, pp. 30, 134.

[1] ABBOTT (N. W.), *Cases of Resection*, in *Chicago Medical Examiner*, 1864, Vol. V, p. 612.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Operation.	Operation and Operator.	Result and Remarks.
10	[1]Greely, T., Pt., C, 74th New York, age 20.	Oct. 5, 1861.	Round ball splintering neck of left femur into articulation.	Oct. 6, 1861.	Head and fragments of neck, through incision seven inches long, sect. thro' troch. maj. and base of neck, by Ass't Surg. J. W. S. Gouley, U. S. A., and others.	Surgical fever, pyæmia. Died Oct. 12, 1861. *Circ.* 6, p. 62, and *Circ.* 2, pp. 21, 132.
11	Grimshaw, S., Sergeant, H, 6th N. Y. Cavalry, age 31.	Oct. 19, 1864.	Fragm'nt of shell shat'ing head and neck of left femur, fissures extending four and a half ins. in shaft, lodged in acetabul'm.	Oct. 19, 1864.	Head and four and a half ins. of shaft, through straight incision seven inches long, by Surg. A. P. Clark, 6th New York Cavalry.	Died November 5, 1864. *Circ.* 2, pp. 32, 134.
12	[2]*Hobson, T. J.*, Pt., H, 32d Tennessee, age 23.	June 24, 1864.	Conoidal ball fract. neck and trochanters of femur, extend into capsular ligament.	June 24, 1864.	Head and shaft just below trochanters, through linear incision ten inches long, by Surg. J. F. Grant, P. A. C. S.	Reaction never complete. Died June 27, 1864. *Circ.* 2, pp. 30, 134.
13	*Johnston, B. C.*, Pt., B, 56th North Carolina, age 26.	June 17, 1864.	Conoidal ball severing head and portion trochanter major, right femur.	June 17, 1864.	Head and fragments, through curvilinear incision five ins. long, roughened projection of shaft cut off, by Surg. C. H. Ladd, 56th N. C.	Died August 16, 1864, from exhaustion, probably the result of caries and ill-judged diet. *Circ.* 2, pp. 29, 134. EVE (*l. c.*, p. 263).
14	McCulloch, J., Recruit, age 35.	Aug. 30, 1861.	Shot shattering upper part of femur.	Aug. 30, 1861.	Head, neck, and trochanters, through vertical incision, by Prof. G. C. Blackman.	Died August 30, 1861, four hours after operation. *Circ.* 2, pp. 20, 132.
15	McDonald, E. A., Pt., F, 149th Pennsylvania, age 31.	Aug. 20, 1864.	Conoidal ball splintered neck and lodged in head of right femur.	Aug. 20, 1864.	Head, fragments of neck, and shaft, thro' trochanteric ridge, V-incision, by Surg. F. C. Reamer, 143d Penn.	Died September 4, 1864, of pyæmia. *Circ.* 6, p. 70, and *Circ.* 2, pp. 30, 134.
16	McGuire, J. A., Lieut., I, 148th Pennsylvania.	May 12, 1864.	Musket ball smashed trochanters and neck of right femur.	May 12, 1864.	Head, neck, and trochanters, thro' longitudinal incision, by Surg. G. W. Snow, 35th Mass.	Died May 15, 1864. *Circ.* 2, pp. 28, 134.
17	*Mayo, G. W.*, Pt., B, 25th Virginia Reserves.	May 12, 1864.	Conoidal ball fractured neck and shaft of right femur.	May 13, 1864.	Head and shaft, five inches below troch. minor, through straight incision, by Surg. C. B. Gibson, P. A. C. S.	Died May 15, 1864, from shock. *Spec.* 5498, A. M. M. *Circ.* 2, pp. 28. 134.
18	Melcar, I., Pt., A, 8th Michigan Cavalry, age 18.	Nov 16, 1863.	Conoidal ball shattered head and upper part neck of left femur.	Nov. 16, 1863.	Head and neck, thro' incision ten inches long, by Surg. J. S. D. Cullen, C. S. A.	Died December 2, 1863. *Circ.* 2, pp. 25, 133. EVE (*l. c.*, p. 257).
19	Morrison, C., Pt., C, 185th New York, age 21.	Mar. 29, 1865.	Conoidal ball separated neck from shaft of left femur and frack trochanter major, and probably lodged in pelvis.	Mar. 29, 1865.	Head and shaft, half inch below trochanter minor, thro' longitudinal incis'n, by Surg. W. Fuller, 1st Mich.	Hæmorrhage. Died April 26, 1865, irritation and profuse suppuration. *Circ.* 2, pp. 33, 134.
20	*O'Rourke*, —, Pt., 18th Mississippi, age 24.	May 6, 1864.	Musket ball shattered neck of right femur and lodged.	May 6, 1864.	Head, neck, and shaft, through trochanters, curvilinear incis. four inches long, by Surg. J. T. Gilmore, C. S. A.	Did not react. Died May 9, 1864. *Circ.* 2, pp. 27, 133, and EVE (*l. c.*, p. 257).
21	Pease, T. G., Pt., B, 117th New York.	Oct. 28, 1864.	Musket ball shattered trochanters and neck of right femur and lodged in cotyloid cavity.	Oct. 28, 1864.	Upper extremity of femur, by Surg. N. Y. Leet, 76th Penn.	Died Oct. 29, 1864. *Circ.* 2, pp. 32, 134.
22	*Phillips, J. J.*, Pt., G, 61st Virginia.	May 6, 1864.	Conoidal ball, extensive longitudinal splintering of shaft of right femur.	May 7, 1864.	Head and up. extremity, thro' long vertical incis'n, by Surg. C. B. Gibson, C. S. A.	Died May 11, 1864. *Spec.* 5499, A. M. M. *Circ.* 2, pp. 27, 133.
23	*Raines, C.*, Pt., E, 25th N. Carolina, age 23.	June 2, 1864.	Conoidal ball, extensive comminution of shaft and upper portion of right femur within the capsule.	June 2, 1864.	Head, neck, trochanter major, and three and a half ins. of shaft, thro' longitudinal incision six inches long, by Surg. C. M. Clark, 39th Ill.	Died June 4, 1864, exhaustion.
24	Robeson, T. R., Capt., 2d Massachusetts, age 24.	July 3, 1863.	Conoidal ball shattered head and neck of right femur, fractured the pelvis, and penetrated its cavity.	July 3, 1863.	Head, neck, and shaft just below trochanters, thro' incis'n six inches long, by Surg. J. McNulty, U. S. V.	Did not rally. Died July 3, 1863. *Circ.* 2, pp. 25, 133.
25	Talman, J. M., Sergeant, H, 18th Wisconsin, age 30.	May 14, 1863.	Conoidal ball comminuted head and neck of left femur, and lodged in neck; fissures extending down shaft.	May 15, 1863.	Head, neck, and shaft, two and a half inches below lesser trochanter, curved incision, by Surgeon H. S. Hewit, U. S. V.	Died May 19, 1863. *Circ.* 6, p. 66, and *Circ.* 2, pp. 24, 133.
26	Unknown, Pt., 1st Army Corps (a Frenchman).	Sept. 17, 1862.	Fragment of shell comminut'g upper extremity of left femur, lesions extending into pelvis.	Sept. 17, 1862.	Head and neck, thro' vertical incision six inches long, by Surg. J. McNulty, U. S. V.	Survived the operation ten hours. *Circ.* 2, pp. 22, 133.
27	Unknown, Pt., First Army Corps.	Aug. 30, 1862.	Conoidal ball fractured the left femur at junction of head and neck, pen. pelvic cavity.	Aug. 30, 1862.	Head and shaft, at junct'n with neck, vertical incision six ins. long, by Surg. J. McNulty, U. S. V.	Died August 31, 1862, from shock of injury and operation. *Circ.* 2, pp. 22, 132.
28	Unknown, Pt., General R. King's division, First Army Corps.	Aug. 28, 1862.	Conoidal ball splintering neck and trochanters of left femur, and pen. pelvic cavity.	Aug. 28, 1862.	Head and shaft, about two ins. below trochanter minor, vertical incision, by Surgeon P. Pineo, U. S. V.	Patient fell into the hands of the enemy, probably survived but a short time. *Spec.* 71, A. M. M. *Phot. Ser.*, Vol. 1, p. 13, S. G. O. *Circ.* 6, p. 62; *Circ.* 2, pp. 21, 132.
29	Unknown, Pt., Fifth Army Corps.	May 10, 1864.	Musket ball fracturing trochanteric portion of left femur.	May 10, 1864.	Head, neck, and trochanters...	Died May 13, 1864. *Circ.* 2, pp. 28, 133.
30	Unknown, Pt., Eighteenth Army Corps.	June 3, 1864.	Fragment of shell comminuted trochanter major and neck of right femur.	June 3, 1864.	Head, neck, and trochanters...	Died June 6, 1864. *Circ.* 2, pp. 29, 134.
31	*Unknown*, Pt., C. S. A.	Dec. 13, 1862.	Fragment of shell fractured trochanter major and neck of right femur.	Dec. 13, 1862.	Head, neck, and trochanters, by Surg. H. McGuire, P. A. C. S.	Died two or three days after operation, from shock. *Circ.* 2, pp. 23, 133.
32	*Unknown*, Pt., Ewell's Corps.	May 5, 1864.	Conoidal ball fractured neck of left femur, lodging.	May 5, 1864.	Head and shat'd fragments of neck and shaft, longitudinal incis'n, by Surg. H. McGuire, P. A. C. S.	Died May 22, 1864, pyæmia. *Circ.* 2, pp. 26, 133.
33	*Unknown*, Pt., Kershaw's S. C. Brigade.	May 3, 1863.	Musket ball shattered neck of femur.	May 4, 1863.	Head and neck, by Surgeon James, 16th South Carolina.	Died May 6, 1863. *Circ.* 2, pp. 24, 133, and EVE (*l. c.*, p. 257).

[1]CALHOUN (J. T.), *Army Correspondence*, in *Med. and Surg. Reporter*, 1862, Vol. VIII, p. 76.

[2]EVE (P. F.), *Contribution to the History of the Hip Joint Operations, etc.*, in *Trans. of Am. Med. Ass.*, 1867, Vol. XVIII, p. 261.

Of the thirty-three primary excisions at the hip seventeen were on the right side, thirteen on the left, and in three cases the side of the injury was not indicated. In twenty-two instances the straight, vertical longitudinal or linear incision, as variously termed by the different operators, was employed; in four instances the curvilinear; in one the V-shaped, and, in six cases the mode of incision was not indicated. In five instances the missile, either whole or in part, was excised with the injured bone.

Intermediary Excisions.—Of twenty-two excisions classified as intermediary, two resulted successfully, a mortality rate of 90.9. Sixteen of the operations were practised on Union and six on Confederate soldiers. The shortest interval between the dates of reception of injury and operation was two days, the longest twenty-eight, the average interval being about thirteen days. Details of the two successful intermediary excisions will be first noticed:

CASE 239.—Lieutenant *James M. Jarrett*, Co. C, 15th North Carolina, a spare man, 28 years of age, of medium size, of fair complexion, of temperate habits, and good general health, was wounded at the affair at Bristow Station, Virginia, October 14, 1863, by a conoidal musket ball, which entered in front and a little to the outside of the median line of the left thigh, two inches below Poupart's ligament, shattered the femur, and made its exit posteriorly at the outer part of the limb, the wound of exit being on a rather higher level than that of entrance. The fracture was dressed with a straight splint, and the wounded officer was placed in an ambulance wagon and transported over rough roads to Richmond, a distance of one hundred and sixty miles. On October 20th, he was admitted to hospital No. 4, at Richmond, in an exhausted state, and was placed in charge of Surgeon James B. Read, P. A. C. S. He complained of extreme pain upon any movement of the limb, and was unwilling to submit to an examination of the injury unless insensibility was induced. Chloroform having been administered, the splints and soiled bandages were removed, and the limb was placed in an easy position on pillows. Water dressings were applied to the wounds, and an opiate was administered. For the next three weeks, the progress of the case was very unfavorable. The wound of exit discharged copiously unwholesome thin pus, mixed with blood and bubbles of fetid gas and small bits of dead bone. The pulse was quick and small, the tongue red and dry. There was a tendency to diarrhœa, and night sweats frequently recurred. On November 9th, as the patient was steadily growing worse, a consultation was asked for, and Surgeons C. B. Gibson and M. Michel saw the case with Dr. Read. It was decided that the circumstances called for operative interference, and that an excision of the head of the femur offered the best prospect of recovery. On November 9th the patient was anæsthetized, and then placed on his right side on the operating table. A straight incision was commenced two inches below the posterior or exit wound, and was carried through this to the great trochanter, and thence upward for two inches further, thus making a wound about seven inches in length. This incision being carried down to the bone, the upper end of the shaft of the femur was examined and was found to be jagged and pointed, thin layers of bone about three inches long being broken off from its anterior aspect. The lower fragment was projected through the incision by adducting the limb and pushing the knee upward, and it was sawn about two inches below its upper sharp extremity. The trochanteric portion of the femur was then sought for, and was found drawn upward by the psoas and iliacus internus. Its extremity was seized by the lion forceps and drawn downward, and the attachments of these muscles to the lesser trochanter were divided. To luxate the head of the femur so as to admit of the division of the round ligament was a work of great difficulty. It was finally accomplished, partially by twisting the neck of the bone, and the head was exarticulated. The appearance of the principal portion of this excised bone is shown in the annexed wood-cut (FIG. 51). Several large detached fragments and splinters were then extracted, and other closely attached bits of bone were enucleated by the finger-nail. The wound was cleansed and then closed by sutures and adhesive strips. Dry dressings were applied, and the thigh was fixed by a large straight splint. The patient was ordered two grains of opium and a drachm and a quarter of brandy every two hours. At bed-time the patient was quite comfortable, and could shift his position slightly without pain; his pulse was 120. On the following day, anodynes were given at greater intervals. On November 11th, they were omitted, except at bed-time, and nutritious diet was ordered. The next day the sutures were removed; the wound began to discharge laudable pus in small quantity. The case progressed without any untoward complication. On December 9th the wound was healed, except at two points, connected by sinuses leading to the cotyloid cavity and the upper end of the shaft. The patient had gained flesh and strength; his pulse was full and strong at 76; his

FIG. 51. — Shattered upper portion of the left femur. [From a wood-cut after READ.]

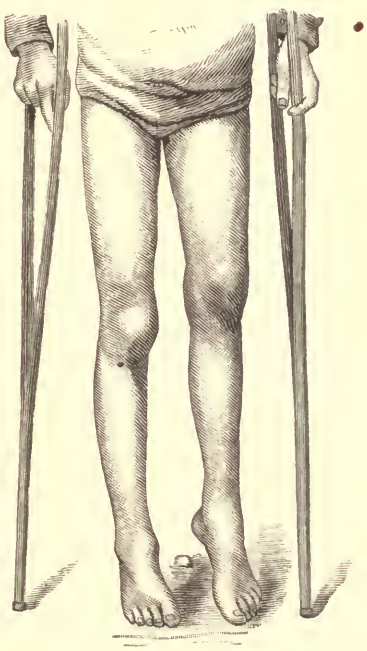

FIG. 52.—Appearance of limb seven months after operation. [From a photograph.]

appetite and digestion were natural; he slept well, was cheerful, and did not complain of pain. The limb was shortened five inches. The daily discharge of pus was less than half an ounce. Two weeks subsequently the wound was entirely united; the cicatrix was firm; the patient could move about his bed without inconvenience; there was no pain on pressure about the muscles of the injured part. The patient was now removed to his home in North Carolina, and was soon able to move about on crutches. In September, 1864, ten months after the operation, he reported that he was able to bear considerable weight on the limb, and that he had discarded his crutches and walked about in a high-heeled boot with the aid of a cane. The appearance of the patient, seven months after the operation, is exhibited in the wood-cut on the preceding page (FIG. 52), copied from a photograph presented to the compiler by Assistant Surgeon Latimer, C. S. A.

CASE 240.—Private Hugh Wright, Co. G, 87th New York, aged 28 years, a robust, healthy man, was wounded on May 5, 1864, at the battle of the Wilderness, by a conoidal musket ball, which entered the right thigh an inch within the track of the femoral vessels and two inches below Poupart's ligament, passed backward and outward, shattering the neck and trochanters of the femur, and, having been greatly flattened and distorted by the impact, it lodged amid the fragments of bone. The precise direction of the fracture is indicated in the accompanying wood-cut (FIG. 54).[1] He stated that after being wounded, he was carried to the rear by a number of his companions, and, in the evening, was taken to the field hospital of the 2d division of the Second Corps. Here he remained for three days. He was then sent in an ambulance wagon to Fredericksburg, and placed in a temporary hospital. He stated that his wound was repeatedly examined by different surgeons, but that no treatment was instituted beyond the application of a compress dipped in cold water to the wound. He was transferred, after a fortnight, on a hospital steamer, to Washington, and on May 25th he was admitted to Stanton Hospital, then under the charge of Surgeon B. B. Wilson, U. S. V. He was placed in Ward 6, under the care of Acting Assistant Surgeon J. B. Garland, who communicated a special report of the case. The injured limb was swollen, everted, and shortened. Pus had accumulated in the tissues about the hip. Notwithstanding the gravity of the injury, the patient's constitutional condition is said to have been hopeful. On exploring the wound with the finger, the patient being under the influence of chloroform, detached fragments of bone could be felt. On consultation with Acting Assistant Surgeon George A. Mursick,[2] an operation was decided upon, for the purpose of removing these loose fragments, and the missile, if it could be found. On May 27th, the patient was rendered insensible by sulphuric ether, and Dr. Mursick, assisted by Dr. Garland and others, made a straight incision, commencing above and behind the trochanter major and carried downward in the axis of the thigh. It was not in contemplation, at the beginning of the operation, Dr. Garland states, to exarticulate the head of the femur; but when the muscular attachments were divided, and the full extent of the fracture was revealed, and the joint was found distended with pus, it was at once determined to make a formal excision. The fragments of the neck were extracted piecemeal. The ball was found lying behind the neck, and was extracted. The capsular ligament being freely incised, a bistoury was inserted into the cotyloid cavity and the round ligament was severed, and the head of the femur was removed without difficulty. The jagged upper extremity of the shaft of the femur was then turned out of the wound by carrying the limb over the opposite knee, and was smoothed off by a chain saw. There was but trifling hæmorrhage, and no ligatures were required. The wound was carefully cleansed, dressed with dry lint, and left to heal by granulation. To keep the limb in position, long sand bags were laid on either side of it, and moderate extension was made by means of a weight attached to the leg and suspended from the foot of the bed. At night he took a grain of sulphate of morphia in a draught. The operation seemed to depress him very much, and reaction was slow. He passed a restless night, manifesting much nervous excitement. In the morning his pulse was feeble and frequent; his tongue dry and furred. He was ordered an ounce of brandy every three hours, a grain of opium every four hours, and as much beef tea and concentrated nourishment as he could take. On May 29th his general condition had much improved; the pulse was less frequent and stronger. There was free suppuration. The wound was dressed with a weak solution of permanganate of potassa. On June 1st he continued to improve, the wound looked well, and the character of the suppuration was good. The amount of brandy was reduced to four ounces daily. On August 1st he was still doing well. The wound was filled up with granulations from the bottom, with the exception of a sinus leading to the bone. It continued to suppurate quite freely, and some small pieces of dead bone had come away with the discharges. He had gained in flesh, and his health and spirits were good. On August 22d, he attempted, for the first time, to sit up in bed, but, owing to the rigidity of the parts and the agglutination of the muscles, the pain caused by the sitting posture was so severe that he was compelled to lie down again. Cold evaporating lotions were applied to the thigh. On August 23d the upper part of the thigh swelled and was painful, and the discharge was increased in quantity. On August 27th the swelling of the thigh had increased, the discharge from the wound was very free, thin, and flaky, and the surrounding surface was glazed and doughy to the touch. The wound of entrance had re-opened and discharged thin pus. An abscess formed on the inner side of the thigh, and about four ounces of thin flaky

FIG. 53.—Appearance of limb two years and five months after operation. [From a photograph.]

FIG. 54.—Shot comminution of neck and trochanters of right femur. *Spec.* 3375.

[1] An anterior view of this specimen is printed in the surgical report in *Circular* No. 6, S. G. O., 1865, p. 74, and in the *Catalogue of the Surgica Section of the Army Med. Museum*, 1866, p. 246.

[2] MURSICK (G. A.), *A successful Case of Excision of the Head of the Femur for Gunshot Fracture*, in *New York Med. Jour.*, 1865, Vol. I, p. 424. See also *Circular* No. 6, S. G. O., 1865, p. 68, *Circular* No. 2, S. G. O., 1869, pp. 41, 135, *Photographic Series*, A. M. M., Vol. IV, p. 38.

pus was discharged. The patient was restless. He was ordered twenty drops of the tincture of the sesquichloride of iron every six hours, with stimulants and nutritious diet. On September 1st the swelling and inflammation of the thigh continued. He complained of nausea and want of appetite. An abscess formed on the outer side of the thigh. On September 5th the abscess was incised, and a large quantity of thin, flaky, and offensive pus was evacuated. He had an irritable stomach, and Hoffman's anodyne was administered. On September 6th the edges of the incision in the abscess were beginning to slough, and nitric acid was freely applied. On September 9th he had diarrhœa; ten grains of subnitrate of bismuth and a grain of opium were given every six hours. On September 13th the diarrhœa had nearly ceased. The patient's general condition had improved, and the wound looked well, though the suppuration was still copious, and had improved in quality. On September 25th a large ring-shaped exfoliation from the upper end of the femur was removed through the wound of operation. On September 26th another exfoliation was removed. On October 6th, 1864, Private Wright was discharged from the military service on account of the expiration of his enlistment. On October 7th the swelling of the thigh had subsided; the discharge from the wounds had much diminished in quantity, and presented the appearance of laudable pus; the diarrhœa had ceased, and his general condition was much improved, he being able to sit up in bed. On October 30th, a sinus communicating with necrosed bone opened on the outside of the thigh. In the latter part of December, another abscess formed on the outer side of the thigh. When this was opened the swelling and inflammation subsided. He continued to do well until February 6, 1865, when another abscess formed in the lower third of the thigh, on the outer side. This was incised and the pus evacuated. Several pieces of dead bone came away with the discharges from the wound of operation. About the middle of March, 1865, he was able to get out of bed, and to walk about the ward on crutches. Soon after, in getting out of bed, "he let his leg fall and hurt it." This accident was followed by inflammation and swelling of the thigh, and an abscess in the lower third of it, on the inner side. This was incised, and a small quantity of pus was evacuated. He was now attacked with erysipelas, which extended from the knee to the hip. This was combated with tonics and stimulants, such as iron and quinine, and rapidly disappeared. From this time he did well, taking daily exercise about the hospital on crutches. On April 17th, he was transferred to the Ward Hospital, at Newark, New Jersey. His general health was tolerably good. He could not bear much weight on his limb, and inflammation and abscesses followed any unusual exertion. He remained at this hospital until May 6, 1865, when it was reported that he "eloped." As a discharged soldier, he was no longer under military authority, and was at liberty to go. For many months, though diligent inquiries were made, he could not be traced; but, in July, 1866, Surgeon General L. W. Oakley, of New Jersey, transmitted a letter from Dr. W. Pierson, of Orange, New Jersey, which stated that Wright had entered the almshouse at that place in June, 1865, and had remained there until the following spring, under Dr. Pierson's professional care. At first, the mutilated limb had been enormously swollen from œdema, and there was an ichorous discharge from a sinus near the hip joint. With careful bandaging, the œdema gradually disappeared. In the spring of 1866, Wright left the almshouse, and engaged himself as a laborer on a farm. He wore, Dr. Pierson reported, a cork-soled shoe of his own manufacture. The limb was shortened precisely five inches. The circumference of the injured thigh at the highest part was one inch less than that of its fellow. He walked well without crutch or cane, bearing his full weight on the mutilated limb. There was quite free motion at the hip, but little at the knee. There were no open fistules, and no tenderness about any of the cicatrices. Dr. Stephen Wickes, of Orange, reported, in the summer of 1866, that Wright was in good health, though somewhat intemperate; that he worked daily at light tasks, and was even able to mow grass. He commonly walked with a cane. According to the measurement of Dr. Wickes, the limb was shortened four and three-quarter inches. About this period, Dr. Mursick, the operator in the case, discovered his former patient, and examined him. He found the resected end of the femur firmly attached to the pelvis by ligamentous tissue an inch and a half long. The agglutination of the muscular sheaths had nearly disappeared. The limb was quite under control. The man could flex and extend it slightly, and adduct to a limited extent; the power of rotating and abducting was lost. Motion at the knee was quite restricted, on account of the thickening and consolidation of the surrounding tissues resulting from inflammation. He stated that latterly the improvement in his limb had been very decided; that when he first commenced to walk, the limb felt like a weight attached to the body; this sensation had entirely disappeared. January 15, 1867, Hugh Wright was found duly established at his residence in North Orange, Essex, New Jersey, receiving a pension dating from October, 1864, the date of his injury. The Pension Examiner, Dr. A. W. Woodhull, of Newark, reported "that at that date there was about six inches shortening, with no power of flexion or extension at the hip and the power of rotation to a very limited degree. All motion of the injured limb for progression was imparted by lateral swing of the body itself. I may add that the knee joint of the injured limb is stiffened." On October 19, 1867, Dr. Mursick again examined Wright, and took him to New York, and had his photograph taken. The negative is preserved at the Army Medical Museum, and is No. 188 of the Surgical Series of Photographs, a reduced copy of the lower limbs as shown, in the photograph, is presented in the wood-cut (FIG. 53). At this period, Wright reported that his limb had given him no trouble since the sinuses healed, in May, 1865, and that it sufficed for all purposes of locomotion. He stood on it very firmly, and could move it in any direction with an easy, swinging motion. He had been engaged for a year and a half as a farm hand, and was employed at that time as a wood-chopper. He had for a short time earned larger wages as a hod bearer, and had climbed high ladders with a heavy hod of bricks on his shoulders; but he found this avocation too fatiguing. His general health and physical condition were good. The knee joint continued quite stiff. It could be flexed to about quarter, perhaps, of the normal extent. When he walked, the rounded upper extremity of the femur played up and down on the dorsum of the ilium over a space of an inch and a half. In November, 1868, Dr. Mursick again examined Wright, and reported on his condition. The utility of his limb had augmented during the twelve months that had elapsed since the last examination. The attachment of the femur to the pelvis was strong; the cicatrices were firm and healthy. All the movements of the thigh were performed with almost as much facility as in the normal state; rotation, even, as well as flexion, extension, adduction, and abduction. His general health was good. On August 3, 1872, Wright's pension was increased to $18 per month on account of increasing disability and because additional legislation permitted larger payment to the more gravely mutilated. In September, 1873, Pension Examiner A. W. Woodhull reported the local disability unchanged, and, on October 26, 1874, the sudden death of the pensioner, Hugh Wright, from supposed cardiac disease was reported. Unfortunately no autopsy was made and the valuable opportunity of examining the relations of the resected joint was unimproved.

In the twenty unsuccessful intermediary excisions the average duration of life after operation was twelve and a half days. One patient (CASE 248) survived seventy-five days, and apparently succumbed to climatic influences rather than to the effects of the injury and operation; another (CASE 251) died at the end of three weeks with colliquative diarrhœa and malarial complications. Four cases where the lesions seemed to indicate the operation, made little or no recuperative effort, and form the first category. The first was a solitary instance of fracture by a shell fragment:

CASE 241.—Private Cornelius Callaghan, Co. G, 2d Delaware, was wounded in the left hip by a fragment of shell, at the battle of Antietam, September 17, 1862. On September 19th, he was admitted to hospital No. 3, at Frederick, Maryland. He was placed under the influence of chloroform, and an examination of the wound was made by Assistant Surgeons Bill and Colton, U. S. A. The wound being enlarged sufficiently to admit of free exploration, the trochanteric region of the femur was found to be badly comminuted, the great trochanter entirely detached and drawn backward by the action of the gluteus, while fissures extended up the neck within the capsular ligament. No fissures extended below the trochanter minor. The patient's general condition was good, and all the circumstances being favorable to such an attempt, it was determined, in a consultation of the medical staff, and with the approval of Medical Inspector Coolidge and Surgeon Milhau, U. S. A., that the injured portions of bone should be excised. On September 29th, Assistant Surgeon J. H. Bill made an incision from the wound three inches downward in the course of the shaft, and another three inches long curving upward and inward from the wound to a point a little below the anterior superior spinous process of the ilium. The muscular attachments being dissected aside, a chain saw was passed around the shaft of the femur and made to divide it just below the trochanter minor. The head of the bone was then disarticulated. The edges of the wound were united by six sutures, and adhesive plasters and water dressings were applied. The limb was kept in position by pillows, without the use of splints. A full dose of morphia was given, and light but nourishing food was directed. On the following day the patient was quite comfortable. His pulse, which was 100 before the operation, now beat 120. He was ordered a diet of beef tea, eggs, and oysters, with a small amount of wine. At midnight he was sleeping quietly. On October 1st he was still cheerful. His pulse was very compressible at 120, and he was sweating profusely. The thigh was swollen and painful. A draught of aromatic sulphuric acid with a little quinia was added to his prescriptions, and the allowance of wine was increased. The prognosis was now very unfavorable. On October 2d the sweating was checked, but diarrhœa had supervened. The pulse was still softer and more frequent, and suppuration had commenced. At midnight the patient was attacked with vomiting and hiccough. On October 3d the vomiting persisted, and the sweating was renewed. This state continued through the day and night, the patient sinking gradually. He died at 3 o'clock P. M. of October 4, 1862. The pathological preparation is deposited in the Army Medical Museum, and is numbered 840 of the Surgical Section. An anterior view of it is presented at page 247 of the Catalogue of the Surgical Section, and a posterior view in the accompanying wood-cut (FIG. 55).

FIG. 55.—Neck and trochanters of right femur shattered by a fragment of shell, and excised. *Spec.* 840, Sec. I, A.M.M.

CASE 242.—Private D. M. Noe, Co. C, 46th Ohio, aged 22 years, was wounded at the battle of Shiloh, Tennessee, April 6, 1862, by a conoidal musket ball, which shattered the neck of the left femur. The patient was placed on board the hospital transport steamer Lancaster, under the charge of Surgeon George C. Blackman, U. S. V. On April 16, 1862, chloroform having been administered, Dr. Blackman made a longitudinal incision four inches in length over the trochanter, and excised the head, neck, and trochanters, together with three inches of the shaft of the femur, the diaphysis being divided by a common amputating saw. The patient reacted well after the operation, and for five days the symptoms progressed favorably. Pyæmia was subsequently developed, and death ensued on April 24, 1862, eight days after the operation.

CASE 243.—Private *Marsella Smith*, Co. F, 38th Virginia, a robust middle-aged man, was wounded near Spottsylvania, early in the morning of May 10, 1864, by a conoidal musket ball, which entered at the upper posterior part of the left thigh, passed through the perinæum without injuring the urethra, and through the soft parts of the right hip. He was sent to Richmond by rail, and was admitted to hospital No. 9, otherwise known as the Receiving and Wayside Hospital, on the following morning. On May 12th he was placed under chloroform and the wound was thoroughly explored. The limb was everted and shortened and swollen; there was crepitus on rotation. The fracture appeared to be limited to the great trochanter and neck. It was supposed that the urethra was divided; but this was afterwards proved not to be the case. Surgeon Charles Bell Gibson, C. S. A., decided to excise the injured bone, and the operation was performed forty-eight hours after the reception of the injury, the head, neck, and two inches of the shaft being removed. It is stated that the effects of the chloroform were unfavorable. On the following day "patient commenced sinking at an early hour, and continued growing more and more feeble until 3 o'clock P M., when death ended his sufferings," May 13, 1864. The excised portion of the femur was preserved by Dr. Richardson, and has been presented by him to the Army Medical Museum. It is represented in the accompanying drawing (FIG. 56), and shows that the injury to the bone was altogether external to the hip joint.

FIG. 56.—Oblique gunshot fracture of the upper portion of shaft of left femur. *Spec.* 5500, Sect. I, A.M.M.

CASE 244.—A soldier of General Buell's army was wounded in a picket skirmish, about seven miles from Nashville, in March, 1862, by a conoidal musket ball, which shattered the neck and trochanters of the femur. He was immediately conveyed to Nashville, and placed in the College Hospital, under the care of Surgeon A. H. Thurston, U. S. V. Surgeon M. Goldsmith, U. S. V., saw him in two days after the reception of the injury, and deemed the case peculiarly well adapted for the operation of excision. The surgeon in charge concurring in this opinion, the patient was anæsthetized, and Dr. Thurston proceeded to excise the head and splintered upper extremity of the femur, through a long straight incision. The operation was accom-

plished with but little hæmorrhage, and although the patient was much prostrated by the shock of the injury and of the operation, he reacted and was in a comfortable condition for several days. But surgical fever and suppuration soon set in, and he gradually sank, and died one week after the operation. There can be little doubt that the subject of this operation was Corporal Henry F. Smith, Co. B, 1st Wisconsin, who, according to the records of the Nashville Hospital, was admitted for a gunshot wound of the hip, and was the only patient who died from wounds in Dr. Thurston's wards, at the period referred to.[1] Corporal Smith died on March 15, 1862. The operation was probably done on March 10th.[2]

In the second category of intermediary excisions are grouped eight cases well adapted from the local lesions for the operation in which all the patients made a struggle for recovery, and two survived respectively five and eleven weeks:

CASE 245.—Private *T. C. Christopher,* Co. D, 18th South Carolina, aged 21 years, a robust man, was wounded at Williamsburg, Virginia, May 5, 1862, by a conoidal musket ball, which entered about two inches below and behind the left trochanter major, and passed forward, upward, and inward. He was stooping at the time he received the injury. He was made prisoner, and sent to York River, and thence on a hospital steamer to Washington, and placed in Cliffburne Hospital, May 17th. His pulse was 100, and he complained of severe pain in the hip and knee. The tissues about the hip were much swollen; the limb was everted, and shortened one and a half inches. The opening made by the bullet was very small, and discharged a thin sanious pus. There was no orifice of exit. The patient was etherized, and careful exploration of the wound revealed a fracture of the inner portion of the neck and probably of the head of the femur. It was decided that excision should be performed, and the patient was placed upon a soothing and supporting regimen preparatory to the operation. May 20th, Assistant Surgeon J. S. Billings, U. S. A., made a curvilinear incision, four inches in length, one inch behind the great trochanter, that revealed the condition of the parts. Fragments of the inner extremity of the neck were removed piecemeal. The head was then removed from the cotyloid cavity, except a small fragment which was extracted from an intermuscular space. The ball was now discovered lying in the obturator externus muscle, and extracted. Little blood was lost, and reaction took place. Water dressing was applied, and a grain of sulphate of morphia administered. Eversion of the foot was corrected by fastening the limb by straps of adhesive plaster to an upright piece of wood screwed to the foot of the bedstead, and, the latter being raised, adequate extension and counter-extension were secured. On May 21st, the patient reported a comfortable night, but now had a very irritable stomach, with frequent vomiting. His skin was cool and clammy; his pulse small and feeble at 115. He was ordered aromatic spirits of ammonia in small doses, brandy, egg-nog, and beef essence, with sinapisms to the epigastrium. On May 23d, the irritability of the stomach had subsided. The patient was weaker; stimulants and concentrated nourishment were given. On May 24th, the patient rapidly grew weaker. Capillary hæmorrhage took place from the surfaces of the incision, but was readily checked by the application of a solution of persulphate of iron. Enemata of beef essence and brandy were administered, and these articles also by the mouth. The patient sank rapidly, and died May 24th, five days after the operation. At the autopsy, twelve hours after death, the soft parts about the seat of injury were found dark in color and softened. The acetabulum was eroded. A clot of blood of three ounces was found between the peritoneum and iliacus externus muscle. The innominatum and superior portion of the femur were removed, and, together with the excised fragments, forwarded to the Army Medical Museum, and numbered 19 of the Surgical Section, having been mounted among its earliest specimens, and it is represented in the wood-cut (FIG. 57).—(*Circ.* 6, S. G. O., 1865, p. 62, and *Circ.* 2, S. G. O., 1869, pp. 35, 135.)

FIG. 57.—Transverse shot fracture of the anatomical neck of the left femur, with caries. *Spec.* 19.

CASE 246.—Private *T. E. Foulke,* Co. D, 2d Alabama, aged 17 years, was wounded and captured at Fort Blakely, Alabama, April 9, 1865. A conoidal musket ball entered posteriorly at the middle third of the left thigh, fractured the upper third of the femur, including the trochanters and neck, and was removed from above the anterior superior spinous process of the left ilium. The patient was then transferred to New Orleans, and, on April 15th, he was admitted to the St. Louis Hospital. On admission he was very much exhausted by profuse suppuration, the soft parts about the hip-joint being filled with unhealthy pus. On April 27th Surgeon A. McMahon, U. S. V., excised the head, neck, trochanters, and two inches of the shaft of the left femur, the patient being under the influence of chloroform. He was placed on nourishing diet, with two bottles of porter daily, eggs, beef tea, and everything he desired. On May 26th he was transferred to the Marine Hospital at New Orleans. He was then doing well; but he gradually failed, and died June 5, 1865, of exhaustion, thirty-nine days after the operation.

CASE 247.—Private Charles E. Marston, Co. F, 1st Massachusetts, aged 19 years, a pale and delicate boy, was wounded at the second battle of Bull Run, August 30, 1862. He was admitted to the College Hospital, Georgetown, D. C., on September 6th, having laid on the battle-field several days, and then moved in an ambulance wagon thirty miles over very rough roads. An examination revealed a large bullet wound an inch anterior to and on a line with the right trochanter major, with great comminution of the head and neck of the femur. The limb was shortened, and the foot was everted. The circumference of the

[1] The above account has been submitted to Dr. M. GOLDSMITH, who states that he thinks that the identification of the case is complete. Surgeon THURSTON died during the war.

[2] The report of the Adjutant General of Wisconsin for 1865, p. 33, states that on March 8, 1862, five companies of the 1st Wisconsin Volunteers were sent out beyond Nashville on picket duty. They were attacked by a cavalry force, and Private Willett Greenly was killed—"the first Union soldier killed in Tennessee"—while Corporal H. F. Smith and one other were wounded, and were sent to Nashville.

limb exceeded that of its fellow by half. The pulse was 112, and of moderate volume. The tongue was rather dry. The patient suffered little pain. The general condition was not promising, and yet not very bad. Excision of the fractured bone was decided upon, and, on the 27th of September, Assistant Surgeon B. A. Clements, U. S. A., assisted by Assistant Surgeon Charles H. Alden, U. S. A., and the surgical staff of the hospital, proceeded to perform the operation. Chloroform was administered, and a slightly curved incision five inches in length was made on the outside of the thigh, the shot hole in the middle of the incision, and the trochanters and neck were thus exposed. The neck was crushed into about forty fragments, which were extracted. The head was also much broken, and the round ligament was absorbed or destroyed, so that exarticulation was easy. The roughened portion of the neck, at its attachment with the trochanter, was sawn off with a small chain saw.

FIG. 58.—Shot comminution of head and neck of right femur. *Spec.* 328.

The missile, a conoidal musket ball, was found on the inner side of the thigh at the bottom of a large cavity, and was removed with difficulty. After thoroughly syringing the wound and removing the powdered bone, the wound was closed by silver sutures, except at the bullet hole, and sand bags were placed to keep the limb in position. Slight extension was made by a weight to the foot. The patient expressed himself as relieved by the operation, and he slept well that night. On the following day his pulse had risen to 128, and the discharge from the wound was very copious, thin, and brown. On September 29th, his pulse was still quick and feeble, and his tongue dry, and, though he took nourishment well, and was free from distress, he gradually sank. He died on September 30, 1862, at half past 8 o'clock A. M., three days after the operation. At the autopsy, on October 1st, made by Acting Assistant Surgeon G. K. Smith, the wound made by the operation was found to be filled with very offensive pus. The upper end of the shaft of the femur was found to be diseased on its posterior surface near the trochanter minor, and the periosteum was loosened from the bone for some distance above and below this point. The fracture of the ischium, which was noticed at the operation, extended obliquely upward and backward from the lower border of the acetabulum, terminating in the sciatic notch, about an inch and a quarter above the spine of the ischium. The lower half of the acetabulum had been broken into several fragments, which were held in position by the cotyloid ligament. The excised portions of the femur were forwarded to the Army Medical Museum, and are numbered 328 in the Surgical Section. They are represented in the adjoining wood-cut (FIG. 58).

CASE 248.—Private John Miller, Co. E, 162d New York, aged about 38 years, a robust, phlegmatic German, in good health, was wounded on June 14, 1863, in the assault on Port Hudson, Louisiana, by a conoidal musket ball, which passed through the upper portion of the thigh, breaking the neck of the left femur transversely, and splitting it longitudinally, but without great comminution. The pelvis was uninjured, and there was no serious damage to the soft tissues. The patient was conveyed to New Orleans on a hospital transport, and was placed in the St. Louis Hospital, on June 16th. It was determined that excision of the injured bone was advisable, and the officer in charge of the hospital, Surgeon F. Bacon, U. S. V., being confined to his bed by illness, the operation was performed on July 8th, by Assistant Surgeon George W. Avery, 9th Connecticut. The head, neck, and great trochanter were removed in the usual way, through a single straight incision of moderate extent over the trochanter and in a line with the axis of the femur. There was an immaterial loss of blood. The state of the tissues involved and the constitutional condition of the patient were as good as might be. Dr. Bacon remarked that the operation was well and rapidly performed. The patient rallied from it promptly, and afterwards received the most assiduous care. His progress was very favorable until the early part of September. The wound had nearly healed, and Surgeon Bacon and his assistants were very hopeful of the patient's recovery. But in September the weather became most oppressively hot, and the patient steadily declined. The wound assumed a bad appearance, discharging copiously, and despite sustaining measures, the patient sank and died from exhaustion on September 21, 1863, seventy-five days after the operation. Dr. Bacon examined the fragments of bone removed, and found the periosteum adherent throughout the larger pieces.

CASE 249.—Private Henry Phillips, Co. I, 146th New York, a robust man, aged 34 years, was wounded at the South Side Railroad, near Petersburg, on April 1, 1865, by a conoidal musket ball, which entered the left thigh and lodged against the anterior surface of the neck of the femur. The patient was conveyed to the field hospital of the 2d division of the Fifth Corps, and thence by ambulance and rail to City Point, where he arrived on April 4th, and was transferred by steamer to Washington, and, on April 6th, was admitted into Douglas Hospital. He was much exhausted and had considerable fever, though in frequency the pulse and respiration were nearly normal. The wound was painful, and the beginning of its grave constitutional aspect was becoming manifest. There was no shortening or deformity of the limb. At a preliminary exploration the ball was found impacted near the anatomical neck, and was extracted. The limited nature of the fracture was also ascertained, and excision was decided on. On April 8th the patient was placed under the influence of ether, and Assistant Surgeon William F. Norris, U. S. A., excised the head, neck, and trochanter major through a curved incision six or seven inches in length with its convexity forward. About twelve or sixteen ounces of blood were lost during the operation. One small artery required a ligature. The ball had crushed in the laminated structure of the anterior face of the neck, and from this cup-shaped cavity a small fissure ran up the articular surface and a deep fissure nearly around the neck; but the separation between the head and neck was incomplete. During the operation this fracture was converted into a complete one in rotating the bone to facilitate the exarticulation. The operation concluded, the limb was supported by pillows, and the patient was ordered beef tea and milk punch every three hours, and a full dose of opium at midnight. He had another dose of laudanum at four o'clock the next morning. On the 9th, 10th, and 11th, there was little pain, and anodynes were not required, but concentrated nourishment and stimulants were assiduously administered. It was thought the nurse exceeded his instructions in the amount of whiskey given, for on April 12th, the patient had hiccough and nausea, and his breath was redolent of alcoholic fumes. He was now transferred to the immediate charge of Acting Assistant Surgeon C. Carvallo. A laxative enema was administered, and, when the bowels were unloaded, a sinapism at the epigastrium, and small doses of creasote allayed the irritability of stomach. On April 13th the stomach was quiet, pulse 120, rather weak,

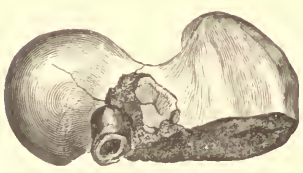

FIG. 59.—Fracture of head and neck of left femur by a conoidal musket ball. *Spec.* 3235, Sect. I, A. M. M. ½

and there was profuse perspiration. The patient was ordered a cupful of beef tea every two hours, one of milk punch every four hours, milk toast and soft boiled eggs at breakfast and dinner. No change the next day. On the 14th the wound looked well. Some shreds of disorganized connective tissue were removed by the dressing forceps. There was some pain and difficulty in micturition. Small doses of tincture of the sesquichloride of iron were directed thrice daily, and chicken broth was added to his dietary. No entry of importance appears on the 16th. On the 17th the pulse was 120, respiration 32. Slight pain on right side, and signs of pleurisy on auscultation. There was an erythematous blush about the wound, and, in the evening, there was diarrhœa, which was checked by pills of opium and nitrate of silver. On the 18th the pleurisy was worse, the breathing more rapid, and there was retention of urine, so that it was necessary after this to use a catheter. April 19th the countenance was sunken, and the wound was flabby. There was a sore on the sacrum. The patient was moved to a Crosby Invalid Bed. He had a draught containing ammonia and sugar, and a blister on his side. April 20th the nurse reported a chill during the night. The breathing was labored. There were sordes on the teeth. At the next morning visit the patient was very low. He died before noon, April 21, 1865, eleven days after the operation. The autopsy revealed dry pleurisy on either side; lungs healthy, somewhat congested posteriorly; heart and liver not abnormal. A large sub-peritoneal abscess in the course of psoas and internal iliac muscles, which appeared to originate in the obturator foreamen and ascend along the left iliac fossa, denuding the bone of its periosteum. No evidences of pyæmia were found, though it was strongly suspected after the occurrence of the chill on April 20th. The pathological specimen, contributed by the operator to the Army Medical Museum, is represented at page 246 of the Catalogue of the Surgical Section of 1866, and by the wood-cut (FIG. 59).

CASE 250.—Captain John Phelan, Co. A, 73d New York, aged 22 years, received a compound comminuted fracture of the neck and upper extremity of the left femur at the battle of Spottsylvania Court House, on May 14, 1864. On May 16th, he was admitted to Mount Pleasant Hospital, Washington. The rapid and incessant influx of wounded was such that the attention of the overworked hospital staff was not especially drawn to his case for some time after his admission, and the delay in minutely examining the case was extended by the uncomplaining fortitude of the sufferer, who expressed his wish that the more serious cases should first be attended to, and declared that his own sufferings were comparatively slight. When, however, Acting Assistant Surgeon Mulford, the ward surgeon, proceeded, on June 3d, to adapt apparatus to what he supposed to be an ordinary gunshot fracture of the upper third of the thigh, he was led to apprehend that the injury extended to the coxo-femoral articulation, and requested the opinion of the surgeon in charge of the hospital, Assistant Surgeon C. A. McCall, U. S. A., as to the diagnosis and treatment. Dr. McCall immediately visited the patient, and found him to be a large, muscular, finely formed man, whose previous health had been excellent. When lying quietly in bed, he suffered but little. His appetite was good; and his strength, so far, had diminished but little. Altogether, his general condition was extraordinarily good, in view of the gravity of the injury he had sustained. The ball had entered in front, just over the point at which the profunda is given off from the left femoral artery. The aperture of entrance was small and characteristic as an entrance wound of a conoidal musket ball. The missile had passed toward the great trochanter and shattered it. Further, its course could not be ascertained at the time. Any movement of the limb caused extreme pain. Though the femur was much comminuted, Dr. McCall was not positive that the hip joint was implicated, and, with a view to a full exploration of the injury, he directed Dr. Mulford to make a longitudinal incision three inches in length over the trochanter, to explore the parts thoroughly, and to ascertain by digital examination the condition of the articulation. If it was uninjured, Dr. Mulford was instructed to extract detached fragments of bone and foreign matters, to close the upper part of the wound, and to avail of the lower portion for drainage. In the afternoon the patient was etherized, and the exploratory incision was made, and it was found that the fracture extended to the head of the femur. It was then decided to excise the head. The patient was again rendered insensible by the inhalation of sulphuric ether, and Dr. McCall extended Dr. Mulford's incision upward an inch or more, and then made an oblique incision across its upper extremity, as represented in the accompanying figure (FIG. 61). The two flaps thus marked out were reflected, and the joint was readily exposed, the round ligament divided, and the head of the femur exarticulated. The acetabulum was carefully examined and found to be uninjured. Seven large and numerous small fragments of the neck and trochanter major were then removed, a task requiring much time and patience, many fragments being driven into the gluteal muscles, or deeply retracted by the muscles attached to the great trochanter. The fractured upper extremity of the femur was then brought out at the wound, by adducting and pushing upward the knee of the injured limb, and all diseased tissue was removed. The periosteum was in a healthy condition quite up to the end of the bone. The wound was now thoroughly washed out, and approximated by three stitches, and by adhesive strips. A grain of sulphate of morphia was administered, and the patient was put to bed. The operation lasted three-quarters of an hour. Dr. McCall thinks that the ball was removed during the operation; but is not positive on this point. The hospital report, which is quoted at page 69 of *Circular* No. 6, S. G. O., 1865, states that the patient's pulse was quick and irritable at the time of the operation, that he had a furred tongue and diarrhœa, and was reduced by suppuration. But Dr. McCall (letter of February 11, 1868) thinks that this report exaggerates the gravity of the constitutional symptoms, and is quite sure that the general condition was favorable. The patient rallied well from the operation. For two days the wound was dressed with lint. Suppuration then commencing, the limb was placed in Fergusson's apparatus for excision of the head of the femur, the counter-extension straps being left off. The wound was freely syringed with cold water containing a little permanganate of potassa. A nourishing diet was ordered, with tonics

FIG. 60.—Excised head and fragments of neck of left femur. *Spec.* 2618.

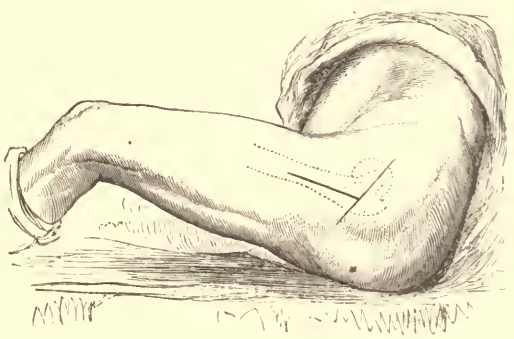

FIG. 61.—Direction of the incisions in case of excision of the head of the femur. [From a drawing by Dr. MCCALL.]

and stimulants. For a week or ten days subsequently, the case progressed favorably. Suppuration was moderate in amount, and of a healthy character. About the middle of June, the weather became intensely hot. The atmosphere of the wards, in which nearly every bed was occupied by a patient with suppurating wounds, became intensely oppressive. About this time, the patient began to grow worse. The cheerful resolution and hopefulness he had hitherto evinced, gave way. Diarrhœa supervened, and he lost strength rapidly. The fatal event was thought to have been delayed by the plan which was pursued of daily removing the patient in his bed at nine in the morning to a spot beneath the shade trees near the hospital, where he had pure air and escaped the distressing scenes of the ward; he remained each day until five in the afternoon. He died on June 21, 1864. The portion of bone excised was forwarded at the time of the operation to the Army Medical Museum. The preparation is No. 2618 of the Surgical Series. It is represented in the adjacent wood-cut (FIG. 60).

CASE 251.—A private soldier of General Pope's Army of Virginia, was admitted on September 2, 1862, to the Cliffburne Hospital at Washington, D. C., with a gunshot fracture of the neck of the left femur, received at the second Bull Run battle, on August 29, 1862. A conoidal musket ball had entered the left hip directly over the trochanter major and embedded itself in the neck of the femur. The trochanter major and the neck of the femur were split and comminuted, but the head was uninjured. The patient had suffered greatly from the journey from the battle-field to the hospital, and was prostrated by diarrhœa and malarial complications. The tissues about the hip joint were but slightly swollen, and the wound discharged healthy pus. It was decided that excision was the most hopeful resource, and on September 4, 1862, Assistant Surgeon John S. Billings, U. S. A., proceeded to operate. Chloroform was administered, and a straight incision was made over the trochanter major, and the head and fragments of the neck were removed. The shaft of the femur was then divided by a chain saw at the level of the trochanter minor. The patient reacted well from the operation. He was placed on a fracture bed, and extension by means of a weight was made on the injured limb. The diarrhœa increased in severity despite all treatment, and the patient succumbed, exhausted, on September 24, 1862, twenty days after the operation.

CASE 252.—"Private Michael Welsh, Co. H, 10th Kentucky, aged 40 years, was struck by a conoidal ball in the region of the left great trochanter, at the battle of Chickamauga, September 20, 1863, and at once conveyed to a field hospital, which soon after fell into the hands of the enemy. Ten days subsequently, he was brought to Chattanooga; and during the period of his captivity the only nourishment that he received was a small portion of corn-meal gruel daily. Having lost his blankets, he also suffered much from cold, and had contracted a rather severe bronchial inflammation. On the 1st of October, he was admitted into the general field hospital of the Fourteenth Corps, when a conoidal musket ball was removed from among a mass of small fragments of the neck of the femur, the ball having entered just anteriorly to the great trochanter. Two days subsequently, Surgeon F. H. Gross, U. S. V., carried a curvilinear incision, with its convexity presenting forward, and including the opening made by the ball, from above downward, and excised the head of the femur along with the attached greater portion of the lower surface of the neck of the bone. Many fragments were removed with the forceps; but as the trochanters were not involved in the injury, the remaining sharp portions of the neck were trimmed off close to the inter-trochanteric lines, which completed the procedure. No ligatures were required. The man bore the operation well, and the limb was placed in a comfortable position. From the date of the operation up to October 20th, the man did very well, in spite of his enfeebled condition and bronchial trouble, when the discharge from the wound became sanious. On the same night he had a chill and was delirious, and the pulse was very feeble and frequent. On the 25th of October his condition is thus described: Pulse 125 and very feeble; tongue dry and red; had a natural alvine evacuation. At 9 o'clock A. M. hæmorrhage recurred from the wound, which was arrested by injecting a solution of sulphate of iron. Stimulants freely administered, but the man grew more and more feeble, and expired at 2 o'clock P. M. No *post-mortem* examination was held, but death was evidently due to pyæmia. The specimen shows that about one-fifth of the head at its upper aspect has been shot away, together with the entire upper surface of the neck, about one-half of the anterior and posterior surfaces and the lower border of the neck remaining." The pathological specimen, illustrated by the accompanying wood-cut (FIG. 62), was forwarded to the Army Medical Museum, June 3, 1868, by the operator.

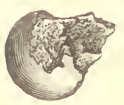

FIG. 62.—Shot fracture of neck of left femur. *Spec.* 5442.

The third category of intermediary excisions includes eight cases in which the conditions revealed on exploration offered little prospect of success. All of the patients were subjected to rough transportation. The first case was complicated with shot perforation of the elbow, the second was a man of sixty in poor health, the third a lad, rudely exposed in a wagon without springs; two others had wounds penetrating the pelvic cavity, and, in one of these cases, a splinter of the left innominate bone opened the internal iliac vein, and led to uncontrollable hæmorrhage, while, in the other, hyperacute peritonitis supervened.

CASE 253.—Private *G. W. Brantley*, Co. C, 2d Alabama, aged 18 years, was wounded and taken prisoner at Fort Blakely, Alabama, April 9, 1865. A conoidal musket ball had passed through the left groin, fractured the neck of the femur, and emerged posteriorly at the apex of the left buttock. He also received a gunshot fracture of the external condyle of the right humerus. He was conveyed to New Orleans, and, on April 15th, he was admitted to the St. Louis Hospital. The thigh, groin, and surrounding parts were infiltrated with unhealthy pus, and the patient was very much exhausted. On April 28th, the patient was anæsthetized by chloroform, and Surgeon A. McMahon, U. S. V., proceeded to excise the head, neck, and trochanters of the left femur. No arteries required ligation. The patient did not rally very well. Stimulants were freely administered; but the patient sank, and died on May 2, 1865, of capillary hæmorrhage. The condition of the patient did not admit of any operation on the elbow joint.

CASE 254.—Private Peter Boyle, Co. D, 59th Massachusetts, aged 60 years, was wounded at Petersburg, July 30, 1864. A conoidal musket ball entered the left hip and passed antero-posteriorly through the soft parts and surgical neck of the femur,

and fractured the trochanter major. His entry at the base hospital at City Point and transfer to Washington are recorded on August 1st. He was conveyed to Washington on an hospital steamer, and on August 3d was admitted to Douglas Hospital. His constitutional condition, on admission, was poor The wound, however, had an healthy aspect, and a thorough exploration showed that the injury to the soft tissues involved no important part, and that the fracture at the junction of the neck and trochanter major was not accompanied by much longitudinal splintering in either direction. Assistant Surgeon William Thomson, U. S. A., decided that an excision of the injured bone was expedient, and that the operation should be done as soon as the patient had rallied from the fatigue and irritability induced by his long journey. On August 5th, ether having been administered, Assistant Surgeon Thomson proceeded to excise the head, neck, and trochanters of the left femur, through a straight incision of sufficient length made over the trochanter major. The rotator muscles and the tendons of the psoas and iliacus being divided, the round ligament was readily cut and the head exarticulated. The section of the shaft was made by a chain saw at the level of the trochanter minor. The operation was rapidly accomplished, and there was no hæmorrhage of moment. The wound was dressed with an antiseptic solution of one drop of creasote to each ounce of water on charpie, and the limb was supported by a sand bag on either side. The patient reacted well after the operation; but at night there was profuse sweating and some nausea. On the following morning he ate a good breakfast. He still had a cool, sweating skin, and his pulse was at 128. He gradually sank, and died from exhaustion on August 7, 1864. The pathological preparation, presented by Dr. Thomson to the Army Medical Museum, is figured by the accompanying wood-cut (FIG. 63).

FIG. 63.—Shot perforation of neck of left femur. *Spec.* 3593.

CASE 255.—Private Charles C. Cleaver, Co. C, 2d Infantry, aged 18 years, was wounded at the battle of Spottsylvania, on May 12, 1864, by a conoidal musket ball, which fractured the neck and trochanters of the right femur. He was transferred to Fredericksburg and thence to Belle Plain in a wagon, and thence on a steam hospital transport to Washington. On May 18th he arrived at Washington, and was admitted to Judiciary Square Hospital. The soft parts of the upper and outer part of the thigh were extensively lacerated, and pus of an ill-conditioned character was burrowing in every direction around the wound. The patient's condition was unfavorable; but it was decided that excision of the fractured portion of the femur afforded the only prospect of relief. Accordingly, on the 19th, Assistant Surgeon Alexander Ingram, U. S. A., proceeded to make a curved incision six inches in length, through which the head, neck, and four and a quarter inches of the shaft of the femur were removed. Carpie soaked with permanganate of potash was applied to the wound, and tonics and stimulants were freely given. Pyæmia supervened, and the patient died on May 23, 1864, four days after the operation. The pathological specimen, figured in the accompanying wood-cut (FIG. 64), is in the Surgical Section of the Army Medical Museum.

FIG. 64.—Shot fracture of the neck and trochanter of right femur. *Spec.* 2819.

CASE 256.—Private Alexander Ewing, Co. A, 140th Pennsylvania, aged 30 years, was wounded at the battle of Spottsylvania, on May 12, 1864, by a conoidal musket ball, which comminuted the upper part of the left femur. He was taken to the hospital of the 1st division of the Second Corps, and on the following day was sent to the rear in a wagon. Arriving at Belle Plain after a three-days' journey over rough roads, he was conveyed on an hospital steamer to Washington, and, on May 18th, he was admitted to Judiciary Square Hospital. There was considerable inflammation and swelling of the soft parts, and the patient was in poor health. On the following day he was anæsthetized, and Acting Assistant Surgeon J. F. Thompson made an incision five inches in length over the great trochanter, including in it the wound of entrance. The muscular attachments being divided, it was found that the neck was splintered, that fissures extended within the capsule, that the great trochanter was separated from the shaft, and the upper part of the shaft much comminuted. The head and fragments of the neck and trochanters were removed, and the shaft was sawn just below the trochanter minor. Ice was applied to the wound, and stimulants were freely administered. The wound assumed an unhealthy action, and the patient gradually sank and died from exhaustion on May 24, 1864, five days after the operation. The pathological specimen was not received at the Army Medical Museum.

CASE 257.—Corporal Henry C. Sennett, Co. F, 122d New York, aged 27 years, was wounded in front of Petersburg, March 27, 1865, by a conoidal musket ball, which entered midway between the anterior superior spinous process of the ilium and the trochanter major, and lodged in the head of the left femur. The patient was removed to Washington, and, on April 2d, was admitted to Mount Pleasant Hospital. He was feverish and fretful, and his tongue was furred; but the wound had a healthy aspect, and there was but little swelling or deformity of the limb. But exploration with the finger proved that the ball had penetrated the hip joint. On April 4th the patient being anæsthetized by an equal mixture of chloroform and ether, Assistant Surgeon H. Allen, U. S. A., made a T-shaped incision, four inches by six inches, over the trochanter major, and excised the head and neck of the femur. The head was fractured into three pieces, and the ball was embedded in it. Violent hiccough came on immediately after the operation and continued through the night, but was finally arrested by the persistent use of antispasmodics. On April 5th and 6th there was great tympanitis, the bowels being obstinately constipated. An enema of castor oil was administered without effect, and in two hours another of molasses and water and salt, which induced a slight evacuation. Singultus again recurred. On April 7th the bowels moved freely. A chill occurred, lasting half an hour. There was great abdominal tenderness on pressure, and other well marked symptoms of peritonitis. On the 8th the hiccough continued; the abdomen became greatly distended; the countenance became pinched and ghastly, and the patient died at ten at night. At the autopsy, made twelve hours after death, the lungs were found healthy; the liver greatly hypertrophied; the lower fifth of the ilium inflamed and injected. The tissues surrounding the hip joint were in a sloughing condition, and were infiltrated with fetid pus, which had burrowed several inches under the gluteal muscles and two inches below the trochanter minor. The acetabulum was denuded and slightly

FIG. 65.—Upper extremity of the left femur, from which the head, with a conoidal ball in it, has been excised.—*Spec.* 153.

fractured at its upper and posterior border. Two inches of the upper extremity of the shaft of the femur was denuded of periosteum. The specimen was presented by Dr. Allen to the Army Medical Museum, and is represented in the adjoining wood-cut (FIG. 65). The innominate bone was not removed; but the upper fourth of the femur was sawn off after death, and mounted with the excised head to show how completely the injury to the femur was limited to the epiphysis. Had it not been for the fracture of the pelvis, it would have been difficult to have found a case better adapted for the operation of primary excision.

CASE 258.—Private F. Machlin,[1] 11th Pennsylvania, a robust man, was wounded at the second battle of Bull Run, August 30, 1862. He laid on the field several days, and was then transported thirty miles in a wagon to the Warehouse Hospital, Georgetown, D. C., where he was received on September 8th. A musket ball had entered the right buttock and emerged an inch and a half below and within the anterior superior spinous process of the ilium. The limb was shortened, and the foot was everted; any movement gave excessive pain. A thorough examination was made under the influence of chloroform, and showed that the neck of the bone was comminuted and the shaft uninjured. The case was considered to be a particularly favorable one for the operation of excision of the broken fragments, and the general condition of the patient was such as to offer some hopes of its success, and it was determined to do the operation on the following day. But the surgeon in charge of the hospital was confined to his bed by illness, and was unable to see the patient for five days. On September 13th the general condition of the latter was less favorable. His pulse was 130, quick and weak, and his tongue was dry. He was placed under very careful nursing, and beef essence, brandy, eggs, and milk, and other concentrated nourishment and stimulants were administered *ad libitum*. By September 20th this treatment had produced slight improvement, and though he was still in a very unfavorable condition for an operation, it was determined, on consultation, that an excision might afford the patient relief from the constant pain he suffered, and that it could not greatly depress him. At noon on September 20th, accordingly Assistant Surgeon B. A. Clements, U. S. A., assisted by Dr. George K. Smith, of Brooklyn, and the surgical staff of the hospital, performed the operation. An incision five inches in length was made from a point two inches behind and an inch below the anterior superior process of the ilium, downward over the prominence of the trochanter major. The incision exposed the parts freely, and the muscular insertions being divided, and several small loose fragments of bone removed, the irregular broken extremity of the shaft, at its junction with the neck and the tip of the great trochanter, were excised by a chain saw. The remnant of the capsular ligament and the round ligament were now cut, the joint being opened from below and in front with a probe-pointed bistoury. A blade of a long bullet forceps was then introduced as a lever and the head was disarticulated by gently prying it out of the cotyloid cavity. These steps in the operation were facilitated by rotating the trochanter outward, and by lifting the extensor muscles by a metallic retractor. A small vessel was tied at the upper end and another at the lower end of the wound. The wound was well washed out by means of a syringe and a few stitches were applied, the middle portion of the wound being left open. The limb was suspended in a Smith's anterior wire splint. The patient appeared to rally from the operation satisfactorily. At 9 o'clock P. M. he was free from pain; his pulse was 136, and the skin was cool and natural. He had slept tranquilly. On the following day, September 21st, his pulse was 120 and very feeble. The discharge from the wound was dark and thin, and copious. His countenance was placid, the pinched, distressed expression it had worn having disappeared. But in the afternoon he sank rapidly, and died in the evening, thirty-six hours after the operation, September 21, 1862. The specimen is No. 329 of the Surgical Section of the Army Medical Museum, and is represented in the accompanying wood-cut (FIG. 66).—(*Circular* 6, S. G. O., 1865, p. 64; *Circular* 2, S. G. O., 1869, pp. 37, 135.)

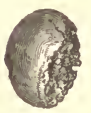

FIG. 66.—Excised head of right femur. *Spec.* 329.

CASE 259.—Lieutenant *D. N. Patterson*, 46th Virginia, aged 31 years, was wounded at an engagement on the Boydton Plank Road, near Petersburg, March 29, 1865, and was captured and sent to City Point, and immediately conveyed on an hospital transport to Washington, and placed in Armory Square Hospital on April 2d. On examination, it was found that a conoidal ball had entered the left thigh behind the trochanter major, and had passed inward and forward, fracturing the trochanter, neck, and head of the femur, and the anterior border of the acetabulum. On the day after the patient's admission, five days subsequent to the reception of the injury, Surgeon D. W. Bliss, U. S. V., in charge of the hospital, decided that the case was one in which excision of the upper extremity of the femur was applicable. The wounded man was anxious that an operation should be performed, and his general condition was very satisfactory. On April 3d he was placed under the influence of chloroform, and Surgeon Bliss exposed the fractured bone by a curvilinear incision with its convexity forward. The shattered fragments of the neck were extracted, the rent in the capsular ligament was enlarged and the round ligament was divided, and the head of the femur was exarticulated. It was found that the ball had not only comminuted the head, neck, and great trochanter, but that fissures extended down the shaft of the femur. The bone was divided by the chain saw two inches below the trochanter minor. The deep wound was now washed out, and small fragments of bone were removed, and search was made for the ball. It was finally detected by means of a Nélaton probe deeply buried in the obturator muscle near the posterior margin of the obturator foramen. The operation was accomplished with little loss of blood, and the patient reacted satisfactorily. The wound was lightly dressed, sufficient outlet for discharges being left, and the limb was extended and supported by pillows. Careful nursing was provided, and such stimulants and concentrated nourishment as seemed best adapted to the patient's condition. For three days he progressed very satisfactorily. Notwithstanding the extensive lesions of the pelvis, which were not detected until after death, there was no indication of peritonitis or disturbance of the urinary organs. On April 7th, however, profuse hæmorrhage

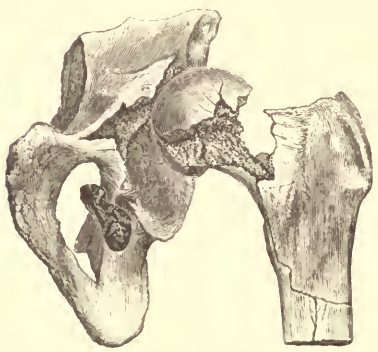

FIG. 67.—Extensive fractures of the shaft, trochanters, head, and neck of the left femur, and of the os innominatum. *Spec.* 4048.

[1] BATES (S. P.) (*History of Pennsylvania Volunteers*, 1861–5, Harrisburg, 1869, Vol. I, p. 30) records the name of this patient as Philip Mechling, Co. I, 11th Pennsylvania Volunteers.

took place, which could not be controlled, and the patient died on the morning of that day. At the autopsy it was found that the bleeding had proceeded from the internal iliac vein, gradually worn away by a sharp bit of bone forced inward by the ball. The pathological specimen, represented in the adjoining wood-cut (FIG. 67), is also figured at page 246 of the Catalogue of the Surgical Section of the Army Medical Museum, where another view is given.

CASE 260.—"I have the honor to report," writes Dr. Hooton, "that I did not take charge of hospital 21 until March 10, 1863, and did not treat the case referred to. I was somewhat conversant with its history, however, and will give it to you as I received it from Surgeon Sennet, 94th Ohio, whom I relieved. The wound was received at the battle of Stone River or Murfreesboro', the last of December, 1862, or January 1, 1863. Resection of the upper part of the shaft, including the shattered trochanters, was performed on the field. The head of the bone was left in the cotyloid cavity. A few days subsequently the patient was sent by rail to Nashville, a distance of twenty miles. Notwithstanding the fatigue of the long journey, his general condition was very satisfactory, and the wound looked well. Part of the incision healed; but there was a profuse discharge from the lower part, and gradually this discharge became thin and ichorous. About January 21st it was determined to reopen the wound. It was found that the head of the bone was carious throughout its whole extent. It was therefore removed After this operation, which was accomplished without hæmorrhage or other untoward circumstance, the limb swelled very much, irritative fever set in, and the patient died exhausted in a few days." [The records of the hospital identify this patient as Sergeant Dallas W. Hade, Co. H, 101st Ohio, wounded at Stone River, December 31, 1862; died January 31, 1863.]

Of the twenty-two intermediary excisions at the hip, four were on the right side, sixteen on the left; in two cases the side of the injury was not reported. A straight longitudinal incision was made in nine instances, a curvilinear in seven, a crucial in one, a T-shaped in one, and in four operations the mode of incision was not stated. In five instances the missile was removed at the time of the operation. Twenty excisions were performed by Union surgeons and two by Confederate surgeons. Pathological specimens illustrating thirteen of the excisions are preserved in the Army Medical Museum, with photographs of the two survivors of intermediary excisions at the hip.

TABLE XII.

Summary of Twenty-two Cases of Intermediary Excision at the Hip Joint for Shot Injury.

No.	NAME, AGE, AND MILITARY DESCRIPTION.	DATE OF INJURY.	NATURE OF INJURY.	DATE OF OPERATION.	OPERATION AND OPERATOR.	RESULT AND REMARKS.
1	[1] *Jarret, J. M.*, Lieut., C, 15th North Carolina, age 28.	Oct. 14, 1863.	Left femur shattered at upper third by a conoidal ball.	Nov. 9, 1863.	Excis'n of head, neck, trochanters, and a port'n of shaft of left femur; several large detached fragments and spiculæ rem'd, by Surgeon J. B. Read, P. A. C. S.; chloroform; straight incision seven inches long.	September, 1864. Recovered.
2	[2] Wright, H., Pt., G, 8th N. Jersey, age 28.	May 5, 1864.	Conoidal ball shattered the neck and trochanters of right femur and lodged, greatly flattened and distorted, amid the fragments of bones.	May 27, 1864.	Head, neck, and both trochanters of right femur removed thro' straight incision; missile extracted; jagged upper extremity of shaft turned out and smoothed off, by Ass't Surg. G. A. Mursick, U. S. V.	Disch'd October 6, 1864, and pensioned. *Spec.* 3375, A. M. M. Sept. 4, 1873, "Six and a half inches shortening." Pensioner died October 26, 1874, of heart disease.
3	Boyle, P., Pt., D, 59th Massachusetts, age 60.	July 30, 1864.	Conoidal ball perforated surgical neck of the left femur and fractured trochanter major.	Aug. 5, 1864.	Head, neck, and shaft of left femur at level of troch minor, excised through straight incision, by Ass't Surgeon W. Thomson, U. S. A.; ether.	Died August 7, 1864, from exhaustion. *Spec.* 3593, A. M. M. *Circ.* 6, S. G. O., 1865, p. 70. *Circ.* 2, S. G. O., 1869, pp. 45, 136.
4	*Brantley, G. W.*, Pt., C, 2d Alabama, age 18.	April 9, 1865.	Conoidal ball fractured neck of left femur; also fract. of extl. condyle hum.	April 28, 1865.	Head, neck, and trochanters of femur excised, by Surg. A. M. McMahon, U. S. V.	Died May 2, 1865, of capillary hæmorrhage. *Circ.* 6, S. G. O., 1865, p. 74. *Circ.* 2, S. G. O., 1869, pp. 47, 136.
5	Callaghan, C., Pt., G, 2d Delaware.	Sept. 17, 1862.	Comminut'n of left trochanteric region, fissures extending up neck of femur, by a fragment of shell.	Sept. 29, 1862.	Head, neck, and portion of shaft of left femur excised, by Ass't Surgeon J. H. Bill, U. S. A.; curved incision; shaft divided just below trochanter minor.	Died October 4, 1862. *Spec.* 840, A. M. M. *Circ.* 6, S. G. O., 1865, p. 64. *Circ.* 2, S. G. O., 1869, pp. 37, 135.
6	*Christopher, T. C.*, Pt., D, 18th South Carolina, age 21.	May 5, 1862.	Conoidal ball fractured head and neck of left femur and lodged in obturator externus muscle.	May 20, 1862.	Shattered fragments of head and neck of left femur remo'd through a curvilinear incision four inches long, by Assistant Surg. J. S. Billings, U. S. A.	Died May 24, 1862. *Spec.* 19, A. M. M. *Circ.* 6, S. G. O., 1865, p. 62. *Circ.* 2, S. G. O., 1869, pp 35, 135.
7	Cleaver, C. C., Pt., C, 2d Infantry, age 18.	May 12, 1864.	Neck and trochanters of right femur fractured by a conoidal ball.	May 19, 1864.	Head, neck, and four and a quarter inches of shaft of right femur removed thro' a curved incision, by Ass't Surgeon A. Ingram, U. S. A.	Died May 23, 1864, of pyæmia. *Spec.* 2819, A. M. M. *Circ.* 6, S. G. O., 1865, p. 66. *Circ.* 2, S. G. O., 1869, pp. 43, 135.

[1] READ (J. B.), *Resections of the Hip Joint*, in *Confederate States Medical and Surgical Jour.*, 1864, Vol. I, p. 5. *Phot. Ser.*, A. M. M., Vol. I, p. 41. *Circular* No. 6, S. G. O., 1865, p. 66. *Circular* No. 2, S. G. O., 1869, pp. 39, 135. EVE (P. F.), *A Contribution to the History of the Hip Joint Operations, etc.*, in *Trans. of the Am. Med. Association*, 1867, Vol. XVIII, p. 256.

[2] MURSICK (G. A.), *A Successful Case of Excision of the Head of the Femur for Gunshot Fracture*, in *New York Med. Jour.*, 1865, Vol. I, p. 424. *Circular* No. 6, S. G. O., 1865, p. 68. *Circular* No. 2, S. G. O., 1869, pp. 41, 135. *Surgical Photograph Series*, A. M. M., Vol. IV, p. 38.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Operation.	Operation and Operator.	Result and Remarks.
8	Ewing, A., Pt., A, 140th Pennsylvania, age 30.	May 12, 1864.	Conoidal ball splintered neck, separated the great trochanter from shaft, and comminuted upper part of the left femur. The fissure extended within the capsule.	May 19, 1864.	Removal of the head and fragments of the neck and trochanters through an incision five inches long, by A. A. Surgeon J. F. Thompson.	Died May 24, 1864, from exhaustion. *Circ.* 6, S. G. O., 1865, p. 68. *Circ.* 2, S. G. O., 1869, pp. 43, 135.
9	*Foulke, T. E.*, Pt., D, 2d Alabama, age 17.	April 9, 1865.	Neck, trochanters, and upper third of left femur fractured by a conoidal ball, which lodged above the ant. sup. spinous process of the left ilium. Missile removed.	April 27, 1865.	Excision of the head, neck, trochanters, and two inches of the shaft of femur, by Surg. A. M. McMahon, U. S. V.	Died June 5, 1865, from exhaustion. *Circ.* 6, S. G. O., 1865, p. 74. *Circ.* 2, S. G. O., 1869, pp. 47, 136.
10	Hade, D. W., Sergeant, H, 101st Ohio.	Dec. 31, 1862.	Shot fracture of the trochanters of —— femur; resection of the upper part of the shaft and the shattered trochanters on the field; head of bone left in cotyloid cavity.	Jan. 21, 1863.	On reopening the wound the head of the femur was found carious throughout its entire extent; it was therefore removed, by Surg. E. Sennet, 94th Ohio.	Died January 31, 1863, from exhaustion. *Circ.* 2, S. G. O., 1869, pp. 38, 135.
11	Marston, C. E., Pt., F, 1st Massachusetts, age 19.	Aug. 30, 1862.	Neck of right femur crushed, and the head of the bone comminuted by a conoidal ball, which lodged in the inner side of the thigh.	Sept. 27, 1862.	Fragments of neck removed, head of bone exarticulated, the roughened portion of the neck at its attachment with the trochanter sawn off with a small chain saw, and the missile removed with difficulty at the bottom of a large cavity; slightly curved incision, by Ass't Surgs. B. A. Clements and C. H. Alden, U. S. A.	Died Sept. 30, 1862. *Spec.* 328, A. M. M. *Circ.* 6, S. G. O., 1865, p. 64. *Circ.* 2, S. G. O., 1869, pp. 36, 135.
12	Machlin, F., Pt., I, 11th Pennsylvania.	Aug. 30, 1862.	Comminution of neck of right femur by a musket ball; fissure extending into the head of the bone.	Sept. 20, 1862.	Loose fragm'ts removed, irregular broken extremity of shaft excised, and head of bone disarticulated; incis'n five inches long; Ass't Surg. B. A. Clements, U. S. A., assisted by Dr. G. K. Smith, of Brooklyn.	Died Sept. 21, 1862. *Spec.* 329, A. M. M. *Circ.* 6, S. G. O., 1865, p. 64. *Circ.* 2, S. G. O., 1869, pp. 37, 135.
13	Miller, J., Pt., E, 162d N. York, age 38.	June 14, 1863.	Conoidal ball perforated upper portion of left thigh, breaking the neck of femur transversely and splitting it longitudinally, but without great comminut'n.	July 8, 1863.	Ass't Surg. G. W. Avery, 9th Conn., excised the head, neck, and great trochanter through a single straight incision.	Died Sept. 21, 1863, from exhaustion. *Circ.* 2, S. G. O., 1869, pp. 38, 135.
14	Noe, D. M., Pt., C, 46th Ohio, age 22.	April 6, 1862.	Neck of left femur shattered by a conoidal ball.	April 16, 1862.	Excision of the head, neck, and trochanters, and three inches of the shaft of femur; incision four inches long, by Surg. G. C. Blackman, U. S. V.	Died April 24, 1862, of pyæmia. *Circ.* 2, S. G. O., 1869, pp. 34, 135.
15	*Patterson, D. N.*, Lieut., 46th Virginia, age 31.	Mar. 29, 1865.	Conoidal ball fractured the trochanter major, neck, and head of the left femur, and anterior border of the acetabulum; fissures extended down shaft. Missile lodged.	April 3, 1865.	Shattered fragm'ts of the neck extracted, head of femur exarticulated, and shaft divided two inches below the trochanter minor, through curvilinear incision; missile removed, by Surg. D. W. Bliss, U. S. V.	Died April 7, 1865, from hæmorrhage. *Spec.* 4048, A. M. M. *Circ.* 6, S. G. O., 1865, p. 72. *Circ.* 2, S. G. O., 1869, pp. 45, 136.
16	Phelan, J., Capt., A, 73d New York, age 22.	May 14, 1864.	Left trochanter major shattered and neck of femur fractured to the head by a conoidal ball, which lodged; many fragm'ts driven into gluteal muscle.	June 3, 1864.	Head of femur exarticulated and the fragments of the neck and trochanter major remov'd, thro' crural incision, by Ass't Surg. C. A. McCall, U. S. A.	Died June 21, 1864, from diarrhœa. *Spec.* 2618, A. M. M. *Circ.* 6, S. G. O., 1865, p. 68. *Circ.* 2, S. G. O., 1869, pp. 44, 136.
17	Phillips, H., Pt., I, 146th New York, age 34.	April 1, 1865.	Conoidal ball crushed in the laminated structure of the anterior surface of neck of left femur, where it lodged. Missile extracted.	April 8, 1865.	Head, neck, and trochanter major removed through a curved incision six or seven inches long, by Ass't Surg. W. F. Norris, U. S. A.	Died April 21, 1865. *Autopsy:* Pleurisy on either side; large subperiosteal abscesses. *Spec.* 3235, A. M. M. *Circ.* 6, S. G. O., 1865, p. 72. *Circ.* 2, S. G. O., 1869, pp. 47, 136.
18	Sennett, H. C., Corp'l. F, 122d New York, age 27.	Mar. 27, 1865.	Left acetabulum fract'd slightly at its up. and post. border by a conoidal ball, which also fractured the head of the bone and lodged in the same.	April 4, 1865.	Head and neck excised thro' a T-shaped incision, by Ass't Surgeon H. Allen, U. S. A.	Died April 8, 1865, from peritonitis. *Spec.* 153, A. M. M. *Circ.* 6, S. G. O., 1865, p. 72. *Circ.* 2, S. G. O., 1869, pp. 46, 136.
19	*Smith, M.*, Pt., F, 38th Virginia.	May 10, 1864.	Conoidal ball fractured the upper portion of the shaft of left femur, passed through the perinæum without injuring the urethra, and through the soft parts of the right hip.	May 12, 1864.	Head, neck, and two inches of the shaft of femur excised, by Surg. C. B. Gibson, C. S. A.	Died May 13, 1864. *Spec.* 5500, A. M. M. *Circ.* 2, S. G. O., 1869, pp. 43, 135.
20	Unknown soldier of General Buell's Army. [Probably Corporal H. F. Smith, 12th Wisconsin.]	Mar. —, 1862.	Neck and trochanters of —— femur shattered by a conoidal ball.	Two days after injury.	Head and splintered upper extremity of femur remov'd thro' a long straight incision, by Surg. A. H. Thurston, U. S. V.	Died one week after operat'n, from surgical fever and suppuration. *Circ.* 6, S. G. O., 1865, p. 62. *Circ.* 2, S. G. O., 1869, pp. 34, 135.
21	Unknown soldier, private of Gen'l Pope's Army.	Aug. 29, 1862.	Conoidal ball split and comminuted the left trochanter major and neck of the femur and lodged in the latter.	Sept. 4, 1862.	Head and fragments of neck of the femur removed; the shaft of femur was then divided at the level of trochanter minor, straight incision, by Assistant Surg. J. S. Billings, U. S. A.	Died Sept. 24, 1862, from exhaustion. *Circ.* 6, S. G. O., 1865, p. 64. *Circ.* 2, S. G. O., 1869, pp. 36, 135.
22	[1] Welsh, M., Pt., H, 10th Kentucky, age 40.	Sept. 20, 1863.	Conoidal ball fractured the neck and head of left femur and lodged. Oct. 1st, ball removed.	Oct. 3, 1863.	Head of femur excised, together with the attached greater portion of the lower surface of the neck of the bone, fragments removed and remaining sharp portions of neck trimmed off; Surg. F. H. Gross, U. S. V.	Died October 25, 1863. *Spec.* 5442, A. M. M.

[1] Gross (S. W.), *Head of the Thigh Bone removed by Excision on account of Gunshot Injury*, in *Am. Jour. Med. Sci.*, 1868, Vol. LV, p. 410. Otis (G. A.), *Observations on some Recent Contributions to the Statistics of Excisions and Amputations at the Hip for Injury*, in *Am. Jour. Med. Sci.*, 1868, Vol. LVI, p. 130. *Circular* No. 2, S. G. O., 1869, pp. 39, 135.

Secondary Excisions.—There were reported eleven secondary excisions at the hip practised on nine Union and two Confederate soldiers, resulting in three recoveries and eight deaths, a mortality rate of 72.7 per cent.[1] The shortest interval between the reception of the injury and the operation was thirty-one days, and the longest eight years and four months. Two of the survivors of secondary excision at the hip are still pensioners in comparatively good health, at a period remote from the date of operation.

CASE 261.—Private Joseph Brown, Co. I, 3d Michigan, aged 38 years, was wounded at the second battle of Bull Run, August 29, 1862, by a musket ball, which passed through the left thigh, fracturing the femur just below the trochanter minor. He laid on the battle field three days, and was then removed to Centreville. On September 11, 1862, he was admitted to Fairfax Seminary Hospital, near Alexandria. The limb was kept in position by appropriate apparatus; but suppuration was profuse, and, on two occasions, fragments of bone were removed from the wound. Early in March, 1863, there was great swelling of the thigh, the discharge became scanty and fetid, and pus burrowed amid the muscles. On March 21st, an exploratory incision was made from three inches above to five inches below the prominence of the great trochanter. The neck and upper extremity of the shaft of the femur were found to be extensively diseased, and excision was decided on. Surgeon D. P. Smith, U. S. V., performed the operation. Difficulty was experienced in separating the muscular attachments from the trochanters, on account of the foliaceous masses of callus that had been thrown out. When this dissection was accomplished, many necrosed fragments were extracted, and the periosteum and new bone were separated by the handle of the scalpel and preserved as far as practicable. The shaft of the femur was then divided by powerful cutting bone forceps, about six inches below the tip of the great trochanter. A screw was driven into the mass of callus, below the trochanters, to be used as a lever in disarticulating the head, but it would not hold, and the bone was seized with large forceps and rotated, so as to facilitate the division of the capsular and round ligaments. The head, neck, and trochanters, and the masses of callus adhering to the trochanters, were then removed. The operation was accomplished with but very trifling hæmorrhage, yet great prostration followed, and the patient rallied slowly. As the anæsthesia passed off, he had much nausea and vomiting. As soon as this subsided, he was given a very full allowance of concentrated nourishment, such as strong beef-tea, eggs, milk, etc, with half an ounce of brandy every two hours. The wound was partially closed; the limb was supported on pillows until the third day, when it was dressed in a Smith's anterior splint. About forty-eight hours after the operation, an erysipelatous blush pervaded the limb, and the constitutional symptoms assumed a typhoid character. A female catheter was passed through the middle of the wound and another at its lower extremity, through which much offensive decomposed serum and grumous blood escaped. The wound was thoroughly washed out through the catheters with warm water impregnated with chlorinated soda. On the fifth day there was a rigor, and hæmorrhage to the extent of six ounces. As the anterior splint did not permit convenient access to the limb, it was removed, and the leg and thigh were suspended in a canvas hammock, the leg being horizontal and the thigh in an almost vertical position. A piece of soft toweling extending from the perinæum to the popliteal space, and, connected by cords with an upright post at the head of the bed, supported the muscles on the sides and under surface of the thigh. The wound freely discharged synovia, bloody serum, and thin pus, until the seventh day, when healthy suppuration was fairly established. During April, 1863, the patient's progress was satisfactory. He was supplied with very nutritious diet, with porter, and cod-liver oil. He took for a time as much as a half a pint of oil daily. During May, the case continued to progress favorably. It was necessary to keep a tube in the wound until June 1st. Previously, whenever it was removed pus would accumulate and burrow. A mesh of suture wire was finally substituted for the tube. This was retained until June 20th, when the patient began to get about on crutches. In the latter part of July the wounds closed. In August, Brown was reported as "well," and on August 23, 1863, he was discharged from the hospital and from the military service of the United States. On March 21, 1864, he wrote from his home in Coopersville, Michigan, that his health was good; that he could get about and attend to home business; could saw and split a little wood for fuel, though his knee was stiff and his leg painful. On the whole, there had been steady improvement. In September, 1865, he again wrote, and stated that his general health was good; that he had some control over the movements of the thigh, being able, when standing on the right foot, to swing the left backward and forward, and to adduct the thigh enough to carry the injured limb across the other. He could bear some weight on the limb, and use but one crutch, with a stirrup for the foot. There had been no fistulous orifices since March 1864, and there was no soreness about the cicatrices. In November, 1865, in accordance with a request from the Surgeon General's Office, Mr. Brown had a photograph (FIG. 69) taken to represent the amount of deformity in his limb. This picture is numbered 110 in the Photograph Series of the Army Medical Museum. It is carefully copied in the accompanying wood-cut. The excised bone is preserved at the Museum, and is numbered 1192, Section I. It is represented in the adjacent wood-cut (FIG. 68). On February 12, 1868, he wrote to the compiler of this report: "I take pleasure in informing you that my

FIG. 68.—Head, neck, and trochanters of left femur, with foliaceous callus. *Spec.* 1192.

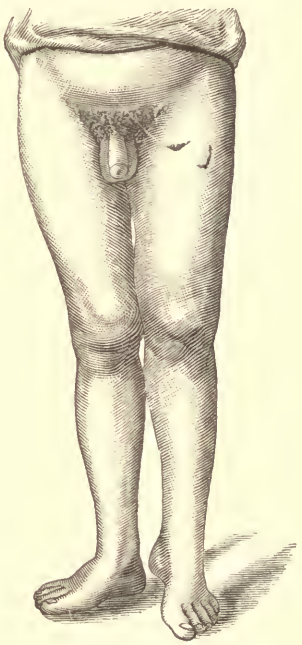

FIG. 69.—Appearance of limb three years after the operation. [From a photograph.]

[1] Besides the nine cases recorded in the *Report on Excisions of the Head of the Femur for Gunshot Injury*, S. G. O., 1869, a successful example has been reported by Dr. E. STERLING, of Cleveland, Ohio, and another successful operation was performed in 1871, by Dr. J. K. BIGELOW of Indianapolis.

limb is in as good condition as when I last wrote you; but think there is no improvement, except that it is not as tender. There have been no abscesses, nor any pain in the limb, excepting slight pains about the knee, just before storms About two years ago, I slipped and fell upon the ice, injuring the limb severely about the knee, and was thereby confined to the house for about three weeks. In March last I had a severe attack of ague. The limb swelled quite badly at this time, and was much inflamed for about ten days. I applied cold water and a bandage to reduce the swelling. I had to keep it bandaged about two weeks after the inflammation was removed. Since that time the limb has given me no more trouble than usual. Since I was discharged I cannot see that there is any lengthening of the limb. I have to use a crutch and cane all the time when moving about, and I think I shall always have to do this. The injured limb has wasted away somewhat since I last wrote. The circumference of the well limb at the upper extremity is 22 inches, and the injured limb measures at the same place 19½ inches. The knee of the well limb measures around the centre of the knee-pan 15½ inches; the injured limb measures at the same place 17 inches. The above measurements were made in the evening; I think that in the morning the measurements of the injured limb would be less. The knee still remains quite stiff, and gives me about all the pain there is anywhere in the limb. I have been troubled during cold weather by coldness of the outer side of the leg, and I have to warm it by the fire before going to bed nearly every night when I have been out." On November 19, 1868, another letter was received from Mr. Brown, from which the following extract is made: "I take pleasure in informing you that my limb is in as good condition as it has been at any time since it was entirely healed, and, if anything, in better condition. It does not pain me about the knee as much as it did one year ago. It does not have any spell of swelling at the knee as it did for the first two years after my discharge, and there is less soreness about the limb than there was even one year ago. I can get around without hurting it as much as formerly. I can bear some weight upon it. I have walked across a room without the aid of crutch or cane, by stepping very quick with the well limb; but it is more like hopping than walking. There have been no abscesses in the limb. I think that it is gradually improving, and hope that I may yet see the day that I can go without a crutch. My general health is good. I have not been sick a day for a year and a half, and then only a few days with ague. My weight now is 167½ pounds. Before I entered the army my weight was never quite up to those figures, but within a few pounds of it. I have been postmaster at this office over a year, and have attended to all the business of the office almost entirely without assistance, and it gives me pretty good exercise." On September 6, 1875, the date of his last examination for pension, the Grand Rapids Examining Board stated: "There is now a false joint with shortening of the limb." Since then this pensioner has been exempted from further surgical examinations. He was paid September 4, 1877, remaining in comparatively good health more than fourteen years after the operation.

The next successful secondary excision at the hip after shot injury was not identified at the Surgeon General's Office until after the publication of *Circular* 2, in 1869.

CASE 262.—G. W. Tilliston, Co. D, 1st Ohio Artillery, aged 44 years, was wounded at Laurel Hill, July 7, 1861, by a rifle ball, which entered the right groin, passing backward through the neck of the femur and lodging in the large muscles of the buttock. Two weeks after the reception of the injury he was mustered out by reason of expiration of service, and subsequently he was admitted on the Pension Rolls. Dr. E. Sterling, of Cleveland, who was the regimental surgeon and treated the wounded man in the field, subsequently certified to the nature of the injury and reported the following: "Extraction of the ball was impossible. The wound was dressed, and within a few days the patient was removed to his home in Cleveland. On or about the 20th of September following it became necessary to remove that portion of the bone traversed by the ball, and I performed the operation of excision at the hip joint." Examiner J. Laisy, of Cleveland, on July 17, 1867, certified to resection of the head and part of the neck of the femur, and stated: "A fistulous opening has formed six inches below the anterior superior spinous process of the ilium, which is keeping up a constant and profuse discharge of purulent matter. The right leg, in consequence of the operation, is shortened about three inches. He is unable to bear any weight on the injured limb, and obliged to walk on crutches." Two years later, in August, 1869, the excised head of the femur, represented in the wood-cut (FIG. 70), was transmitted to the Museum by the operator, who deplored the loss of the other portion of the resected bone, and described the case as being attended with "perfect recovery and a good limb, the pensioner being able to go up and down stairs with ease."[1] Dr. N. M. Jones, attending physician of the pensioner, certified that he died September 6, 1871, and added that a *post-mortem* examination, held by himself, revealed "extensive necrosis of the upper third of the femur * * * and of the ilium, having entirely destroyed the acetabulum and penetrated the pelvis." He also stated that he found an enormous abscess covering the entire right ilium and sacrum.

FIG. 70.—Shattered head of right femur. *Spec.* 5590.

The third successful secondary excision at the hip was practised, in 1871, for ostitis and coxitis, eight years and four months subsequent to the reception of the shot injury.

CASE 263.—Private T. W. Pease, Co. H, 19th Indiana, aged 26 years, was wounded at Gettysburg, July 1, 1863, by a conical musket ball, which entered the anterior aspect of the right thigh three inches below Poupart's ligament, passed backward and outward, and lodged just behind the trochanter major, having fractured the upper third of the femur and passed through the trochanter. The wounded man remained for several months at a Corps hospital at Gettysburg, where merely a "shot wound of right thigh" was noted, but no progress of the case recorded. According to his statement, the missile was extracted by incision three days after the injury, and on July 9th, while under the influence of ether, nearly three inches of bone was removed in fragments. Extension and counter-extension were applied, but the latter caused so much pain that it was discon-

[1] Professor H. CULBERTSON, M. D. (*Excision of the Larger Joints of the Extremities*, Prize Essay, *Trans. Am. Med. Assoc.*, Vol. XXVII, *Supplement*, 1876, pp. 5 and 50), reports this operation as practised "August 20, 1861," which would make it the first excision at the hip after shot injury performed in the United States, the primary excision practised by Professor BLACKMAN, on Private J. McCulloch (CASE 230, p. 97, *ante*) having been done August 30, 1861. Dr. E. STERLING in his letter transmitting the specimen (5590) also asserts that his excision of the head of the femur in Tilliston's case was the first during the war. Pension Examiner LAISY also states that the patient was wounded July 7, 1861, and that resection was performed six weeks afterwards; but, in his official report to the Pension Office, Dr. STERLING states that the operation was performed "on or about the 20th of *September*."

tinued at the end of twenty-four hours. Smith's anterior splints were applied on July 20th, and cold-water dressings were used. The patient also stated that the limb was swollen and painful, the discharge of pus profuse, and his general health bad. For the first two weeks he suffered from constipation, after which, having taken a laxative, diarrhœa set in and troubled him, with short intermissions, for about three months. The records of Camp Letterman Hospital show that the patient was admitted there on September 5th, also that Acting Assistant Surgeon E. A. Koerper took charge of the case on October 8th, who opened a large abscess on the inner side of the thigh on November 3d, and removed the splints several days afterwards, the fracture having become united and the patient's health improved. The subsequent progress of the case was recorded by Acting Assistant Surgeon H. L. Smyser, at the York Hospital, where the patient was transferred on November 14th. The wound of entrance and exit at that time had closed, but there was still discharge from an opening on the middle and external part of the thigh, and the limb was swollen and curved outward, with three inches shortening. After this a steady improvement followed until January 12, 1864, when the patient was seized with a chill, followed by fever, and a deep seated abscess began to form on the anterior part of the thigh, which was opened four days afterwards. Abscesses continued to form at intervals and suppuration was more or less constant, causing the cicatrices of the wound to be reopened. On February 29th, symptoms of tetanus appeared, being exhibited by stiffness of the muscles of the neck and inability of the patient to open his mouth more than half an inch. This attack was subdued, by the administration of pills of camphor and opium, after several days' duration, and during the succeeding night and morning it was followed by an almost constant hiccough, after which another attack of diarrhœa came on. In April following the wound had again healed, and the patient had so far amended as not to require any more medicine. On July 3d, he was able to walk about on crutches for the first time. His term of service having expired, he was mustered out August 8, 1864, and pensioned. Examiner G. W. Clippinger, of Indianapolis, certified, October 17, 1866: * * * "Almost total anchylosis of knee joint, with foot turned inward at the toes; extensive necrosis of entire shaft of bone, with discharge at three points. * * * Discharge offensive and exhaustive. Is feeble and emaciated, has frequent night sweats, and requires constant aid and attendance." Dr. A. L. Lowell, of the Pension Office, who made a special examination of the pensioner on July 20, 1868, reported the following: * * * "The wound is still discharging from its anterior opening and the process of exfoliation is still progressive. The coxofemoral articulation is firmly fixed and immovable. * * * The subject travels with the assistance of crutches. His general health is good." Dr. J. K. Bigelow, attending physician of the pensioner and late Surgeon of the 8th Indiana, reported that he, being aided by Surgeon J. S. Bobbs, "on September 2, 1868, removed ten and a half inches of the necrosed shaft of the femur, said necrosed bone having kept up a constant and exhaustive discharge from three or four large sinuses at various places along the inner and posterior part of the thigh," etc. The Indianapolis Examining Board certified, February 8, 1870: "The pensioner is very obnoxious to erysipelas, which frequently causes large inguinal and popliteal abscesses," etc. Two years afterwards the same Board reported that "the operation for removal of necrosed bone two years ago, apparently resulted in good recovery. * * One year after said operation erysipelas of the limb, with ulceration, etc., again ensued, and on October 20, 1871, he was again attacked with large abscesses, and several sinuses made their appearance. Upon careful examination it was found that the new bone was necrosed and necessitated coxo-femoral exsection, which was performed on the 8th of November, 1871. There is ten inches shortening. He requires the constant attention of a nurse," etc. In a report recapitulating the history of this case, transmitted by Dr. Bigelow, in September, 1877, he describes the operation of exsection as follows: "While under the influence of chloroform, an incision was made from the middle of the dorsum of the right ilium down the outer aspect of the thigh to within two inches of the knee joint. The femur was exposed and divided five inches below the trochanter with Hey's saw, and on account of the extensive perforations of the muscles surrounding the bone by osteophytes (FIG. 71) the epiphysis was with difficulty and considerable hæmorrhage, enucleated and unjointed from the acetabulum. It was found to consist of a very large dead involucrum, filled in all its aspects with sharp projecting spiculæ. A portion of the leaden ball was found embedded in the cancellous structure near the trochanter. The wound healed kindly, and was entirely closed in twenty-eight days. In three months a cartilaginous union had taken place, and now—in September, 1877—with the assistance of a 'six-inch lift' on the right boot the man can walk quite well with a cane, having nearly a perfect arthrodial joint at the hip, and being able to attend to the ordinary duties of a Deputy United States Marshal." In 1873, in visiting the Surgeon General's Office, Dr. J. K. Bigelow contributed a photograph of the excised epiphysis, which is copied in the wood-cut (FIG. 71). In 1877, Dr. Bigelow contributed to the Museum another photograph representing the cicatrix and appearance of the injured limb, which is copied in the right hand wood-cut (FIG. 72). This pensioner was paid September 4, 1877.

FIG. 71.—Shot fracture of trochanter major of right femur. [From a photograph furnished by Dr. BIGELOW.]

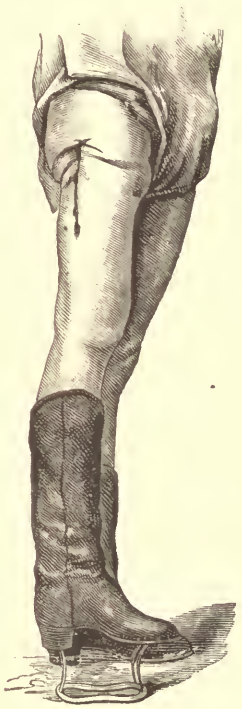

FIG. 72.—Appearance of the limb six years after the operation. [From a photograph.]

The number of patients who servive shot injuries involving the hip joint until the secondary period without operative interference is small; but such cases may be regarded in reference to their ability to sustain excisions as becoming analogous to the subjects of excisions at the hip for pathological causes. Now we learn from the experience of civil practitioners that excisions at the hip for disease have a mortality rate in children averaging perhaps below 45 per cent., yet in adults of the military age rising to an average

of over 60 per cent. It is found on examination, that, as might be anticipated, the secondary excisions at the hip for traumatic cause attain a mortality rate approximating that of excisions for disease in adults of about the same age. The three survivors of secondary excisions at the hip after shot injury were robust mature men of 26, 34, and 44 years of age. In the eight unsuccessful cases the ages varied from 18 to 43 years. In seven of the eight unsuccessful operations the patients succumbed in from one to eight days from the dates of operation, a mean of a little over four days, while the eighth lived over a hundred days after the operation, and succumbed apparently to unfavorable climatic influences and only in part to traumatic causes.

CASE 264.—Private Hugh Frain, Co. G, 31st Massachusetts, aged 22 years, was wounded February 1, 1865, by a conoidal musket ball, which entered the anterior surface of the middle third of the left thigh, ranging upward, and making its exit above the left gluteus, fracturing the neck of the femur in its course. He was on horseback, his regiment serving at the time as mounted infantry. He was treated in the regimental hospital for several days, and then, on February 13th, he was admitted to the St. Louis Hospital, at New Orleans. When admitted, he stated that the surgeon of his regiment had given him chloroform, and examined the wound, and that the bone was not touched. He had walked upon the limb, and there was then no evidence of fracture. His general health became poor. He had night sweats. His tongue was clean and moist, and his appetite was good. The whole thigh gradually became dissected with pus of an unhealthy character. Abscesses discharged through fistulous openings in the groin. The limb was inverted and shortened, and was drawn over to the right. It was decided that an excision of the head of the femur was expedient. On March 24th, Surgeon A. McMahon, U. S. V., proceeded to perform the operation. An incision four inches in length was made over the great trochanter, the soft parts were dissected up, and the femur was divided by the chain saw just below the trochanter minor. The ligamentum teres was softened, and the head of the femur was removed without difficulty. The wound was filled with lint, and the patient was ordered porter, chicken broth, eggs, stimulants, and everything necessary to sustain the drain upon his system. He felt easier for a few days after the operation, but he gradually sank, becoming very much emaciated, and died March 30, 1865, six days after the operation. The ball had injured the neck of the femur, and the subsequent caries had caused the destruction of the head and the disorganization of the surrounding tissues.

CASE 235.—Private Edward Hunt, Co. D, 71st Pennsylvania, aged 24 years, was wounded at the battle of Antietam, September 17, 1862, by a conoidal musket ball, which entered about two and a half inches above the trochanter major, and grazing the neck of the right femur, passed out at the nates. Shortening and eversion were not present, and it was thought that there was not a complete fracture. After the battle, he was removed to a barn near the battle-field, where he was treated with cold-water dressings for eleven days. He was then removed to the City Hotel at Frederick, Maryland, and the cold applications were continued up to November 19th. During this period the wound was discharging healthy pus profusely. As pus was burrowing in the muscles, a seton was run through the wound and six inches down the thigh. On November 19th, he was removed to Jail Street Hospital, and about the last of December he was transferred to the U. S. Hotel Hospital, and thence, on January 20, 1863, to hospital No. 5, at Frederick, Maryland. On January 31st, an abscess formed on the anterior internal aspect of the thigh, which was opened, and discharged nearly a quart of laudable pus in twenty-four hours. On February 2d, the opening on the posterior aspect of the thigh was enlarged and the wound syringed out with warm water. Erysipelas attacked the wound, but it was not of an intense character, and by February 10th, it had subsided, and the patient was in good condition comparatively. On February 23d, he had become more emaciated and had night sweats, but his strength continued good. On exploring for the ball with the finger, in the opening on the inner side of the thigh, a round, smooth surface was felt, which was thought at first to be a piece of a conoidal ball, but was ascertained to be the head of the femur just outside of the acetabulum. Excision of the hip joint was now decided upon, and Assistant Surgeon Henry A. Dubois, U. S. A., operated, the patient being under chloroform, by enlarging the opening on the inner side of the thigh, cutting the capsular ligament, and removing the head of the femur. The neck was divided by the lion-jawed cutting forceps. A small quantity of pus was found behind the head of the bone. But very little blood was lost during the operation, and the patient rallied partially, but he never fully recovered from the shock, and died February 25, 1863, two days after the operation. At the autopsy the neck of the femur was found rounded off, and formed a false centre of motion on the inner side of the acetabulum. The rounded extremity of the neck and the acetabulum were carious. The cut (FIG. 73) imperfectly represents the specimen, which was sent to the Army Medical Museum.

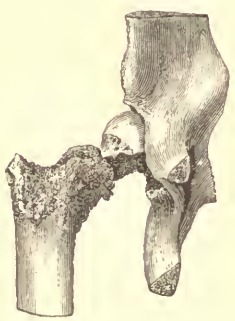

FIG. 73.—Caries of the acetabulum, neck, and trochanters of the right femur, following an excision for shot fracture. *Spec.* 3907. ½

CASE 266.—Ensign *W. J. Henry*, 21st Mississippi, aged 22 years, was wounded near Petersburg, on June 21, 1864, by a conoidal musket ball, which entered the upper third of the left thigh anteriorly and made its exit at the opposite side of the limb, having badly comminuted the femur, without injuring the principal vessels or nerves. The wounded man was conveyed to Richmond, and was admitted to hospital No. 4, on June 28th. The injured limb was suspended by Smith's anterior splint, the wound was dressed with water dressings, a nourishing diet was ordered, with an opiate at bed-time. Under this treatment the case progressed satisfactorily until August 2d, when the copious suppuration and wasting of the patient excited so much anxiety that a consultation was held, at which Surgeons C. B. Gibson, M. Michel, and J. B. Read assisted. After a careful exploration of the injury under chloroform, it was decided that an excision of the upper extremity of the femur was expedient, and the operation was at once performed by Surgeon J. B. Read, P. A. C. S. An incision seven inches in length was made,

commencing above the trochanter and carried downward in the axis of the thigh. The joint was opened and the head of the bone exarticulated. The shaft was sawn below the trochanter minor, about six inches of the bone being removed. The wound being thoroughly cleansed, was approximated and kept in position by sutures and adhesive strips. A long straight splint was then applied on the outside of the limb. An ounce of brandy and thirty drops of tincture of opium was ordered to be administered every hour until reaction should be fully established. August 3d, the patient had reacted and had passed a comfortable night. The pulse was at 136; there was no pain, except in the left knee, which was swollen, but without increased heat or redness. The appetite was poor but improving. A nourishing diet was directed, and half an ounce of brandy every two hours with a grain of opium every three hours. 4th, the patient had rested well, had a good appetite, the tongue was clean, the skin moist, the bowels had been moved naturally, the pulse was at 129, the countenance was cheerful. The treatment was continued with the addition of porter thrice daily. 5th, the pulse was stronger at 120, the countenance was cheerful; the treatment was continued. 6th, the patient was reported to have passed a bad night. He complained of acute pain in his left knee and in the right side of his chest. The pulse was 135 and weak. Incipient pneumonia was detected in the right lung. He had vomited the porter, and it was discontinued; the brandy and opium were continued as before. The wound was suppurating profusely. The sutures were clipped, and the wound was kept together by adhesive strips. The bowels were constipated. An enema of warm soap and water was administered, which procured a normal dejection in a few hours. Sinapisms were applied to the chest. 7th, he had rested tolerably well, but breathed badly. He was sweating profusely, and complained of much pain in the chest. The pulse was at 140, and was very weak. He was ordered an ounce of brandy every hour and a grain of opium every four hours. 8th, he was reported as having passed a very restless night. He was too weak to expectorate; the pulse was very feeble at 148. He was evidently sinking. He died at 3 o'clock P. M., August 8, 1864, six days after the operation, and forty-nine days from the reception of the injury. The report gives no account of the *post-mortem* appearances.

CASE 267.—Private John W. Nelling, Co. K, 1st Massachusetts, aged 25 years, was wounded on June 30, 1862, at the engagement at White Oak Swamp, by a musket ball, which entered his right groin, passed horizontally backward, comminuted the neck of the femur, and emerged posteriorly. He was abandoned with other wounded in the retreat of General McClellan's army. Being made a prisoner, he was confined in Richmond for three weeks, and was then released and sent by water to Baltimore, where he was admitted to the National Hospital, on July 25th, in a very depressed condition. There was copious suppuration, and through the large orifices of entrance and exit it was easy to explore the extent of the injury to the bone, and to determine that the comminution was limited to the epiphysis. It was deemed advisable to excise the shattered extremity of the bone as soon as the patient could acquire, by a tonic treatment, strength to undergo such an operation. In a few weeks his general condition was much improved, though he was still anæmic and feeble. On August 21st, Assistant Surgeon Roberts Bartholow, U. S. A., in charge of the hospital, proceeded to perform the operation. The patient being placed under chloroform, Dr. Bartholow made a vertical incision, commencing a little above and behind the great trochanter, continued downward into the axis of the limb four inches, and carried it down to the bone. The head of the femur was found to be entirely separated from the neck, and was retained in the acetabulum only by the round ligament. This was divided, and the head was removed. Several necrosed fragments were then extracted, and the jagged extremity of the neck was smoothed by an osteotome. But little blood was lost in the operation, and the patient rallied promptly from the effects of the anæsthetic. After he was put to bed, the limb was suspended by Smith's anterior splint, and the patient's condition was rendered comparatively comfortable. The case progressed favorably and without an untoward symptom till the afternoon of August 25th, when a sudden and very profuse gush of dark blood from the wound of incision and the entrance bullet wound took place, and the patient expired before the hæmorrhage could be controlled. At the *post-mortem* examination, the soft parts in the vicinity of the wound were found to be in a softened and semi-gangrenous condition. The end of the excised neck was denuded of periosteum and was necrosed. The external iliac and femoral arteries were traced some distance above and below Poupart's ligament, and were found to be in a normal condition. The femoral vein was softened, and near the track of the ball appeared to be broken down so as not to be distinguished from the surrounding tissues. A quantity of dark fluid blood was found under the integuments. The excised head and neck were deposited in the Army Medical Museum by the operator, and are represented in the cut (FIG. 74).

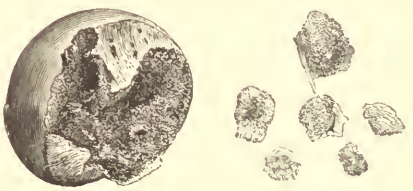

FIG. 74.—Head and fragments of the neck of right femur, excised for gunshot fracture. *Spec.* 400, Sect. I, A. M. M. ½

CASE 268.—Private Joseph Roth, Co. B, 188th New York, aged 25 years, a large robust man, was wounded in the engagement at Hatcher's Run, near Petersburg, on February 6, 1865, by a round musket ball, which entered a little below Poupart's ligament, an inch external to the course of the vessels, and lodged in the neighborhood of the hip joint. He was received at the field hospital of the 1st division of the Fifth Corps, and thence conveyed to the base hospital at City Point, and, as there was no pain or deformity, the case was regarded and treated as a flesh wound, and a week subsequently the patient was sent in the hospital transport steamer State of Maine to the General Hospital at Point Lookout. After a short time, Roth began to complain of great pain in the knee and leg of the wounded limb, which aroused suspicion that the hip joint was implicated. The symptoms becoming aggravated, and pointing clearly to some injury of the joint, Surgeon John Vansant, U. S. A., in charge of the hospital, determined to make an exploratory incision, and to ascertain the true condition of things. The patient being anæsthetized by a mixture of chloroform and ether on March 9th, an incision was made, commencing at the wound of entrance, and continued downward three inches or more. The ball was now found impacted in the head of the femur, the anterior part of which was shattered, while the posterior two-thirds of the head was intact. The muscular attachments being divided, and the capsular ligament freely opened, the round ligament was severed, and the head was exarticulated. A chain saw was then passed around the neck, which was divided near to the head, and the latter, with the ball inserted in it, was removed. Some sharp projecting portions of the neck were smoothed off with bone forceps. There was very little hæmorrhage. The wound was drawn together and treated by water dressings, and the limb was kept in suitable position by pads and pillows. The patient seemed to do well for several weeks, but gradually became feeble and emaciated, losing all appetite. There was

but a slight discharge. In May, the patient became quite yellow, and apparently suffered from malarial complications. In spite of a careful tonic and sustaining regimen, and the bracing, wholesome salt air of Point Lookout, he gradually declined, and died June 17, 1865. The pathological specimen was not forwarded to the Museum, and no account of an autopsy was rendered, an annoying omission, since it would have been interesting to have learned what reparative action had taken place during the three months after the operation which this patient survived.

CASE 269.—Private *Alfred Toney*, Co. A, 16th North Carolina, aged 43 years, a farmer by profession, was wounded June 30, 1863, and admitted to hospital No. 4, Richmond, on the same day. A conoidal musket ball had entered the left buttock and lodged. No particular attention was called to this case for some time. The patient seemed to be doing well. On August 11th, however, he complained of great pain in the knee and ankle; the slightest touch caused great anguish. The foot was œdematous. Chloroform was administered, and digital examination of the wound was made. The finger could pass but half an inch into the wound until the limb was carried forward; it then could be passed into the cotyloid cavity, and the ball was found in the acetabulum. The round ligament was severed and the head of the femur was ascertained to be slightly fractured and deprived of its cartilage. Excision of the head of the femur was decided upon, and on August 12th, Surgeon James B. Read, P. A. C. S., proceeded to operate. The patient was laid on his face, and his buttocks were brought to the edge of the table. A straight incision was commenced two inches below the anterior superior crest of the ilium and carried downward to one inch below the trochanter major. The muscles were then separated, and the joint exposed. The head was then dislocated by forcibly bringing the leg under the table. The soft parts were protected by a spatula and the head was sawn off. The ball was removed from the cotyloid cavity, which was found to be broken across and the cartilage loosened. The wound was then closed by sutures and the patient was removed to his bed. He suffered no pain, and in twenty-four hours the swelling had subsided. His general condition was very feeble, and he was freely stimulated during the after-treatment. He died August 19, 1863, eight days after the operation, exhausted by hectic fever. There is no account of any abdominal disturbance or pyæmic symptoms resulting from the fracture of the acetabulum.

CASE 270.—Private Henry Woodworth, Co. A, 4th Vermont, aged 18 years, was wounded at the battle of Spottsylvania Court House, on May 11, 1864, by a conoidal musket ball, which entered the left thigh, just below the trochanter major, passed inward and forward, grooving the femur anteriorly at the level of the lesser trochanter, and lodging under the sartorius muscle. The patient was conveyed to the field hospital of the 2d division of the Sixth Corps, where the ball was removed through an incision at the edge of the sartorius. A week subsequently, he was placed on one of the trains for the Rappahannock, and was transferred from Fredericksburg to Washington, where, on May 25th, he was admitted to Harewood Hospital. His condition on admission was very unpromising; his pulse was quick and feeble; he was anæmic, and without appetite. He was placed upon a tonic regimen, but he did not improve. The wound discharged profusely; there was much pain in the joint, pain aggravated by the slightest movement, and pus had burrowed in every direction about the articulation. Surgeon R. B. Bontecou, U. S. V., in charge of Harewood Hospital, decided that an excision of the head of the femur offered the only possible chance of saving life, and, on July 1st, the patient having been anæsthetized by sulphuric ether, Dr. Bontecou proceeded to perform the operation. A curved incision, with its concavity forward, embracing the trochanter, readily exposed the joint. The muscular attachments were divided, and the head was easily disarticulated, the joint being disorganized and the round ligament destroyed. The continuity of the bone being uninterrupted, the upper extremity was readily turned out and sawn just below the point of impact of the ball. On examination of the portion of bone removed, it was found that much of the head had been absorbed, and that the remainder was carious. The specimen is represented in the accompanying wood-cut (FIG. 75). The neck and trochanters are covered with traces of the effects of periostitis. The cotyloid cavity was ulcerated. The wound was drawn together by adhesive strips, and the limb was dressed in a fracture apparatus with moderate extension. Every means of supporting the patient's strength was adopted, but he did not rally from the operation, and, sinking gradually, expired on July 2, 1864.

FIG. 75.—Excised upper extremity of left femur with a conoidal ball. *Spec.* 3049. ¼

CASE 271.—Private John Zaborowski, Co. H, 7th Connecticut, aged 33 years, was wounded at the engagement at Deep Bottom, Virginia, August 16, 1864, by a conoidal musket ball, which entered just below the right trochanter major, and passing upward and inward, fractured the neck and slightly injured the head of the femur. The patient was conveyed to the field hospital of the Tenth Corps, where his wound was dressed, and he was then sent to City Point and transferred to the hospital transport steamer De Molay, and conveyed to the U. S. Hospital, at Beverly, New Jersey, where he was admitted on August 22d. His condition at this period is not described, and it is not stated whether the ball had been extracted. From the subsequent history, it would appear that there was profuse suppuration about the joint, since a free transverse incision was practised to give free escape to the discharge. On September 27th it was determined to excise the head of the femur. The patient had greatly lost in flesh and strength since his admission, and seemed to be rapidly failing from the exhaustive suppuration; extensive sloughing of the soft parts had supervened, and, upon the whole, the case was unfavorable and unpromising. Chloroform having been administered, and the patient being placed on his sound side, Assistant Surgeon C. Wagner, U. S. A., made an incision four and a half inches in length, extending from just below the anterior superior spinous process of the ilium toward the tuberosity of the ischium, crossing the transverse incision previously made over the trochanter major to permit free exit of pus. The thigh was flexed and rotated inward, the tendons of the muscles were divided, and a chain saw was passed under and between the head of the femur and the trochanter major, and the bone was sawn through the neck, the soft parts being protected by spatulas. About one inch of the trochanter major was found to be necrosed, and was removed by a small saw. No blood was lost during the operation. The patient sank rapidly, and died September 28, 1864, of exhaustion. A *post-mortem* examination revealed nothing of note, except slight caries of the acetabulum. The carious head of the femur was sent to the Army Medical Museum, and is represented in the adjacent wood-cut (FIG. 76). The fragments of the neck and the necrosed trochanter major were lost.

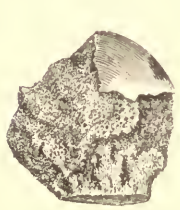

FIG. 76.—Head of right femur excised for caries following a gunshot fracture. *Spec.* 5716, Sect. I, A. M. M. ½

Of the eleven secondary excisions at the hip five were on the right and six on the left side. The pathological specimens were preserved in six instances.

TABLE XIII.

Summary of Eleven Cases of Secondary Excision of the Head of the Femur for Shot Injury.

No.	NAME, AGE, AND MILITARY DESCRIPTION.	DATE OF INJURY.	NATURE OF INJURY.	DATE OF OPERATION.	OPERATION AND OPERATOR.	RESULT AND REMARKS.
1	[1] Brown, J., Pt., I, 3d Michigan, age 38.	Aug. 29, 1862.	Musket ball perforated the left thigh, fracturing femur just below the trochanter minor.	Mar. 21, 1863.	Necrosed fragments extracted; shaft of femur divided six ins. below tip of troch. minor. The head, neck, and trochanters, and the masses of callus adhering to the trochanters were then removed, straight incis. eight ins. long, by Surgeon D. P. Smith, U. S. V.	Disch'd Aug. 23, 1863, and pensioned. Appointed postmaster in 1867, at Coopersville, Mich. Able to attend almost entirely without assistance to the business of the office. Paid pension March 4, 1876. *Spec.* 1192, A.M.M. *Phot. Ser.* 110, A.M.M.
2	Tilliston, G. W., Pt., D, 1st Ohio Light Artillery, age 44.	July 7, 1861.	Rifle ball enter'd the right groin, passed backward, fractured the head and neck of femur, and lodged in large muscles of buttock.	Sept. 20, 1861.	Head and neck of femur excised, by Dr. E. Sterling.	(Disch'd July 21, 1861.) July, 1867, fistulous opening discharging purulent matter. Three ins. shortening. Pens'ner died Sept. 6, 1871, of asthenia. Autopsy. *Spec.* 5590, A. M. M.
3	Pease, T. W., Pt., H, 19th Indiana, age 26.	July 1, 1863.	Conoidal ball fractured upper third of right femur, passed thro' trochanter and lodged behind trochanter major, followed by chronic ostitis and coxitis.	Nov. 8, 1871.	Femur divided five ins. below the trochanter and unjointed from acetabulum, by Dr. J. K. Bigelow, late Surgeon 8th Indiana.	Portions of femur had been previously removed. Patient had been disch'd Aug. 8, 1864. In Sept., 1876, the pensioner had "nearly a perfect arthrodial joint at hip, and was able to attend to the ordinary duties of a deputy marshal."
4	Frain, H., Pt., G, 31st Massachusetts, age 22.	Feb. 1, 1865.	Left thigh perforated by a conoidal ball; the neck of the femur was fractured.	Mar. 24, 1865.	The femur was divided by the chain saw just below the trochanter minor; the head of the femur was removed without difficulty; Surg. A. M. McMahon, U. S. V. Incision four ins. long.	Died March 30, 1865. *Circ.* 6, S. G. O., 1865, p. 72. *Circ.* 2, S. G. O., 1869, pp. 54, 137.
5	*Henry, W. J.*, Ensign, 21st Mississippi, age 22.	June 21, 1864.	Comminuted shot fracture of upper third of left femer by a conoidal musket ball.	Aug. 2, 1864.	Head of femur exarticulated, shaft sawn below trochanter minor, six inches of bone removed, by Surg. J. B. Read, C. S.A. Incis. seven ins. long.	Died August 8, 1864. *Circ.* 2, S. G. O., 1869, pp. 52, 137.
6	Hunt, E., Pt., D, 71st Pennsylvania, age 24.	Sept. 17, 1862.	Conoidal ball grazed the neck of the right femur and passed out at the nates.	Feb. 23, 1863.	Opening on inner side of thigh enlarged, neck of the femur divided with lion-jawed forceps and head of bone removed, by Ass't Surg. H. A. DuBois, U. S. A.	Died Feb. 25, 1863. *Spec.* 3907, A. M. M. *Circ.* 6, S. G. O., 1865, p. 66. *Circ.* 2, 1869, S. G. O., pp. 49, 137.
7	Nelling, J. W., Pt., K, 1st Massachusetts, age 25.	June 30, 1862.	Musket ball comminuted neck of right femur; head of bone entirely separated.	Aug. 21, 1862.	Head of bone removed, several fragments extracted, and the jagged extremity of the neck smoothed by an osteotome, by Ass't Surg. R. Bartholow, U. S. A., thro' vertical incis.	Died August 25, 1862, of hæmorrhage. *Spec.* 400, A. M. M. *Circ.* 6, S. G. O., 1865, p. 62. *Circ.* 2, S. G. O., 1869, pp. 48, 137.
8	Roth, J., Pt., B, 188th N. York, age 25.	Feb. 6, 1865.	Anterior part of head of left femur shattered by a round ball, which lodged in same.	Mar. 9, 1865.	The neck of the femur was divided near the head of the bone by a chain saw; the head of the bone with the ball inserted was then removed, straight incision, by Assistant Surg. J. Vansant, U. S. A.	Died June 17, 1865. *Circ.* 6, S. G. O., 1865, p. 74. *Circ.* 2, S. G. O., 1869, pp. 53, 137.
9	[2] *Toney, A.*, Pt., A, 16th N. Carolina, age 43.	June 30, 1863.	Head of the left femur slightly fractured by a conoidal ball that lodged in acetabulum.	Aug. 12, 1863.	Head of femur sawn off and the ball removed from the cotyloid cavity, by Surg. J. B. Read, P. A. C. S.; straight incision.	Died August 19, 1863, from exhaustion, of hectic fever.
10	Woodworth, H., Pt., A, 4th Vermont, age 18.	May 11, 1864.	A conoidal ball grooved the left femur anteriorly at the level of the lesser trochanter and lodged under the sartorius muscle and was removed.	July 1, 1864.	Head of femur disarticulated and upper extremity of bone readily turned out and sawn just below the point of impact of the ball, by Surg. R. B. Bontecou, U. S. V.; curved incision.	Died July 2, 1864. *Spec.* 3049, A. M. M. *Circ.* 6, S. G. O., 1865, p. 70. *Circ.* 2, S. G. O., 1869, pp. 52, 137.
11	[3] Zaborowski, J., Pt., H, 7th Connecticut, age 33.	Aug. 16, 1864.	Conoidal ball fractured the neck and slightly injured the head of the right femur.	Sept. 27, 1864.	Chain saw passed under and between the head of femur and trochanter major and the bone sawn through the neck; an inch of trochanter major, found to be necrosed, removed by small saw, by Ass't Surg. C. Wagner, U. S. A.; crucial incision.	Died September 28, 1864, from exhaustion. *Spec.* 3716, A. M. M.

[1] SMITH (D. P.), *Gunshot Wounds of the Great Trochanter*, in *Am. Med. Times*, 1863, Vol. VII, p. 12. *Circular* No. 6, S. G. O., 1865, p. 66. *Circular* No. 2, S. G. O., 1869, pp. 50, 137.

[2] READ (J. B.), *Resections of the Hip Joint*, in *Confederate States Med. and Surg. Jour.*, 1864, Vol. I, p. 6. EVE (P. F.), *Contribution to the History of the Hip Joint Operations performed during the late Civil War*, in *Transactions of the American Medical Association*, Vol. XVIII, p. 256. *Circular* No. 2, S. G. O., 1869, pp. 51, 137.

[3] WAGNER (C.), *Report of Interesting Surgical Operations performed at the U. S. Gen. Hosp., Beverly, N. J.*, 1864, pp. 14, 15. *Circular* No. 6, S. G. O., 1865, p. 70. *Circular* No. 2, S. G. O., 1869, pp. 53, 137.

Since the termination of the civil war the operation of excision at the hip for shot injury has been practised five times in the service of the United States Army and once in the service of the United States Navy, and this aggregate of six excisions[1] gives the

[1] Four of the operations are described at length in *A Report of Surgical Cases treated in the Army of the United States from* 1865 *to* 1871, *Circular* No. 3, War Department, Surgeon General's Office, Washington, 1871, pp. 228–234, and the facts regarding them will be here briefly recorded, two of the cases are hitherto unpublished, and will be narrated more in detail. Two of the excisions were primary, one intermediary, and three secondary operations. The first case was that of Private Hubert Erne, Co. D, 4th Infantry, aged 48 years, wounded December 2, 1869, while acting as one of a corporal's guard of the mail wagon from Fort Laramie to Fort Fetterman, in an attack by a band of Indians. He was struck in the left buttock by a round carbine ball (cal. 45, weight 225 grains), and fell to the ground. His comrades placed him in a wagon and drove rapidly to Laramie, over a very rough road; he was struck at two in the afternoon and was placed in bed in the hospital at half-past seven, much exhausted, having driven thirty-two miles in five and a half hours. He had lost blood copiously. His extremities were cold, pulse almost imperceptible, and his countenance was pallid and covered with clammy sweat. The left lower limb showed shortening with eversion, the thigh arched with an anterior convexity. The entrance wound was an inch and a half behind the trochanter major on a slightly higher plane; the exit aperture was near the centre of the groin just below Poupart's ligament, directly over the axis of the femoral artery. The diagnosis of Assistant Surgeon F. MEACHAM, post surgeon, was that there was fracture of the shaft, neck, and trochanters of the left femur. As he had not rallied from the shock, it was thought best to defer surgical interference until morning, and the limb was placed in a comfortable position, and the patient allowed half an ounce of brandy every half hour, while external applications of heat were made by hot blankets, heated sad-irons, and bottles of hot water. At midnight the patient had fairly reacted; but complained of great pain in the middle of the injured thigh. He was ordered a fourth of a grain of morphia to be repeated in two hours if needed. At 7.30 A. M., December 3d, the patient was comfortable; pulse at 90. No appetite and little sleep during the night. Temperature in axilla 99° F. Cold-water dressings to wound were applied, milk punch given freely, and an eighth of a grain of sulphate of morphia every two hours. At 1 P. M. Dr. MEACHAM, assisted by Assistant Surgeon J. B. GIRARD, U. S. A., placed the patient under chloroform and thoroughly explored the injury, after enlarging the entrance wound to admit the finger to ascertain the extent of shattering of the neck, trochanters, and shaft. No important vessels or nerves were involved. The patient was an old soldier; he had been a hard drinker; during the civil war had been more than once wounded, having on one occasion suffered a shot fracture of the lower jaw. After careful consideration of the local and constitutional conditions it was determined that excision of the upper extremity of the femur would afford the patient the best chance of life. Dr. MEACHAM made a curvilinear incision seven inches in length, beginning an inch and a half above the trochanter major, traversing the entrance wound and extending downward in the axis of the shaft. Exposing the bone by rapid division of the muscular attachments, the fragments of the shaft were first removed and the pointed upper extremity of the shaft was then divided by the chain saw; then, with some difficulty, the head of the bone was exarticulated, and the operation completed. The exploratory incisions, consultation, and final excision occupied nearly an hour. Little blood was lost, and the patient promptly rallied, with little sign of shock. The upper part of the incision was united by sutures and adhesive strips. The man was put to bed with the injured limb extended, and a weight of four pounds attached by Buck's method. The wound had cold-water dressings, and the patient had an ounce of brandy every hour when awake, and a quarter of a grain of sulphate of morphia every two hours. December 4th, the patient had passed a good night, and had a full pulse at 90. During the day he had nutritious diet, a half ounce of brandy hourly if awake, and two grains of quinia and an eighth of a grain of sulphate of morphia every four hours. Excised fragments of bone were cleaned and sent to the Army Medical Museum and preserved as Specimen 5658, of the Surgical Section, which are represented one-fourth the size of nature (FIG. 78). On December 5th, in the early morning, there was little change in the constitutional symptoms. The patient had slept four hours during the night. He was troubled with hiccough. He had partaken freely of freshly prepared essence of beef. At the surgeon's morning visit, at half past seven, twenty-grain doses of bromide of potassium were substituted for the morphia, and the other treatment and diet were continued, with the addition of canned oyster soup. At the evening visit, at nine, the hiccough had nearly ceased, the wound had begun to suppurate, the pulse was 100, the tongue was moist, and the thirst diminished. The dose of bromide of potassium was reduced one-half; the other treatment was continued. On the morning of December 6th he was found to have passed a restless night, annoyed by hiccough when awake. He complained of the extension, and the weight attached to his foot was diminished one-half. Whiskey was substituted for the brandy which he disliked, and a tincture of sesquichloride of iron was given in twenty-drop doses, with two grains of sulphate of quinia every four hours. One-fourth of a grain of sulphate of morphia was ordered to be given when the pain demanded it. The patient was removed to a water-bed. On December 7th the patient was more comfortable and had slept well. He was annoyed by flatulence, the bowels not having moved since the reception of the injury. He was ordered a tablespoonful of castor oil and twenty drops of turpentine, and an enema of soap and water. The suppuration from the wound was quite copious. On the following day it was practicable to omit the anodyne, and the patient had a free evacuation of the bowels, with great relief. The patient was allowed a small piece of beef-steak for his breakfast, and chicken for dinner. The discharge from the wound was profuse, and the integument over the hips and nates was somewhat abraded from heat and moisture. The weight attached to the foot was removed altogether. The patient was transferred from the water-bed to a mattress, in the middle of which was a movable portion corresponding with the pelvic region. This arrangement greatly facilitated the application of dressings and the use of a bed-pan. The patient was ordered three ounces of beef essence thrice daily and as much milk as he should relish. On the 9th, he was found to have slept well without taking an anodyne. The suppuration was profuse. The pulse was at 100. The appetite was abundant. Hiccough was again quite troublesome. The bowels had not been moved since the 7th, and an enema of castile soap and warm water was ordered to be given daily, unless there should be an alvine evacuation before nine in the morning. During the next fortnight there were no symptoms of especial interest. The wound continued to suppurate, but less copiously, and was rapidly filling up with granulations. On December 23d the patient passed a very restless night. The surface was hot, and the pulse at 100; the appetite was gone; the abdomen was tympanitic. On December 23d, he had several dejections, and had slept soundly during the previous night, and was in every respect much better. On January 1, 1870, his bowels were again obstinately constipated. Cicatrization of the wound was rapidly going on. Citrate of iron and quinine was substituted for the sesquichloride of iron. Laxative enemata were required daily, and whiskey was still given. The obstinate hiccough ceased about the middle of January, at which date the pulse had fallen to an average of 90, and the wound had far advanced toward healing. For the next six weeks there was very little change in the daily record. The patient's convalescence progressed favorably, and by February 28th the wound was open at two points only. Constipation was still a troublesome complication; the patient being annoyed by injections he was ordered to take a three-grain compound cathartic pill nightly. By the end of March the patient was able to sit up. There were still two fistulous sinuses leading

FIG. 77.—Cicatrix in Meacham's case of successful excision of the left hip. [From a photograph.]

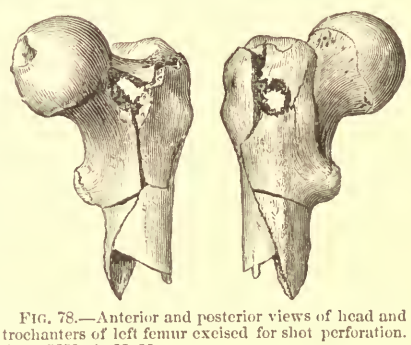

FIG. 78.—Anterior and posterior views of head and trochanters of left femur excised for shot perforation. *Spec.* 5658, A. M. M.

gratifying result of four recoveries. Adding to the sixty-six cases of excision at the hip for shot injury performed during the War of the Rebellion the ninety-nine cases referred to in Note 1 on page 90 *ante*, and the six cases detailed in Note 1 commencing on page

toward the cotyloid cavity. About an ounce of pus was discharged daily. The limb was about five inches shorter than the other. On April 10th the patient got on crutches, but could not walk far without fatigue. For the next twenty days he seemed disinclined to exert himself but was taken out every day in a wheeled litter. One of the sinuses had closed. By July 8th the patient had gained in flesh and strength, and the purulent discharge had diminished to a few drops daily. The limb was swollen considerably and there was an erysipelatous blush extending below the knee. At this date Dr. MEACHAM was ordered to Omaha, and the patient passed into the hands of Acting Assistant Surgeon L. S. TESSON, who, on July 29th, wrote to Dr. MEACHAM that quite a large abscess formed in the muscles of the thigh. On August 9th, Dr. TESSON again wrote that it had been necessary twice to make incisions to evacuate abscesses in the thigh. Again, on March 9, 1871, Acting Assistant Surgeon A. J. HOGG writes that the man is entirely well, the cicatrix being perfectly sound; but the man persisted in lying in bed. On April 1, 1871, Dr. MEACHAM reports that he had succeeded in getting his patient again under his personal observation, previous to which he had borne transportation in an ambulance for ninety miles, and appeared in better spirits at the end of the journey than when he set out. The wound had entirely healed, leaving a firm and sound cicatrix three inches in length. The patient was able to walk comfortably on crutches and had slight control over the limb, which admitted of a to-and-fro motion, with rotation inward. The upper end of the femur rested on the dorsum of the ilium, about one inch above the acetabulum, and was movable in that position. There was six and a half inches shortening. The patient was somewhat hypochondriacal, being greatly troubled with indigestion and irregular bowels. A photograph of the patient, taken at Omaha, March 30, 1871, is copied in the wood-cut (FIG. 77). Private Hubert Erne was discharged from service May 18, 1871, and by an order dated A. G. O., June 9, 1871, was sent to the Soldier's Home, near Washington. In answer to an enquiry from this Office, Surgeon C. H. LAUB reported: "Hubert Erne, late of the 4th Infantry, was received in hospital at Soldier's Home on July 16, 1871, in a very emaciated and feeble condition, the result of chronic diarrhœa. Having during his residence here exhibited symptoms of partial insanity, and having no facilities for the proper care of such cases, he was transferred to the Government Insane Asylum, near Washington, August 20, 1871, at which place it is reported that he died a short time after his admission." Then Dr. C. H. NICHOLS, Superintendent of the Government Hospital for the Insane, reported that the patient "was admitted August 19, 1871, to be treated for acute insanity, and that he died Nov. 7, 1871, from exhaustion, of acute mania. No autopsy was made in the case." Another primary excision at the hip for shot fracture of the upper extremity of the femur was practised at Fort Concho, Texas, in 1874, by Assistant Surgeon W. F. BUCHANAN, U. S. A. The fracture was attended with very extensive longitudinal splintering, and it would appear that such conditions involve incisions of such perilous magnitude as to afford the slightest prospects of success even under the most favorable attendant circumstances. The abstract of this case has not, at this date, (June 1, 1878), been published in print.—Sergeant T. Duncan, Co. K, 25th Infantry (Colored), aged 27, was shot in the left hip while a prisoner and attempting to escape from his guard at Fort Concho, Texas, on the morning of November 21, 1874. On receiving the injury, which was produced by a conical rifle ball at a distance of about sixty yards, he fell to the ground, when he was placed on a wheeled litter and was conveyed to the Post Hospital. At 9.20 A. M. an ounce of brandy with half a grain of morphia was administered. An examination externally exhibited a wound of entrance in the gluteal region, on a line with the lower border of the great trochanter, and about mid-

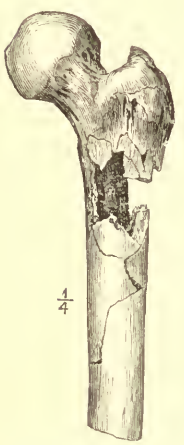

FIG. 79.—Shattered upper extremity of the left femur. *Spec.* 6513.

FIG. 80.—Posterior view of the same specimen.

way between the trochanter and the tuberosity of the ischium; the wound of exit existed in the anterior part of the thigh, same side, about an inch and a half below Poupart's ligament and one inch external to the femoral vessels. The mobility, crepitus, probing, etc., proved that the upper part of the shaft of the femur had been shattered; a compound comminuted fracture, doubtless extending within the capsule. Venous hæmorrhage was taking place from the wound in the gluteal region, and great pain was felt in touching the great trochanter and in the knee. There was also great nervousness, and quick and feeble pulse. He was placed on his right side, the injured leg supported, the body bolstered, and the hæmorrhage controlled by pledgets of lint saturated with a solution of persulphate of iron. Cold-water dressing was applied, a tin warmer filled with hot water applied to the feet, and a quarter of a grain of sulphate of morphia together with an ounce of brandy was given every two or three hours. On the following day, at 11.30 A. M., the patient was quite nervous, suffering great pain, and only relieved by the full effects of the anodyne, having slept little during the night and eaten nothing but a little beef essence; pulse 120 and small; temperature normal. It was decided that resection offered him the only chance to survive. He was therefore placed on the operating table and brought under the influence of the anæsthetic, consisting of one part of chloroform and two of ether, when a longitudinal incision about eight inches in length was made, commencing just above the trochanter and extending in the axis of the head and neck of the bone, and the soft parts were dissected away. The upper end of the shaft being found much shattered and the fracture extending within the neck, the head of the bone was exarticulated and the fractured extremity removed with the chain saw. About five inches of the shaft, with the head and neck, were exsected. No arteries were cut, and but one small vein was ligated. All the fragments of bone, about forty, were removed, the parts washed out and a weak solution of permanganate of potassa applied, the sides of the wound being united with interrupted sutures supported by adhesive straps. The patient was then placed in bed, position maintained by sand bags, and cold-water dressings instituted. As soon as he had recovered consciousness, brandy and morphia were given and repeated frequently. Warmth was applied to the feet. The patient was of great muscular development, and the incision required to be lengthened an inch or so to allow of necessary retraction. His pulse was about the same as before the operation, rather full. Although relieved of the pain he had suffered previous to the operation, he continued restless, constantly trying to change his position, groaning, etc., and died on the morning of November 26th, about fourteen hours after the operation." The exeised portion of the fractured femur, represented in the wood-cuts (FIGS. 79, 80), with the history, was contributed to the Museum by the operator, Assistant Surgeon W. F. BUCHANAN, U. S. A. Of the excisions at the hip after shot injury, practised since the close of the civil war in the United States Army, one was an intermediary operation performed by Surgeon GLOVER PERIN, U. S. A., at Newport Barracks, Kentucky, in August, 1867: CASE.—Private Francis Ahearn, aged 30 years, U. S. General Service, was wounded at Newport Barracks, Louisville, on July 31, 1867. He was a prisoner in the guard-house, and was shot by a sentinel while attempting to escape. The ball entered behind and below the prominence of the right trochanter major and passed inward and upward, emerging on the anterior part of the thigh, two inches below Poupart's ligament, a little to the outside of the course of the femoral artery, having shattered the upper part of the femur, the fissures extending within the joint. The wounded man was immediately taken to the Post Hospital, and was examined by Colonel PERIN, the surgeon in charge. The patient had been an habitual drunkard for years and had *mania a potu* when shot. The shock of the injury was so great that an operation was not considered advisable. It was determined to adopt a supporting treatment, and to endeavor to build up the general health, with a view of operating at the first favorable moment when a good result could be reasonably anticipated. On August 26, 1867, the patient was in a better condition than at any time subsequent to the reception of the injury. The pulse was at 90; there had been troublesome diarrhœa, but it was somewhat abated; the injured limb was much wasted, except at the upper part of the thigh, where it was greatly swollen: the discharge from the wound was very copious, and there was extreme pain on the slightest movement. There were abscesses about the joint communicating with its cavity. Excision having been decided upon, Surgeon PERIN, assisted by Assistant Surgeon T. E. WILCOX, U. S. A., proceeded with the operation. The patient being rendered insensible by a mixture of chloroform and ether, the entrance wound was enlarged by a straight incision downward and three

120, we have a total of one hundred and seventy-one instances of excision at the hip for shot injury, of which one hundred and forty-eight, or 86.5 per cent. proved fatal. Forty-three of the operations were primary, with forty deaths, or 93 per cent.; sixty were inter-

inches in length. The head of the bone was disarticulated, and the shaft was sawn several inches below the lesser trochanter. The wound was then cleansed and approximated. Scarcely any hæmorrhage took place, no ligatures being required. On recovering from the anæsthetic, the patient complained of great pain and nausea. Brandy was administered, and half a grain of sulphate of morphia; but there was such irritability of stomach that everything was rejected. A quarter of a grain of sulphate of morphia was then administered hypodermically, and this relieved the pain. But there was no decided reaction, and, sinking gradually, the patient died from the shock of the operation twenty hours after its completion. No autopsy was made. The shattered excised bones were sent to the Army Medical Museum, and are represented in the adjoining wood-cuts (FIGS. 81, 82). Many of the fragments were carious. Of the six cases of excision at the hip joint practised on account of shot injury in the United States since the civil war, three were successful secondary operations. Two occurred in the United States Army and one in the United States Navy. The first of the operations was performed by Assistant Surgeon J. R. GIBSON, in August, 1868. The patient recovered with a very satisfactory control of the functions of the articulation and limb. A detailed report of the case was published in *Circular* No. 2, S. G. O., 1869, pp. 117-120, and in *Circular* No. 3. S. G. O., 1871, p. 228, an account of the pensioner's progress was given, with a lithograph plate showing the appearance of the injured limb three years subsequent to the operation. The following is the condensed abstract of the case as published in *Circular* No. 3: "Private Charles F. Read, Co. I, 37th Infantry, while in a stooping posture, and distant about one hundred feet, was shot by a sentinel at Missouri Bottom, New Mexico, on June 6, 1868. The ball struck about the middle of the posterior aspect of the left thigh, causing an injury to the bone, the nature of which is shown in the accompanying wood-cut (FIG. 84), illustrating the specimen contributed to the Army Medical Museum by the operator, Assistant Surgeon J. R. GIBSON, U. S. A. The case being fully detailed in *Circular* No. 2, S. G. O., 1869, page 117, reference will only be made to the more salient points, and to information received since the publication of that report. After weeks of temporization, during which the patient, a young man in the prime of life, had become much exhausted from numerous and futile searches after the missile, from bedsores, profuse suppuration, an irritable diarrhœa, and pain so intense as to require the administration of an anæsthetic previous to dressing the wound, the choice lay between a lingering death or excision of the head of the femur, or the more fearful and precarious alternative of amputation at the joint. On August 14th the patient expressed willingness to submit to any operation that would afford relief, when he was anæsthetized for the purpose of again freely examining the parts, and performing such operation as should be considered necessary. Upon explorations of the wound with the probe and finger, the ball was discovered in the head of the femur, a T-shaped incision was made over the joint, the head of the bone was turned out of the acetabulum, and was sawn through the neck, just within the greater trochanter. The incisions were closed with metallic sutures, and the limb was temporarily placed between splints, with a pillow under the knee. A Smith's anterior splint not being on hand, nor the material procurable for making one, a long external splint, made in two parts, and connected by iron braces, was devised and put in course of construction. The after treatment consisted in carbolized dressings to the wound, the administration of antiperiodics to control a fever of a remittent type (at one time supposed to be the precursor of erysipelas or pyæmia), and a plain nutritious diet. Notwithstanding frequent displacement of the limb from occasional attacks of diarrhœa, and the absence of a proper apparatus to secure immobility, the performance of this formidable operation seemed to have imparted a new tenure of life. By November 20th the patient was able to walk about the hospital, and the further progress of the case was as rapid as it was favorable. On May 16, 1869, this soldier was discharged the service and pensioned for total and permanent disability, the injured member being shortened one inch and three-quarters. He came across the plains by the next train, and, in September, 1869, reported at the Surgeon General's Office, where a photograph was taken. At that time the patient's general health was excellent; the cicatrix was perfectly firm and sound, and the strength of the ligamentous attachments and the amount of control over the movements of the limb were very remarkable. He could bear much weight on the limb. He was supplied with a prothetic apparatus and advised not to use it straightway, but to continue exercising the limb continuously for some months, thereby increasing the strength of the muscles and ligamentous attachments, and the freedom of the newly-formed joint. The next week Read went to New York, where the proposed apparatus was ingeniously applied by Dr. E. D. HUDSON. In the summer of 1870, it was reported that this man could walk very comfortably with a cane either with or without apparatus. The appearance of the patient is shown in the accompanying wood-cut (FIG. 83.) In June 1871, three years after the operation, the man was in very good health, and could walk almost as well as ever." He was last paid on September 4, 1877. The next secondary operation was performed by Surgeon W. E. TAYLOR, U. S. Navy. A report of the case was published in *Circular* No. 3, S. G. O., 1871, p. 232: Charles B. Scott, a seaman of the U. S. Navy, aged 34, of fair general health, was wounded in an attack on a piratical vessel in Tecapan River, west coast of Mexico, June 17, 1870, by a rifle ball, fired at a distance of about eighty yards. He was conveyed a distance of seventy miles to the U. S. ship Mohican, on board of which he was treated for several days, and finally transferred on July 12th to the Naval Hospital, Mare Island, California. The wound of entrance was small, and situated a little below and about two inches posterior to the top of the left great trochanter. He rested entirely on the right side, with the injured limb partially flexed and resting on the sound one, the whole limb being inverted and shortened about one inch. Cold-water dressings had been applied to the wound and anodynes administered when required. His general condition was decidedly below par. The least movement in the injured joint caused severe pain; he did not sleep well, and his appetite was poor. Full diet, with milk and an anodyne at night, were ordered. On July 14th an examination of the wound was made. No anæsthetic was used, and the result was unsatisfactory. However, appearances led to the belief that the neck and probably the head of the femur were fractured; the ball could not be felt. The joint was not swollen but was very sensitive, and there was a scanty sanious and fetid discharge from the wound. On July 25th the patient was chloroformed, and Surgeon W. E. TAYLOR, U. S. Navy, made a single straight incision, seven or eight inches long, and found the neck and head extensively comminuted; he then sawed off the bone just below the trochanter minor, and removed the fragments, some twelve or fourteen in number, as also the ball, which seemed to have struck the neck obliquely, breaking it into three pieces, and then passed into the head, shattering it into nearly a dozen pieces. Very little blood was lost, two small arteries only requiring to be secured. After syringing the wound with a weak solution of permanganate of potash, it was partially approximated by four sutures, and the limb was placed in an ordinary fracture box, and dressed with oakum. The operation was well borne, and reaction prompt. Stimulants, with nutritious diet, were ordered, and rigid cleanliness was enforced. On the 27th the patient began to suffer from decubitus. On the evening of the 29th he became delirious; pulse 130

FIG. 81.—Shattered upper extremity of right femur, excised for caries following shot fracture. *Spec.* 5489.

FIG. 82.—Posterior view of the same specimen.

FIG. 83.—Appearance of the limb fifteen months after the operation.

FIG. 84.—Excised head of left femur with impacted musket ball. *Sp.* 5576.

mediary, with fifty-eight deaths, or 96.6 per cent.; forty-one, with twenty-six deaths, or 63.4 per cent., were secondary; and, in twenty-seven instances, with twenty-four deaths,

and irritable. Hydrate of chloral being substituted for morphia, he went to sleep in a few minutes, and next morning awoke refreshed and feeling better than at any time since the accident. The pulse fell to 100. On the 31st, the sutures were removed. The good effect of the chloral was very marked, but, by August 6th, it seemed to have lost some of its effect; whereupon morphia was combined with the usual dose, and he slept well. The discharge from the wound was small in quantity and laudable. On August 8th, some extension of the limb was made, but was badly borne. By the 14th, the patient was doing well in every respect. On the 21st, all dressings being removed from the limb, it was thoroughly bated and rubbed, after which it was replaced in the fracture box, when extension and counter-extension were made by means of the ordinary perineal band and screw. This was discontinued on the 26th, owing to enlargement of the inguinal glands and the general *malaise* and discomfort experienced by the patient. On the 30th, the use of anodynes was discontinued, as he could sleep without them. September 1st, found the patient improving, the discharge from the wound being moderate, with an entire absence of inguinal trouble, bedsores, and excoriations. Slight passive motion was commenced in the limb, and it was allowed to rest lightly on a pillow for several hours. On the 7th, he was able, for the first time, with assistance, to leave his bed. After this he continued to sit up several hours daily, and, gaining in flesh, was able, by the 18th, to walk on crutches. He continued to take daily a moderate amount of out-door exercise, the limb meanwhile being supported and steadied by means of a wire splint, and his general condition became excellent. On December 27th, he went by steamer to San Francisco, a distance of fifty miles, and returned in the evening, having borne the journey well. On January 20, 1871, a prothetic apparatus was adjusted to the limb, which, at the beginning, proved highly useful. On February 1st, the patient was transferred to the new Naval Hospital. At this time his general health was excellent. The left buttock was somewhat flattened, and there was a small opening about the centre of the line of incision, which discharged a small quantity of pus; the limb was about three and a half inches shorter than its fellow, the knee being quite stiff and foot everted (FIG. 86). The patient had gained about thirty pounds since the operation of excision, and there was a probability of his being able to walk quite well without the aid of crutches. Scott was discharged April 18, 1871, at Mare Island, California, and pensioned. Drs. R. V. WALSH and J. S. GUNNING, of Enniskillen, Ireland, certified, September 4, 1875: "There is a fistulary opening connected with the bone. The leg is greatly wasted, being one-third the size of the sound leg." Dr. JOHN ST. CLAIR GUNNING certified, October, 17, 1877: "Charles B. Scott, who died at Omagh, Tyrone County, Ireland, on the 1st day of July, 1877, was under my professional care, and his death was caused by chronic cystitis, the result of a very extensive and severe injury to his hip joint." The specimen 5884 is preserved in the Museum and shown in the accompanying wood-cut (FIG. 85). The third of the secondary operations of excision at the hip joint for shot injury was practised at Fort Fetterman, Wyoming Territory, in September, 1877, by Assistant Surgeon JOHN V. R. HOFF, U. S. A., who has furnished a detailed report of the case, from which a condensed abstract is made: Sergeant William J. Linn, Co. M, 4th Cavalry, aged 22 years, was wounded in a fight with Cheyenne Indians during the Powder River Expedition, November 25, 1876. The bullet (probably conoidal, calibre .50 inch, weighing 412 grains) entered the right groin three inches below and slightly internal to the anterior superior spinous process of ilium and two and three-fourth inches external to the symphysis pubis, passed obliquely backward through the hip joint, fractured the neck of the femur, notched the posterior segment of the rim of the acetabulum, and emerged at a point about one inch posterior and exterior to the notch in the acetabulum. The wound was received while the soldier was resting on his right knee and left foot in the act of discharging his carbine. The patient was immediately carried to the rear and a plaster of Paris badge applied. He was moved on a *travois* over an almost impassable country, during weather so cold that mercury froze, and reached Supply Camp on the third day. Here the plaster bandage was reapplied and the patient was placed in an ambulance and carried to Cantonment Reno, reaching the latter place after a five days' journey over a country where roads are unknown, in weather of the utmost severity, and under circumstances of hardship which skillful care and unremitting attention could but little alleviate. A week after his arrival at Reno, the plaster bandage was removed, the limb was elevated, and the wounds of entrance and exit, which were discharging pus freely, were treated with simple dressings. The wound of entrance closed in four weeks, and, though the wound of exit was still discharging, an immense abscess formed in and about the joint, which pointed in anterior cicatrix, finally opened spontaneously, and remained so for several months. A light extending weight was used for a short time, no medicine given except morphia occasionally for pain and physic for constipation. On March 24, 1877, the patient was transferred to the post hospital at Fort Fetterman. The journey was accomplished in five days on a stretcher slung in an army wagon. When admitted he was very emaciated, pale and pain-worn, and weighed about 100 pounds, having lost 80 pounds since the reception of the injury. Two suppurating sinuses led into the articulation and there was fibrous anchylosis of both hip and knee joints. The patient had not moved from a recumbent position since he received the injury, and could not even be raised upon a bed-pan without great pain. Tonics and a generous diet were ordered, the wounds were dressed with carbolic acid solution. The bowels were freely opened and kept regular. When the patient had fairly recovered from the exhausting effects of the journey a side splint was applied which enabled him to be moved without pain. Notwithstanding the most careful attention the patient gradually failed, and grew so feeble and complained so much of pain that it seemed but a question of weeks between an operation or death. On September 28th, Assistant Surgeon J. V. R. HOFF, U. S. A., excised the hip joint after SEDILLOT'S method. A circular incision was made to include the great trochanter and opening into the joint, the capsular ligament was severed, the head of the femur was thrown out and removed by the chain saw at a point just below great trochanter. The head of the femur (proper), which had been severed by the bullet at its neck, was found lying loosely in the acetabulum partially absorbed, and was easily removed by forceps. Ether was used; insensibility induced in seventeen minutes and maintained one hour and ten minutes; reaction was rapid and satisfactory. Antiseptic dressings were used. A double splint to fit both legs, made of light iron, reaching to the waist and there secured by a belt, was applied. This proved most useful in enabling the patient to be moved with comparative ease, and, at the same time, keeping the wounded parts measurably immovable. Extension was applied by means of tin plates

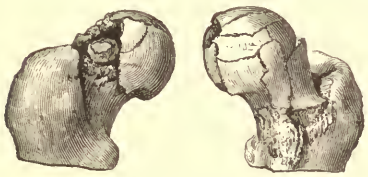

FIG. 85.—Anterior and posterior views of the upper extremity of the left femur. *Spec.* 5884.

FIG. 86.—Appearance of limb seven months after operation.

FIG. 87.—Appearance of limb ten months after operation. Side view.

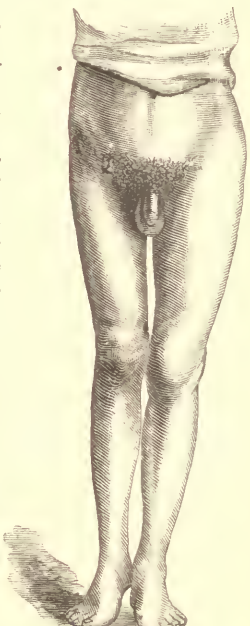

FIG. 88.—Anterior view of the same.

or 88.8 per cent., the period of the operation was not stated. Grouping the one hundred and seventy-one cases of excision at the hip, according to the time or the occasions on which the injuries were received, we find that of sixteen operations performed before the American war, 1860–65, one proved successful, and that in a second the patient survived after consecutive amputation; that four fatal operations were performed during the insurrection in Poland, 1863, and the campaign in Schleswig-Holstein, 1864; that six excisions at the hip with two successes were performed during the Austro-Prussian War of 1866; that of seventy-one operations done in the Franco-Prussian War of 1870–71, eight were successful; that once, at least, excision at the hip was unsuccessfully performed during the Russo-Turkish War, 1876–77, and that in one instance the hip joint was successfully excised for shot injury in 1876, in California; that of the sixty-six cases of excisions at the hip performed for shot injury received during the American civil war, six proved successful; and that finally, of the six cases performed in the service of the United States since the close of the American war in 1865 to the present time (1879), four were attended with success. Of the six survivors of excision at the hip performed on patients wounded during the American civil war, two only were living in the early part of 1879: Brown, of Grand Rapids, Michigan (CASE 261, *ante*), and Pease, of Indianapolis, Indiana, (CASE 263, *ante*); both were examples of recovery from secondary excision. Brown can bear his weight upon the injured limb, can walk across a room without the aid of crutches or cane, but ordinarily uses a support. Pease, with the assistance of a "six-inch lift," can walk quite well with a cane. Tilliston, the third survivor of secondary excision, lived until September 6, 1871, ten years after the operation. He was unable to bear any weight on his limb, and was obliged to wear crutches. He succumbed to most extensive necrosis of the pelvic bones and femur, with huge recurring abscesses. In the case of *Cannon*, the survivor of primary excision (CASE 206, *ante*), the limb was useless for purposes of locomotion. He died of diphtheria in 1865, eighteen months after the injury and operation. Of the two survivors of intermediary excision, Lieutenant *J. M. Jarrett* (CASE 239, *ante*) went to his home in North Carolina, and was reported as doing well in September, 1864, ten months after the operation; walking about with a high-heeled boot and the aid of a cane. Persevering attempts to obtain further information regarding the ulterior history of

three inches wide by twelve inches long, secured to the leg by adhesive straps and connected through eyes, at their extremities, by elastic tubing, to a twenty-one pound weight, playing over a pulley. The tubing passed through a piece of board twelve inches long, secured below the foot piece, thereby preventing pressure on the malleoli. This arrangement answered the purposes of extension admirably, while counter-extension was effected by elevating the foot of the bed. The patient's convalescence was very tedious. He suffered from bed-sores and almost continuous pain, requiring the constant administration of opiates and anodynes; but gradually improved, and, on December 9th, Dr. HOFF notes: "From this date there was scarcely an untoward symptom. Convalescence progressed slowly but surely; stiffness of the muscles disappeared entirely about the 15th instant. Tympanitis lasted three days. Spasm persisted, but with greatly reduced violence, nearly two weeks after the extension-weight was removed, December 27th. The patient had daily exercise, and, on January 10, 1878, took his first walk in the open air. The discharge grew less in amount, and, on January 15th, the dressings were entirely removed. February 17th, the partial anchylosis of the right knee joint not having been fully overcome by passive motion and mechanical appliance, ether was administered and the adhesions thoroughly broken up. There was partial bony anchylosis, the patella at portion of superior external border was firmly joined to femur, and in the breaking down suffered fracture. The limb was placed in a straight splint, and on the third day passive motion was instituted. March 18, 1878, the patient was ordered to join his regiment. The false joint at the hip had all the motions of its predecessor in a somewhat limited degree, and, though capable of sustaining the patient's weight while walking, was not yet equal to any great exertion, but daily gained in strength. In other respects the patient's health was in admirable condition. Apparent shortening of the limb one inch. The resected upper extremity of the femur was contributed to the Army Medical Museum by the operator, and is numbered 6787 of the Surgical Section. It is shown in the wood-cuts (FIGS. 88*a*, 88*b*). In a letter to Dr. HOFF, dated Fort Clark, Texas, April 30, 1878, Sergeant Linn writes: "Dear Sir: I write to you according to promise to let you know how I am getting along. I am feeling just as well as ever I did. My leg is improving in size and strength, but the hip joint is just about the same as when I left you. I weigh one hundred and fifty pounds now and am still improving." On July 10, 1878, Surgeon JOHN MOORE, U. S. A., Medical Director Department of Texas, forwarded to the Surgeon General two photographs showing the appearance of the limb ten months after the operation. They are copied in the wood-cuts (FIGS. 87, 88) on the preceding page. In a letter from Fort Clark, Texas, October, 1878, Linn states that he "don't use a crutch at all, and only uses a cane when he goes to walk a long distance."

FIG. 88*a*.—Excised upper extremity of right femur; anterior view. *Spec.* 6787.

FIG. 88*b*.—Posterior view of the same.

this officer were unavailing. The second survivor of the intermediary operation, Hugh Wright (CASE 240, *ante*), excised May 27, 1864, walked well without crutch or cane, bearing his full weight on the mutilated limb. He lived until October 26, 1874; his death was ascribed to cardiac trouble.

Of the six patients submitted to excision at the hip in the United States Army and Navy since 1865, four recovered. Assistant Surgeon F. Meacham's primary case of Erne, 4th Infantry, aged 48 (Note 1, p. 120, *ante*), operated on December 3, 1869, lived until November, 1871. The patient walked comfortably on crutches and had slight control of his limb. Recovering thoroughly from the coxo-femoral lesions, he became a great sufferer from chronic diarrhœa, and, at last, was attacked with acute mania. The other three cases were examples of successful secondary excision. In the case of Charles F. Read, 37th Infantry (Note to p. 122, *ante*), wounded June 6, 1868, and successfully excised by Assistant Surgeon J. R. Gibson, August 14, 1868, the result was exceptionally gratifying. In a letter from his home at Thornton's Ferry, New Hampshire, dated July 1, 1878, nearly ten years after the operation, Read was able to write that he thought he had a very good leg under the circumstances, and used no artificial appliance. His crutches he had laid aside since 1871, relying altogether on his cane, with which he "could get along very handily." He adds a minute account of the condition of the injured limb, showing indisputably an extraordinary restoration of the functions of the articulation. "I can use it so well," says Read, "that some think me falsifying when I tell them that the head of the bone is lost." In the secondary case of the seaman, Charles B. Scott, wounded June 17, 1870, on whom Surgeon W. E. Taylor, U. S. N., successfully excised the head of the femur, July 25, 1870, there was temporary relief. The patient regained comparative health and flesh, and partial use of the limb, exchanging his crutches for a cane; but necrosis invaded the articulation, and the patient succumbed July 1, 1877, while on a visit to his friends in Tyrone County, Ireland. In the case of Sergeant W. J. Linn, 4th Cavalry, wounded November 25, 1876, who underwent excision at the right hip by Assistant Surgeon J. V. R. Hoff, U. S. A., September 28, 1877; a year after the operation the patient's health was in admirable condition, and there was every prospect that the mutilated limb would regain as great a measure of utility as can be hoped for, under such circumstances. In October, 1878, he had discarded the crutch, and only used a cane when he walked long distances.

Of the sixty-six excisions at the hip performed during the American civil war, forty-five were practised on Union and twenty-one on Confederate soldiers. Of the forty-five Union soldiers, four recovered, a mortality rate of 91.1 per cent.; of the twenty-one Confederates, two recovered, a fatality of 90.5 per cent.

The side on which the excision was practised was recorded in sixty-one of the sixty-six cases, twenty-six being on the right and thirty-five on the left side. Three of the former, or 88.4 per cent., and also three of the latter, or 91.4 per cent., proved fatal.

Six operations, viz: one primary, four intermediary, and one secondary, performed on patients under the age of 20 years, terminated fatally; twenty excisions, viz: nine primary, six intermediary, and five secondary, on patients, between 20 and 29 years, inclusive, presented three recoveries, one after a primary, and two after intermediary operations; of thirteen operations on men between 30 and 39, six were primary, four intermediary, and three, with two recoveries, were secondary; four excisions were performed on patients over 40 years, two being fatal intermediary, and two, with one recovery,

secondary operations. In twenty-three of the sixty-six excisions the ages of the patients were not ascertained.

According to the statistical arrangement of the cases of excision at the hip for shot wounds in the American civil war, as given in TABLE X, p. 89, *ante*, the mortality of the primary operations was 96.9 per cent., that of the intermediary 90.9 per cent., while the fatality of the secondary operations was only 72.7 per cent. The results of the six excisions at the hip in the American Army and Navy since the civil war gave a mortality of 50.0 per cent. for the primary operations, of 100.0 per cent. for the intermediary, while the three secondary operations were all successful. Of the ninety-nine other cases of excision at the hip after shot injury, cited in Note 1, page 90, *ante*, of primary cases, 87.5 per cent. proved fatal; of the intermediary all perished, while, of the secondary, only 66.6 per cent. had a fatal termination. Aggregating all cases of excision at the hip for shot injury in which the results have been ascertained, we have a mortality rate of 93.0 per cent. for the primary, of 96.6 per cent. for the intermediary, and of 63.4 per cent. for the secondary operations. This result confirms what we have already stated on page 610 of the *Second Surgical Volume*, that the "excisions and amputations practised during the intermediary or inflammatory stage are by far the most dangerous, and should never be performed except as compulsory operations." The ratio of mortality in the secondary or ulterior operations is considerably less than that in the primary operations. But this fact should not lead to the conclusion that the primary operation is to be avoided. The disastrous results attending cases of indubitable shot fracture at the hip treated by temporization, as pointed out on page 88, *ante*, must induce the surgeon to desist from such an experiment, and to excise primarily rather[1] than submit the patient to the danger of the inflammatory period.[2]

In nine[3] of the sixty-six cases of excision of the head of the femur performed for shot injuries received during the American civil war, the acetabulum was involved, and, although these nine cases terminated fatally, the successful operations of Assistant Surgeon J. V. R. Hoff, U. S. A., in the case of Linn (Note on page 123, *ante*), and of Drs. Schön-

[1] Dr. JOHN ASHHURST, jr. (*Princ. and Pract. of Surgery*, 1871, p. 165), declares that: "Gunshot injuries of the hip joint are universally regarded as among the gravest injuries met with in military practice," and, after reviewing the statistical and other evidence on the comparative advantages of expectant treatment, excision, and amputation, asserts that: "From these facts the conclusion is fairly drawn, that in any case of gunshot injury of the hip joint, primary excision should be preferred to any other mode of treatment, and this simply to increase the chance of life, without reference to the utility of the preserved limb. Of course there may be such extensive destruction of parts as to put excision out of the question, and in such cases the surgeon must still have recourse to what HENNEN calls the 'tremendous alternative' of hip joint amputation, an operation which may also be required secondarily, after an unsuccessful attempt to save the limb." Dr. WILLIAM THOMSON, formerly Brevet Major and Assistant Surgeon, U. S. A., who, as Acting Medical Inspector of the Army of the Potomac and Surgeon-in-charge of Douglas Hospital, Washington, had excellent opportunities to investigate the subject of shot fractures at the hip joint, wrote to the compiler in 1868: * * "From a study of these cases, and others similar in character, it would appear that the fatal terminations, under expectant treatment, are due to the following causes: the joint becomes inflamed primarily or secondarily; the capsule becomes distended by the products of inflammation, gives way, and the contents escape into the neighboring parts, and give rise to those extensive dissecting abscesses which are found at the autopsies, and which account so entirely for the fatal results. If these views should be accepted, a full and free incision into the joint, at an early period, would be the proper surgical procedure, and this is accomplished by its excision. The removal of the head of the bone severs, to that extent, the connection between the body and the lower extremity, prevents that constant disturbance at the joint that follows every motion of the body, and thus places the seat of injury at comparative rest. The division of the bone through its cancellated structure may increase the risk of osteomyelitis with its purulent infection, and experience may yet demonstrate that a full and free incision alone, in the primary stage, may be the best resource of surgery."—(*Circular* No. 2, S. G. O., 1869, p. 114.)

[2] LOSSEN (I.) (*Kriegschir. Erf. aus Mannheim, Heidelberg und Carlsruhe*, in *Deutsche Zeitschr. für Chir.*, 1873, B. II, p. 64) cites a fatal case of shot fracture of the neck of the femur and great trochanter, and remarks: "A primary resection of the joint, with removal or gouging of the trochanter major, might in this case have offered a chance for recovery. But it was probably difficult to ascertain immediately after the injury how far the joint was involved. A secondary excision, from the general appearances *(post-mortem)* cited, gave very little prospect of success." FISCHER (II.) (*Kriegschirurgische Erfuhrungen*, Erlangen, 1872, p. 201) remarks of shot fractures of the hip joint: "All well-timed operative interference miscarries on account of the difficulty of the diagnosis. . . I lament this difficulty and impossibility of exact diagnosis, because I believe that the best mode of treatment of shot fractures of the hip joint is the primary resection of the joint, however difficult the execution of the operation might be."

[3] CASE 209, p. 93, Private *Charles Beard*, 12th Miss.; CASE 224, p. 95, Sergeant S. Grimshaw; CASE 235, p. 98, Captain T. R. Robeson; CASE 236, p. 98, Unknown private of the First Army Corps; CASE 237, p. 99, Unknown; CASE 247, p. 105, Private C. E. Marston, 1st Massachusetts; CASE 257, p. 109, Corporal H. C. Sennett, 122d New York; CASE 259, p. 110, Lieutenant *D. N. Patterson*, 46th Virginia; CASE 269, p. 118, Private *A. Toney*, 16th North Carolina.

born[1] and Hupeden,[2] prove conclusively that an injury of the margin of the acetabulum does not preclude the operation of excision at the hip.

When we consider the evidence adduced in the foregoing pages, and especially the fact that of one hundred and seventy-one patients on whom excision at the hip for shot injury is known to have been performed to the present date, twenty-three survived the operation, although in one instance the excision was followed by amputation at the hip (Neudörfer's case of Schranz, Note 1, on page 90, *ante*), and that the remaining twenty-two survivors had more or less use of the injured limbs, it must be admitted that the results of this operation, so far, have been encouraging, in an almost hopeless class of cases.

AMPUTATIONS AT THE HIP JOINT.—In 1867, in a monograph on amputations at the hip joint,[3] it was stated that "fifty-three authenticated instances of amputations at the hip joint, performed on account of injuries inflicted by weapons or of lesions consecutive thereto," had occurred during the American civil war. Since that time, data of thirteen additional cases of this operation have been obtained, making, at the present time, a total of sixty-six cases of coxo-femoral amputations to be considered here:

TABLE XIV.

Numerical Statement of Sixty-Six Cases of Amputation at the Hip Joint.

AMPUTATIONS.	TOTAL CASES.	RECOVERIES.	DEATHS.	RATIO OF MORTALITY.
Primary	25	3	22	88.0
Intermediary	23		23	100.0
Secondary	9	2	7	77.7
Reamputations	9	6	3	33.3
Aggregate	66	11	55	83.3

I have continued to divide these sixty-six operations into primary, intermediary, secondary, and reamputations, according to the plan adopted in the monograph of 1867, and the relative percentage of fatality of the secondary operations and of reamputations confirm me in the opinion expressed at that time, that the reamputations "should be separated into a distinct class, because they are quite numerous and widely differ in the risk attendant upon them from other secondary operations." Of nine cases of reamputations at the hip three only, or 33.3 per cent., were fatal; of nine secondary operations six, or 77.7 per cent., terminated in death. The subjects of the twenty-three intermediary exarticulations at the hip all perished, and of twenty-five primary amputations probably three were successful.

As indicated in TABLE IX, page 65, *ante*, in twenty-seven of the sixty-six exarticulations the injury directly involved the hip joint. In thirty-two instances, the operations followed shot fractures which did not extend beyond the diaphysis of the femur. In two of this series and in seven examples in which the primary lesion implicated the knee joint, amputations in the continuity of the thigh had preceded the exarticulations at the hip.

[1] See LANGENBECK (B. von), *Ueber die Schussfracturen der Gelenke und ihre Behandlung*, Berlin, 1868, p. 16, and CASE 24 of Note 1, on page 90, *ante*.

[2] See DEININGER, *Beiträge zu den Schussfracturen des Hüftgelenks unter besonderer Berücksichtigung der Erfahrungen aus dem Feldzuge* 1870-71 *und Benutzung der Acten des Königlichen Kriegsministeriums*, in *Deutsche Militairärztliche Zeitschrift*, 1874, B, III, p. 300, CASE No. 37; and CASE No. 63, in Note on page 91, *ante*.

[3] OTIS (G. A.), *A Report on Amputations at the Hip Joint in Military Surgery*, *Circular* No. 7, War Department, Surgeon General's Office, July 1, 1867, Washington, p. 20.

In the subjoined foot-note[1] an endeavor is made to compile a correct record, in chronological order, of the published authentic examples of amputation at the hip joint in military

[1] LARREY (D. J.) (*Mém. de Chir. mil. et Camp.*, Paris, 1812, T. II, p. 180), A soldier of the French army of the Rhine, in 1793. Primary operation; died within a week.—2. WENDELSTADT (*Reminiscenzen*, in HUFELAND'S *Neues Journal der Practischen Arzneykunde*, Berlin, 1811, B. XXVI, Stück II, p. 110) relates: "I have seen and examined an Englishman, who served as a sailor in the British Navy, and who had lost at the bloody battle of Aboukir, August 1, 1798, the thigh from a cannon ball, and who had undergone the amputation of the probably splintered stump out of the acetabulum, and who *survived the operation many years.*"—3. LARREY (D. J.) (*Rel. chir. de l'Armée d'Orient*, Paris, 1803, p. 329), Bonhomme, officer of the 18th Demi-Brigade, Army of Egypt, 1799. Primary exarticulation at right hip; died of the plague on the eighth day.—4. LARREY (D. J.) (*Rel. chir. de l'Armée d'Orient*, 1803, p. 332), Drummer of 2d Light Demi-Brigade, Army of Egypt, in 1799, aged 20. Primary amputation at right hip; died in a few days.—5. LARREY (D. J.) (*Mém. de Chir., etc.*, 1812, T. III, p. 350), A French soldier at Wagram, July 6, 1809. Primary operation; died in three hours.—6. LARREY (D. J.) (*Mém. de Chir., etc.*, T. III, p. 351), A French soldier at Wagram, July 6, 1809. Primary operation; died within twenty-four hours.—7. BROWNRIGG (GUTHRIE'S *Commentaries*, 6th ed., 1855, p. 62), A soldier at Elvas, 1811. Secondary operation; died in eight days.—8. LARREY (D. J.) (*Mém. de Chir., etc.*, 1817, T. IV, p. 26), A Russian soldier, in 1812. Primary amputation at left hip; died on the twenty-ninth day from dysentery.—9. LARREY (D. J.) (*Mém. de Chir., etc.*, 1817, T. IV, p. 50), Lieutenant of Dragoons, Borodino, September 7, 1812. Primary; alive and well at Orcha three months after.—10. BROWNRIGG (AVERILL (C.) (*A Short Treatise on Operative Surgery*, London, 1825, p. 217), Private 13th British Light Dragoons, December 29, 1811. Secondary operation December 12, 1812; recovery.—11. BROWNRIGG (AVERILL, *loc. cit.*), Particulars not recorded: fatal.—12. GUTHRIE (G. J.) (*Treatise on Gunshot Wounds*, 1827, p. 332), Private Mason, 23d British Infantry, in 1812. Secondary re-amputation; death in seven hours.—13. COOPER (SAMUEL) (*Dict. Pract. Surg.*, 8th London ed., 1861, Vol. I, p. 116), A British soldier at Oudenbosch, in Holland, in 1814. Intermediary operation; died in a few minutes.—14. COLE (G. J. GUTHRIE, *loc. cit.*, p. 351), A soldier at Bergen-op-Zoom, 1814. Secondary operation; died in twenty hours.—15. EMERY (GUTHRIE, *loc. cit.*, p. 334), Sebastian de l'Amour, Corp. Chass. Britt., Spain, August, 1813. Secondary operation July 21, 1814; death in thirty days.—16. GUTHRIE (G. J.) (*A Treatise on Gunshot Wounds*, London, 1827, p. 342), Duguet, 45th French Regiment, aged 25, Waterloo, June 18, 1815. Intermediary operation July 7th; recovered. Duguet died in 1840 (GUYON, *Stat. des amputations pratiquées à l'Armée d'Afrique*, etc., *pendant les années* 1837, 1838, *et* 1839, in *Gaz. Méd. de Paris*, 1841, T. IX, p. 106).—17. Mr. BLICKE (J. THOMSON, *Obs. after the Battle of Waterloo*, Edinb., 1816, p. 270), A British soldier, Waterloo, 1815. Secondary operation; died in eight days.—18. B. BRODIE (G. J. GUTHRIE, *On Gunshot Wounds of the Extremities*, London, 1815, p. 116) operated, in 1814, unsuccessfully in a case of accidental shot wound.—19. QUARRIER (D.) (*Med. Chir. Trans.*, 1820, Vol. VIII, p. 3), Seaman T. Sullivan, Algiers, 1816. Primary operation; death in fifteen minutes.—20. KRIMER (*Exarticulation des Oberschenkels aus dem Hüftgelenke*, in *Journal der Chirurgie*, von C. F. von GRAEFE und Ph. v. WALTHER, Berlin, 1828, B. XII, p. 121), J. S. C——, aged 38, Waterloo, 1815. Exarticulated in 1822; died on the tenth day.—21. Dr. SPER (ROUX (J.), *Désarticulation de la cuisse d'après des observations rec. a Saint Mandrier*, Paris, 1860, p. 4), A galley prisoner at Toulon, in 1825; fatal.—22. DIEFFENBACH (J. F.) (*Mag. für die gesammte Heilkunde*, B. XXIV, H, S. 335), A Baron, aged 22. Secondary operation in 1826; died in ten hours.—23. Dr. BRYCE (*Glasgow Med. Jour.*, 1831, p. 262), Soldier, aged 23, at the siege of Athens, May, 1827. Recovery in six weeks.—24. ROUX (P. J.) (*Gaz. des Hôp.*, 1830, p. 392), A Swiss subaltern, in 1830. Primary operation; died the same day.—25. CLOT BEY (*Gaz. des Hôp.*, 1830, T. IV, p. 96), Ali Homer, an Arab, aged 26. Secondary operation in 1830; died November 17, 1830.—26. SÉDILLOT (C.) (*Ann. de la Chir. Franç. et Et.*, 1841, T. II, p. 279), A Russian prisoner; Poland, 1831. Primary; died soon after the operation.—27. The elder DEMME (VERDAT, *Thèse inaug.*, Berne, 1846, and A. LÜNING, *Über die Blutung bei der Exarticulation des Oberschenkels*, Zürich, 1877, p. 69), Polish solder, in 1831. Intermediary operation; death in thirteen days.—28. Surgeon ARNOLD (A. LÜNING, *loc. cit.*, p. 69, and VERDAT, *Thèse inaug.*, Berne, 1846), Russian soldier in Polish War, 1831. Ligation of common iliac by Dr. DEMME. Intermediary exarticulation at hip; death on the third day.—29. Dr. FRANCKE (A. LÜNING, *loc. cit.*, p. 69, and FRANCKE, *Diss.*, Leipzig, 1835), Russian soldier, A. Pasgezuk, aged 22, Warsaw, Sept. 7, 1831. Operation Sept. 22, 1831; death in two days.—30. The elder DEMME (A. LÜNING, *loc. cit.*, p. 68, and VERDAT, *Thèse inaug.*, Berne, 1846), Polish soldier, in 1831. Intermediary operation; death from gangrene on fifth day.—31. LETULLE (H. LARREY, *Hist. chir. du siége de la Cit. d'Anvers*, 1803, p. 307), A French cannonier of the 11th regiment of Artillery. Siege of Antwerp, 1832. Primary operation December 13th; died December 22, 1832.—32, 33. During the campaign in Syria, in 1832, two exarticulations at the hip were performed, one by VON WELZ, the other by CHERUBINI. Both were fatal (M. JÆGER in Dr. W. WALTHER'S *Handwörterbuch der Gesammten Chirurgie*, Leipzig, 1836, B. I, p. 409).—34, 35. ALCOCK (R.) (*Notes on the Med. Hist. and Stat. of the British Legion in Spain*, London, 1838, p. 78) relates that he was informed by Dr. BELMONT that an accomplished Spanish surgeon had twice amputated at the hip joint during the Peninsular War of 1835—once with success.—36. HUTIN (F.) (*Rec. de Mém. de Méd. de Chir., etc.*, 1re série, T. XLIV, p. 219), M——, a soldier of the 1st Light Battalion, Constantine, 1836. Primary amputation; Manec's method; died December 13, 1836.—37. HUTIN (F.) (*Rec. de Mém. de Méd. de Chir., etc.*, T. XLIV, p. 220), L——, 2d Regiment of Engineers, Constantine, 1836. Primary operation; died December 4, 1836.—38. BAUDENS (L.) (*Clin. des plaies d'armes à feu*, Paris, 1836, p. 517), C——, a soldier in the Battalion d'Afrique, 24 years old, Algiers, 1836. Intermediary operation; recovered, and was an inmate of the *Hotel des Invalides* in 1840 (SÉDILLOT, *Amp. coxo-fémorale*, in *Rec. de Mém. de Méd.*, 1840, T. 49, p. 276).—39–41. From the tabular statement of Dr. GUYON (*Statistique des amputations pratiquées à l'armée d'Afrique*, etc., *pendant les années*, 1837, 1838, *et* 1839, in *Gaz. Méd.*, 1841, T. IX, p. 105) it appears that no exarticulations at the hip were performed during these years; but Dr. GUYON states (*loc. cit.*, p. 106) that three unsuccessful amputations at the hip were performed in 1841.—42. BAUDENS (L.) (*Rec. de Mém. de Méd. de Chir.*, etc., 1853, 2me sér., T. X, p. 130), X——, a soldier of the 18th Light Infantry, Paris, 1848. Primary operation; death on the second day.—43. VIDAL (AUG.) (*Traité de Path. ext. et de Méd. op.*, 5me éd., Paris, 1861, T. V, p. 731), A French student of medicine, insurrection in Paris in 1848. Secondary exarticulation; fatal.—44–46. During the same revolution RICHET (M. E. HERVIEUX, *Compte rendu des blessés reçus à l'ambulance des Tuileries*, in *Gaz. Méd. de Paris*, 1848, p. 712) performed a primary operation which proved fatal; and P. GUERSANT and ROBERT (L. LEGOUEST, *Traité de Chir. d'Armée*, 1863, p. 700) had each an unsuccessful intermediary operation.—47. RESTELLI (F. BAROFFIO, *Delle Ferite d'arma da fuoco*, Torino, 1862, p. 284) performed a successful exarticulation in 1848, after the insurrection in Lombardy.—48. TREZZI (GRITTI ROCCO, *Delle Fratture del Femore par arma da fuoco*, Milano, 1866, p. 80) operated unsuccessfully on an insurgent at Milan in March, 1848.—49. C. TEXTOR (G. B. GUENTHER, *Die Blutigen Operationen*, Leipzig, 1859, Abschmitt VIII, p. 180), Exarticulation for shot fracture of the neck of the femur in a patient aged 32, in 1848; death from pyæmia.—50. TEXTOR, the younger (GÜNTHER, *loc. cit.*, p. 180), performed an intermediary operation in 1848; death on the fourth day.—51. ROUX (P. J.) (*Des plaies d'armes à feu, Communications faites, etc.*, par BAUDENS, ROUX, etc., Paris, 1849, p. 38, and *Gaz. des Hôp.*, 1848, p. 513) had, in June, 1848, a secondary fatal operation.—52. LINHART (W.) (A. LÜNING, *loc. cit.*, p. 75, and ESCHE, *Diss. inaug.*, Würzburg, 1863, p. 11), in 1848, in a case of shot comminution of the trochanter, ligated the femoral, and afterwards exarticulated at the hip. The patient died shortly after the operation.—53–59. During the Schleswig-Holstein War, 1848–50, seven exarticulations at the hip were made. Prof. B. von LANGENBECK (*Über die Schussfracturen der Gelenke*, Berlin, 1868, p. 19) performed four of the seven operations: J. Seibold, drummer in Tann's corps, aged 18, wounded at Hoptrup, June 7, 1848; operation June 8th; patient hale and hearty in 1856. Anders Nielson, 2d Danish Jaegers, aged 26, Schleswig, April 23, 1848; operation April 24th; death May 21st. Niels Andersen, 4th Danish Infantry, Schleswig, April 23, 1848; operation May 14th; death May 20, 1848. Danish soldier, wounded at Bau, April 9, 1848; operation June 20th; death June 21, 1848. The other three operations of this campaign proved fatal; no further data are noted (L. STROMEYER, *Maximem*, 1861, p. 532).—60. LENTE (F. D.) (*Transactions Am. Med. Association*, 1848, Vol. IV, p. 316), J. Dalzell, aged 23. Astor Place Riots, New York, 1849. Primary operation; died May 12, 1849.—61–63. In the War in the Punjaub, 1848–49, three primary operations were performed. Dr. MCRAE (*Indian Annals of Med. Sci.*, 1857, p. 663) states that the patients died—one in six, one in twelve, and one in thirty-six hours, from shock.—64. BECK (B.) (*Die Schusswunden*, Heidelberg, 1850, p. 315), Soldier of the 2d Baden Infantry, wounded June 29, 1849, in battle, at the Murg. Secondary operation: death six days after operation.—65. FAYRER (J.) (*Clinical Surgery in India*, London, 1866, p. 630), Moung Schwé-Mo, a Burman, aged 30. Rangoon, Bengal, February 15, 1853. Primary amputation at left hip February 16th; death March 17, 1853.—66. Dr. BEATSON (RANKING'S *Abstract*, 1855, No. 21, p. 182), Thomas Lisbey, aged 61. Conductor in the Ordnance Department, Donnabew, March 19, 1853. Exarticulation of left hip March 25th; died March 25, 1853.—67–110. Of the forty-four exarticulations at the hip performed during the

surgery apart from the sixty-six cases that pertain to the American civil war. This category comprises one hundred and eighty-four cases, of which the results are ascertained in

Crimean War, two were done in the Sardinian army, eight by Professor N. PIROGOFF (*Grundzüge der Allgemeinen Kriegsch.*, Leipzig, 1864, p. 1137), in the Russian army, fourteen in the British army (MATTHEW, *loc. cit.*, p. 374), and twenty in the French army (J. C. CHENU, *Rapport med. chir. de Camp. d'Orient*, 1865, p. 658). PORTA states that the two cases in the Piedmontese army were fatal. Of PIROGOFF'S eight cases two survived five days and the others perished within two or three days. The operations in the English army were all primary and resulted fatally. The results of the operations in the French army were equally unfortunate; all the patients died. Of twenty-two of the forty-four cases it is only recorded that they had a fatal termination. The particulars of the other twenty-two will here be cited: ALEXANDER (T.) (GUTHRIE'S *Comment.*, 6th ed., p. 620) disarticulated at the hip, in the case of Peter Cleary, 23d Fusileers, for gunshot fracture of femur, Alma, Sept. 20, 1854. Operation Sept. 21st; patient died on the passage to Scutari. ALEXANDER (T.) (G. J. GUTHRIE, *Commentaries*, 6th ed., 1855, p. 620), A Russian prisoner, Alma, Sept. 20, 1854. Primary operation Sept. 22d, died Oct. 22, 1854. ALEXANDER (T.) (G. J. GUTHRIE, *loc. cit.*, p. 620), Peter Sullivan, 33d British Infantry, Alma, Sept. 20, 1854. Primary operation Sept. 21st; died Oct. 11, 1854. MCKENZIE (R.) (MACLEOD, *Notes on Surgery in the Crimea*, London, 1858, p. 369), Soldier, Alma, Sept. 20, 1854. Primary operation; died. Assistant Surgeon WYATT (T. P. MATTHEW, *Med. and Surg. Hist. of the British Army in the Crimea*, London, 1858, Vol I. p. 111), An officer of the Coldstream Guards, Inkermann, Nov. 5, 1854. Primary operation; died immediately after the operation. MOUNIER (in CHENU'S *Rapp. méd. chir. sur. la Camp. d'Orient*, 1865, p. 660), Garassimoff, a Russian prisoner, Alma, Sept. 20, 1854. Intermediate operation Sept. 27th; died Sept. 29, 1854, two days after the operation. LEGOUEST (L.) (*Mém. de la Soc. de Chir.*, 1863, T. V, p. 157), Ignatius Wolokenski, 5th Russian Infantry, aged 30, Alma, Sept. 20, 1854. Intermediary amputation at left hip October 3d; died Feb. 9, 1855. MOUNIER (CHENU, *loc. cit.*, p. 660), Chifftzoff, a Russian prisoner, Inkermann, Nov. 5, 1854. Intermediary operation November 5th; died December 2, 1854, one week after the operation. PAULET (CHENU, *loc. cit.*, p. 661), Soldier. Primary operation in 1855; died one hour after the operation. LUSTREMAN (CHENU, *loc. cit.*, p. 661), Soldier. Primary operation in 1855; died five hours after the operation. THOMAS (CHENU, *loc. cit.*, p. 661), Soldier, gunshot fracture of the femur, 1855. Primary operation; died five hours after the operation. THOMAS (CHENU, *loc. cit.*, p. 661), Soldier, 1855. Primary operation; died eleven hours after operation. PERRIN (CHENU, *loc. cit.*, p. 660), A private of the 32d French Infantry. Fracture of left femur July 5, 1855. Primary operation a few hours after injury; died in one or two days. FRANKLYN (T. P. MATTHEW, *loc. cit.*, Vol. I, p. 377), A private of the 77th British Infantry, Sevastopol, August, 1855. Primary operation; died twenty-two hours after the operation, from exhaustion. DUNLOP (T. P. MATTHEW, *loc. cit.*, Vol. I, p. 403), A soldier of the 88th Regiment Connaught Rangers. Primary operation; died soon after the operation, in November, 1855. Surgeon-Major TROUSDELL (R. DRUITT, *Surgeon's Vade Mecum*, 1865, 9th ed., p. 160), A private of the 50th British Regiment, Sevastopol, 1855. Primary operation; died the day after the operation. MOUNIER (CHENU, *loc. cit.*, p. 660), Pietrow, a Russian prisoner, Inkermann, Nov. 5, 1855. Secondary operation Dec. 19th; died Dec. 29, 1854. LARIVIÈRE (CHENU, *loc. cit.*, p. 660), Kerigla, a Russian prisoner, Traktir Bridge, Aug. 16, 1855. Intermediary operation Aug. 23d; died August 23, 1865, during the operation. MAUGER (CHENU, *loc. cit.*, p. 661), A Russian prisoner, Traktir Bridge, Aug. 16, 1865. Intermediary operation; died soon after the operation. SALLERON (*Mém. de Méd., de Chir. et de Phar. Mil.*, 2me sér., T. XXI, p. 317), A soldier. Sevastopol, 1855. Intermediary operation (?); died twenty hours after the operation. SALLERON (*Mém. de Méd., de Chir. et de Phar. Mil.*, 2me sér., T. XXI, p. 317), A soldier, Sevastopol, 1855. Intermediary operation (?); died sixty hours after the operation. Chief Surgeon MARROIN, of the French Navy (J. ROUX, *Désarticulation de la cuisse*, Paris, 1860, p. 4), disarticulated, in the case of a soldier of the Crimean army, for fracture of the greater trochanter. The patient died shortly after the operation.—111–112. Professor J. F. HEYFELDER, chief surgeon of the Russian army in Finland, in 1855 (*Die Verwundungen und Operationen in Folge des Bombardements von Svéaborg vom* 9–11 *Aug.*, in *Deutsche Klinik*, 1855, B. 7, pp. 530–532) exarticulated twice at the hip. A Finnish soldier, wounded at Svéaborg, August, 1855; primary amputation at left hip; died in two hours. Stanislaus Maletzki, 8th Finnish Bat., shot fracture of neck of left femur, Svéaborg, Aug. 9–11, 1855; primary operation; patient died in less than an hour.—113–115. BERTHERAND (*Camp. de Kabylie*, Paris, 1862, pp. 145, 238, and 280) gives three examples of disarticulation at the hip: A——, 60th Line, wounded June 20, 1854; fracture of neck of femur, disarticulation, by Dr. GILGENCRANTZ, July 14, 1854; death on the same day, before recovering from the effects of the chloroform. C——, 90th Line, shot fracture of neck of femur, Algiers, May 24, 1857; secondary disarticulation; died on the day of the operation. W——, 2d *Légion étrangère*, shot fracture of neck of right femur; disarticulation by Dr. TABOURET; fatal.—116. BERTHERAND (A.) (*Camp. d'Italie, de* 1859, Paris, 1860, p. 37), An Austrian soldier, a prisoner after the battle of Palestro, June 4, 1859. Intermediary operation; died three hours after the operation.—117. ARLAUD (J. C. CHENU, *Camp. d'Italie en* 1859 *et* 1860, T. II, p. 697), Louis Legallo, Fusileer, 84th French Regiment, age 25, Montebello, May 20, 1859. Secondary exarticulation at right hip; recovered.—118. ISNARD (J. C. CHENU, *loc. cit.*, p. 694), Captain Deshayes, 73d Regiment, Solferino, June 24, 1859. Secondary exarticulation at left hip; recovery.—119. ROUX (JULES) (CHENU, *Camp. d'Italie, en* 1859 *et* 1860, T. II, p. 697), Lieutenant Joseph Vitarel, 65th French Infantry, aged 24, Magenta, June 4, 1859. Secondary amputation at left hip; recovered.—120. NEUDÖRFER (J.) (*Handbuch der Kriegschir.*, 1872, B. II, Abth. II, S. 1468), Johann Schranz, 7th Jaeger. Neck of femur. Palestro, May 30, 1859. November 27th, excision at left hip joint. December 1st, amputation at hip joint. NEUDÖRFER saw the patient in 1868.—121. NEUDÖRFER (J.) (*loc. cit.*, p. 1467), Jurko Katsch, of Inf. regiment E. H. Stephan, Solferino, June 24, 1859. Right trochanter. Operation, August 8th, seventy-six days after the injury; died August 25, 1859.—122. NEUDÖRFER (J.) (*loc. cit.*, p. 1468), Walland Waskaneder, Co. 13, of Baron Rossbach's Regiment, Solferino, June 24, 1859. Fracture of upper third of femur. Disarticulation Dec. 31st (one hundred and ninety days after injury); died four months later.—123. SCOTTI (G. B.) (GRITTI ROCCO, *Frat. del fem. per arma da fuoco*, Milano, 1866, p. 80), An Italian soldier. Gunshot fracture of femur, Solferino, June 24, 1859. Intermediary exarticulation in July, at Ospitale San Francesco, Brescia; died.—124. TASSANI (GRITTI ROCCO, *loc. cit.*, p. 80), An Italian soldier. Shot fracture of femur, Solferino, June 24, 1859. Intermediary amputation at hip at Ospitale Maggiore, Milan, July, 1859; died.—125. GHERINI (GRITTI ROCCO, *loc. cit.*, p. 80), An Italian soldier. Gunshot fracture of the femur, Solferino, June 24, 1859. Disarticulation about July 26th, at Ospitale San Filippo, Brescia; died.—126. JOHNSON (T. D.) (*Amputation at the Hip Joint, Recovery*, in *Pacific Med. and Surg. Jour.*, N. S., Vol. II, 1868–69, p. 305), A man of San Juan, Monterey Co., received a shot from a Colt's revolver, in July, 1862; ball shattered the entire shaft of femur. Dr. JOHNSON exarticulated two days after the injury. The patient recovered, and was still living, in 1868, at the New Almaden mine, in Santa Clara County.—127. VILLAGRAN (J. M. B. de) (*Observacion de una herida de arma de fuego situada en el muslo izquierdo complicada con fractura comminutiva del femur: desarticulacion coxo-femoral a los* 180 *dias, y muerte del enfermo a los* 259, in *Gaceta Médica de Mérico*, 1865, Vol. I. p. 164), Roman Medina, age 26, shot Nov. 2, 1863, in the left thigh, and admitted to hospital at San Pablo, Nov. 8, 1863. Disarticulated May 11, 1864; death July 29, 1864.—128–129. LANGENBECK (B. von) (*Schussfracturen der Gelenke*, Berlin, 1868, p. 20), Danish soldier, wounded at Alsen, June 29, 1864; disarticulation July 1st; died July 8, 1864, of septicæmia; and Danish soldier, wounded at Alsen, June 29, 1864; disarticulated at right hip June 30th; death July 5, 1864.—130–131. LANGENBECK (B. von) (*Die Schussfracturen der Gelenke*, Berlin, 1868, p. 21), Austrian soldier, wounded at Koenigsgrätz, July 3, 1866; exarticulated at left hip July 10th; death July 14, 1866, of septicæmia. Austrian soldier, wounded at Koenigsgrätz, July 3, 1866; amputation at right hip July 17th; death July 24, 1866.—132. LINHART (W.) (BECK, B., *Kriegschir. Erf.*, 1867, p. 340) performed secondary disarticulation at the hip in 1866, at Würzburg, for comminution of upper part of femur. Patient died a few hours after the operation.—133. FISCHER (K.) (*Militairärztliche, Skizzen*, Arau, 1867, p. 78) mentions a case in which disarticulation at the hip was performed unsuccessfully for hæmorrhage, in the Austro-Prussian campaign of 1866.—134. HEYFELDER (J.) (*Gaz. méd. de Paris*, 1867, p. 541) states that an unsuccessful disarticulation at the hip was performed at the hospital at Nedelischt, in charge of Dr. WILDE, after the battle of Koenigsgrätz, July 3, 1866.—135. MANNEL (OTTO) (*Kriegschirurgische Beobachtungen im Cadetenhaus Kriegslazareth zu Dresden*, in *Allgemeine Wiener Med. Zeitung*, 1867. Jahrg, XII, p. 403), Musquetier B——, 1st Thüringian Infantry, No. 31, wounded July 3, 1866, near Hradeck, in the left femur. Exarticulation October 4, 1866, by Stabsarzt Dr. KÜHNE; died October 8, 1866.—136. Dr. J. HEYFELDER (*Gaz. Méd. de Paris*, 1867, p. 540) reports that a second amputation at the hip was performed at the hospital at Hradeck, in 1866, which proved fatal in about forty-eight hours.—137. FAYRER (J.) (*Gunshot Wound; Amputation at the Hip Joint*, in *Edinburgh Med. Journal*, 1868, Vol. XIII, II, p. 793), Lieutenant H——, shot accidentally, on the Island of Ceylon, Sept. 12, 1867, over the left tuber ischii, ball lodged; fracture of neck of femur not detected. Exarticulation at left hip Sept. 25th; died three hours after the operation.—138. ASHHURST (JOHN, jr.) (*Case of Amputation at the Hip Joint for Gunshot Fracture of the Head and Neck of the Femur*, in *Am. Jour. Med. Sci.*, 1869,

one hundred and eighty-three, presenting sixteen recoveries. We thus arrive at an aggregate of two hundred and fifty cases of exarticulation at the hip as the present status of this grave mutilation in military surgery, with twenty-seven recoveries, two hundred and twenty-two deaths, and one example with unknown result, or a mortality rate of 89.1 per cent. We will next notice the details of the sixty-six cases of hip joint amputations of the American civil war as classified in TABLE XIV.

Vol. LVII, p. 94), E. B——, Irish woman, aged 22, shot in the right hip, in Aug., 1867, at Tacony, Pennsylvania. Exarticulation on Jan. 14, 1868; death in three hours.—139. CAROTHERS (A. E.) (*Amputation at the Hip Joint*, in *Am. Jour. Med. Sci.*, 1873, Vol. LXV, p. 92), Juan Blanco, aged 14; Saltillo, Mexico, Dec. 5, 1871. Intermediary operation Dec. 15th; recovery.—At least forty-four exarticulations at the hip were performed during the Franco-Prussian War, 1870–71.—140. Dr. RÜPPEL (DEININGER, *Beiträge zu den Schussfracturen des Hüftgelenks, etc.*, in *Deut. Mil.-ärztl. Zeitschr*, 1874, B. III, p. 304), Chr. Lucia, 3d Brandenburg Field Art., shell laceration, received at Artenay, Dec. 3, 1870. Exarticulation at right hip Dec. 4th; died shortly after the operation, Dec. 4, 1870.—141–143. Generalarzt Dr. BUSCH (*Zweiter Congress der Deutsch. Gesellschaft für Chir.*, in *Berlin Klin. Wochenschrift*, 1873, B. X, p. 273, and DEININGER, *loc. cit.*, p. 306) performed three exarticulations at the hip: Aug. Hensel, 2d Pomm. Grenadier Reg't; fracture of right femur, Metz, Oct. 14, 1870; operation Oct. 15th; death immediately after operation. No particulars of the other two unsuccessful cases are recorded.—144–147. MACCORMAC (W.) (*Notes and Recollections of an Ambulance Surgeon*, etc., London, 1871, pp. 78, 79), Guerieri, 4th Marines, wounded at Sedan, Sept. 1, 1870. Left tibia and upper part of left femur smashed. Admitted to Asfeld hospital Sept. 10th; operation Sept. 18th; death shortly after the operation. Liprendé, wound of back part of left thigh by explosion of shell. Admitted to Asfeld hospital Sept. 10th; operation Sept. 15th; death in six days. Dr. MACCORMAC (*loc. cit.*, p. 80) states that Mr. BLEWITT disarticulated the hip at Balan, "but with no better result than our two cases," and, on page 123, enumerates among the operations at the field hospital at Flöing, under Generalstabsarzt STROMEYER, another hip joint exarticulation with unknown result. Dr. DEININGER also refers to two exarticulations by Dr. FRANK, and cites MACCORMAC as authority. The latter (*loc. cit.*, p. 46), however, only states that "he (Dr. FRANK) afterwards told me there were two cases where operations should have been performed at the hip joint, but this had to be left undone for want of assistance." 148. Ober-Stabs-arzt NEUBER (DEININGER, *loc. cit.*, p. 308) exarticulated in the case of August Schmidt, 70th French Line; shot fracture of femur, Aug. 18, 1870; died Sept. 7, 1870.—149. Ober-Stabs-arzt Dr. LIPPEL (DEININGER, *loc. cit.*, p. 308), at the 8th field hospital of the Tenth Army Corps, at Pont à Mousson, exarticulated for gangrene in the case of Louis Lecoque, shot in the soft parts of the leg; death four hours after the operation.—150. Dr. KOCH (DEININGER, *loc. cit.*, p. 308), at the hospital at Maizery, Private Andreas Wilczynski, 44th Infantry, shot fracture of the right femur immediately below the trochanter, August 31, 1870. Exarticulation October 23, 1870; died of dysentery October 31, 1870.—151. Dr. SACHS (DEININGER, *loc. cit.*, p. 306), at the 9th field hospital of the First Army Corps, at Les Etanges, case of J. Nikelski, private, 12th Co., 43d Infantry; shot fracture of right femur; ball lodged. Metz, Aug. 14, 1870. Exarticulation Sept. 20, 1870; death, from pyæmia, Sept. 25, 1870.—152. Dr. BRANISH, at the hospital at Neudorf (DEININGER, *loc. cit.*, p. 306), disarticulated in the case of Private H. Malton, 66th French line, shot in the left femur August 6, 1870. Operation Sept. 7th; death on day of operation.—153. Generalarzt Dr. WAGNER (DEININGER, *loc. cit.*, p. 306), at the 8th field hospital, First Army Corps, at Gras, Private M. Buddrus, Co. 2, East Prus. Gren., No. 1; shot fracture of right femur near trochanter major, with extensive injury of the soft parts, received at Metz Sept. 1, 1870. Exarticulation Sept. 17th; died upon the operating table.—154. Assistant Surgeon TRENDELENBERG (DEININGER, *loc. cit.*, p. 306), of the 8th field hospital, Third Army Corps, at Vionville, case of Adolph Marschall, private, 52d Infantry. Shot fracture of left knee joint August 16, 1870; extensive suppuration. Exarticulation August 28, 1870; death on the same day.—155. Dr. METZLER (DEININGER, *loc. cit.*, p. 306), at the Hessian field hospital No. 1, Anoux la Grange, exarticulated at the hip in the case of L. Nouveau, 73d French line, wounded August 18, 1870. Operation Aug. 19th; death two hours after operation.—156. Dr. RAYNAUD (GILLETTE, *Remarques sur les blessures par armes à feu observées pendant la siége de Metz* (1870), *et celui de Paris* (1871), in *Arch. gén. de Méd.*, 1872, T. XX, p. 571, and CH. PILLET, *De la suppression de la compression digitale préliminaire, etc.*, Paris, 1873, p. 64) exarticulated at the left hip in a young *garde nationale*, aged 19; death in a few hours.—157. Dr. WIESEMES (B. BECK, *Chir. der Schussverletzungen*, Freiburg, 1872, p. 855), W——, 67th Infantry, wounded before Paris, December 21, 1870, by a shell, fracturing femur to neck. Primary operation; death in twenty-four hours.—158. HUETER (Berlin, *Klin. Wochenschrift*, 1873, p. 250) operated on a French soldier for extensive fracture of femur. The patient died suddenly on the following day from venous hæmorrhage.—159, 160. BŒHME (*Verhandl. der mil.-ärztl. Gesellschaft zu Orleans* 1870–71, in *Deut. Mil.-arztl. Zeitschrift*, 1872, B, I, p. 66), Fracture of femur just below trochanter, arterial bleeding; ligation of femoral; secondary hæmorrhage; exarticulation; died during the operation. Another case proved fatal in a few days.—161. OTT (*Kriegschir. Mittheil. aus dem Reserve Laz. Ludwigsburg*, 1871, p. 52), Harles, a French soldier, wounded at Vionville, Aug. 16, 1870, in right femur close to trochanter. Exarticulation Sept. 24, 1870; death a few hours after the operation.—162. SIMON (G.) (*Verhandl. des Zweiten Congress der Deut. Gesellshaft für Chir.*, in *Berl. Klin. Wochenschr.*, 1873, B. X, p. 261), French officer; fracture of femur—osteomyelitis. Secondary exarticulation; fatal in three days.—163–167. RUPPRECHT (L.) (*Mil. ärztl. Erf., etc., im Jahre* 1870–71, Würzburg, 1871, p. 75) states that four unsuccessful exarticulations at the hip—three primary, one intermediary—were performed at the Bavarian field hospital No. 8, during September and October, 1870, and that a later operation at Verrières also resulted fatally.—168. MUNDY (*Rapport sur l'ambulance de l'ancien corps legislat. du* 19 *Sept.*, 1870, *au* 31 *Janv.*, 1871) exarticulated on December 2, 1870, in the case of Desehamp, 2d Zouaves, for shot fracture of the right femur with injury of the large veins and of the hip joint; fatal.—169. Dr. J. ARNOLD (*Anat. Beiträge zu den Schusswunden*, Heidelberg, 1873, p. 97) gives the case of H. Moulin, wounded at Wörth, August 6, 1870; shot wound of right femur, with fissure; osteomyelitis and necrosis extending to neck of femur. Exarticulation at the hip; death Sept. 22, 1870.—170. Dr. JŒSSEL (SÉDILLOT, *Du traitement des fractures des membres, etc.*, in *Archives gén. de méd.*, 1871, VI^e^ serie, T. 17, p. 421) performed a secondary fatal exarticulation at the hip.—171–183. CHENU (J. C.) (*Aperçu hist. stat. et clin., etc., pendant la guerre de* 1870–71, Paris, 1874, T. I, p. 493) tabulates twenty-three exarticulations at the hip performed on French soldiers. Some details of ten of these cases have just been noticed; of the remaining thirteen cases it is only recorded that all the patients perished.—184. MORTON (T. G.) (*The Cincinnati Lancet and Clinic*, Cincinnati, Jan. 4, 1879, N. S., Vol. II, p. 9), Dominico Ludovess, aged 24, wounded at Sedan, September 1, 1870; amputation of thigh; admitted to Pennsylvania Hospital Nov. 24, 1878; reamputation at hip December 14, 1878. In a letter dated February 19, 1879, Dr. MORTON reports that the "patient is up and about, and would be discharged, but he has no home to go to." Of the 184 cases of exarticulation at the hip here cited, one (STROMEYER'S case, reported by MACCORMAC) must be set aside, since its result was unknown. Of the remaining 183 cases, 16 recovered and 167 proved fatal, a mortality of 91.2 per cent. Of the 53 primary operations, 50, or 94.3 per cent., were fatal. The three recoveries were: LARREY'S sub-lieutenant of dragoons, wounded September 7, 1812, and seen at Oreha three months afterwards; LANGENBECK'S operation on J. Siebold, June 8, 1848; T. D. JOHNSON'S operation on the California miner, July, 1862. Of the 32 intermediary cases, 29, or 90.6 per cent., were fatal. The three successful instances were: G. J. GUTHRIE'S Waterloo case of Duguet, in 1815; L. BAUDENS'S Algerian case in 1836; and CAROTHER'S case of the Mexican lad, in December, 1871. Of the 31 secondary operations, 26, or 83.8 per cent., had a fatal termination. The five successful cases were: BROWNRIGG'S British dragoon, wounded at Merida, December, 1811, and amputated in 1812, who was living, long afterwards, at Spalding, in Lincolnshire, England; ARLAUD'S case of the fusileer, in the Italian War of 1859; ISNARD'S case of the officer wounded at Solferino; Dr. JULES ROUX'S case of the Magenta soldier, in 1859; and NEUDÖRFER'S case of the soldier wounded at Palestro, May 30, 1859, who underwent secondary excision and amputation in December following. Of two re-amputations at the hip (CASES 12 and 184), T. G. MORTON'S operation, in 1878, on a French soldier wounded in 1870, had a successful issue. Of the 66 exarticulations in which the period of operation was unknown, 4 recovered, giving a mortality of 93.8 per cent. The operators in the four successful cases were: The unknown operator, who, in 1798, operated on the English sailor who was examined by Dr. WENDELSTADT; Dr. CHARLES BRYCE, in the case of the British soldier wounded at Athens, in 1827; the Spanish surgeon reported by Dr. BELMUNT to Mr. ALCOCK, who successfully disarticulated in 1835; and RESTELLI, in the Italian revolution in 1848. Of the 16 successful operations, 5 were performed by French surgeons, 4 probably by English, 3 by American, 2 by German, 1 by an Italian, and 1 by a Spanish surgeon.

Primary Operations.—Of twenty-five well authenticated primary amputations at the hip joint practised during the American civil war, one was completely successful. The pensioner, Kelly, whose left lower limb Surgeon Edward Shippen disarticulated more than fifteen years ago, still survives in comfortable health. A brief review of the case will be given, with references to a few of the numerous accounts of it that have been published:[1]

CASE.272.—Private James E. Kelly, Co. B, 56th Pennsylvania, aged 28 years, was wounded, about 9 o'clock of the morning of April 29, 1863, in a skirmish of the 1st division, First Corps, on the Rappahannock, nearly opposite the "Pratte House," below Fredericksburg. A conoidal musket ball, fired from a distance of about three hundred yards, shattered his left femur. A consultation of the senior surgeons of brigades decided that exarticulation of the femur was expedient, and the operation was performed, at four in the afternoon, at the "Fitzhugh House," by Surgeon Edward Shippen, U. S. V., surgeon-in-chief of the 1st division. The single flap method was adopted, and the amputation was accomplished with slight loss of blood. The patient was at first placed in a hospital tent, and was transferred, May 22d, to the Corps Hospital, progressing favorably. By May 28th, all the ligatures had been removed. On June 15, 1863, the patient was captured by the enemy, and was removed to the Libby Prison, in Richmond. Up to this date there had been no bad symptoms. On July 14th, Kelly was exchanged, and was sent to the Annapolis U. S. A. General Hospital. On his admission he was much exhausted by profuse diarrhœa. The internal portion of the wound had united, but the external portion was gangrenous. Applications of bromine were made to the sloughing surface without amelioration. A chlorinated soda lotion was substituted, and in the latter part of July there was a healthy granulating surface. On December 23, 1863, the wound had entirely healed, and Kelly visited Washington, and obtained an honorable discharge from service, and a pension. Kelly then went to his home, near Black Lick P. O., Indiana County, Pennsylvania. A letter, dated January 12, 1865, was received from him at this Office, and represented him as in excellent health and spirits at that time. In the spring of 1868, Kelly went to New York and had an artificial limb adapted by Dr. E. D. Hudson. At that time a photograph was taken representing the appearance of the cicatrix and of the prothetic appliance. A reduced copy of this picture is presented in the accompanying wood-cut (FIG. 89). Front and posterior views of the upper half of the shattered exarticulated femur are introduced among the accessories in the picture. In a pamphlet on *Mechanical Surgery*, New York, 1878, page 31, Dr. E. D. Hudson prints an excellent wood-cut displaying the appearance of the cicatrix and the artificial stump. By this simple and excellent expedient of a padded gutta-percha artificial stump secured to the pelvis by a broad chamois-lined canvas band, Dr. Hudson succeeded in applying satisfactorily and comfortably the ordinary artificial limb for thigh amputations, not only in Kelly's case but in the case of Pt. George W. Lemon, Co. C, 6th Maryland. The specimen of the fractured exarticulated femur is preserved at the Army Medical Museum, as No. 1148 of the Surgical Section. Kelly's disability was rated, March 4, 1874, as total. His pension of $24.00 monthly, was paid in March, 1878, and he was then in tolerably good health, nearly fifteen years after his terrible mutilation. He remains an irrefragable demonstration of a successful primary amputation at the hip after shot injury. There was nothing additional recorded at the Pension Office at the above date.

FIG. 89.—Appearance of stump five years after the operation. [From a photograph.]

Although in the next two instances of primary amputation at the hip it was found impracticable to trace the ulterior histories of the patients, it is known that Surgeon W. M. Compton's patient, *Robinson*, aged 35, was alive and well six months after the exarticulation, and that Private *Williamson*, the subject of Dr. J. T. Gilmore's operation, reached his home in Mississippi, after two months, with his stump fairly cicatrized.

[1] HAMILTON (F. H.), *A Treatise on Mil. Surg.*, 1865, p. 482. SORREL (F.), *Gunshot Wounds—Army of Northern Virginia*, in *Confed. States Med. and Surg. Jour.*, 1864, Vol. I, p. 153. BUTCHER (R. G.), *On amputations at the hip joint*, in *Dublin Quar. Jour. of Med. Sci.*, 1866, No. LXXXIV, p. 301. LEGOUEST (M. L.), *Le Service de Santé des Armées Américaines, etc.*, in *Annales D'Hygiène Publique*, 1866, Deuxième série, T. XXVI, p. 270. *Circular* No. 6, S. G. O., 1865, p. 48. *Circular* No. 7, S. G. O., 1867, pp. 26, 58. LÜNING (A.), *Ueber die Blutung bei der Exarticulation des Oberschenkels*, Zürich, 1877, p. 93. HUDSON (E. D.), *Mechanical Surgery: Prothetic Appliances and Apparatus.* New York, 1878, p. 31.

CASE 273.—Private *Robinson*, of a Louisiana Regiment, aged 35 years, was wounded at Battery Pemberton, at the confluence of the Tallahatchie and Yalabusha Rivers, on March 13, 1863, by a fragment of a twenty-four pounder shell, fired from one of the United States gunboats attacking the work. Surgeon William M. Compton, 2d Texas, was standing near the wounded man when he fell, and ran to his assistance. Hastily exposing the wound, Dr. Compton found that the immense projectile, consisting of nearly half of an elongated shell, had buried itself in the upper part of the left thigh, smashing the trochanters and neck of the femur and wounding the femoral artery. An assistant compressed the artery at the crural arch, while the necessary preparations for an amputation were made on the spot. Chloroform was administered, and then Dr. Compton made an irregular circular incision through the integuments just above the margin of the huge lacerated wound, dissected up and retracted the skin, trimmed away the lacerated muscles and divided those that were intact, and exarticulated the head of the femur, making, as Dr. Compton described it, an awkward circular amputation. The arteries were now rapidly secured and the wound dressed. Strange to say, the patient reacted with scarcely a symptom of shock. When the influence of the anæsthetic passed away, he was cheerful and even jocular. He was moved to a field hospital, and was treated under Dr. Compton's immediate supervision until March 17th. The febrile reaction was very slight; the appetite never failed; the wound had as healthy an appearance as could be desired. On the fifth day, the patient was sent on a steamer to the large general hospital at Yazoo City. The surgeon in charge of that hospital, Dr. J. M. Greene, writes that the case presented a most extraordinary example of union by the first intention throughout almost the entire extent of the vast wound. The patient left the hospital on April 20, 1863, in fine health and excellent spirits. Dr. Greene received direct intelligence from him near the close of the ensuing September, more than six months subsequent to the operation, and he then reported himself in good condition.[1]

CASE 274.—Private *Williamson*, 13th Mississippi, was wounded at an advanced picket station near Seven Pines, on June 4, 1862. A conoidal musket ball entered the posterior part of the right thigh about two inches below the trochanter major, and, passing forward and downward, made its exit at the middle third of the thigh in front, having badly shattered the femur in its course. The wounded man was carried to the field hospital in charge of Surgeon J. T. Gilmore, C. S. A., in a church building on the road to Richmond, and there placed under the influence of chloroform about two hours after the reception of the injury. After an exploration of the wound, it was decided that amputation should be performed. Dr. Gilmore began the operation with the belief that the comminution of the femur was mainly below the entrance wound, and that by making a long anterior flap the bone might be sawn at least through the trochanters; but when the anterior flap was reflected and the fracture exposed, it was found that fissures extended upward into the neck quite within the capsular ligament, and that disarticulation must be resorted to. A ligature was first placed upon the femoral artery, and the incisions were then extended upward, the joint opened, the round ligament divided, and a short posterior flap formed by cutting downward and outward. Assistants compressed the bleeding orifices of the arteries, which were then rapidly picked up and tied. The amount of blood lost was small. The wound was dressed, and the patient was comfortably in bed within three hours after the reception of the injury. He was put upon a very nutritious regimen, a messenger being sent daily to Richmond for eggs, milk, and other delicacies which could not be procured in camp. Dr. Gilmore attended him for two weeks, during which suppuration was not excessive, and the healing of the wound progressed favorably. He was then placed under the charge of Acting Assistant Surgeon Spinks. Early in July, he was carried to Richmond upon a hand-litter to a private house, at which he received every attention. In the middle of July, six weeks subsequent to the amputation, the wound had entirely healed, and he was allowed to start for his home in Mississippi. Dr. Gilmore learned that he arrived there in safety; but no intelligence was subsequently received from him.

Of twenty-two primary coxo-femoral amputations that resulted fatally soon after operation, the following series of thirteen cases is composed of instances in which the wounds were inflicted by cannon shot, shell fragments, or other large projectiles:

CASE 275.—Private Jacob Barger, Co. B, 26th Pennsylvania, aged 22 years, of robust constitution and sanguine temperament, was wounded on the morning of May 18, 1864, in the attack of Birney's division of the Second Corps upon the intrenchments before Spottsylvania Court House. He was struck by a fragment of shell, which shattered the femur from a little above the trochanter minor for nine inches downward, and tore and mangled the soft parts on the anterior and lateral aspects of the

[1] "*Mississippi State Lunatic Asylum, Jackson, Mississippi, January* 1, 1878. MY DEAR DOCTOR: I herewith enclose a letter from Dr. GREENE, of Aberdeen, Mississippi, the surgeon who treated the case of amputation at the hip joint in the Yazoo City hospital. To explain to you what may appear to be my want of attention in keeping the track of so interesting a case, I will remind you that the operation was performed in the field. The patient was at once conveyed to a steamboat, and as soon as it was full of sick and wounded (a few days) the boat was sent to Yazoo City. Soon after the date of the operation, I was ordered to Vicksburg, where I remained until after the surrender of that city, and for a long time was shut up by the siege from all communication with the outside world. The fall of Vicksburg, in July, was succeeded by the rapid evacuation of Yazoo City, and it was nearly a year before I met Dr. GREENE, in Alabama, who informed me of the recovery of my patient. I had not heard of him after the departure of the steamboat from Fort Pemberton, and did not know that he had fallen into the hands of Dr. GREENE until the doctor informed me himself. I lost my note-book and other papers at Vicksburg and have never had any means of tracing the patient. I will say, however, for Dr. J. M. GREENE, that he stands at the head of his profession in Mississippi, and is in every respect a highly esteemed christian gentleman, and his word in any statement of fact where he is known is received as solid truth. Very respectfully, your obedient servant, (signed) WM. M. COMPTON." "*Aberdeen, Mississippi*, December 29, 1877. DEAR DOCTOR: At the request of Dr. WM. M. COMPTON, of Jackson, Mississippi, I again write to you in regard to the hip joint amputation which he performed at Fort Pemberton, in 1863. I greatly regret my inability to furnish any facts in addition to those contained in a letter which I wrote to you in 1867. I believe I therein told you that the subject of the amputation was received by me in hospital at Yazoo City, Mississippi, in a few days after the operation. So skilfully were the flaps made and so perfect was the coaptation throughout the vast extent of cut surface, that the fibrinous agglutination followed at once, and resulted in union by first intention in all parts except the tracks of ligatures and sutures. I am positive in my recollection that within six weeks from the time of the operation the patient was dismissed from the hospital with the *stump healed*. Information of him reached me some months—I believe about five—afterwards, which I *then* regarded as entirely authentic. It was probably in the form of an application for 'Certificate of Disability' upon which to be 'retired' or 'discharged' from service. At any rate, I am certain that it thoroughly satisfied me of the life and well-doing of the patient. It is to be deplored that in a matter of so much interest to the profession, complete documentary evidence cannot be obtained; but yet I feel assured, from my point of view, that the cause of surgical history can sustain no detriment from placing Dr. COMPTON'S case in the same catalogue as that of Dr. SHIPPEN. Very sincerely, your obedient servant, (signed) J. M. GREENE."

thigh, leaving uninjured a V-shaped portion of integument and subjacent tissue on the antero-internal femoral region, seven inches wide at the base and ten inches in vertical length. He was carried to a field hospital of the Second Corps and examined about two hours after the injury. There was no apparent shock, and there had been very little hæmorrhage. The pulse was full and calm, and the surface of the body was of a natural temperature. The senior surgeons of the division concurred in the opinion that this was one of the few cases of extensive gunshot injury of the femur in which a successful result might reasonably be anticipated from an amputation at the hip joint. The patient was desirous that an operation should be practised. He was of a hopeful, buoyant nature, and was sanguine of a favorable issue. Amputation having been decided upon, chloroform was administered by Surgeon John Wiley, 6th New Jersey, a medical officer of great experience and caution in this duty. Only two drachms of the anæsthetic was used, given from a napkin, with great regard to a due admixture of atmospheric air. Surgeon C. C. Jewett, 16th Massachusetts, performed the amputation by making a single antero-internal flap. Assistant Surgeon J. T. Calhoun, U. S. A., and others present on the occasion, have described the admirable dexterity and skill manifested in the operative procedure. The disarticulation was completed in less than forty seconds. Surgeon C. K. Irwine, 72d New York, compressed the crural artery at the groin; Surgeon F. Prentice, 73d New York, grasped the flap and secured the cut end of the femoral; Surgeon James Ashe, 70th New York, had charge of the limb; Surgeon Everts, 20th Indiana, Surgeon E. A. Whiston, 1st Massachusetts, and Assistant Surgeon J. T. Calhoun, U. S. A., also aided in the operation. The flap, the form and location of which were determined by the wound, was made by cutting from without inward. Immediately after the head of the bone was freed from the acetabulum a spasmodic catch was heard in the patient's respiration, and an assistant exclaimed: "Stop the chloroform!" Surgeon Wiley promptly responded: "He is not taking any." The next instant an assistant at the wrist reported that the pulse was failing. The arteries were now rapidly secured. The loss of blood was estimated not to exceed a single ounce. But the patient was insensible, the respiration labored, the pulse very slow and feeble. The usual restoratives were employed without effect. The patient did not rally; he lingered for about two hours, and died a little after noon, May 18, 1864. In consequence of an advance of Rhodes's Division of Ewell's Corps the field hospital was hastily broken up. Surgeon Jewett was under the impression that the specimen was lost. This, however, was not the case. Some one fastened a label with the names of the patient and operator to the mangled limb, and it was forwarded, with other pathological specimens, from Spottsylvania to the Army Medical Museum, where it arrived safely, and furnished the preparation represented in the adjoining wood-cut (FIG. 90).[1]

FIG. 90.—Comminution of femur by a shell. *Spec.* 3080.

CASE 276.—On March 9, 1862, in the engagement between the U. S. frigate Congress and the rebel iron-clad Merrimac, Private J. Bushmil, 99th New York, or Union Coast Guard, detailed as a seaman on the Congress, was wounded by a piece of shell, which tore away the muscles on the outer side of the left thigh so as to expose the bone, and comminuted the neck and trochanters of the femur. He was immediately conveyed to the military post hospital at Newport News, Virginia, which was distant but a few hundred yards from the anchorage of the Congress, and restoratives and stimulants were administered. Eight hours after the injury, reaction having taken place to a considerable degree, the patient was placed under the influence of chloroform by Surgeon R. K. Browne, U. S. V., and Surgeon Leroy McLean, 2d New York, amputated at the hip joint by the lateral double-flap method of Larrey. His principal assistants were Dr. Everts, Dr. R. K. Browne, and Surgeon J. Curtis, U. S. V. The operation was rapidly accomplished, with the loss of but little blood. Six arteries required ligature. The patient did not rally from the shock of the operation, and died in less than two hours after its completion.[2]

The details of the next primary amputation at the hip (CASE 277), communicated by Dr. F. J. Bancroft, of Denver, Colorado, have not been heretofore published:[3]

CASE 277.—"Captain Ralph Carlton, Co. I, 3d New Hampshire, received a severe wound in the left hip and thigh from a cannon ball or a fragment of a shell at the battle of Secessionville, on James's Island, June 16, 1862. The trochanters were fractured and the femur was shattered and laid bare for several inches below. The gluteus maximus muscle was severed from its insertion, and the biceps and semi-membranosus were torn asunder. Amputation at the hip joint was performed about two hours after the reception of the injury by some surgeon whose name I have forgotten, assisted by myself. The anterior flap was made by transfixion and carried well down the limb. The posterior one was short and made by paring the torn ends of muscles and the skin. The patient did not rally, and died about two hours thereafter, although he possessed, apparently, a strong will and a good constitution, and was suffering but moderately from shock at the time of the operation. When told of the dangers

[1] The abstract of this case is compiled from a full report by Surgeon C. C. JEWETT, 16th Massachusetts, of Holliston, and from communications by Assistant Surgeon J. C. CALHOUN, Surgeon H. F. LYSTER, U. S. V., Assistant Surgeon J. D. STEWART, 74th New York, Major SAMUEL BRECK, A. A. G. See *Catalogue of Surg. Sect. of A. M. M. of* 1866, p. 234, *Spec.* 3080 of SECT. I. See *Circular* 7, S. G. O., 1867, pp. 30 and 59, and LÜNING (A.), *Über die Blutung bei der Exarticulation des Oberschenkels*, Zürich, 1877, CASE 324, p. 96.

[2] The imperfect abstract of CASE 276 is compiled from letters from Surgeon G. C. HARLAN, 11th Pennsylvania Cavalry, Surgeon R. B. BONTECOU, U. S. V., Dr. RUFUS KING BROWNE, and Dr. LEROY MCLEAN, 2d New York. See *Circular* 7, S. G. O., 1867, pp. 24 and 57, and LÜNING (A.), *Über die Blutung bei der Exarticulation des Oberschenkels*, Zürich, 1877, p. 90, CASE 281.

[3] The particulars of this case were first communicated to the Surgeon General's Office by Dr. F. J. BANCROFT, of Denver, Colorado, formerly Surgeon of the 3d Pennsylvania Artillery, November 26, 1875. Captain CARLTON'S regimental surgeon, Dr. A. A. MOULTON, 3d New Hampshire, wrote to the Surgeon General's Office from Tilton, New Hampshire, December 9, 1875, that he "did not see Captain CARLTON, but *heard* that his limb was amputated at or near the hip joint." A search at the Pension Office corroborates the dates of the injury as reported by Dr. BANCROFT. On June 16th, the 3d New Hampshire was in a brigade comprising the 97th Pennsylvania, 7th Connecticut, and 3d Rhode Island Artillery. Enquiries regarding the case were addressed to Surgeon J. R. EVERHART, 97th Pennsylvania, to Assistant Surgeon H. P. PORTER, 7th Connecticut, and Surgeon H. G. STICKNEY, 3d Rhode Island Artillery, medical officers of the brigade of General I. I. STEPHENS, and also to Surgeon E. L. DIBBLE, 6th Connecticut, and Surgeon P. A. O'CONNELL, 28th Massachusetts, New England medical officers who were present at the engagement on James Island, on June 16, 1862; but no further information could be elicited from any surgeon present at this operation in addition to the details recorded by Dr. F. J. BANCROFT, formerly Surgeon 3d Pennsylvania Artillery.

attending and following the amputation, I well remember how earnestly and energetically he said: 'I desire it. I must live. I will live. I have a wife and five children to provide for.' Yet in two short hours all earthly ties were severed." Surgeon A. A. Moulton, 3d New Hampshire, reported that Captain Carlton died on June 16, 1862, of "gunshot wound," and in the military history of the regiment, published by the Adjutant General of the State in 1866, he is mentioned as "a gallant and promising officer," who during said engagement "was hit in both legs by a solid shot, and died the same day."

CASE 278.—Private *Cooper*, of an Alabama Regiment, aged 20 years, was wounded at the siege of Vicksburg, on May 22, 1863, by a fragment of shell, which inflicted a terrible laceration of the upper exterior part of the right thigh, comminuted the upper third of the femur, and fractured the tuberosity of the ischium. There was profuse hæmorrhage. Surgeon W. M. Compton, 2d Texas, decided to operate, because the wounded man most earnestly begged that an attempt should be made by amputation to save his life. A few hours after the reception of the injury he was placed under chloroform, and amputation at the right hip joint was rapidly performed by making a large anterior flap and dividing the soft parts posteriorly by a circular sweep of the knife. The stump was dressed and the patient actively stimulated, but he never rallied from the shock of the operation, and died in less than an hour after its accomplishment.[1]

CASE 279.—Private Isaac C. Fulton, Co. I, 4th New York Heavy Artillery, was wounded, on October 1, 1864, in the trenches before Petersburg, by a fragment of shell, which shattered the upper extremity of his left femur and lacerated the soft tissues on the outside of the thigh, without, however, implicating any important vessels or nerves. He was immediately carried to the Second Corps field hospital, under the charge of Surgeon F. F. Burmeister, 69th Pennsylvania, and a consultation was held, at which it was determined that an amputation at the hip joint was the only resource that could possibly preserve life. The wounded man was, therefore, immediately placed under the influence of chloroform, and Surgeon J. W. Wishart, 140th Pennsylvania, did the operation. The ordinary method by antero-posterior flaps formed by transfixion was employed. The operation was rapidly performed and but a trifling quantity of blood was lost. The patient survived the shock of the injury and operation but a few hours, and died at City Point, October 1, 1864.

CASE 280.—Private Richard Gordon, Co. H, 7th Rhode Island, a stout and apparently healthy man, aged 28 years, was wounded May 18, 1864, in one of the assaults on the lines at Spottsylvania, and was carried on a stretcher, two or three miles to the rear, to a field hospital of the Ninth Corps. A fragment of shell had completely shattered the left thigh, leaving the lower part of the limb attached to the upper by shreds of integument and muscles only. There had been but slight primary hæmorrhage. He was conscious and his pulse was perceptible; but he was in extreme collapse. A consultation was held, at which the Surgeon-in-chief of the division, Surgeon P. A. O'Connell, Surgeon James Harris, 7th Rhode Island, and others, assisted, and it was determined to give the man the chance of an operation rather than to allow him to die without an effort to save him, and Dr. J. M. Carnochan, who had volunteered his services at the hospital, was selected to operate. Chloroform was carefully administered by Surgeon Harris, and Dr. Carnochan, as a preliminary step, tied the femoral artery three-quarters of an inch below Poupart's ligament, and then proceeded to amputate at the hip joint by a modification of the oblique method of Guthrie. A vertical incision three inches long, commencing an inch above the great trochanter, was made, the soft parts being divided down to the bone. From the lower third of this incision, two oblique incisions, one before and one behind, were made to diverge and then to reunite about two and a half inches below the level of the ischiatic tuberosity. The head of the femur was then disarticulated, and the knife being carried to the inner side of the neck the operation was finished by dividing the soft parts on that side by a single sweep of the instrument. The operation, including the ligation of the femoral, was completed in two minutes. The patient recovered kindly from the influence of the anæsthetic. He was placed in a shelter tent and took a dose of opium. He died ten hours after the operation, no reaction having taken place.[2]

CASE 281.—Brevet Lieutenant-Colonel J. H. Janeway, Assistant Surgeon, U. S. A., learned that Dr. Hunter McGuire, Surgeon-in-chief of Ewell's Division, performed a primary amputation at the hip after the engagement at Ball's Bluff, October 21, 1861, upon a Union prisoner of war, with a frightful injury of the upper part of the femur, caused by a large projectile, and that the patient succumbed to the combined shock of the injury and operation soon after the completion of the latter.

CASE 282.—A lieutenant in an Arkansas Regiment in Cabell's Brigade, aged 28 years, was wounded at the attack on Corinth, Mississippi, October 3, 1862. A solid cannon ball struck the right hip and made a formidable wound, tearing up the soft parts of the buttock and shattering the upper extremity of the femur. The trochanters and about five inches of the shaft of the femur were comminuted; the head of the femur was exposed and was split across. It was decided that amputation at the hip presented the only possible surgical resource, and the operation was undertaken, two hours after the injury, by Surgeon W. M. Compton, 2d Texas. The operation consisted in paring into shape the lacerated soft parts at the posterior part of the thigh, completing the disarticulation already partly effected by the projectile, and forming a large and long antero-internal flap. The patient was under the influence of chloroform. There was but little hæmorrhage. The flap covered the immense wound and was adjusted with tolerable accuracy to meet the incision at the gluteal region. The combined shock of the injury and operation was very great, and the patient reacted slowly and with difficulty. But he rallied finally, and progressed very favorably for several days. The inflammation was not intense, appetite returned, and strong hopes of the patient's recovery were entertained. But, on the seventh day, erysipelas invaded the stump and extended rapidly, in spite of the use of tincture of iron and such other treatment as it was thought proper to institute. The case terminated fatally on October 12, 1862.[3]

CASE 283.—A private in General A. S. Johnston's army was wounded on the morning of Sunday, April 7, 1862, at the battle of Shiloh, by a fragment of shell, which shattered the upper extremity of the left femur. The comminution extended to the neck and head of the bone, and the soft parts at the upper third of the thigh were torn into shreds. Notwithstanding the

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[1] EVE (P. F.), *A Contribution to the History of Hip Joint Operations performed during the late civil war*, in *Transactions of the Am. Med. Ass'n*, 1867, Vol. XVIII, pp. 255, 263. *Circular* No. 7, S. G. O., 1867, pp. 27, 58.

[2] HAMILTON (F. H.), *A Treatise on Mil. Surgery*, 1865, pp. 485, 627. *Circular* No. 6, S. G. O., 1865, p. 50. *Circ.* No. 7, S. G. O. 1867, pp. 30, 59.

[3] EVE (P. F.), *A Contribution to the History of the Hip Joint Operations performed, etc.*, in *Transactions of the Am. Med. Ass'n*, 1867, Vol. XVIII pp. 255, 262. *Circular* No. 7, S. G. O., 1867, pp. 25, 58.

terrible nature of the injury the patient reacted, and it was thought, in the evening, that his condition justified amputation. At seven in the evening disarticulation at the hip joint was performed by Dr. D. W. Yandell, Medical Director. The operation was well borne; but about three hours after its completion symptoms of exhaustion were manifested, and the case terminated fatally seven hours after the operation, at two o'clock of the morning of April 8, 1862.[1]

CASE 284.—A private of the 3d Missouri Regiment was wounded at the siege of Vicksburg, in June, 1863, by a large fragment of shell. The projectile produced a frightful laceration of the tissues on the inner and posterior parts of the right thigh, completely divided the femoral artery, and comminuted the femur through an extent of eight or nine inches. A surgeon in the trenches put a ligature on the femoral artery, and the wounded man was conveyed to the City Hospital and was plied with cordials. The sufferer had but recently recovered from an attack of illness; the primary hæmorrhage had been copious, and reaction was very imperfect. A consultation of surgeons decided that amputation at the hip joint should be practised, and the wounded man expressed a desire to have the benefit of this forlorn chance. Surgeon B. D. Lay undertook the operation with great reluctance, fearing that the patient might die under the knife, he was so very feeble. Stimulants were freely administered and morphia; but it was decided that the operation should be done without anæsthetics. The nature of the wound determined the direction of the incisions. There was a rent in the soft parts laying bare the tuberosity of the ischium, and another extending nearly to Ponpart's ligament, in which the ligated femoral artery was hanging. Dr. Lay commenced the operation, in the presence of Surgeons Britts, McDowell, Nidelet, and others, by making a clean circular cut through the inner and posterior parts of the thigh, dividing all the soft parts down to the articulation; a semilunar flap was then obtained from the outer and anterior part by cutting from without inward; the head of the femur was then disarticulated. Eight ligatures were required. The flap fitted well. The operation, which occupied about twenty minutes, was well supported, and the patient said that he felt more comfortable after than before it. However, reaction was never fully established. Dr. Nidelet relates that the patient died upon the table within an hour and a half after the completion of the dressing. Dr. Lay's recollection is that he survived the operation some fourteen or sixteen hours.[2]

CASE 285.—A private of the 27th Tennessee Regiment was wounded at Jonesboro', Georgia, August 31, 1864, by a cannon shot, which frightfully lacerated the soft parts on the upper and outer part of the thigh and shattered the femur, the splintering extending quite to the neck of the bone. Six hours after the injury, Surgeon J. R. Buist, 1st Tennessee, of Cheatham's Division, removed the limb at the hip joint by the antero-posterior flap method by transfixion. The patient was rendered insensible by chloroform. He rallied promptly from the anæsthetic and from the shock of the operation. Cold-water dressings were applied to the stump, and stimulants and concentrated nourishment were administered. After about eight hours the patient began to sink, and he died thirty-six hours after the operation, September 2, 1864.[3] In a letter, dated Nashville, Tennessee, March 25, 1867, Dr. Buist states: "I am sorry to say that the exsected head of the femur was not preserved, nor a photographic drawing taken."

CASE 286.—Private William Waters, Co. K, 123d New York, was wounded at Resaca, Georgia, on May 15, 1864, by a large fragment of shell, which completely carried away his left thigh and fractured both the tibia and fibula of the right leg. He was carried to a field hospital of the Twentieth Corps, and as soon as he had partially rallied from the shock of his frightful injuries chloroform was administered, and Surgeon J. W. Brock, 66th Ohio, amputated at the left hip joint: and then removed the right leg at the place of election. The patient survived the double operation but a short period. The exact length of time is not stated; but he died in the afternoon of the day on which he was wounded, May 15, 1864.[4]

CASE 287.—Private Elisha Wayland, Co. E, 34th Iowa, had his right thigh almost completely torn off at the hip joint, at the siege of Vicksburg, July 3, 1863, by an unexploded shrapnel shell. He was hurriedly conveyed to a field hospital, but bled very profusely during the short transit, and is represented as almost exsanguineous upon reaching the hospital. His regimental surgeon, Charles W. Davis, 34th Iowa, having mastered the hæmorrhage, had the patient placed under chloroform, ligated the femoral artery, divided the lacerated soft parts which still connected the mutilated limb with the trunk, and then formed a single large anterior flap, and exarticulated the femur. The patient survived the operation two hours, and died July 3, 1863.[5]

In five of the foregoing examples (CASES 273, 280, 284, 286, 287) and in CASE 289, to be cited presently, primary disarticulation at the hip appeared to be of absolute urgency, since the graver injuries of the femur were, in each case, conjoined with lesions of the femoral artery.

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[1] The particulars of this case were communicated to the Surgeon General by Professor P. F. EVE in a letter dated Nashville, March 5, 1867. See also EVE (P. F.), *loc. cit.*, p. 253, and *Circular* No. 7, S. G. O., 1867, pp. 24 and 57; LÜNING (A.), *op. cit.*, p. 90.

[2] The abstract of this case was compiled from data furnished by the operator, Dr. BENJAMIN D. LAY, in charge of the City Hospital, at Vicksburg, during the siege, in a letter to the editor, dated Paducah, July 26, 1867. Dr. LAY, who reluctantly undertook the operation, closes his account with the following remark: "I saw nothing in it to diminish the horror with which I approach such cases, of which I have had the misfortune to have three. I have been present at three others. All were fatal." See *Circular* No. 7, S. G. O., 1867, pp. 27, 58; EVE (P. F.), *loc. cit.*, pp. 253, 258; LÜNING (A.), *op. cit.*, p. 94.

[3] The facts in this case were furnished by Professor PAUL F. EVE, from a carefully written account by the operator, Surgeon J. R. BUIST, 1st Tennessee. See *Circular* No. 7, S. G. O., 1867, pp. 31, 59; EVE (P. F.), *loc. cit.*, pp. 253, 258; LÜNING (A.), *op. cit.*, 97.

[4] The abstract of this case was made from field returns signed by Surgeon G. E. COOPER, U. S. A., Medical Director, Surgeon A. L. COX, U. S. V., and Surgeon A. BALL, 5th Ohio. See *Circular* No. 6, S. G. O., 1865, p. 50; *Circular* No. 7, S. G. O., 1867, pp. 29, 58; LÜNING (A.), *op. cit.*, p. 96.

[5] This abstract was compiled from notes of the case on the Monthly Report of Sick and Wounded of the 34th Iowa, for July, 1863. In a letter to the editor, dated Indianola, Iowa, June 1, 1869, the operator, Dr. C. W. DAVIS, writes: "In reply to yours of May 1st, I will say, after examining my Army surgical notes, I notice the case of E. M. Wayland, Co. E, 34th Iowa Volunteers. Disarticulation of hip joint, on the right side. The femur was fractured at upper third; also laceration of the tissues, muscles, and vessels of the posterior part of the leg as far up as the insertion of the gluteus maximus. I performed the amputation by the single anterior flap operation, ligating the artery before disarticulating the head of the femur. The operation was neat and made a perfect stump, but the patient lived *only* forty-seven hours." See *Circular* No. 2, S. G. O., 1869, p. 108.

The following nine fatal cases of primary amputations at the hip were for wounds inflicted by small projectiles. In one instance (CASE 294), the patient survived the operation at least eleven days; in another (CASE 293), the patient had rallied so far that it was considered safe to move him, but he succumbed on the road, forty-eight hours after the operation. The remaining seven patients died within a few hours.

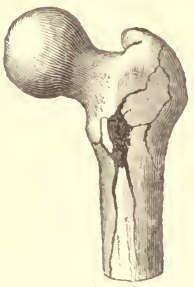

FIG. 91.—Shot fracture through the trochanters of the left femur. [From a drawing by Surgeon H. Z. GILL, U. S. V.]

CASE 288.—Private James A. Alling, Co. D, 3d Wisconsin, was wounded on March, 16, 1865, at the battle of Averysboro', North Carolina, by a conoidal musket ball, which entered the upper part of the left thigh in front, and produced a comminuted fracture of the femur through the trochanters, with longitudinal splintering extending a short distance down the shaft and upward within the capsular ligament. The wounded man was conveyed to a field hospital of the Twentieth Corps. Chloroform was administered and the wound was thoroughly explored, and it was determined to amputate at the hip joint, because it was imperative to move the wounded on the following day over rough roads, and either an excision of the head of the femur, or an attempt at conservation of the limb, offered, under the circumstances, less chance of a favorable result than the removal of the limb. Five hours after the reception of the injury, Surgeon H. Z. Gill, U. S. V., amputated by double flap. The patient reacted well after the operation, but the amendment was of brief duration. He died seven hours after the completion of the amputation, March 17, 1865. A drawing of the shattered extremity of the femur, contributed by the operator, is presented in the adjacent wood-cut (FIG. 91).[1]

CASE 289.—Corporal Wad Brookins, Co. C, 49th U. S. Colored Troops,[2] was accidentally shot, in the regimental camp, near Transylvania Landing, Louisiana, on September 3, 1863. He was struck in the upper third of the left thigh, at close range, by a musket ball, which divided the femoral artery and badly comminuted the thigh bone. Assistance was immediately rendered, and the copious hæmorrhage was controlled by compression. Prompt preparations having been made, the thigh was amputated at the hip by Surgeon Sylvester Lanning, 49th U. S. C. T. The patient died from the hæmorrhage and shock, four hours after the completion of the operation, September 3, 1863.

CASE 290.—Private J. M. Brown, Co. H, 63d Indiana, was wounded on June 16, 1864, in the attack of the Twenty-third Corps upon the earthworks at Lost Mountain, near Marietta, Georgia. A conoidal musket ball struck his right thigh and shattered the upper extremity of the femur, fissures extending through the trochanter major. He was conveyed to the field hospital of the Twenty-third Corps, and on June 17th, about fourteen hours after the reception of the injury, he was placed under the influence of chloroform, and after a careful examination of the injury, it was decided to amputate at the hip joint. The operation was performed by Surgeon Edward Shippen, U. S. V. The operative method was similar to that adopted by Dr. Shippen in his successful operation (CASE 272). Comparatively little blood was lost, but the patient succumbed to the shock of the operation and died upon the operating table very soon after the completion of the disarticulation.[3]

FIG. 92.—Comminution of femur by a rifle ball. *Spec.* 2273.

CASE 291.—Seaman George Cook, aged 21 years, an Englishman, was wounded on February 1, 1864, in an engagement of a gunboat with a battery supported by sharpshooters, at Smithfield, Virginia. A rifle ball grazed his right thigh, passed through both testicles and entered the left thigh, fractured the femur, and passed out at the posterior and outer portion of the limb. The wounded man was taken to the Naval Hospital, at Portsmouth, Virginia, not many miles distant, and Surgeons Solomon Sharp, A. C. Gorgas, John Paul Quinn, and Assistant Surgeon G. S. Franklin, U. S. N., held a consultation, at which it was decided that the femur was extensively shattered, and that an amputation at the hip joint presented the only chance of saving the patient's life. On the morning of February 2d, the patient was placed under the influence of chloroform, the femoral artery was compressed at the groin, and Surgeon Gorgas, assisted by his colleagues, proceeded to remove the limb. The operation was performed by transfixing and forming an anterior flap, disarticulating, and then making a posterior flap by cutting from within outward. Very little blood was lost; yet the patient never reacted, but succumbed about two hours after the completion of the operation. The shattered femur was forwarded by Surgeon Gorgas to the Army Medical Museum. It is represented in the adjacent wood-cut (FIG. 92). It is a very strong and compact bone. The ball has separated five large fragments, and has produced fissures extending from above the level of the trochanter minor a little over four inches down the shaft.[4]

CASE 292.—"Private John W. Dadds, Co. B, 4th Maryland, was wounded on the morning of May 12, 1864, at the battle of Spottsylvania, by two musket balls, one of which shattered his left tibia and fibula, while the other passed through the left

[1] The notes in this case were furnished by the operator, Surgeon H. Z. GILL, U. S. V. See *Circular* No. 7, S. G. O., 1867, pp. 31, 59; LÜNING (A), *Über die Blutung bei der Exarticulation des Oberschenkels, etc.*, Zürich, 1877, S. 102.

[2] The regiment was styled at the period "11th Louisiana Regiment of African Descent." Its designation was changed, March 11, 1864, to "49th United States Colored Troops." The case was reported on the Monthly Report of Sick and Wounded of the 11th Louisiana Regiment of African Descent, signed by the operator, Surgeon SYLVESTER LANNING. See *Circular* No. 2, S. G. O., 1869, p. 108; LÜNING (A.), *op. cit.*, p. 93.

[3] *A Report of Surgical Operations during the Atlanta Campaign in* 1864, collected by Surgeon A. M. WILDER, U. S. V., furnished the data in this case. This is one of the two fatal cases referred to by Dr. EDWARD SHIPPEN, the operator, in connection with an account of his successful amputation at the hip (CASE 272, *ante.*), published in Professor FRANK H. HAMILTON'S *Treatise on Military Surgery*, New York, 1865, p. 485. A special report from Dr. SHIPPEN, dated January 13, 1866, contains no further particulars. See *Circular* No. 6, S. G. O., 1865, p. 50; *Circular* No. 7, S. G. O., 1867, pp. 31, 59; LÜNING (A.), *op. cit.*, p. 97.

[4] An account of this case was forwarded to the Surgeon General's Office by the operator, Surgeon ALBERT C. GORGAS, U. S. N., together with the pathological preparation. See *Circular* No. 6, S. G. O., 1865, p. 50; *Circular* No. 7, S. G. O., 1867, pp. 28, 58; *Catalogue of the Surg. Sect. of the Army Medical Museum*, 1866, p. 233; LÜNING (A.), *op. cit.*, p. 96.

thigh, comminuting the femur at the trochanters. He was carried to the field hospital of the 2d division of the Fifth Corps, where a consultation was held by the senior surgeons present. After a careful exploration, under chloroform, it was determined that the thigh wound involved the hip joint. It was decided that an excision of the head of the femur, or a resort to expectant treatment, were alike forbidden by the grave compound fracture of both bones of the leg, which complicated the thigh fracture, and that there was no alternative but coxo-femoral amputation. Accordingly, stimulants were administered, and every means were employed to bring about reaction, and, three hours after the reception of the injury, Surgeon Enos G. Chase, 104th New York, proceeded to remove the limb. He performed the double-flap operation, sometimes described as Béclard's, transfixing the thigh and forming a large flap in front, disarticulating and then cutting from within outward to make a posterior flap. The vessels were then rapidly secured. The patient survived the operation twelve hours."[1]

CASE 293.—Private James Martin, Co. I, 146th New York, aged 20 years, was wounded on July 13, 1863, in one of the reconnoissances of General Lee's position near Williamsport. He was carried to the rear and placed in a barn by the roadside not far from Williamsport. On the following morning a consultation was held in the case, at which Assistant Surgeons Howard, C. Wagner, and Colton, U. S. A., and Drs. Stearns, Lord, Dean, and others assisted. It was found that a conoidal musket ball had passed through the upper part of the left thigh from before backward, and had struck the femur a little below the great trochanter and produced a comminuted fracture. It was believed that the fracture extended into the coxo-femoral articulation, and it was decided that no operative procedure could be advantageously practised except an amputation at the hip joint. Dr. Howard was invited to operate. Chloroform having been administered, he removed the limb by a double-flap operation. He describes the operation as performed by "entering the knife about four or five inches below the anterior superior spinous process of the ilium, and causing it to emerge by transfixion an inch and a half to the inside of the course of the femoral vessels. The operation was completed in the ordinary manner of flap amputations. By transfixing at the points described, the mouths of the divided vessels were so near the margin of the anterior flap as to be readily seized immediately after division, and by the external obliquity of the plane of incision drainage of pus was facilitated more than by the ordinary horizontal antero-posterior flaps." It appears that the disarticulation was rapidly accomplished, and that very little blood was lost. The shock was great, but the patient is reported to have rallied so far that it was considered safe to move him. On July 16, 1863, he died on the road to Sharpsburg, about forty-eight hours subsequent to the operation. An examination of the specimen from this case, which was forwarded by Assistant Surgeon Howard to the Army Medical Museum, and is represented in the wood-cut (FIG. 93), justified the opinion formed before the operation, that an excision of the head of the femur was impracticable; for besides the comminution about the lesser trochanter and the fissures towards the neck, fissures ran down the shaft of the bone for a long distance.[2]

FIG. 93.–Comminuted shot fracture of femur. *Spec.* 1379.

CASE 294.—A private soldier of Major Douglass's Cavalry was accidentally wounded by a comrade near Lavergne, Tennessee, on October 19, 1862. The injury was inflicted by a round ball, with buckshot, fired from a fowling-piece, the muzzle being within a few inches of the person of the man who was wounded. The charge passed directly through the thigh just below the trochanters, comminuted the femur, and extensively lacerated the soft parts. The operation was performed eight hours after the reception of the injury. Chloroform was administered until anæsthesia was complete. Then an assistant controlled the femoral at the groin, and the operator, Dr. J. F. Grant, P. A. C. S., entered the point of a knife twelve inches long an inch below the anterior superior spinous process of the ilium and transfixed, according to Lisfranc's method, on the outer side of the femur, bringing the point out near the tuberosity of the ischium, and cutting an external and posterior flap five inches long. The gluteal and sciatic arteries were then tied; then an antero-internal flap was cut and the head of the bone was disarticulated. He was taken to the neighboring house of a widowed lady on the Murfreesboro' pike, between Lavergne and Nashville. Here he was seen by Dr. Grant on October 22d, and seemed in every respect to be doing well. On this day that locality was occupied by United States troops and Dr. Grant did not see his patient again. He received a message from him on October 30th, but no subsequent information. It is altogether probable, therefore, that the patient died.[3]

CASE 295.—A private of the 18th Mississippi Regiment, of Barksdale's Brigade, a robust man, under thirty years of age, received a shot fracture of the upper extremity of the left femur, at Malvern Hill, July 1, 1862. The injury was probably caused by a conoidal musket ball, and there was great splintering of bone, extending to the neck. Early on the morning of July 2d the patient inhaled chloroform, and amputation at the hip joint was performed by Surgeon J. T. Gilmore, P. A. C. S., by forming anterior and posterior flaps by transfixion. There was no reaction, and the patient died from the shock of the operation an hour or two after its completion.[4]

CASE 296.—A private of the 21st Mississippi Regiment, a young healthy man, was wounded at Malvern Hill, July 1, 1862, by a conoidal musket ball, which fractured the left femur through the trochanters and neck. Twelve hours after the reception of the injury he underwent amputation at the hip joint. The operation was performed under chloroform, by Surgeon J. T. Gilmore, by the antero-posterior flap method, the flaps being formed by transfixion. The patient only partially reacted after the operation, and, though he lingered until the morning of July 4th, he died apparently from the shock of the operation.[5]

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[1] At the date of the publication of *Circular* No. 7, in 1867, various reports regarding this case led to the belief that the head of the femur had been excised. A report of the case, by Surgeon ENOS G. CHASE, 104th New York, the operator, was finally discovered in time for publication in *Circular* No. 2, 1869, at page 107; LÜNING (A.), *op. cit.*, p. 96.

[2] Assistant Surgeon BENJAMIN HOWARD, U. S. A., the operator, and Surgeon T. M. FLANDRAU, 146th New York, communicated the facts in this case. See *Circ.* No. 6, S. G. O., 1865, p. 50; *Circ.* No. 7, S. G. O., 1867, pp. 28, 58; *Cat. Surg. Sect. A. M. M.*, 1866, p. 233; LÜNING (A.), *op. cit.*, p. 94.

[3] The abstract of this case was compiled from data furnished by Professor PAUL F. EVE. See *Circular* No. 7, S. G. O., 1867, pp. 25, 28; EVE (P. F.), *loc. cit.*, pp. 254, 260; LÜNING (A.), *loc. cit.*, p. 91.

[4] EVE (P. F.), *loc. cit.*, pp. 254, 259; *Circular* No. 7, S. G. O., 1865, pp. 25, 57; LÜNING (A.), *op. cit.*, p. 91.

[5] SORREL (F.), *Confed. States Med. and Surg. Jour.*, 1864, Vol. I, p. 155; EVE (P. F.), *loc. cit.*, p. 254; *Circular* No. 7, S. G. O., 1867, pp. 25, 58; LÜNING (A.), *op. cit.*, p. 91.

TABLE XV.

Summary of Twenty-five Cases of Primary Amputation at the Hip Joint.

No.	NAME, AGE, AND MILITARY DESCRIPTION.	DATE OF INJURY.	NATURE OF INJURY.	DATE OF OPERATION.	OPERATION AND OPERATOR.	RESULT AND REMARKS.
1	Kelly, J. E., Pt., B, 56th Pennsylvania, age 28.	April 29, 1863.	Conoidal ball fractured upper extremity of left femur.	April 29, 1863.	Single anterior flap, by Surg. E. Shippen, U. S. V.	Gangrene, diarrhœa. Disch'd December 23, 1863. *Spec.* 1148.
2	*Robinson*, Pt., Louisiana regiment, age 35.	Mar. 13, 1863.	Frag. of 24-pounder shell crushing trochanters and neck of left femur and wounding femoral artery.	Mar. 13, 1863.	Antero-internal flap amputat'n, by Surg. W. M. Compton, 2d Texas.	Healed by first intent'n; left hospital April 20, '63, in fine health. EVE (P. F.), *loc. cit.*, pp. 254, 262. *Circ.* 7, S. G. O., 1867, pp. 26, 58.
3	*Williamson*, Pt., 13th Mississippi, age 20.	June 4, 1862.	Conoidal ball fract. right femur, fissures extending into neck quite within capsular ligam't.	June 4. 1862.	Long anterior and short posterior flaps, by Surg. J. T. Gilmore, C. S. A.	Six weeks after operation wound healed and patient allowed to leave hospital. EVE (P. F.), *loc. cit.*, pp. 254, 259. *Circ.* 7, S. G. O., 1867, pp. 24, 57.
4	Alling, J. A., Pt., D, 3d Wisconsin.	Mar. 16, 1865.	Conoidal ball fract'd left femur thro' troch's, with longitud'l splinter'g extend'g down shaft and upw'd within capsul. lig.	Mar. 16, 1865.	Double flap, by Surg. H. Z. Gill, U. S. V.	Died, March 17, 1865, seven hours after operation. *Circ.* 7, S. G. O., 1867, pp. 31, 59.
5	Barger, J., Pt., B, 26th Pennsylvania, age 22.	May 18, 1864.	Fragment of shell shattering right femur from just above tro. minor nine ins. downward.	May 18, 1864.	Single antero-internal flap, by Surg. C. C. Jewett, 16th Mass.	Died, May 18, 1864, two hours after operation. *Spec.* 3080. *Circ.* 7, S. G. O., 1867, pp. 30, 59.
6	Brookins, W., Corp'l, C, 49th Colored Troops.	Sept. 3, 1863.	Musket ball comminut'g upper third left thigh and dividing femoral artery.	Sept. 3, 1863.	Amputation, by Surg. S. Laning, 49th Colored Troops.	Died, Sept. 3, 1863, from hæmorrhage and shock, four hours after operation. *Circ.* 2, S. G. O., 1869, p. 109.
7	Brown, J. M., Pt., H, 63d Indiana.	June 16, 1864.	Conoidal ball shattered upper extremity right femur, fissures extending through trochanter major.	June 17, 1864.	Single anterior flap, by Surg E. Shippen, U. S. V.	Died June 17, 1864; shock of operation. *Circ.* 6, S. G. O., 1865, p. 50. *Circ.* 7, S. G. O., 1867, pp. 31, 59.
8	Bushmil, J., Pt., 99th New York (detailed as a seaman on U. S. frigate Congress).	Mar. 9, 1862.	Piece of shell comminuted neck and trochanters of left femur.	Mar. 9, 1862.	Lateral double flap, method of Baron Larrey, the elder, by Surg. L. McLean, 2d N. Y.	Did not rally; died two hours after operation. *Circ.* 7, S. G. O., 1867, pp. 24, 57.
9	Carlton, R., Captain, I, 3d New Hampshire.	June 16, 1862.	Large missile fractured trochanters and shattered left femur for several inches below.	June 16, 1862.	Anterior posterior flap, by a New England surgeon, assisted by Ass't Surg. F. J. Bancroft, 76th Penn.	Did not rally; died, June 16, 1862, less than two hours after operation.
10	Cook, G., seaman, age 21 ...	Feb. 1, 1864.	Rifle ball fractured left femur, wounded both testes and right thigh.	Feb 2, 1864.	Anterior posterior flap, by Surg A. C. Gorgas, U. S. N.	Never reacted; died two hours after operat'n. *Spec.* 2273. *Circ.* 6, S. G. O., 1865, p. 50. *Circ.* 7, S. G. O., 1867, pp. 28, 58.
11	*Cooper*, ——, Pt., Alabama regiment, age 20.	May 22, 1863.	Fragment of shell comminuted upper third right femur, fracturing tuberosity of ischium.	May 22, 1863.	Large anterior flap, by Surg. W. M. Compton, 2d Texas.	Never rallied; died in less than an hour.
12	Dadds, J. W., Pt., B, 4th Maryland.	May 12, 1864.	Musket ball comminuting left femur at trochanters, involv. hip joint (also fract. left leg).	May 12, 1864.	Double flap, Beclard's method, by Surg. E. G. Chase, 104th New York.	Died, May 12, 1864, twelve hours after operation. *Circ.* 2, S. G. O., 1869, p. 107.
13	Fulton, I. C., Pt., I, 4th New York Heavy Artillery.	Oct. 1, 1864.	Fragment of shell shattered upper extremity of left femur.	Oct. 1, 1864.	Anterior post. flaps, by Surg. J. W. Wishart, 140th Penn.	Died, Oct. 1, 1864, from shock, in a few hours. *Circ.* 2, S. G. O., 1869, p. 108.
14	Gordon, R., Pt., H, 7th Rhode Island, age 28.	May 18, 1864.	Fragment of shell completely shattered left femur.	May 18, 1864.	Method of Guthrie, by Dr. J. M. Carnochan; femoral tied before amputation.	No reaction; died ten hours after operation.
15	Martin, J., Pt., I, 146th New York, age 20.	July 13, 1863.	Conoidal ball comminu'd fracture of left femur a little below trochanter major.	July 14, 1863.	Double flap, by Ass't Surgeon B. Howard, U. S. A.	Shock great; rallied somewhat. Died July 16, 1863. *Spec.* 1379. *Circ.* 6, S. G. O., 1865, p. 50. *Circ.* 7, S. G. O., 1867, pp. 28, 58.
16	Unknown, Union soldier, taken prisoner.	Oct. 21, 1861.	Large missile fractured upper part of femur.	Oct. 21, 1861.	Amputation, by Surgeon H. McGuire, C. S. A.	Died soon after operation; combined shock of injury and oper'n. *Circ.* 2, S. G. O., 1869, p. 108.
17	*Unknown*, Lieut., Arkansas regiment, age 28.	Oct. 3, 1862.	Cannon ball wound of right hip, five inches of the shaft of femur comminuted, head split and exposed.	Oct. 3, 1862.	Soft parts of post. part of thigh pared into shape, large and long antero-internal flap, by Surg W. M. Compton, 2d Tex.	Rallied; favorable progress; Oct. 10th, erysipelas extended rapidly. Died October 12, 1862.
18	*Unknown*, Pt., Maj. Douglass's Cavalry.	Oct. 19. 1862	Round ball and buck comminuted femur just below trochanters.	Oct. 19, 1862.	External posterior flap, antero-internal flap, by Surg. J. F. Grant, P. A. C. S.	Oct. 22d, doing well; last heard from Oct. 30th; probably died. EVE (P. F.), *loc. cit.*, pp. 254, 260. *Circ.* 7, S. G. O., 1867, pp. 25, 58.
19	*Unknown*, Pt., Gen. A. S. Johnston's army.	April 7, 1862.	Frag. shell shatt'd up. extremity left femur, com. extended to head and neck of bone.	April 7, 1862.	Amputation, by Surg. D. W. Yandell, C. S. A.	Died, from exhaust'n, seven h'rs after operation. EVE (P. F.), *loc. cit.*, p. 253. *Circ.* 7, S. G. O., 1867, pp. 24, 57.
20	*Unknown*, Pt., 18th Miss., Barksdale's brigade, age under 30.	July 1, 1862.	Conoidal ball fractured upper extremity of left femur, splintering extending to neck.	July 2, 1862.	Anterior and posterior flaps, by Surg. J. T. Gilmore, C. S. A.	Died, an hour or two after operation, from shock of operation. EVE (P. F.), *loc. cit.*, p. 254. *Circ.* 7, S. G. O., 1867, pp. 25, 57.
21	*Unknown*, Pt., 21st Miss....	July 1, 1862.	Conoidal ball fract'd left femur through trochanters and neck.	July 1, 1862.	Anterior posterior flap, by Surgeon J. T. Gilmore, C. S. A.	Died, July 4, 1862, apparently from shock of operation.
22	*Unknown*, Pt., 3d Missouri.	June —, 1863.	Large frag. of shell comminuting right femur extent of eight inches; femoral artery divided.	Day of injury.	Semi-lunar flap from outer and anterior part, by Surg. B. D. Lay, P. A. C. S.	Reaction never completely established; died same day. EVE (P. F.), *loc. cit.*, pp. 253, 261. *Circ.* 7, S. G. O., 1867, pp. 27, 58
23	*Unknown*, Pt., 27th Tenn....	Aug. 31, 1864.	Cannon shot shat'd right femur, splintering extending to neck.	Aug. 31, 1864.	Antero-posterior flaps, by Surg. J. R. Buist, 1st Tennessee.	Rallied promptly; died, Sept. 2, 1864, thirty-six hours after operation. EVE (P. F.), *loc. cit.*, pp. 253, 258. *Circ.* 7, S. G. O., 1867, pp. 31, 59.
24	Waters, W., Pt., K, 123d New York.	May 15, 1864.	Large fragment of shell carried away left thigh, fracturing right leg.	May 15, 1864.	Amputation of the left hip and right leg, by Surgeon J. W. Brock, 66th Ohio.	Died May 15, 1864. *Circ.* 6, S. G. O., 1865, p. 50. *Circ.* 7, S. G. O., 1867, pp. 29, 58.
25	Wayland, E., Pt., E, 34th Iowa.	July 3, 1863.	Unexploded shrapnel shell almost completely tearing off right thigh at hip joint.	July 3, 1863.	Single large anterior flap, by Surgeon C. W. Davis, 34th Iowa.	Died two hours after operation. *Circ.* 2, S. G. O., 1869, p. 108.

Intermediary Amputations.—Twenty-three instances of amputations at the hip joint during the inflammatory period after shot injury are included in this category, and refer to cases of fifteen Union and eight Confederate soldiers, each case having a fatal result. Brief details of the cases are given in alphabetical order, with foot-note references to the sources of information.[1]

CASE 297.—Private James Carden, of the army of Major General Rosecrans, was wounded at the battle of Chickamauga, in the second day's fight, September 20, 1863, by a fragment of shell, which caused great laceration of the soft parts at the upper part of the thigh, with comminuted fracture of the femur. He was left upon the field and was made a prisoner. On the evening of September 21st, Surgeon R. P. Bateman, C. S. A., amputated his thigh at the hip joint. The patient died on September 27, 1863, six days after the operation.[2]

CASE 298.—Sergeant Lewis Carroll, Co. H, 1st Delaware, aged 23 years, was wounded on October 22, 1864, near the Weldon Railroad.[3] A conoidal musket ball entered the right thigh in front, and, striking the femur at the junction of the upper thirds, produced a remarkable longitudinal splintering of the bone, extending from an inch below the lesser trochanter downward for ten inches, together with several oblique fissures. The wounded man was conveyed in an ambulance to one of the field hospitals of the Fifth Corps, where the ball was extracted and the sharp extremity of the upper fragment of the femur was sawn off. The fractured limb was then dressed, and the patient sent to City Point, and thence on a hospital steamer to Alexandria, where he was admitted to the Third Division Hospital on November 2d. The thigh was swollen to three times the size of its fellow. An incision six inches long on the outer side presented inflamed everted edges, between which fasciculi of muscles protruded. There was much febrile irritation, but the patient's strength was maintained to a remarkable degree. On November 11th, there was quite free hæmorrhage from a small artery, and the patient was etherized and the vessel secured, and afterward a thorough exploration of the wound was made. The very extensive longitudinal splintering was recognized; the bone was found denuded in several places; the soft tissues of the thigh were infiltrated with pus of a very offensive character. In view of this condition of things, it was determined to remove the limb at the hip joint. The patient was placed under the influence of chloroform, and the operation was performed by Surgeon Edwin Bentley, U. S. V. An external flap was made by cutting from without inward; then the head of the femur was disarticulated, and an internal flap was cut from within outward. The loss of blood was slight and the patient reacted promptly. The progress of the case for two or three days after the operation was very favorable. Then a chill occurred, followed by a cold clammy sweat. The wound looked badly and the discharge was unhealthy; the stump was kept covered with yeast poultices. Beef essence, stimulants, and anodynes were administered. Six days after the operation there was yellowness of the surface and of the conjunctival membranes; then delirium and coma, and death on November 19th, eight days from the date of the operation. At the autopsy, pus was found in the external iliac vein, metastatic foci in the lungs, and a gangrenous abscess in the enlarged spleen. The preparation of the femur was sent to the Army Medical Museum, and is figured in the adjacent wood-cut (FIG. 94).

FIG. 94.—Right fem. fissured by a musket ball. *Spec.* 1020.

CASE 299.—Private John Chamberlain, of one of the United States regiments engaged at the battle of Chickamauga, was wounded on September 20, 1863. A conoidal musket ball passed through the upper part of the thigh and produced great comminution of the upper extremity of the femur, the fissures extending to the neck of the bone. The wounded man was left upon the field when the United States forces were driven back and fell into the hands of the enemy. On September 21st he underwent amputation at the hip joint, the operation being performed by Surgeon R. P. Bateman, P. A. C. S. The man survived the operation thirty-six hours, and died September 23, 1863.[4]

CASE 300.—Private Levi Eckley, Co. A, 67th Ohio, was wounded May 20, 1864, in the assault upon the entrenchments near Bermuda Hundred. A conoidal musket ball passed through the left thigh, shattering the upper extremity of the femur and wounding the sciatic nerve. The patient was conveyed on a hospital transport to Fort Monroe, and was admitted to Chesapeake Hospital on May 22d. A consultation was held, at which it was decided that amputation at the hip joint presented the only chance of preserving life. The patient's condition was unfavorable; he was greatly prostrated. On May 24th the operation was performed by Assistant Surgeon H. C. Roberts, U. S. V., by forming antero-posterior flaps by transfixion. The femoral artery was compressed at the groin by Surgeon D. G. Rush, 101st Pennsylvania, and Acting Assistant Surgeons Bayles, Frick, and others aided in the operation. The hæmorrhage was excessive. Though the patient reacted fairly, and partook of nutritious food and stimulants, he died from exhaustion four days after the operation, May 24, 1864.[5]

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[1] Of the twenty-three intermediary coxo-femoral amputations, details of eighteen were published in *A Report on Amputations at the Hip Joint in Military Surgery*, War Department, S. G. O., July 1, 1867, pp. 32–39 and pp. 61–62, four were noted on pages 107–8, of *A Report on Excisions of the Head of the Femur for Gunshot Injury, Circular* No. 2, War Department, S. G. O., 1869, and one (CASE 308, p. 141, *ultra*, of *Martin*, a soldier of the 26th Confederate Arkansas regiment) was communicated personally by Dr. WILLIAM BLACKWELL WELCH, of Boonsboro', Arkansas, who served three and a half years in the Confederate service. Eleven of the operations were practised by Confederate surgeons,—seven upon their own men and four upon prisoners.—twelve of the operations were by Union surgeons, upon eleven Union and one of the Confederate wounded.

[2] EVE (P. F.), *A Contribution to the History of the Hip Joint Operations performed during the late Civil War*, in *Trans. Am. Med. Assoc.*, 1867, Vol. XVIII, p. 255. *Circular* No. 7, S. G. O., 1867, pp. 36, 62.

[3] See *Circ.* No. 6, S. G. O., 1865, p. 50, CASE 18, and *Circ.* 7, S. G. O., 1867, CASE XXXVI, pp. 38 and 62, and *Cat. of Surg. Sect.*, of 1866, p. 247.

[4] This case was communicated to Dr. P. F. EVE (*loc. cit.* p. 255) by Dr. R. P. BATEMAN, of Memphis, Tennessee. A request for further details of the case, from the Surgeon General's Office, of May, 1867, received no response.

[5] The data in this case are noted in *Circular* 6, S. G. O., 1865, p. 50, CASE XII, and in *Circular* 7, S. G. O., 1867, at pp. 37 and 62, with additional details from letters by Assistant Surgeon E. MCCLELLAN, U. S. A., and Acting Assistant Surgeon G. BAYLES.

CASE 301.—Private Sullivan Gaines, Co. M, 2d Michigan Cavalry, was wounded on January 31, 1864, near Knoxville, Tennessee, by a conoidal musket ball, which shattered the neck and head of the right femur. On the following day the patient was admitted to hospital No. 4, at Knoxville. He was greatly prostrated, and his constitutional condition was considered unfavorable. On February 3d, Surgeon Edward Shippen, U. S. V., amputated at the hip joint in the presence of Surgeon Henry S. Hewit, U. S. V., and others. The patient being placed under the influence of chloroform, a long double-edged knife was introduced about an inch above the trochanter major; the point was first directed inward and slightly upward so as to divide the capsule freely, and was then depressed and brought out near the tuberosity of the ischium; a large antero-internal flap was then formed, an assistant having passed his hands into the incision and compressed the femoral artery in the flap before it was cut. The flap was now raised, and the heel of the knife was placed at the inner angle of the wound, and a straight incision was made connecting this point with that at which the knife first entered, and dividing the tissues on the back of the thigh down the bone. Disarticulation was then effected. The patient never rallied from the shock of the operation. He died in about one hour.[1]

CASE 302.—*Frank G———*, a private in a Texan regiment, was wounded at the battle of Gettysburg, in the left thigh, by a grapeshot, which entered two inches below the trochanter major, shattered the bone up into the neck, and lacerated the soft parts terribly between the place of entrance and the knee. He remained on the battle-field from the 2d until the 4th day of July, with very little attention, until he was brought to the hospital of the Fifth Corps. After a consultation with a number of surgeons, and the conclusion being in favor of amputation at the hip, the patient was placed upon the table, and, when fully under the influence of chloroform, Surgeon B. Rohrer,[2] 10th Pennsylvania Reserves, performed the antero-posterior operation, assisted by Dr. Joseph A. Philips, and Henry Grimm, Surgeon 12th Pennsylvania Reserves. Surgeon Philips controlled the femoral artery, and not over three ounces of blood were lost. Death followed in thirty-six hours.

CASE 303.—Private Henry H. Hale, Co. G, 14th Illinois, aged 21 years, was wounded at the battle of Shiloh, April 6, 1862. A fragment of shell shattered the upper portion of his left femur so that fissures extended to the neck and far down the shaft. The soft parts on the outer aspect of the thigh were extensively lacerated and contused; the femoral vessels and nerves were uninjured. On April 9th he was placed on the hospital transport steamer Crescent City to be conveyed to St. Louis. On April 12th, Surgeon D. P. Smith, U. S. V., assisted by Surgeons Thomas W. Fry and H. P. Stearns, U. S. V., and Assistant Surgeon M. C. Tolman, 2d Minnesota, performed amputation at the hip joint. The patient being made insensible by chloroform, a long anterior flap was made by transfixion. Surgeon Stearns, following the knife with his fingers, compressed the vessels in the flap and completely controlled the hæmorrhage. The head of the femur was rapidly disarticulated and the soft parts posteriorly were divided by a straight incision. On April 14th the hospital transport steamer arrived at St. Louis, and the wounded were transferred to hospitals in that city. Shortly after Hale's admission to hospital his stump began to look badly, the vast wound suppurated profusely, gangrene supervened, and he sank and died on April 20, 1862.[3]

CASE 304.—Private C. Hamilton, Co. H, 3d U. S. C. T., while employed as a stretcher bearer, in carrying a wounded man from the field, during the assault on Port Hudson, Louisiana, June 14, 1863, was struck by a musket ball, which passed through the upper part of his left thigh. The missile entered behind, near the gluteal fold, and, having fractured the upper part of the femur badly, passed out in front in close proximity to the track of the femoral artery. He was taken to his regimental hospital. The limb was shortened and rotated inward, and great swelling and inflammatory mischief speedily supervened. It was ascertained that fragments of bone were detached and driven into the soft tissues, and there was excessive pain in the limb. It was resolved to make an exploratory incision and to remove the displaced splinters. Chloroform was administered for this purpose, and the patient was then removed to an operating table. While being moved from his bed to the table arterial hæmorrhage of an alarming character took place, and was so copious as to threaten a speedy dissolution. The bleeding was controlled by digital compression of the femoral at the crural arch, and a hasty consultation was held by Surgeon E. P. Gray, 3d U. S. C. T., Surgeon Pierce, U. S. C. T., and Assistant Surgeon George P. Percival, 3d U. S. C. T., and it was determined that amputation at the hip joint afforded the only chance of preserving the man's life. The operation was immediately performed by Surgeon Gray, assisted by his colleagues. He disarticulated the thigh by the antero-posterior flap method, the operation being quickly accomplished without much hæmorrhage. Although the patient was reduced by the irritation and pain caused by his wound, and prostrated by the sudden profuse hæmorrhage, his constitution was robust, and he bore the operation remarkably well. The wound being approximated by sutures and adhesive strips, he was put to bed and carefully nourished and watched. He expressed great gratitude for the operation, declaring that it had entirely relieved him of his excessive suffering. He rallied and appeared, for forty-eight hours after the operation, to be in a very hopeful condition. Then the vital powers seemed to flag. He sank gradually, and died from exhaustion, June 29, 1863, four days after the operation.[4]

CASE 305.—Private *Jackson*, of Colonel Tappan's Brigade, aged 21 years, was wounded at the battle of Belmont, Missouri, November 7, 1861, and was conveyed on a steamer to Memphis and admitted to the Marine Hospital. He had a badly comminuted fracture of the upper extremity of the femur. On November 15th, Dr. Richard Potts proceeded to amputate at the hip joint by antero-posterior flap method. The patient succumbed promptly to the shock of the operation; dying, indeed, before its completion, according to Dr. Mastin, or, according to Dr. Saunders, ten hours after its completion.[5]

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[1] HAMILTON (F. H.), *Treatise on Mil. Surgery*, 1865, p. 485. *Circular* No. 6, S. G. O., 1865, p. 50. *Circular* No. 7, S. G. O., 1867, pp. 37, 62.

[2] ROHRER (B.), *Original Communications*, in *Amer. Jour. Med. Sci.*, 1869, Vol. LVII, N. S., p. 285. *Circular* No. 2, S. G. O., 1869, p. 108.

[3] SMITH (D. P.), *Experiences in the Practice of Mil. Surg.*, in *Am. Med. Times*, 1862, Vol. IV, p. 332. *Circular* No. 6, S. G. O., 1865, p. 50. *Circular* No. 7, S. G. O., 1867, pp. 34, 61.

[4] The details of the coxo-femoral amputation by Surgeon E. P. GRAY, 3d U. S. C. T., were not received in season for publication in *Circular* 7, S. G. O., 1867, but were printed in *Circular* 2, S. G. O., 1869, p. 109. See also LÜNING (A.), *Über die Blutung bei der Exarticulation des Oberschenkels und deren Vermeidung*, Zurich, 1877, CASE 301, p. 93.

[5] The facts in this case were furnished by Dr. CLAUDE H. MASTIN and Dr. D. D. SAUNDERS, of Memphis. See Professor P. F. EVE'S *Contribution to the History of the Hip Joint Operation performed during the late Civil War*, in *Trans. Am. Med. Assoc.*, 1867, Vol. XVIII, pp. 255 and 264, and *Circular* 7, S. G. O., 1867, pp. 33 and 61, and LÜNING (A.), *Über die Blutung bei der Exarticulation des Oberschenkels*, Zürich, 1877, p. 89, CASE 272.

CASE 306.—Private P. Johnson, Co. C, 2d Delaware, was wounded at the battle of Fredericksburg, December 14, 1862, by a conoidal musket ball, which entered the upper part of the right thigh in front and passed out at the nates, having in its course divided the femoral artery and perforated the great trochanter. Except that the primary hæmorrhage was slight, little is known of the early history of the case. On December 25th the wounded man was conveyed to Washington and placed in the Douglas Hospital. On admission, nearly the entire injured limb was gangrenous, and it was believed that the fracture extended into the hip joint. Surgeon P. Pineo, U. S. V., decided to amputate at the hip joint, "with no hope of a favorable result, but to mitigate patient's distress in the last moments of life." On December 27th, anæsthesia being induced by ether, the operation was performed. The patient survived it only a few hours. The pathological specimen was sent to the Army Medical Museum. It presents an oblique shot perforation through the great trochanter, with radiating fissures which separate the trochanter and neck in four large fragments and run obliquely down the shaft. Traces of the results of periostitis are visible along the outer aspect of the shaft.[1]

FIG. 95.—Shot perforation of trochanter of right femur. *Spec.* 710.

CASE 307.—Private Charles Lackey, Co. E, 7th Wisconsin, aged 30 years, was struck, at Spottsylvania, May 12, 1864, by a conoidal musket ball, which entered in front at the upper part of the right thigh and produced a comminuted fracture of the femur through the trochanters, and extending downward nearly half the length of the shaft of the bone, and then lodged in the muscles at the posterior part of the thigh. After a fatiguing journey to Belle Plain, to which most of the wounded from Spottsylvania were unavoidably subjected, Lackey was conveyed on a hospital steamer to Washington, and was received at Judiciary Square Hospital on May 18th. The wounded limb was much swollen. The sharp extremity of the lower fragment of the femur had lacerated the muscles, and there was profuse suppuration with burrowing of pus throughout the thigh. The fracture was believed to extend into the joint. The patient earnestly demanded that an operation should be performed for his relief. His condition was unpromising, for he was suffering from surgical fever of an intense character. A consultation of surgeons decided, however, that, without operative interference, the case would prove inevitably and speedily fatal; and as the extensive fracture of the shaft of the femur and the purulent infiltration of the thigh precluded excision, amputation at the hip joint was determined on. On May 21st anæsthesia was induced by sulphuric ether, and Assistant Surgeon Alexander Ingram, U. S. A., performed the operation by the antero-posterior flap method. After the operation the patient reacted but partially. After removal to the ward he was plied with beef-tea and stimulants and restoratives; but he continued to sink, and died on the following day, May 22, 1864, twenty hours after the operation.[2]

The details of the next intermediary amputation at the hip (CASE 308) were personally communicated to the Surgeon General's Office by the operator, Dr. W. B. Welch, of Boonsboro', Arkansas, on June 10, 1875, and have not been heretofore published:[3]

CASE 308.—Private *Martin*, of the 26th (Brooks's) Arkansas Regiment, aged 25 years, was wounded at Prairie Grove, December 7, 1862, by a cannon shot, which shattered his left thigh so dreadfully as to leave the limb attached to the trunk only by the soft parts on the anterior aspect. His case had been regarded as hopeless, but after the surgeons had finished all the other operations he was observed to have rallied somewhat, though greatly exsanguined and prostrated. With the assistance of Drs. Duvall and Keller, Surgeon W. B. Welch, P. A. C. S., of Gunter's Arkansas Regiment, performed exarticulation, making a large anterior flap. The operation was performed twenty-four hours after the injury, and the patient survived four days, when he succumbed from exhaustion.

CASE 309.—Private Joseph Minott, Co. A, 4th Vermont, was wounded early on June 23, 1864. Minott had his right femur fractured in the upper portion of the shaft by a conoidal musket ball, and lay where he fell, beyond the reach of succor. On the morning of the third day, June 25th, having been without food or drink for forty-eight hours, he crawled into our lines, a distance of over half a mile. He was carried to the field hospital of the 2d division of the Sixth Corps, greatly exhausted. After he had received nourishment and cordials his injuries were examined, and it was found that, besides the extensive comminution of the femur, rapidly spreading gangrene had supervened. In front, mortification already extended to within a few inches of Poupart's ligament. A consultation of the surgeons of the division decided that coxo-femoral amputation offered the only chance of recovery, and that the operation could not be delayed. On the afternoon of June 25th, therefore, the patient was rendered insensible by chloroform, and the amputation was performed by Surgeon D. A. Goodwin. But little blood was lost, yet the patient soon began to sink, and expired on June 25, 1864.[4]

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[1] See *Circular* 6, S. G. O., 1865, p. 50, CASE 10; *Catalogue of the Surg. Sect. of the Army Medical Museum*, 4to, 1866, p. 248; *Circular* 7, S. G. O., 1867, pp. 35 and 62.

[2] The abstract of this case is compiled from register and Report of Surgical Operations of the Judiciary Square Hospital, Washington. The case is noted at p. 50 of *Circular* 6, S. G. O., 1865, as CASE 11. The age is correctly stated at "19" years, while in *Circular* No. 7, S. G. O, 1867, pp. 37, 62, by a clerical inadvertence the age is given at "30" years. See also LÜNING (A.), *Ueber die Blutung bei der Exarticulation des Oberschenkels*, Zürich, 1877, *Fall* 328, S. 97.

[3] After the publication of *Circular* 7, S. G. O. (*A Report on Amputations at the Hip Joint in Military Surgery*, Washington, 1867, 4to, p. 88), Dr. JAMES M. KELLER, of Kentucky, Vice President of the American Medical Association, in 1874, informed the compiler of that report that of several excisions or amputations at the hip that he had observed during his service in the Confederate Army, one was a coxo-femoral amputation practised by Dr. WELCH, after the battle of Prairie Grove, December 7, 1862; and that he had notes of this and of several other amputations and excisions at the hip, which "in the conflagration caused by the explosion in the ordnance depot, at Mobile, Alabama, just after the surrender (April 9, 1865), with notes on field and hospital Surgery, were destroyed." In the absence of any particulars, it was impossible to classify this case of amputation at the hip; but years subsequently, June 10, 1876, Dr. WILLIAM BLACKWELL WELCH called at the Army Medical Museum with Colonel THOMAS MONTICUE GUNTER, M. C. of the IVth Arkansas district, and formerly colonel of the 13th Arkansas regiment, and furnished the details of the case above cited.

[4] Surgeon S. J. ALLEN, 4th Vermont, and the operator, Surgeon DAVID M. GOODWIN, reported this case. See *Circular* No. 7, S. G. O., 1867, pp. 38, 62, and LÜNING (A.) (*op. cit.*, Zürich, 1877, p. 97, CASE 330).

CASE 310.—Private Peter Pausbeck, Co. K, 43d Illinois, was admitted on April 20, 1862, from the battle-field of Shiloh, to hospital No. 2, at Evansville. He had been wounded on April 7th, probably by a conoidal musket ball. The projectile had entered the front of the left thigh, about an inch below the level of the trochanter major, and ranging a little upward had emerged from the gluteal region opposite. The upper portion of the femur was crushed and the injury to the soft parts was most extensive. A consultation was held on April 21st, and the opinion that amputation at the hip afforded the only possible chance of preserving life was unanimous. Dr. DeBruler operated, assisted by Dr. T. N. Myers and others. The loss of blood was very trifling. After the completion of the operation, the pulse, which had been carefully watched, was observed to fail rapidly. Unavailing attempts were made to give brandy and other restoratives. In a few moments the man was dead. There was no reason to believe that the use of chloroform had any connection with the fatal result, which was apparently due solely to the shock of the operation. Such was the opinion of the eminent professor of surgery of Jefferson College, Dr. S. D. Gross, who happened to visit the hospital half an hour after the operation. Professor Gross expressed his approbation of the course that had been adopted, since, although it had resulted unfortunately, it afforded the only hope of saving the patient's life.[1]

FIG. 96.—Longitudinal fissuring of right femur. *Spec.* 4237.

CASE 311.—Private George M. Spencer, Co. B, 2d New York Mounted Rifles, aged 17 years, was wounded on March 31, 1865, at Dinwiddie Court House, Virginia, by a conoidal musket ball, which entered the right gluteal region, and striking the great trochanter, produced a fracture through the trochanters, with very remarkable longitudinal splintering, extending nine inches down the shaft (FIG. 96). The projectile then lodged. The wounded man was sent to City Point, and thence by steamer to Washington, and entered Judiciary Square Hospital on April 4th. There was already a good deal of inflammatory swelling and suppuration, but the constitutional condition was encouraging. Upon examination of the wound, it was thought that the fracture did not extend below the trochanter and that the joint was probably involved, and it was determined to excise the head of the femur. The patient having stated that he was anxious to avail of the benefit of any operation that was deemed necessary, he was placed under the influence of chloroform on April 12th, and Surgeon Elisha Griswold, U. S. V., proceeded to disarticulate the head of the femur through a long vertical incision on the outside of the thigh, and to remove the head with an obliquely fractured fragment of the shaft attached to it. The splintering of the shaft was now discovered, and after a hasty consultation with the surgical staff it was decided that amputation at the hip joint was the only procedure which afforded the patient any prospect of recovery. This operation was rapidly executed by Surgeon Griswold, aided by Acting Assistant Surgeons Hill, McCalla, Colton, and Ahern, by the double-flap method. There was but little hæmorrhage; but the shock of the operation was too great. The usual means to promote reaction were diligently employed, but the patient never rallied, and survived the operation less than an hour.[2]

CASE 312.—A private of Co. C, 54th Massachusetts, a colored man, was wounded and made a prisoner in the assault on Morris Island on July 11, 1863. A fragment of a shell from Fort Wagner struck the upper and outer part of his right thigh, and fractured the neck and head of the femur and the rim of the acetabulum, and extensively lacerated the soft parts in its exit through the posterior part of the thigh. The patient was conveyed to Charleston on the afternoon of July 12th, and was placed in a hospital hastily prepared for the reception of wounded colored prisoners. The contract surgeon in charge of the hospital reports that the patient's condition, in view of the terrible wound he had suffered, was remarkably good, and that the symptoms of shock were unusually slight. On July 13th, the third day after the reception of the injury, Surgeon R. A. Kinloch, P. A. C. S., saw the case, and amputated at the hip joint by Manec's method. The knife being entered midway between the anterior superior spinous process of the ilium and the great trochanter, and carried downward and inward until its point emerged just in front of the ischium, was made to form a large antero-internal flap; the soft parts on the outer and posterior part of the thigh were then divided by a semicircular incision from without inward, and the head of the femur was then disarticulated. The patient bore the operation well, but a few hours subsequently there was extreme depression, and the case terminated fatally on the following morning, July 14th, twenty hours after the operation.[3]

FIG. 97.—Comminuted shot fracture of femur. From a drawing furnished by Dr. BLACKMAN.

CASE 313.—A private soldier of an Ohio regiment, aged 35 years, was wounded at the battle of Shiloh, April 6, 1862, by a fragment of shell, which extensively comminuted the shaft, trochanters, and neck of the right femur, as illustrated in the accompanying wood-cut (FIG. 97). The patient was left on the battle-field during the tempestuous night of April 6th, and until late on the following day. He was then removed to a temporary hospital, and thence to the steamer Lancaster, to be transported to Cincinnati. On April 16th, it was decided to remove the limb, and the patient being rendered insensible by chloroform, amputation at the hip joint was performed by Surgeon G. C. Blackman, U. S. V., by the antero-posterior flap. On April 18th, the patient was transferred to St. John's Hospital, Cincinnati, and Dr. C. D. Palmer reported that the flaps began to slough. Death ensued on April 22, 1862.[4]

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[1] Dr. J. P. DEBRULER, of Evansville, Indiana, communicated the particulars of this case. See *Circular* No. 7, S. G. O., 1867, pp. 34 and 61, and LÜNING (A.), *Über die Blutung bei der Exarticulation des Oberschenkels*, Zürich, 1877, S. 91, F. 290.

[2] This case was first published in *Circular* No. 6, 1865, p. 50, CASE 21, from the Judiciary Square Hospital Surgical Report for the second quarter of 1865. See *Catalogue of the Surgical Section of the Army Medical Museum*, 4to, 1866, p. 248, and *Circular* No. 7, S. G. O., 1867, pp. 39 and 62, with reference to the report of a board of inquiry in the case, convened April 13, 1865, consisting of Surgeon O. A. JUDSON, U. S. V., Assistant Surgeon W. THOMSON, U. S. A., and Assistant Surgeon W. F. NORRIS, U. S. A. See also LÜNING (A.) (*loc. cit.*, Zürich, 1877, p. 102, CASE 366).

[3] The particulars of this case were communicated to the Surgeon General's Office by Professor R. A. KINLOCK, of Charleston. See EVE (P. F.) (*loc. cit.*, Vol. XVIII, p. 255, CASE 17, and *Circular* No. 7, S. G. O., 1867, pp. 36 and 62, and LÜNING (A.), *op. cit.*, Zürich, 1877, p. 94, CASE 307.

[4] BLACKMAN (G. C.), *Amputation at the Hip joint*, in *Cincinnati Jour. of Medicine*, 1866, Vol. I, p. 101. *Circular* No. 6, S. G. O., 1865, p. 50. *Circular* No. 7, S. G. O., 1867, pp. 34, 61. LÜNING (A.), *Über die Blutung bei der Exarticulation des Oberschenkels*, Zürich, 1877, p. 91, CASE 289.

CASE 314.—A private soldier of the U. S. Army was wounded at the first battle of Bull Run, July 21, 1861, by a musket ball, which fractured the lower third of right femur. He fell into the hands of the enemy, and, on the following day, was conveyed in an army wagon to Manassas Junction, and thence by rail to Richmond, where he was admitted to the Alms House Hospital. One week after the reception of the injury there was extensive purulent infiltration in the muscles of the thigh and incipient gangrene of the leg. Under these circumstances Drs. St. George Peachy and Charles Bell Gibson decided to amputate at the hip joint. On July 29th the operation was performed by Dr. Peachy, in the presence of Drs. Gibson, A. E. Peticolas, Richardson, and others. A preliminary ligature was placed upon the femoral artery at the beginning of the operation, which was probably done according to Larrey's method. The patient is believed to have survived the operation two or three days.[1]

CASE 315.—A private of General Bragg's army, whose name and military description are not recorded, a large man, six feet high, of fair complexion, about 26 years of age, was wounded on December 28, 1862, in a skirmish prior to the battle of Murfreesboro'. A conoidal musket ball produced a fracture of the trochanter major and neck of the femur, with fissures extending within the capsular ligament. The wounded man was placed in a field hospital, and his injured limb was supported in a proper position; but the local inflammation and constitutional disturbance that ensued were intense, and, on January 5, 1863, it was determined to amputate at the hip joint. The patient being placed under chloroform, the operation was performed by the antero-posterior flap method by Assistant Surgeon A. C. Crymes, 39th Alabama. On being removed to his bed the patient manifested extreme prostration, and stimulants were freely administered. After a few hours he was able to take nutriment in a concentrated form, and a supporting and stimulating treatment was perseveringly pursued. In a very few hours after the operation, however, the stump evinced a tendency to unhealthy action, and the patient sank into an adynamic condition, and died on the morning of January 8th, three days after the operation.[2]

CASE 316.—A private of Colonel Dockeray's Arkansas Regiment of Cabell's Brigade was wounded at the battle of Corinth, Mississippi, October 3, 1862, by a conoidal musket ball, which shattered the neck of the right femur. He was conveyed to a hospital at Iuka, where, on November 3d, his thigh was amputated at the hip joint by his regimental surgeon, Dr. R. A. Felton. The patient died upon the table before the dressing of the stump was completed. The operation was done under chloroform, and it was the general impression of the surgeons present that the anæsthetic was administered too freely.[3]

CASE 317.—Besides the instance of primary coxo-femoral amputation for shot injury by Dr. B. D. Lay, P. A. C. S., detailed as CASE 284, p. 135, *ante*, were two intermediary amputations at the hip joint for comminution of the upper portion of the femur by conoidal musket balls, performed by the same surgeon. One of them, here to be noted, was that of a Confederate private soldier, who suffered a shot fracture of the femur, in Mississippi, early in 1863, prior to the siege of Vicksburg. Comminution of the femur extended high up through the trochanteric region, and amputation at the hip was practised two days after the injury. The patient sank under the shock of the injury and operation a few hours after the latter,[3] although the operation was completed rapidly and with slight loss of blood. Dr. Lay observed that "nothing in this case served to diminish the terror with which I approach such cases."[4]

CASE 318.—A private Confederate soldier, whose name and military description are not identified, received a shot comminution of the femur in one of the engagements in Mississippi, in the early part of 1863, prior to the siege of Vicksburg. A day or two after the injury, amputation at the hip was performed by Dr. B. D. Lay, P. A. C. S. Although the amputation was rapidly accomplished, with little loss of blood, the patient sank and died a few hours after the operation. The detailed memoranda of this and the preceding case were unfortunately lost.[5]

CASE 319.—Private *J. H. Wolf*, Co. D, 4th Virginia, had his femur fractured at the battle of Bull Run, July 21, 1861, by a musket ball, which traversed the upper part of the thigh in an antero-posterior direction, and striking the femur four inches below the trochanters, shattered it quite up to the neck. The patient was removed to Charlottesville, and was received in the general hospital at that place on July 24th. The fracture was treated by Smith's anterior suspensory splint, and this mode of dressing proved very serviceable for a time. The inflammatory phenomena did not abate, however, and after four weeks it was decided that removal of the limb at the coxo-femoral articulation alone afforded a hope of preserving the patient's life. On August 21st the operation was performed by Brigadier General Edward Warren, Surgeon General of North Carolina, and was rapidly executed by the double flap method, with inconsiderable hæmorrhage. On the following day there was slight hæmorrhage. Death from exhaustion ensued on August 23, 1861, thirty hours after the operation. The constitutional condition of the patient was unfavorable, and he was suffering from colliquative diarrhœa.[6]

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[1] The particulars of this case were supplied by Professor T. G. RICHARDSON, of New Orleans, who was present at the operation. See also *Circular* No. 7, S. G. O., 1867, CASE XX, pp. 33, 61, and LÜNING (A.), *Über die Blutung*, u. s. w., Zürich, 1877, p. 89, CASE 270.

[2] Details of this case were communicated to the Surgeon General's Office by the operator, Assistant Surgeon A. C. CRYMES, 39th Alabama, and by Professor R. A. KINLOCH, of Charleston, South Carolina. The case has been published in Professor P. F. EVE'S contribution (*op. cit.*, *Trans. Am. Med. Assoc.*, 1867, Vol. XVIII, p. 255, CASE 20). See also *Circ.* 7, S. G. O., 1867, pp. 35, 62, and LÜNING (A.), *loc. cit.*, Zürich, 1877, p. 92, CASE 293).

[3] This case was first published by Professor P. F. EVE (*Transact. Am. Med. Assoc.*, 1867, Vol. XVIII, pp. 253, 261). Further particulars of the case were communicated by Surgeon JAMES D. WALLACE, 1st Missouri. The operator, Surgeon R. A. FELTON, died in 1863. See *Circular* No. 7, S. G. O., 1867, pp. 35, 62. See also Dr. AUGUST LÜNING (*op. cit.*, Zürich, 1877, S. 92, CASE 291).

[4] Dr. B. D. LAY, of Paducah, Kentucky, in a letter of July 26, 1867, to the Surgeon General's Office, refers to this case, and Dr. L. D. NIDELET, of Mobile, Alabama, in letters of April 21 and May 4, 1867, mentions having assisted at the operation.

[5] In a letter to the Surgeon General's Office, dated Paducah, Kentucky, July 25, 1867, Dr. B. D. LAY regrets his inability to furnish more details respecting this and the preceding case of intermediary amputation at the hip joint, and states that he had kept copious notes of all of his cases of amputations practised during the war, and that these notes, with records and instruments of the Vicksburg hospitals and its branches, were given in charge to Surgeon J. H. BOUCHER, of Major-General J. B. MCPHERSON'S corps; and, if the registers were preserved, they would give the desired information. It was ascertained that Dr. J. H. BOUCHER, formerly Surgeon 13th Iowa, afterwards Surgeon U. S. V., and Medical Director of the Seventeenth Corps, resided in Iowa City after the war, and died in April, 1874. His son, Dr. F. H. BOUCHER, of Clarksville, Iowa, July 15, 1878, made a careful examination in his father's library for papers and notes pertaining to the surgery of the war without finding any trace of the memoranda referred to by Dr. B. D. LAY.

[6] EVE (P. F.), *loc. cit.*, p. 254. *Circular* No. 7, S. G. O., 1867, pp. 33, 61. FAUNTLEROY (A. M.), *Hip Joint Amputations*, in *Richmond Med. Jour.*, 1866, Vol. I, p. 11. LÜNING (A.), *Über die Blutung bei der Exarticulation des Oberschenkels*, Zürich, 1877, p. 89, CASE 271.

Of the twenty-three intermediary amputations at the hip joint, ten were on the right side, six on the left; in seven cases the side of injury was not stated. The Museum possesses pathological specimens from three of the twenty-three cases.

TABLE XVI.

Summary of Twenty-three Cases of Intermediary Amputation at the Hip Joint.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Operation.	Operation and Operator.	Result and Remarks.
1	Carden, J., Pt., Gen. Rosencrans's army.	Sept. 20, 1863.	Fragment of shell comminuted femur, ex. lac. of soft parts.	Sept. 21, 1863.	Amputation, by Surg. R. P. Bateman, P. A. C. S.	Died September 27, 1863.
2	Carroll, L., Sergeant, H, 1st Delaware, age 23.	Oct. 22, 1864.	Conoidal ball, r't femur splintered, extending ten ins.; ball ext.; sharp upper extremity of femur sawn off; Nov. 2, hæm., lig. small artery.	Nov. 11, 1864.	External flap made by cutting from without inward, internal flap by cutting from within outward, by Surg. E. Bentley, U. S. V.	Progress favorable for three days; Nov. 17th, pyæmio symptoms. Died Nov. 19, 1864, pyæmia. Autopsy. *Spec.* 1020. *Circ.* 6, S. G. O., 1865, p. 50. *Circ.* 7, S. G. O., 1867, pp. 38, 62.
3	Chamberlain, J., Pt., U. S. Army.	Sept. 20, 1863.	Conoidal ball, great com. upper extremity of femur, fissures extending to neck.	Sept. 21, 1863.	Amputation, by Surg. R. P. Bateman, P. A. C. S.	Died thirty-six hours after oper'n. EVE (P. F.), *loc. cit.*, p. 255. *Circ.* 7, S. G. O., 1867, pp. 36, 62.
4	Eckley, L., Pt., A, 67th Ohio, age 33.	May 20, 1864.	Conoidal ball shattering upper extremity of left femur and wounded sciatic nerve.	May 24, 1864.	Antero-posterior flap, by Ass't Surg. H. C. Roberts, U. S. V., and others.	Reacted fairly. Died, May 28, 1864, from exhaustion. *Circ.* 6, S. G. O., 1865, p. 50. *Circ.* 7, S. G. O., 1867, pp. 37, 62.
5	Gaines, S., Pt., M, 2d Michigan Cavalry.	Jan. 31, 1864.	Conoidal ball shattered head and neck of right femur.	Feb. 3, 1864.	Large antero-internal flap, by Surg. E. Shippen, U. S. V.	Never rallied. Died one hour after operation, from shock.
6	*G*——, F., Pt., Texas regiment.	July 2, 1863.	Grapeshot shatt'ring left femur at trochanter major up into the neck.	July 4, 1863.	Antero-posterior flap, by Surg. B. Rohrer, 10th Penn. Res., and others.	Died thirty-six hours after operation.
7	Hale, H. H., Pt., G, 14th Illinois, age 21.	April 6, 1862.	Frag. of shell shattered upper portion of the left femur, soft parts ex. lacerated.	April 12, 1862.	Long anterior flap, by Surg. D. P. Smith, U. S. V., and others.	Reaction fair; April 14th, gangrene. Died April 20, 1862.
8	Hamilton, C., Pt., H, 3d Colored Troops.	June 14, 1863.	Musket ball fract. upper part of left femur—great swelling, inflammation, and pain—copious hæm., digital pressure.	June 25, 1863.	Antero-posterior flap, by Surg. E. P. Gray, 3d Col'd Troops, and others.	Sank gradually, and died, June 29, 1863, from exhaustion. *Circ.* 2, S. G. O., 1869, p. 109.
9	*Jackson*, —, Pt., Col. Tappan's brigade, age 21.	Nov. 7, 1861.	Shot comminuted fracture of upper extremity of femur.	Nov. 15, 1861.	Antero-posterior flap, by Surg. R. Potts, P. A. C. S.	Succumbed to shock of operation. EVE (P. F.), *loc. cit.*, pp. 255, 264. *Circ.* 7, S. G. O., 1867, pp. 33, 61.
10	Johnson, P., Pt., C, 2d Delaware.	Dec. 14, 1862.	Conoidal ball perforating right great trochanter; gangrene eatire limb.	Dec. 27, 1862.	Amputation, by Surgeon P. Pineo, U. S. V.	Died a few hours after operation. *Spec.* 710. *Circ.* 6, S. G. O., 1865, p. 50. *Circ.* 7, S. G. O., 1867, pp. 35, 62.
11	Lackey, C., Pt., E, 7th Wisconsin, age 30.	May 12, 1864.	Conoidal ball frac. right femur, thro' trochanters, nearly half length of shaft; surgical fev.	May 21, 1864.	Antero-posterior flap, by Ass't Surg. A. Ingram, U. S. A.	But partial reacti'n. Died twenty-four hours after operation. *Circ.* 6, S. G. O., 1865, p. 50. *Circ.* 7, S. G. O., 1867, pp. 37, 62.
12	*Martin*, —, Pt., 26th Arkansas, age 25.	Dec. 7, 1862.	Cannon shot shattering the left thigh.	Dec. 8, 1862.	Large anterior flap, by Surg. W. B. Welch, of Col. Gunther's Arkansas regiment.	Rallied somewhat. Died, Dec. 12, 1862, from exhaustion.
13	Minott, J., Pt., A, 4th Vermont, age 20.	June 23, 1864.	Conoidal ball fract. upper portion shaft right femur; gangrene, mortification.	June 25, 1864.	Short anterior, long posterior flap, by Surg. D.M. Goodwin, 3d Vermont.	Rallied, but soon began to fail; died two hours after operation. *Circ.* 7, S. G. O., 1867, pp. 38, 62.
14	Pausbeck, P., Pt., K, 43d Illinois.	April 7, 1862.	Conoidal ball crushing upper portion left femur, extensive injury of soft parts.	April 21, 1862.	External and internal flap, after Lisfranc's method, by A. A. Surg. J. P. Do Bruler.	Died, a few moments after operation, from shock. *Circ.* 7, S. G. O., 1867, pp. 34, 61.
15	Spencer, G. M., Pt., B, 2d New York Mounted Rifles, age 17.	Mar. 31, 1865.	Conoidal ball fract. thro' right trochan's, splintering extending nine ins.; lodged.	April 12, 1865.	Incision for excision, double flap amp., by Surg. E. Griswold, U. S. V., and others.	Died in less than an hour. *Spec.* 4237. *Circ.* 6, S. G. O., 1865, p. 50. *Circ.* 7, S. G. O., 1867, pp. 39, 62.
16	Unknown, Pt., C, 54th Massachusetts.	July 11, 1863.	Fragment of shell fract. neck and head of right femur and rim of acetabulum.	July 13, 1863.	Manec's method, large antero-internal flap, by Surg. R. A. Kinloch, P. A. C. S.	Died twenty-four hours after operation. EVE (P. F.), *loc. cit.*, p. 255. *Circ.* 7, S. G. O., 1867, pp. 36, 62.
17	Unknown, Pt., Ohio regiment, age 35.	April 6, 1862.	Frag. of shell comminuted shaft, trochanters, and neck of right femur.	April 16, 1862.	Antero-posterior flap, by Surg. G. C. Blackman, U. S. V.	Rallied satisfactorily; April 18th, flaps sloughed badly; pyæmic symptoms. Died April 22, 1862.
18	Unknown, Pt., U. S. Army.	July 21, 1861.	Musket ball fract. lower third right femur; ex. pur. infiltration; incipient gang. of leg.	July 29, 1861.	Probably by Larrey's method, by Surg. St. G. Peachy, P. A. C. S.	Survived oper'n two or three days. EVE (P. F.), *loc. cit.*, p. 253. *Circ.* 7, S. G. O., 1867, pp. 33, 61.
19	*Unknown*, Pt., Gen. Bragg's army, age 26.	Dec. 28, 1862.	Conoidal ball fract. troch. maj. and neck of femur, fissures extending into capsular lig.	Jan. 5, 1863.	Antero-posterior flap, by Ass't Surgeon A. C. Crymes, 39th Alabama.	In a few hours stump evinced a tendency to unhealthy action, and patient sank into adynamic condition; died Jan. 8, 1863. EVE (P.F.), *loc. cit.*, p. 255. *Circ.* 7, S. G. O., 1867, pp. 35, 62.
20	*Unknown*, Pt., Col. Dockeray's Arkansas regiment.	Oct. 3, 1862.	Conoidal ball shattering neck of right femur.	Nov. 3, 1862.	Amputation, by Surg. R. A. Felton, of Col. Dockeray's regiment.	Died before dressing of stump was completed. EVE (P. F.), *loc. cit.*, pp. 253, 261. *Circ.* 7, S. G. O., 1867, pp. 35, 62.
21	*Unknown*, Confederate soldier.	1863.	Shot fracture of the femur....	1863.	Amputation, by Surg. B. D. Lay, P. A. C. S.	Died. *Circ.* 2, S. G. O., 1869, p. 108. LÜNING (A.), *Exart. des Oberschenk.*, Zürich, 1877, S. 99, CASE 340.
22	*Unknown*, Confederate soldier.	1863.	Shot fracture of the femur....	1863.	Amputation, by Surg. B. D. Lay, P. A. C. S.	Died. *Circ.* 2, S. G. O., 1869, p. 108. LÜNING, *op. cit.*, S. 99, CASE 341.
23	*Wolf, J. H.*, Pt., D, 4th Virginia.	July 21, 1861.	Musket ball shatt'g femur from four ins. below troch's quite up to neck; colliquative diarr.	Aug. 21, 1861.	Double flap, by Surg. E. Warren, C. S. A.	Died Aug. 23, 1861, from exhaustion.

Secondary Amputations.—Of nine instances of secondary amputations at the hip joint, eight were practised on Union soldiers and one on a Confederate soldier, resulting in two recoveries and seven deaths, a mortality rate of 77.7 per cent. The shortest interval between the reception of the injury and the operation was forty-three days; the longest, two years nine months and twenty-one days. Six of the operations were performed on the right side and three on the left. Of the two survivors of secondary amputation at the hip, one is a pensioner in comfortable health at a period nearly fifteen years after the operation.

CASE 320.—Private George W. Lemon, Co. C, 6th Maryland, aged 30 years, had his left femur fractured, at the junction of the middle and upper thirds, by a conoidal musket ball, at the battle of the Wilderness, May 5, 1864. He was left in a shelter tent on the field and fell into the hands of the enemy. On May 13th he was recaptured, and was sent to Fredericksburg, and thence to Alexandria, where he was received at the Third Division Hospital on June 14th. When admitted he had diarrhœa and was greatly emaciated. There was a bed-sore, four inches in diameter, over the sacrum, and smaller sores over the prominences on the spine and scapulæ. The lower end of the upper fragment of the femur protruded from the wound, from which there was a profuse offensive ash-colored discharge. To check the diarrhœa, to administer suitable nourishment, and to take pressure from the bed-sores by supporting the body on air cushions, were the first matters attended to. Then moderate extension was applied to the injured limb, and a tolerably good position was maintained by means of pillows and cushions. In three weeks the bed-sores were healed, and there was a slight improvement in the general constitutional condition. Extension of the limb causing pain, it was discontinued. For the next ten or twelve months the patient clung to life by the slenderest thread. Detached fragments of bone frequently gave rise to inflammatory swelling, abscesses in the thigh, and profuse suppuration. Yet the appetite and digestion continued to be good, and the great drain upon the system was supported unusually well. In May, 1865, it was found that the fracture was quite firmly consolidated. The patient now occasionally sat up in a chair, but every attempt of the sort was followed by acute inflammation of the thigh, with increased suppuration. It was now decided that the patient must ultimately sink under the profuse suppuration, and that an operation should be performed as soon as it was opportune, and that every effort should be made to put the patient in a condition to support this shock. On October 12, 1865, Surgeon Edwin Bentley, U. S. V., proceeded to amputate at the hip joint. Chloroform was administered; the external iliac artery was compressed at the pubis; anterior and posterior semilunar flaps were formed by transfixion, and the femur was disarticulated. The hæmorrhage was inconsiderable, and the patient reacted soon and satisfactorily. From the day of the operation he steadily improved, with scarcely an untoward symptom. On November 15th, Dr. Bentley reported that the ligatures had all come away, and that the wound was granulating kindly. In December the stump was healed, and the patient began to get about on crutches. The fracture of the exarticulated femur was found to be imperfectly but quite firmly united, with great antero-posterior angular deformity and shortening. The bone was sent to the Army Medical Museum, where it is preserved as *Specimen* 4386. A posterior view of it is given by the annexed left hand wood-cut (FIG. 98). On January 31, 1866, a photograph of the man was taken, from which the right hand wood-cut (FIG. 99) is copied. Lemon was then transferred to the Harewood Hospital, at Washington. He was then quite well, and able to go where he chose on crutches. The cicatrix was firm and healthy. On February 3, 1866, he was discharged from the hospital, and from the service of the United States, at his own request. He went to his home at Bird Hill, Carroll county, Maryland, and resumed his trade of shoemaking. He was granted a pension of fifteen dollars a month. On April 23, 1867, a letter was received from him in which he stated that his health was excellent; that he weighed ninety-nine and a half pounds, an increase of twelve and a half pounds from the date at which he left the hospital; and that he had been able to walk to the village of Westminster, a distance of seven miles, without fatigue. In a letter dated Westminster, Maryland, July 31, 1870, he states "that the artificial limb is not now or ever has been of the least service to me. * * I have tried to wear it; but it only serves to irritate the stump, and makes it so raw and sore that I cannot bear it to touch anything for days afterwards." The pensioner was paid June 4, 1878.[1]

FIG. 98.—Consolidated gunshot fracture of the left femur. *Spec.* 4386.

FIG. 99.—Appearance of cicatrix after secondary coxo-femoral amputation. [From a photograph.]

[1] This secondary amputation at the hip is noted on page 52 of *Circular* No. 6, S. G. O., 1865, in a foot-note. In the *Catalogue of the Surgical Section of the Army Medical Museum*, of 1866, p. 248, there is a brief memorandum of the facts of the case, with a wood-cut of the fractured femur, contributed to the Museum by the operator, Surgeon EDWIN BENTLEY, U. S. V. A detailed account of the case, compiled from the reports of the Third Division Hospital, Alexandria, and Harewood Hospital, Washington, is printed in *Circular* No. 7, S. G. O., 1867, p. 42.

The subject of the second successful secondary amputation at the hip was in good health four and a half years subsequent to the operation, but has not replied to letters of inquiry of a later date.

CASE 321.—Private *Woodford W. Longmoor*, a rebel soldier, aged 25 years, a robust, healthy man, was wounded at a skirmish at Cynthiana, Kentucky, on June 11, 1864. A ball from a Belgian rifle, at short range, passed through his right thigh, shattering the shaft of the femur. There was profuse hæmorrhage and the shock was alarming. He remained almost insensible for three or four days, and for a fortnight there was extreme prostration. He was placed in a rebel field hospital, and the injured limb was put in a fracture box, with which was connected a crutch piece extending to the axilla. On the evening of the reception of the wound numerous detached bony splinters, a handful almost, were extracted. For six weeks extension and counter-extension were maintained, but so much suffering arose from this treatment that it was discontinued, and the limb was simply supported in a comfortable position. The patient was confined to his bed for eight and a half months. In the middle of March, 1865, he was removed to Florence, Kentucky, seven miles from Cincinnati, and Dr. George C. Blackman, professor of surgery in the Medical College of Ohio, was consulted in the case. There was a profuse discharge of offensive pus, and the patient's strength seemed to be failing under the protracted irritation and spoliation. There had been frequent recurrences of abscesses in the thigh, attended with excessive pain and swelling, and followed by the elimination of fragments of necrosed bone. Ever since the reception of his injury the patient had taken morphia very freely. Evidently there were still loose sequestra and diseased bone with which sinuses communicated, and Dr. Blackman proposed to remove these sources of irritation. On April 23d the patient consented to an operation, and a number of necrosed fragments were extracted, with much relief to the local irritation and benefit to the general health. During the autumn, however, evidences of extensive destructive inflammation of the shaft of the femur became unmistakable, and in December a second operation for the removal of fragments was performed without advantage. The discharge became more offensive and sanious, and the strength of the patient rapidly gave way. In January, 1866, his condition became almost hopeless, and the removal of the diseased limb was determined on. The operation was performed on January 18th. Ether was administered, and the lower extremities were kept elevated for a few minutes before the incisions were made. Then the right femoral was compressed at the groin, and the disarticulation was rapidly effected by Lacauchie's method.[1] A circular cut through the skin was made at the junction of the upper third of the thigh; then the integuments were retracted and the muscles were divided circularly down to the bone. A vertical incision was now made on the outer side of the limb, commencing a little above the trochanter and joining the first incision. The head of the bone was then exarticulated. There was but little hæmorrhage, and the patient rallied from the operation remarkably well. The following day he suffered greatly from nausea, which he ascribed to the use of the ether. This distressing complication soon subsided, however, and thenceforward there was no unpleasant symptom, and the patient progressed rapidly toward recovery (FIG. 100). In February, 1867, Longmoor reported himself to Dr. Blackman as in excellent health, and as having recently married. In the latter part of June, 1867, seventeen months after the operation, Dr. Blackman again saw him, and found that his general health was good, and that his stump was sound, though subject to occasional attacks of neuralgia of extreme severity. He was accustomed, in these attacks, to alleviate his suffering by taking large doses of morphia. An examination of the limb after its removal showed that the entire shaft of the femur had been affected by osteomyelitis. The specimen, with its delicately encased sequestra and fragile deposits of new bone, was destroyed by an unskilful preparer. On July 21, 1870, a letter of inquiry was addressed by the reporter to Mr. Longmoor, then at Cynthiana, Kentucky, which elicited the following response: "In answer to your inquiry, 'have you suffered much from neuralgic pains,' I answer there existed, for a long time, contractions of the muscles, in the centre of the stump, attended with considerable pain and tenderness; the interval between those contractions of the muscles and the pain is much lengthened. I now suffer comparatively little, and my general health is much improved."[2]

FIG. 100.—Cicatrix five months after secondary amputation at the hip. [From a drawing by Prof. BLACKMAN.]

In the seven fatal cases of secondary amputations at the hip joint the injuries were inflicted by small projectiles. One patient survived the operation nearly four months; one, twenty-three days; one, eleven days; one, three days; and three, one day or less.

[1] M. A. E. LACAUCHIE, chirurgien principal, and chief medical officer of the French army of occupation in Rome, gives a description, with illustrations, of his procedure for amputating at the hip joint, in the *Gazette Médicale de Paris*, Nos. 19, 20, 25, and 26, 1850.

[2] The particulars of this case of secondary amputation at the hip joint were contributed to the Surgeon General's Office by the operator, Professor GEORGE C. BLACKMAN, of the Medical College of Ohio, in a letter dated February 26, 1867. The operation had been briefly noted in the *Cincinnati Jour. of Med.*, 1866, Vol. I, p. 101, and was more fully detailed in the *Report on Amputations at the Hip Joint*, *Circular* No. 7, S. G. O., 1867, p. 43, with a chromolithographic sketch of the patient five months after recovery, from a drawing transmitted by Dr. BLACKMAN.

CASE 322.—Private Daniel H. Bowman, Co. C, 110th Pennsylvania, aged 24 years, was wounded on July 27, 1864, at Deep Bottom, on the left bank of James River. A conoidal musket ball entered at the upper posterior part of the right thigh, comminuted the femur from the trochanters downward for several inches and lodged. The wounded man was transported to Washington on a hospital steamer, and was received at Lincoln Hospital on July 30th. The injured limb was shortened two and a half inches; the soft parts were badly lacerated. On August 7th the position of the ball at the anterior part of the thigh was detected. An incision was made and the ball and several detached fragments of bone were removed. On August 17th the wound looked badly, and there was slight sloughing. For the next few weeks the patient lost ground steadily. There was profuse suppuration, with great constitutional irritation. There appeared to be no attempt at union at the seat of the fracture. The patient had become much emaciated, and his powers of resistance were failing daily. After due consultation it was determined to amputate at the hip joint. On September 15th the operation was performed by Assistant Surgeon J. C. McKee, U. S. A. The patient was rendered insensible by sulphuric ether. The method by antero-posterior flaps formed by transfixion was adopted. The amputation was rapidly completed and very little blood was lost. The patient did not rally, but died one hour after the operation, September 15, 1864. At the autopsy, the lungs were found to be attached to the thoracic walls by firm fibrinous adhesions. In the upper lobe of the right lung there were two small isolated abscesses. Otherwise the lungs were normal. The right weighed 13 and the left 11 ounces. The abdominal viscera were normal, save that the liver and kidneys were unusually small, the former weighing 44½ and the latter 9½ ounces. At the seat of the fracture of the femur (FIG. 101) there was no attempt at repair; the fragments were carious: a large one, consisting of nearly half of the cylinder of the shaft, was four inches long and was quite detached. Fissures penetrated the trochanters and extended posteriorly half-way up the neck of the bone.

FIG. 101.—Gunshot fracture of the femur. *Spec.* 2288.

CASE 323.—Sergeant Hiram H. Davis, Co. B, 156th New York, aged 26 years, was wounded at the battle of Opequan, Virginia, on September 19, 1864, by a conoidal musket ball, which passed through the fleshy part of the left thigh, and, entering the other thigh, fractured the upper third of the right femur. He was sent by his regimental surgeon, Dr. G. C. Smith, to the Sheridan Field Hospital, near Winchester, where the fracture was adjusted upon a double inclined plane. Thence he was transferred, on March 6, 1865, to the General Hospital at Frederick, Maryland, which reports the flesh wound in the left thigh healed, great deformity and shortening of the fractured limb, and copious suppuration from fistulous sinuses communicating with necrosed bone. On April 25th he was transferred, in a somewhat improved condition, to the Cuyler General Hospital at Germantown, Pennsylvania, where no special alteration in his symptoms or treatment is noted. On May 10th he was moved from Cuyler to Mower Hospital, and thence, on October 18th, to the Post Hospital at Philadelphia. The register of the Post Hospital states that the fracture of the femur was consolidated at the date of his admission, and that he was discharged from service on November 8, 1865. In the spring of 1866 Davis was received at the Episcopal (civil) Hospital in Philadelphia. The appearance of the injured limb at the date of his admission is indicated in the accompanying wood-cut (FIG. 103). The right lower extremity was shortened six and a half inches; there was false anchylosis of the knee and ankle joints on this side; extensive cicatrices on the thigh indicated the location of former sloughing; there were five fistulous canals communicating with diseased bone; apparently the entire upper portion of the femur was necrosed. On May 5, 1866, Dr. William S. Forbes, surgeon to the hospital, amputated the limb at the hip joint. Ether was employed as an anæsthetic, but it did not act satisfactorily. The vessels were controlled by the abdominal aortic compressor. An anterior flap was made by cutting from without inward, the integument being dissected up to form the longer portion of the flap. Then the femoral artery was tied; and then the bone was disarticulated and the posterior flap was completed. The hæmorrhage was estimated at less than eight ounces. The patient rallied bravely from the shock of the operation. Forty-eight hours after the operation the pulse fell, and for about five hours there was great depression. This was followed by a febrile reaction, accompanied by an erysipelatous blush, which, commencing at the outer angle of the wound, gradually involved its entire extent. After this the patient sank rapidly, and expired sixty-four hours after the operation, May 8, 1866. On examining the injured femur (FIG. 102) it was found to be imperfectly united by fragile masses of callus, which enclosed large fragments of dead or diseased bone.[1]

FIG. 102.—Partial union of gunshot fracture of the femur. [From a photograph by RHOADS.]

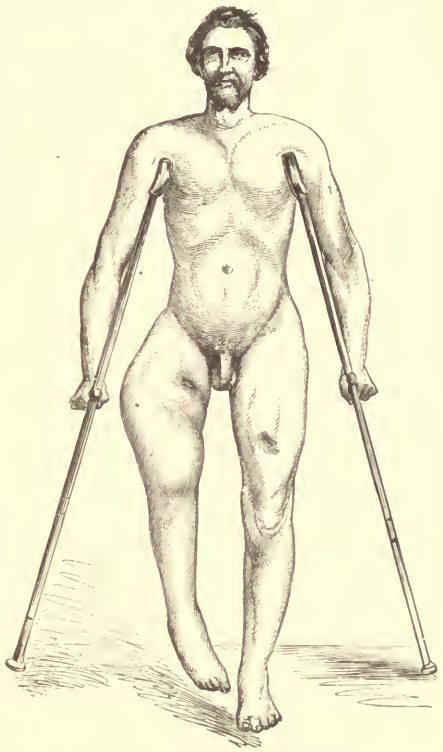

FIG. 103.—Gunshot fracture of the right femur with great shortening and deformity. [From a photograph by NEWELL.]

[1] MORTON (T. G.), *On Amp. Hip Joint, with the Hist. of the Cases*, in *Am. Jour. Med. Sci.*, 1866, Vol. LII, p. 36; *Circ.* No. 7, S. G. O., 1867, pp. 46, 64.

CASE 324.—Corporal Frederick Kelb, Co. G, 7th New York, was wounded at Fredericksburg, Virginia, December 14, 1862, by a conoidal musket ball, which fractured the right femur at the junction of the upper and middle thirds. After remaining for a fortnight in the field hospital of the 1st division of the Second Corps he was conveyed to Washington and placed, on December 25th, in the Patent Office Hospital, where the injured limb was placed in a fracture box and the wound was dressed with oakum. The case progressed favorably, and, on April 2, 1863, the patient was transferred to Judiciary Square Hospital, and, on May 9th, was sent to De Camp Hospital, at David's Island, New York. Acting Assistant Surgeon John C. DuBois reported: "The ball entered about one inch below the fold of the right natis, and, passing outward, shattered the femur at its middle, and lodged in the anterior part of the thigh. The ball was extracted two days afterwards. On January 1, 1863, six pieces of bone were removed. The limb was placed on a double inclined plane and cold water applied. Six weeks after, the long straight external and short internal splints of pasteboard were applied. This was removed in a few weeks and merely the short internal pasteboard splint retained. On April 2d and 8th, pieces of bone came away. The splint was then removed, and the limb suffered to lie on a hair mattress. May 6th, several pieces of bone removed. May 12th, firm union has taken place, with great deformity. External angular curvature, with about 4¾ inches shortening, as near as can be measured. His whole limb is everted, and he is unable to raise it. His general condition is much reduced. As union is firm no treatment can be adopted to relieve the deformity. July 10th, a few more pieces of bone have been removed. The probe reveals rough bone, not loose. Internal wound closed; sinus injected with dilute tincture of iodine. General health pretty good." On July 10th he was removed to McDougall Hospital, at Fort Schuyler; and on January 19, 1864, he was readmitted to De Camp Hospital. On June 8, 1864, he was discharged from the service of the United States. There was evidence of disease of the femur. On June 7, 1865, Kelb was admitted to St. Luke's Hospital, in New York City. There had been a series of recurring abscesses in the thigh, and it was believed that nearly the entire femur was necrosed. It was determined to amputate at the hip joint, and, on June 7th, the patient being anæsthetized by sulphuric ether and the aorta being compressed by Signoroni's clamp tourniquet, the amputation was performed by the attending surgeon, Dr. R. F. Weir, by the method recommended by Dr. Van Buren, an anterior flap being formed by transfixion and a posterior one by section from without inward. The hæmorrhage was slight and the shock was moderate. The case at first progressed very favorably. Three weeks after the operation the healing of the stump was far advanced and the patient was able to leave his bed. After this he began to lose ground very gradually. He died on October 4, 1865, nearly four months after the operation. At the autopsy, the pelvis of the right kidney was found to be blocked up with numerous calculi; there was an abscess in the left kidney, and there was tuberculosis of both lungs at an advanced stage. The stump was still open and the horizontal portion of the os pubis was necrosed. A section of the exarticulated femur presented the characteristic lesions of chronic osteomyelitis.[1]

CASE 325.—Private James McGeehen, Co. K, 107th Pennsylvania, aged 48 years, was wounded at the battle of Gettysburg, on July 1, 1863, by a conoidal musket ball, which entered at the inner aspect of the middle of the right thigh and traversed the entire thickness of the limb, badly comminuting the shaft of the femur in its progress. He lay upon the field for about five hours and lost a good deal of blood, although none of the larger vessels appeared to have been wounded. He was then conveyed to a temporary field hospital, and his wounds were dressed. On July 6th he was removed to the Seminary Hospital at Gettysburg, where he remained until September 4th, at which date there was profuse suppuration and some sloughing at the wound of entrance, and it was deemed expedient to put the patient under canvas in the Camp Letterman Hospital. On October 11th he was moved to the Town Hall Hospital at Chambersburg. Here he was able to move about on crutches, but the injured limb was greatly enlarged and deformed, and numerous fistulous openings successively formed, through which pus was freely discharged and bits of necrosed bone were occasionally eliminated. On April 23, 1864, by order of the Medical Director at Harrisburg, he was discharged from the military service of the United States on account of "permanent lameness resulting from gunshot fracture of the right femur." Nearly two years subsequently, April 9, 1866, McGeehen entered the Pennsylvania Hospital at Philadelphia. His general condition was satisfactory; his spirits were excellent; a careful examination failed to detect organic disease of any viscus. His injured thigh remained greatly deformed and enlarged; the original wounds had long since closed, but there were numerous fistulous sinuses, discharging on an average a gill of pus daily, and, at intervals, scales or nodules of necrosed bone; three tracks seemed to ascend to within an inch and a half of the trochanter major. It was thought probable that above this point the femur was healthy. After a careful consultation, it was determined to remove the limb at the hip joint. The patient was placed upon tonic treatment, with nourishing diet; his bowels were also carefully regulated. He complained of nothing except his cough, arising from a slight bronchitis, which, however, gave him very little trouble. On April 21, 1866, Dr. D. H. Agnew, Surgeon to the Pennsylvania Hospital, removed the limb. The abdominal tourniquet was employed, and by this means the circulation of the abdominal aorta was completely controlled. The method of operating was by antero-posterior skin flaps, with circular division of the muscles. The femoral artery was ligated after the anterior flap was dissected up. The femoral vein was not included in the ligature. Twenty-one of the smaller arteries required deligation. The disarticulation was accomplished in a minute and a half. Pressure was maintained by the abdominal tourniquet for twenty-seven minutes while the minor vessels were secured. The hæmorrhage during the entire operation did not exceed three ounces, scarcely more than an ounce and a half of which was arterial blood. Ether alone was employed in inducing anæsthesia, and about three ounces sufficed, as he inhaled it without effort and soon came under its influence. The stump was packed with lint. The leg, when drained entirely of blood, weighed twenty-two pounds, the entire weight of the body at that time being about one hundred and forty-five pounds. Immediately after his removal to the ward an enema of half a drachm of tincture of opium was administered, and this was repeated at eight in the evening, when the stump was closed by lead sutures and dressed with cerate. On the following day the patient had entirely reacted from the slight amount of shock following the operation. Pulse, which, under agitation from the approaching operation, had been averaging from 100 to 115, had fallen to 96; respiration 20; skin moist and pleasantly warm. No stimulus; moderate diet, and a drachm

[1] LIDELL (J. A.), *On the Secondary traumatic Lesions of bone, etc.*, in *U. S. San. Com. Mem.*, 1870, *Surgical*, Vol. I, p. 438. W. H. VAN BUREN, *Transactions of New York Academy of Medicine*, Vol. I, 1851–57, p. 123, and *Contributions to Practical Surgery*, Philadelphia, 1865, p. 9. M. A. GUÉRIN (*Médecine Opératoire*, p. 220) has suggested the same plan. See also *Circular* 7, S. G. O., 1867, pp. 41, 64.

of laudanum by enema. On April 23d he was more comfortable. Had passed a quiet night; had a good appetite. A considerable part of the stump had united by first intention, and there was only a little greasy, watery discharge from the inner angle. Dry dressing continued. On April 24th he was doing well. Discharge thin and small, and flaps were rapidly uniting. He was ordered four ounces of whiskey daily, and half an ounce of Basham's mixture. Dry dressing continued. April 25th, no unpleasant symptom save a rather frequent bronchitic cough. The flaps are united at the middle of the stump; the discharge comes from the angles, and it is evidently due to the breaking down of the subcutaneous fat. Laudanum enemata were now given twice daily; warm-water dressings were substituted for the dry applications. April 26th, he ate and slept well, but was troubled by his cough, which was severe, accompanied by tenacious mucous sputa. The opiate enemata were suspended, and from two to four drachms of solution of sulphate of morphine were given every night; during the day, a sedative expectorant mixture every three hours. The stimulus was not increased. April 27th and 28th, steady improvement; cough less troublesome, discharge more purulent and increased in quantity; warm-water dressing still applied. April 29th, discharge purulent and quite abundant, amounting, probably, to three or four ounces daily. April 30th, much the same, excepting that the cough was again more troublesome. The union of the flaps was daily becoming more secure, and the discharge now consisted of laudable pus. Four ligatures came away. May 1st, seemed brighter and better than any day heretofore; ate heartily; stump looked perfectly healthy, discharge moderate; two more ligatures came away. May 2d, condition excellent; the stump was rapidly healing; the skin remained as soft and healthy as on the day of operation. Most of the stitches had been cut away. The pulsation of the external iliac artery, which for several days was very marked, had diminished greatly, and seemed as though propagated through a firm clot. He had been troubled considerably with cough for two days. At midnight, in the absence of the watchman, hæmorrhage occurred, and on the return of the latter the patient was found dead. Upon removing the dressing it was seen that a secondary hæmorrhage had taken place. Most of the blood was retained either in the stump or inside the dressing; the little that had escaped had flowed from the inner angle of the stump back under the body. The hæmorrhage was found to have proceeded from the femoral artery. The most powerful restorative measures were employed for a long time, but without producing the slightest effect. Upon dissecting the stump, the union was found to be complete over one-half of the entire surface of the flaps, whilst the deeper portions of the stump were covered with healthy granulations. The femoral vein, which was not ligated, was entirely occluded; the femoral artery was patulous, its inner coat projecting somewhat beyond the other two; the inner coat of the artery was deeply stained and roughened for at least one and a quarter inches above the extremity; higher up it appeared perfectly healthy; the ligature which had secured the vessel was still attached to a shred of the outer fibrous coat. It had evidently very recently cut its way through, and still retained in its loop the end of the vessel which had sloughed off. Lying immediately in front of the femoral vessels, embedded in a recent clot, was found the plug which had been driven out of the artery. This was a firm, flesh-colored clot, of the calibre of the vessel, and long enough to reach up to the origin of the deep epigastric and circumflex iliac arteries. No positive testimony could be obtained that the patient had suffered from one of his violent spells of coughing immediately before the accident, as all in the ward were asleep excepting the watchman; but all the appearances render it highly probable that directly after the ligature of the femoral became detached the violent succussion of the diaphragm incident to a paroxysm of coughing had expelled the clot from that vessel. All the other vessels appeared completely obliterated. Only the thoracic and abdominal cavities were examined. The lungs were large and free from pleuritic adhesions. They were somewhat emphysematous, and showed a large amount of pigment over their surface. The anterior portions were anæmic, but posteriorly there was marked congestion of the lower lobes. The heart was quite flabby and moderately dilated. There was no valvular disease or apparent insufficiency, but microscopic examination showed advanced fatty degeneration of the muscular fibres. The liver was also very soft and fatty. Kidneys anæmic and pale. Other viscera healthy. The large vessels and heart contained very little blood. There was a small collection of unhealthy purulent matter in the manubrium of the sternum. The limb, upon dissection, showed very great disease of all the soft parts between the trochanters of the femur and the knee joint. The muscles had undergone fatty degeneration; their sheaths were very much hypertrophied and of almost cartilaginous density. Toward the bone there was a thick layer of tenacious colloid bone cartilage, apparently resulting from periosteal disease. Through the dense and morbid mass fistulous tracks radiated in every direction, many of them containing small spiculæ of bone. The bone itself was diseased from the condyles to within one and a half inches of the lesser trochanter. The shaft had been fractured obliquely, with considerable comminution, and union had taken place by formation of a very large amount of dense bony structure, which projected in spurs and ridges in all directions. The original track of the ball was marked by a deep groove, and one or two small fragments of lead were found embedded in the bone. There was a large anfractuous cavity, bridged over in places by newly formed bone, which still contained several quite large sequestra. There was incipient periosteal disease along the linea aspera up to the trochanters. A section of the bone showed that if osteo-myelitis had existed it had not extended within several inches of the trochanters.[1]

FIG. 104.—Consolidated shot fracture of femur, with secondary lesions. [From a photograph by WILLARD.]

In the four foregoing fatal secondary amputations, one succumbed to the shock of operation in an hour; another died on the third day with surgical fever and erysipelas; a third in seventeen weeks with phthisis and lithiasis, the stump nearly healed; and a fourth

[1] An account of this case was published by Dr. THOMAS G. MORTON, in *The American Journal of Medical Sciences*, 1866, Vol. LII, p. 33 (*Compound Comminuted Fracture of Right Femur, from Wound by Minié Ball. Amputation at Hip Joint after Thirty-four Months*, by Dr. D. H. AGNEW, *Death from Secondary Hæmorrhage on the Twelfth Day*), from notes carefully and admirably drawn up by Dr. WILLIAM PEPPER, the resident surgeon at the Pennsylvania Hospital, under whose immediate care the patient was. See also *List of the More Important Specimens added to the Pathological Museum of the Pennsylvania Hospital during the year* 1867, by WILLIAM PEPPER, M. D., Curator, in *Penn'a Hospital Reports*, Vol. I, 1868, p. 399.

perished on the eleventh day, from giving way of the femoral at the point of ligation. In two of the following cases the patients sank from shock in a little over twenty-four hours. In the third case, secondary hæmorrhage was restrained by ligating the external iliac on the eleventh day, but bleeding recurred fatally on the twenty-third day.

CASE 326.—Antonio Mutieres, a Mexican, aged 30 years, employed by the depot quartermaster at Fort Union, New Mexico, was wounded, in an altercation with another Mexican, on May 10, 1867, by a conoidal pistol ball, which entered two inches below the anterior superior spinous process of the left ilium, and passed downward and lodged in the neck of the left femur at its junction with the head. He was admitted to the Post Hospital at Fort Union on May 11th, when Assistant Surgeon DuBois, Post Surgeon, enlarged the wound and extracted the ball and wadding with a pair of Tiemann's bullet forceps. After the removal of the ball the finger could be passed half an inch or more into the substance of the cervix, in which the ball had been embedded. The patient suffered but little pain, but he gradually lost flesh and strength from the surgical fever and suppuration. On June 14th he began to have severe pain, running up the side of the trunk and downward to the knee. This became more continuous and distressing on the succeeding day. Surgeon J. C. McKee, U. S. A., saw the patient in consultation, at this date, and advised that amputation should be performed in preference to an excision. At noon, on June 22d, Assistant Surgeon DuBois operated, assisted by Dr. Short, of Los Vegas, and Dr. Simpson, of Moro. A rude clamp abdominal compressor had been made at the post under the direction of Dr. DuBois, and this instrument, applied a little above and to the left of the umbilicus, effectually controlled the aorta. A long anterior and short posterior flap were made. The disarticulation was completed in fifteen seconds. Eighteen arteries were ligated. The soft parts were much diseased, and there was a large amount of venous hæmorrhage. The anæsthetic employed was a mixture of equal parts of chloroform and ether. The patient breathed well notwithstanding the compression of the abdomen. The flaps were left open, a cerate cloth being interposed. In the evening the patient was free from pain and had slept a little; but he had not reacted satisfactorily, and talked and laughed excitedly. His pulse was at 160 and feeble. It was fuller and less frequent immediately after the operation. Milk punch had been given in small quantities every fifteen minutes. Hypodermic injections of tincture of opium in doses of from ten to thirty drops, repeated every twenty minutes or at longer intervals, were now administered. This remedy appeared to bring the pulse up, and to act as a stimulant and not as a narcotic—a therapeutic result observed by Dr. DuBois in other cases of shock. The patient died June 23, 1867. At the autopsy, the acetabulum was found to be extensively diseased.[1]

CASE 327.—Private Michael O'Neil,[2] Co. E, 58th Massachusetts, aged 19 years, was wounded at the battle of Cold Harbor, June 3, 1864, by a conoidal musket ball, which entered the upper anterior part of the right thigh, and passed backward and slightly upward through the limb, comminuting the upper extremity of the femur. The fissures extended about three inches down the shaft, and through the trochanters half way up the neck. The wounded man was sent in an ambulance to the White House, on the York River, and thence by a hospital steamer to Alexandria, where he was received at the Third Division Hospital on June 7th. On admission his limb was much swollen, yet there was but little pain, and this was not increased by moving the limb. His general condition was satisfactory, though he reported that he was subject to attacks of intermittent fever. His limb was arranged in a straight position, supported by cushions and pillows; evaporating lotions were applied to the wound, and a nutritious diet was ordered. On June 10th, several fragments of bone were extracted. On June 12th the patient had a chill, and was ordered to take four grains of sulphate of quinia every four hours. The injured limb was now suspended by means of Smith's anterior splint. On June 24th there was another chill. The wound was now suppurating freely, and the limb was very sensitive when handled. On June 31st there was a slight chill. From this date to August 1st there was little change in the symptoms. It was now decided that there was little hope of consolidation of the fracture. The suppuration was profuse, and it was believed that the patient would inevitably succumb ultimately to the constitutional irritation and the drain upon the system. It was determined, therefore, that amputation should be performed, and the character of the fracture admitted only of amputation at the hip joint. On August 10th, the patient was anæsthetised by sulphuric ether, and amputation at the hip joint was performed by the lateral flap method by Surgeon Edwin Bentley, U. S. V. There was but little hæmorrhage, and the operation was borne well. The patient had an anodyne, and was freely stimulated. For forty-eight hours after the operation there was some febrile excitement, with complete anorexia. The fever then subsided and the appetite returned. The wound looked well, and the amount of suppuration was trifling. The case progressed very favorably until August 20th, when secondary hæmorrhage supervened from ulceration of the femoral near the ligature. About six ounces of blood were lost. A ligature was promptly placed upon the external iliac just above Poupart's ligament. After the operation the patient was very weak and faint, and stimulants were freely administered. On August 22d there was an excess of febrile excitement, but this abated on the following day and the appetite again became moderately good. On August 28th there was nausea and vomiting, which persisted for forty-eight hours. The wound at this time had assumed a very unhealthy appearance, and the patient had become much emaciated. On the night of September 1st there was delirium. The case terminated fatally on the morning of September 3d, twenty-three days after the operation. At the autopsy the viscera was found to be healthy, except that there was an old cicatrix with cretaceous deposit at the apex of the left lung. The lips of the wound were united in nearly their entire extent. There was a large accumulation of pus within the flap, bathing the acetabulum and the gaping mouth of the femoral artery. The wound left by the incision above Poupart's ligament, through which the external iliac was tied, communicated with an abscess between the iliacus externus muscle and the iliac fascia, filled with pus. The ligature on the external iliac was found to be

FIG. 105.—Gunshot fracture of the upper extremity of the right femur. *Spec.* 3098.

[1] See DUBOIS (H. A.), *A Case of Amputation at the Hip Joint for Gunshot Wound of the Head of the Femur*, in *The Medical Record*, 1868, Vol. II, p. 266; *Circular* No. 7, S. G. O., 1867, p. 46; *Circular* No. 3, S. G. O., 1871, p. 214.

[2] The abstract of this case was compiled from a report by the operator, Surgeon E. BENTLEY, U. S. V. See *Circular* No. 7, S. G. O., 1867, p. 39.

placed about half an inch below the origin of the epigastric; the circumflex iliac was given off a little below the epigastric. There was a firm conical plug in the external iliac, ending at the origin of the epigastric. Through this plug ran a canal communicating with the mouth of the circumflexa ilii; this canal was closed by a clot colored by included red corpuscles and of more recent formation than the plugging clot. Ulceration of the external iliac just above the ligature had commenced. The femoral vein was collapsed and contracted; the external iliac vein was distended by a dirty fluid, which, when placed under the microscope, was found to abound in pus globules. Higher up, the contents of the vein consisted of a granular detritus. The branches of the external iliac vein was blocked up by dense coagula. The deep-seated abdominal lymphatic glands were enlarged and deeply injected. An examination of the fractured femur showed that it was shattered, with much loss of substance, just below the trochanters. The fissures ran up with the capsule, and the fractured extremities of the bone were carious and had lost tissue by absorption.

CASE 328.—Private John Williams, Co. F, 13th Ohio Cavalry, aged 44 years, was wounded at Peebles' Farm, near Petersburg, September 30, 1864, by a conoidal musket ball, which passed through the left thigh and contused or partially fractured the femur. He was conveyed in an ambulance to the field hospital of the first division of the Ninth Corps, and his wounds were dressed, and he was then sent by rail to City Point, and thence to the North in a hospital transport steamer. On October 7th he was received at the General Hospital at Beverly, New Jersey. For over three months the case progressed very favorably under the simplest treatment; but early in February abscesses formed in the thigh, and when they were incised they discharged copiously an offensive pus. About the same time the patient was attacked by an obstinate diarrhœa. On February 17, 1865, an exploratory incision was made, and a careful examination with the finger and the probe indicated that the femur was necrosed as high as the trochanters. It was then considered that amputation at the hip joint presented the only chance for preserving life. The operation was performed by Assistant Surgeon Clinton Wagner, U. S. A. The patient inhaled chloroform; anterior and posterior semilunar flaps were made by transfixion; the femoral artery was tied as soon as divided; disarticulation was then effected, and the operation completed by securing the minor vessels. Very little blood was lost. The patient reacted satisfactorily, but sank and died, apparently from shock, twenty-nine hours after the operation. An autopsy revealed a healthy condition of the viscera and no lesion worthy of special mention. The femur displayed an interesting example of necrosis of the entire diaphysis. It is numbered *Specimen* 84 in the collection of the Army Medical Museum, and is represented in the adjacent wood-cut, FIG. 106.

FIG. 106.—Necrosis of the femur following gunshot injury. *Spec.* 84.

TABLE XVII.

Summary of Nine Cases of Secondary Amputation at the Hip Joint.

No.	NAME, AGE, AND MILITARY DESCRIPTION.	DATE OF INJURY.	NATURE OF INJURY.	DATE OF OPERATION.	OPERATION AND OPERATOR.	RESULT AND REMARKS.
1	Lemon, G. W., Pt., C., 6th Maryland, age 30.	May 5, 1864.	Conoidal ball fract. left femur, junct. upper thirds; bedsores; abscesses. May, 1865, profuse suppuration, bone firmly consolidated.	Oct. 12, 1865.	Anterior and post'r semilunar flap, by Surgeon E. Bentley, U. S. V.	Steady imp. Dec., 1865, stump healed. Disch'd Feb. 3, 1866. *Specs.* 4386, 4167, 5040. *Phot. Ser.* 136, 137. *Circ.* 6, S. G. O., 1865, p. 52. *Circ.* 7, S. G. O., 1867, pp. 42, 64.
2	*Longmoor*, W. W., Pt., age 25.	June 11, 1864.	Conoidal ball shattering shaft right femur; abscesses; nec. bone rem'd; protracted irritation and exhaustive suppuration.	Jan. 18, 1866.	Lacanchie's method; circular cut thro' skin, integ. retracted, muscles div. circularly down to bone; vertical incision on outer side, by Prof. G. C. Blackman.	Rapid recovery. 1870, general health good. BLACKMAN(G.C.), *Amputations at Hip Joint*, in *Cincinnati Jour. of Med.*, 1866, Vol. I, p. 101. *Circ.* 7, 1867, pp. 43, 64.
3	Bowman, D. H., Pt., C, 110th Pennsylvania, age 24.	July 27, 1864.	Conoidal ball com. right femur from trochanters down several inches. Aug. 17th, ball and fragm'ts bone extracted; profuse suppuration; no union.	Sept. 15, 1864.	Antero-posterior flaps, by Ass't Surgeon J. C. McKee, U.S.A.	Did not rally. Died one hour after operation. *Spec.* 2288. *Circ.* 6, S. G. O., 1865, p. 50. *Circ.* 7, S. G. O., 1867, pp. 41, 64.
4	Davis, H. H., Sergeant, B, 156th New York, age 26.	Sept. 19, 1864.	Conoidal ball fract. upper third right femur. Mar., '65, healed with great deformity. '66, diseased bone; fistulous canals.	May 5, 1866.	Anterior posterior flap, by Dr. W. S. Forbes, Civil Hospital, Philadelphia.	Rallied well. Died May 8, 1866, sixty-four hours after operation. *Circ.* 7, S.G.O., 1867, pp. 46, 64.
5	Kelb, F., Corporal, G, 7th New York.	Dec. 14, 1862.	Conoidal ball fract. right femur, junct. up. thirds. June 8, '64, fracture consolidated. June, 1865, abscesses, necrosis.	June 7, 1865.	Anterior flap by transfix'n, posterior flap by sect'n from without, in, by Dr. R. F. Weir, St. Luke's Hosp., N. York City.	July 1st, able to leave bed; after this failed, and died Oct. 4, 1865. *Circ.* 6, S. G. O., 1865, p. 52. *Circ.* 7, S. G. O., 1867, pp. 41, 64.
6	McGeehen, J., Pt., K, 107th Pennsylvania, age 48.	July 1, 1863.	Conoidal ball badly comminuting right femur. Oct. 11, '65, able to move on crutches—limb deformed, bone necros'd. April, '66, numerous fistulous openings discharging.	April 21, 1866.	Anterior post'r skin flap, circ. division of muscles, by Dr. D. H. Agnew, Pennsylvania Hospital.	April 23d, heal'g by first intent'n. 26th, bronchial cough troublesome. May 2d, hæm. from femoral artery; died. *Circ.* 7, 1867, pp. 44, 64.
7	Mutieres, A., Mexican, teamster in Quartermaster's Department, age 33.	May 11, 1867.	Revolver ball ent'g left thigh, lodging in neck of femur; ball removed—lost strength daily.	June 22, 1867.	Long anterior, short posterior flap, by Ass't Surgeon H. A. Dubois, U. S. A.	Died June 23, 1867. *Circ.* 7, 1867, pp. 46, 64. *Circ.* 3, S. G. O., 1871, p. 214.
8	O'Neil, M., Pt., E, 58th Massachusetts, age 19.	June 3, 1864.	Conoidal ball comminuting up. extremity right femur. June 10, fragments extract'd. Aug. 1st, profuse suppuration.	Aug. 10, 1864.	Lateral flap, by Surgeon E. Bentley, U. S. V.	Ulceration of femoral. Aug. 20, hæm., lig. of ext. iliac. Died Sept. 3, 1864. *Spec.* 3098. *Circ.* 6, S. G. O., 1865, p. 50. *Circ.* 7, S. G. O., 1867, pp. 39, 64.
9	Williams, J., Pt., F, 13th Ohio Cavalry, age 44.	Sept. 30, 1864.	Conoidal ball thro' left thigh, partially fract'g or contusing femur. Feb, '65, exam. found femur necrosed to trochanters.	Feb. 17, 1865.	Anterior and posterior semilunar flaps, by Ass't Surgeon C. Warner, U. S. A.	Died, twenty-nine h'rs after, from shock of operation. *Spec.* 84. *Circ.* 6, S. G. O., 1865, p. 50. *Circ.* 7, S.G.O., 1867, pp. 41, 64.

Reamputations at the Hip Joint.—The category of exarticulations at the hip for diseased conditions succeeding previous amputations in the continuity of the thigh, pertaining to the surgery of the late civil war, includes nine examples with only three deaths.[1]

CASE 329.—Private W. Cotter, Co. E, 9th New Hampshire, aged 27 years, was wounded at Petersburg, July 30, 1864. Surgeon J. Harris, 7th Rhode Island, recorded his admission to the field hospital of the 2d division, Ninth Corps, and noted: "Fracture of thigh, lower third; amputation of thigh at middle third." From the field hospital the patient was transferred to City Point, and thence to Washington, August 3d. Assistant Surgeon W. F. Norris, U. S. A., contributed the pathological specimen, shown in the wood-cut (FIG. 107), with the following history by Acting Assistant Surgeon H. Gibbons: "The patient was admitted to Douglas Hospital with primary amputation of right thigh, lower part of middle third. The operator had made a long posterior skin flap, which was turned up over the muscles and bone, and attached to the integument anteriorly by means of several sutures. When first seen the stump was greatly swollen, partly from a retention of pus by the bag-like flap. A couple of sutures were removed and the pus evacuated. On August 4th, an incision was made in the dependant portion to admit of free drainage, and poultices were ordered. Appetite and sleep were not greatly disturbed, and there was not as much irritative fever as in most similar cases. Ordered stimulants, tonics, and generous diet. August 13th, swelling much reduced; constitutional irritation less. Ligature of femoral artery separated. The poultices were alternated with flannel dressings till September 1st, when wet cloths were substituted. Flaps mostly united; appetite poor; sleep disturbed; stump painful. Ordered morphia at bed-time. September 13th, patient sits up and walks about with some assistance. Stopped the stimulant. September 28th, stump doing well; swelling gone; dead bone felt with the probe Had an attack of diarrhœa, which lasted but a few days. The irritability of the stomach was a source of continual complaint for two or three months. The various stomachics relieved but temporarily; nevertheless there was marked improvement, especially during November, the patient being about on his crutches daily. November 29th, divided the cicatrix (but a small fistulous opening was still remaining) and removed a sequestrum nearly six inches long. It was attended with some difficulty, yet not as much as was experienced in similar cases. The sequestrum consists of the entire bone at the lower extremity, but tapers to two or three points at the other; the circumference is complete for three inches. In its centre, surrounding the medulla, was found a beautiful transparent flake of new bone. The femur contained, as in like cases, a large amount of new bone. July 16, 1865, the cavity left in the stump has never entirely closed, but continues to discharge, and refuses to heal, though various stimulating injections have been resorted to. It is over three inches deep. The patient is in a promising state of health." On November 2d, the patient was transferred to the Harewood Hospital. Surgeon R. B. Bontecon, U. S. V., reported that he was doing well on December 31st, but that there was still a "fistulous discharge from the stump." At the closing of the Harewood Hospital, on May 1, 1866, the patient was transferred to the Washington Post Hospital, where the specimen represented in the adjacent cut (FIG. 108) was removed. Assistant Surgeon W. Thomson, U. S. A., who performed the operation, reported as follows: "Two sinuses lead to the interior of new bone, which have failed to close since the date of the first operation. On June 6, 1866, resection of four inches of femur from the end of the stump, after previously made incisions into the soft parts, was performed. Ether was used, and the incisions were united by silver sutures. June 30th, wound has healed kindly, two-thirds by first intention, leaving a sinus on the under surface of the stump still discharging. September 30th, although mostly healed the stump is still indurated. Two sinuses, evidently leading to necrosed fragments of femur, are still open and keep up an offensive discharge. Small intercellular abscesses form occasionally. Patient in good condition." He was discharged from service October 15, 1866, and pensioned. In the following year he was reported as having been treated for a time at the Bellevue Hospital, New York City, where Drs. H. B. Sands and F. H. Hamilton are said to have removed several pieces of necrosed bone. On October 5, 1871, the pensioner entered the Providence Hospital

FIG. 107.—Cylindrical sequestrum of right femur. *Spec.* 252. ½

FIG. 108.—Resected extremity of the right femur from a case of osteomyelitis. *Spec.* 4954. ½

[1] Amputation at the hip, after previous amputation in the continuity of the thigh, was first performed by G. J. GUTHRIE, in 1812, in the case of Private Mason, 23d Infantry, or Welsh Fusiliers, wounded at Ciudad Rodrigo. GUTHRIE, *On Gunshot Wounds of the Extremities*, London, 1815, 8vo, p. 141. Of the nine cases pertaining to the American civil war, the earliest, May 21, 1864, was practised by Dr. A. B. MOTT, on the stump of a prior amputation for bayonet stab of the knee. On September 21, 1864, Dr. GURDON BUCK and Dr. F. HASSENBURG disarticulated at the hip unsuccessfully, after prior amputations for shot fracture. In 1865, Dr. J. H. PACKARD had the first successful reamputation at the hip after previous amputation in the thigh for shot fracture, and Dr. A. M. FAUNTLEROY successfully reamputated, under similar conditions, on March 11th. In 1866, the successful reamputation at the hip by Dr. T. G. MORTON, and a like operation, with fatal result, by Dr. J. B. WHITCOMB, were practised. In 1870, and in 1871, Dr. G. A. OTIS and Dr. N. S. LINCOLN performed successful reamputations at the hip, after prior amputations of the thigh, for shot fracture. Professor J. FAYRER (*Clin. and Path. Obs. in India*, London, 1873, pp. 84, 489), in 1867, unsuccessfully reamputated at the hip after prior thigh amputation for an incised wound of knee. Besides these eleven reamputations at the hip, the records of civil surgery afford at least twenty-one examples, viz: five following amputations for bad fractures of the femur—J. SYME'S, in 1848 (*The Medical Times*, London, 1849, Vol. XIX, p. 252); J. ROUX'S, in 1859 (*Gaz. hebd.*, 1860, pp. 292, 297), recoveries; J. F. HEYFELDER'S, in 1861 (*Deutsche Klinik*, 1862, S. 275), fatal; J. FAYRER'S, in 1864, recovery; and J. FAYRER'S, in 1865, fatal (*Clin. and Path. Obs. in India*, 1873, p. 489). There were eight exarticulations following prior amputations for ostitis or ill-defined lesions, viz: A. COOPER'S, in 1824 (*Lond. Lancet*, 1824, Vol. II, p. 96); BRADBURY'S, in 1851 (*Bost. Med. and Surg. Jour.*, 1852, Vol. LXVI p. 349); B. BECK'S, in 1854 (*Deutsche Klinik*, 1856, No. 47); ROSER'S, in 1857 (THIEME'S *Diss.*, Leipzig, 1867, p. 9), successful; and TEXTOR'S, in 1851 (ESCHE'S *Diss.*, Würzburg, 1863); CHELIUS'S, in 1853 (THIEME'S *Diss.*, Leipzig, 1867, p. 8); HEYFELDER'S, in 1854 (THIEME'S *Diss.*, Leipzig, 1867, p. 8); and HANCOCK'S, in 1860 (*Lond. Lancet*, 1860, Vol. I, p. 319). Eight exarticulations followed prior amputations for malignant growths, viz: MAYO'S, in 1835 (COSTELLO'S *Cyclop.*, 1841, Vol. I, p. 182); BOISSEAU'S, in 1841 (METZ'S *Diss.*, Würzburg, 1841, p. 17); W. S. COXE'S, in 1844 (*Mem. on Amp. at the Hip Joint*, London, 1845); VAN BUREN'S, in 1850 (*Contrib. to Pract. Surg.*, 1865, p. 10); GROS CLARK'S, in 1866 (*Lond. Lancet*, 1867, Vol. I, p. 11), successful; and CHELIUS'S, in 1845 (BRUCH, *Die Diagnose der bösartigen Geschwülste*, Mainz, 1847, p. 3); VOLKMANN'S, in 1868 (*Deutsche Klinik*, 1868, p. 338); and J. LISTER'S, in 1872 (REYHER in LANGENBECK'S *Archiv*, B. XVII, p. 516), fatal cases.

at Washington, with the stump still in a diseased condition; and ten days afterwards Dr. N. S. Lincoln exarticulated the remaining part of the femur, consisting of the head, neck, and trochanteric portions, which was also contributed to the Museum, and is represented in the annexed cut (FIG. 109). The femoral vessels were respected, so that the disarticulation might be said to have resembled an excision or enucleation rather than a reamputation. The patient was able to be about in a short time; and, on April 22, 1872, he visited the Army Medical Museum, and a photograph was made of the stump, which is copied in the adjoining wood-cut (FIG. 110). The pensioner subsequently entered the National Military Asylum at Hampton, Elizabeth City County, Va., where Examiner C. McDermont certified the following: "The right leg has been amputated at the hip joint. This was the third amputation performed on the limb. Since the last operation he has been troubled with abscesses in and about the cicatrix, which have not healed, though a year has almost elapsed since the disarticulation was made. It is my belief that the tissues of the wounded limb have been diseased and never free from ulceration since he was wounded. His general health has been considerably impaired by the constant irritation and drain upon his system." This pensioner died at Queenstown, Ireland, January 21, 1874, while on furlough from the Asylum.

FIG. 109.—Exarticulated head and trochanters of right femur after osteomyelitis. *Spec.* 5946. ½

FIG. 110.—Cicatrix six months after coxo-femoral disarticulation and reamputation. [From a photograph.]

CASE 330.—Private Julius Fabry, Co. K, 4th Artillery, aged 38 years, was wounded at Deep Bottom, Virginia, August 16, 1864. Surgeon B. Gesner, 10th New York, reported: "Severe shot wound of left knee joint; amputation at lower third of femur. Sent to general hospital at City Point, Virginia, August 17th." He was admitted, on August 20th, into Satterlee Hospital, Philadelphia, from City Point. Surgeon I. I. Hayes, U. S. V., reported: "Gunshot wound of left leg by round ball, which embedded itself in knee joint; also conical ball, which was extracted high up on outer side of left thigh. August 17, 1864, circular amputation of lower third of left thigh. Improving slowly; simple dressings, tonics, and stimulants." On an unsigned case book of Ward 3, of Satterlee Hospital, the progress and treatment of the case are recorded as follows: "Stump looks well; patient somewhat weak but doing well. August 26th, suppurates very freely. August 28th, conical ball extracted from outer side of thigh two inches below great trochanter. Patient states that he saw one other ball extracted from the wound. September 1st, doing well; suffers from a bedsore contracted before he came here. States that he lost much blood during the amputation, which accounts for his weak and anæmic condition. September 9th, doing well. 21st, improving slowly. November 8th, transferred to Ward A." The progress of the case is continued on another case book, also unsigned: "December 2d, wound still discharging copiously. Bone exposed about one-eighth of an inch; general health middling, appetite good, bowels regular. Some difficulty with his urinary apparatus; detected pus in urine. January 9, 1865, morphia ceases to have any effect except to constipate. Remains much the same, better and worse, alternately, every ten or twelve days. February 4th, made an incision on external side of stump some two inches in length, just cutting the fascia, and removed a small piece of woolen. The muscles were not affected by the

FIG. 111.—Left femur, from a case of reamputation for osteomyelitis following shot injury. *Spec.* 5614, A. M. M.

FIG. 112.—Cicatrix twelve months after coxo-femoral disarticulation and reamputation. [From a photograph.]

superficial sinus." On May 22, 1865, this soldier was sent to regimental headquarters at Fort Washington, whence he was discharged from service January 1, 1866, on surgeon's certificate of disability, signed by Surgeon John H. Bayne, U. S. V. In October, 1865, the patient received an artificial limb but could not use it without discomfort. Fabry was admitted into the Soldiers' Home January 31, 1866. The remnant of the femur was affected by osteomyelitis, and Surgeon C. H. Laub, U. S. A., had frequent occasion to have the stump poulticed and abscesses opened. October 27, 1866, Assistant Surgeon J. S. Billings, U. S. A., made an exploratory and palliative operation, cutting down on the outer aspect of the thick involucrum a little below the trochanter major, trephining over one of the cloacæ, and discovering a sequestrum consisting of the shaft of the femur. Fabry was pensioned, and remained at the Soldiers' Home for the next three years, suffering acutely, at times, from suppuration in the stump, and again enjoying intervals of comparative comfort. The general health did not give way materially under the protracted suppuration. The patient was exempt from albuminuria, and the viscera generally were in a normal condition. The nervous system seemed shattered, a result ascribed to the inordinate doses of narcotics which the patient consumed. On May 15, 1870, Assistant Surgeon George A. Otis, U. S. A., exarticulated at the hip and removed the stump. The single anterior flap procedure was used, only the flap was cut from without inward, because the great masses of foliaceous callus enveloping the upper third of the femur precluded transfixion. The accompanying wood-cut (FIG. 111) will indicate the extent of these osseous formations. Fabry had a rather rapid convalescence, being about on crutches in twenty-one days, and soon afterwards able to ride about the grounds at the Soldiers' Home. A photograph of the patient, made at the Army Medical Museum a year after the operation, is copied in the wood-cut, FIG 112. On May 15, 1878, eight years after the operation, Fabry has had no trouble with his stump. He has never been willing to attempt the expedient of an artificial limb.[1]

The next case is exceptional inasmuch as the amputation and reamputation followed a bayonet stab in the knee instead of shot injury.

CASE 331.—Private Lewis Francis, Co. I, 14th New York Militia, aged 42 years, was wounded July 21, 1861, at the first battle of Bull Run, by a bayonet thrust, which opened the right knee joint. He received not less than fourteen other stabs in different parts of the body, none of them implicating the great cavities. He was taken prisoner, and conveyed to Richmond and placed in hospital. One of his wounds involved the left testis, which was removed on July 24th. On October 28, 1861, his right thigh was amputated at the middle, on account of disease of the knee with abscesses in the thigh. The double-flap method was employed. The stump became inflamed and the femur protruded. An inch of the bone was resected and the flaps were again brought together. In the spring of 1862 the patient was exchanged and sent to Fort Monroe. Thence he was transferred to a Washington hospital, and thence, in March, 1862, to his home in Brooklyn. There was necrosis of the femur, and in May, 1862, its extremity was again resected by a civil surgeon. On October 28, 1863, Francis was admitted to the Ladies' Home Hospital, New York. Necrosis had apparently involved the remaining portion of the femur. On May 21, 1864, Surgeon A. B. Mott, U. S. V., laid open the flaps and exarticulated the bone. The patient recovered rapidly and had a sound stump. He was discharged August 12, 1864. On October 1, 1865, a photograph, from which the accompanying wood-cut (FIG. 113) was taken, was forwarded by Surgeon A. B. Mott to the Army Medical Museum. Dr. Mott reported that the pathological specimen of the exarticulated femur was stolen from his hospital. For some months after his discharge Francis enjoyed good health; but then the cicatrix became unhealthy, pus was discharged through several sinuses, and there was bleeding from the slightest irritation. In March, 1867, a messenger was sent to his residence, 54 Hamilton Street, Brooklyn, and found him in very poor health. He had been unable to leave the house since November, 1866. On April 12, 1867, he was visited by Dr. E. D. Hudson, who reported him as then confined to his bed. There was a large ulcer at the upper outer angle of the cicatrix, which communicated with extensive sinuses; there was a fistula-in-ano also. The pus from the different fistulous orifices was thin, oily, and ichorous. There could be little doubt that there was disease of some portion of the innominatum. The patient was much emaciated, and had a cough with muco-purulent expectoration. His pulse, however, was not frequent, and he had a good appetite. In May, 1867, it was reported that his general condition had somewhat improved. In March, 1868, Pension Examiner J. C. Burdick, of Brooklyn, reported that this pensioner was "permanently helpless and required the constant aid of a nurse." On May 30, 1874 (Decoration Day), and the day prior, at a preparatory parade of the veterans of his regiment, he was particularly active. The day after this unusual exercise, May 31, 1874, he died suddenly while at table.[2] This statement from the Brooklyn *Union*, June 1, 1874, is corroborated by the records of the Pension Bureau.

FIG 113.—Cicatrix sixteen months after a reamputation at the right hip, succeeding amputation for a bayonet stab through the knee.

[1] OTIS (G. A.), *Case of Reamputation at the Hip*, in *American Jour. Med. Sci.*, 1871, Vol. LXI, p. 141. *Circular* No. 3, S. G. O., 1871, p. 215. In the account of Fabry's case, first published in the *American Journal of Medical Sciences*, 1871, Vol. LXI, p. 141, it is stated that the left leg was first amputated by Surgeon G. W. JACKSON, 53d Pennsylvania; again through the joint, August 23d, by Acting Assistant Surgeon W. F. ATLEE; and again on August 28th, by Acting Assistant Surgeon J. B. ROE. These statements were taken from the patient's written statements and from the artificial limb statement of Jewett's Leg Company. The original casualty list of the 2d Artillery Brigade of the Army of the Potomac and the case-book of the City Point Base Hospital of the Second Corps show conclusively that the first amputation was done August 17, 1864, at the lower third of the left thigh, by Surgeon G. L. POTTER, 145th Pennsylvania, and that the subsequent occasions of operative interference were ball extractions or incisions.

[2] *Circular* No. 6, S. G. O., 1865, p. 49. *Circular* No. 7, S. G. O., 1867, pp. 52, 65. HAMILTON (F. H.), *Treatise on Military Surgery*, 1865, p. 629.

CASE 332.—Private Eben E. Smith, Co. A, 11th Maine, aged 19 years, was wounded August 16, 1864, at Deep Bottom. A musket ball passed through the right leg from within outward, fracturing the head of the tibia. The wounded man was conveyed to a field hospital of the Tenth Corps, where it was determined that an attempt should be made to preserve the limb. Constant cold applications were made to the wounds. After a few days, the patient was sent to the North on a hospital steamer, and, on August 22d, he was received at the hospital at Beverly, New Jersey. On admission he suffered but little pain, though the knee joint was considerably swollen. On September 14th secondary hæmorrhage occurred, and it was deemed advisable to remove the limb. The amputation was performed by Acting Assistant Surgeon J. C. Morton, at the lower third of the thigh, by the circular method, the patient being anæsthetised by chloroform. On examining the seat of the injury, it was found that a fissure ran through the external tuberosity of the tibia and the external articular surface, and that the bone was carious in the vicinity of the fracture. The specimen was forwarded to the Army Medical Museum by Assistant Surgeon C. Wagner, U. S. A., and is represented in the wood-cut (FIG. 114). The case progressed favorably until October 17th, when there was hæmorrhage from the stump to the amount of twelve ounces. The stump was in a sloughing condition, and it was therefore determined to tie the femoral artery in Scarpa's space, which was done by Dr. Morton. The ligature came away on November 1st. The wound remained in an unhealthy condition, with a copious fetid suppuration, and the necrosed extremity of the femur protruded from the upper angle of the wound. On November 5th, the soft parts were retracted, and four inches of the shaft of the femur were resected by the chain saw. After this the stump became much swollen, frequent abscesses formed, and it was finally decided that necrosis involved the femur quite up to the trochanters. This conclusion was verified by an exploratory incision made on January 19, 1865, when it was determined to proceed at once to amputate at the coxo-femoral articulation. The operation was performed by Acting Assistant Surgeon John H. Packard. The patient being already under the influence of chloroform, the femoral artery was exposed and tied just below Poupart's ligament. Anterior and posterior flaps were then formed and disarticulation effected. Some difficulty was experienced in securing an artery supposed to be the *comes nervi ischiadici;* but the quantity of blood lost in the operation was not considered large. There was extreme depression after the operation, and the patient was kept on the amputating table for two or three days, lest an attempt at removal should prove fatal. Large quantities of stimulants and concentrated food were administered, and artificial warmth was applied to the surface of the body. Eight days after the operation hæmorrhage to the extent of six ounces occurred, and a ligature was placed upon the external iliac artery by Dr. J. C. Morton. The ligature separated on February 17th. On the 19th there was profuse bleeding from the point of ligation, which was controlled by pressure. Direct compression was maintained for fourteen days. After this the patient rapidly improved, and by the end of March he was quite well. On April 12th, Smith was transferred to the White Hall Hospital, near Bristol, Pennsylvania. On May 27, 1865, Assistant Surgeon W. H. Forward, U. S. A., reported his discharge from service with a sound stump and robust health. After his discharge Smith went to his home at Eastbrook, Maine, and was granted a pension. On February 27, 1867, he wrote to this office that his general health was excellent, but that the cicatrix of his stump was painful. In May, 1867, he was admitted to the eastern branch of the U. S. Military Asylum for disabled volunteer soldiers, at Togus Springs, near Augusta, Maine. On May 12th, the surgeon of the asylum, Dr. B. B. Breed, wrote that he "was apparently in perfect health, and complained only of congestion of the stump after standing for some time." In July, 1867, Dr. Breed forwarded photographic prints representing the condition of the cicatrix two and a half years after the amputation at the hip, from one of which the adjoining photograph (FIG. 115), is copied. An attempt was proposed to adapt an artificial limb to the stump. The exarticulated portion of the femur was forwarded to the Army Medical Museum by Assistant Surgeon C. Wagner, U. S. A. It is represented in the adjacent wood-cut (FIG. 116), and shows a fragile involucrum and sequestrum about to separate extending quite to the epiphysis. Pension Examining Surgeon P. H. Harding, of Ellsworth, Maine, reports, in 1867, that the pensioner's health has become poor, and that he is unable to do any manual labor. On December 4, 1874, Dr. G. Parcher, of Ellsworth, certifies "that, in consequence of the extensive and tender cicatrix, the pensioner cannot sit to work at any trade or to write, and as he cannot wear an artificial limb, he can perform no labor in an erect position." June 4, 1878, this pensioner alleged no further disability.[1]

FIG. 114.—Shot perforation of right tibia. *Spec.* 3709.

FIG. 116.—The upper half of right femur, disarticulated five months after amputation in lower third. *Spec.* 81.

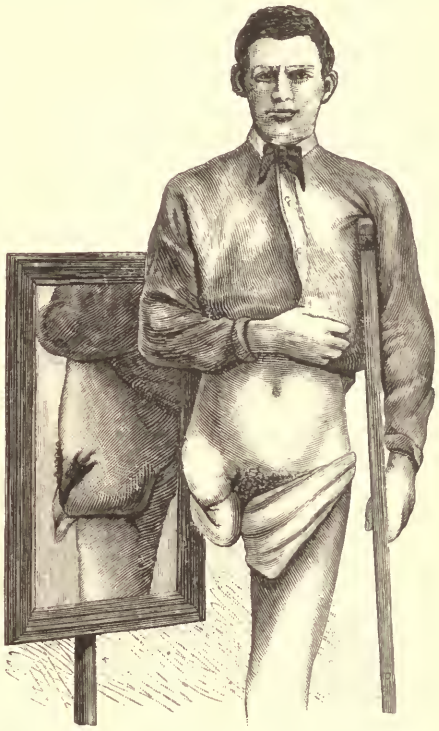

FIG. 115.—Appearance of cicatrix two and a half years after coxo-femoral exarticulation. [From a photograph.]

[1] WAGNER (C.), *Report of interesting Surgical Cases*, p. 15. MORTON (T. G.), *Amp. Hip Joint in Philadelphia, etc.*, in *Am. Jour. Med. Sci.*, 1866, Vol. LII, p. 32. PACKARD (J. H.), *On Amputation at the Hip Joint*, in *New York Jour. Med.*, 1865, Vol. II, p. 161. *Circular* No. 6, S. G. O., 1865, pp. 49, 50. *Circular* No. 7, S. G. O., 1867, pp. 49, 65.

CASE 333.—Sergeant E. D. Ulmer, Co. G, 15th New Jersey, aged 21 years, was wounded at Cedar Creek, October 19, 1864, by a musket ball, which entered the inner face of the left thigh, fractured the bone, and lodged under the skin on the outer side of the limb. The femur was badly comminuted, fissures extending into the knee joint and upward for seven inches (FIG. 117). The ball was extracted at a field hospital of the Sixth Corps, and it was determined to attempt to save the limb. The wounded man was conveyed to Baltimore, to Jarvis Hospital, on October 24th. Intense arthritis supervened, with deep dissecting abscesses in the thigh. On November 14th hæmorrhage to the extent of twenty-five ounces took place from both orifices, which were in a sloughing condition. The patient was put under ether, and amputation at the middle of the thigh was performed by Acting Assistant Surgeon Edmund G. Waters. The patient rallied promptly after the operation, and in a few weeks was able to get about on crutches. Yet the stump continued painful, and the extremity of the femur was found to be necrosed. In March, 1865, it was found that a cylindrical sequestrum was loose. This was removed, on March 8th, by Acting Assistant Surgeon B. B. Miles, with forceps (FIG. 118). On May 29, 1865, he was discharged. On the following day he started for Philadelphia, and, unfortunately, on the journey he fell with violence upon the stump. After this there was increased suppuration, with deep-seated pain in the stump. On the 22d of January, 1866, fifteen months after the original injury, while dressing the part as usual, a hæmorrhage occurred from one of the fistulous openings at the end of the stump, amounting, according to his statement, to at least a pint. On account of this hæmorrhage, he was admitted into the Pennsylvania Hospital. The history of the case and the appearances of the stump clearly indicated the existence of osteomyelitis, with necrosis of the neck, and probably ulceration of the head of the bone. The risk of recurrence of dangerous hæmorrhage, and the extensive disease of the femur, obviously demanded operative treatment. On February 17, 1866, in the hospital amphitheater, the patient being etherised, an exploratory operation was made by Dr. Thomas G. Morton, the attending surgeon, and amputation was decided upon by him in consultation with Drs. W. Hunt and D. H. Agnew. The abdominal tourniquet, used the first time in this country by Professor Joseph Pancoast, June, 1860, was applied, and antero-posterior integumentary flaps were dissected up; the femoral artery was then tied, the muscles cut circularly, and the head of the bone was disarticulated. The aorta was so completely controlled by the abdominal tourniquet that no arterial jet was observed during the operation. About sixteen ligatures were applied. The flaps were approximated with adhesive plaster, no sutures being deemed necessary. The dressings consisted of lint soaked in pure laudanum. The patient reacted well; under vigorous stimulating treatment and the local application of permanganate of potash he rapidly recovered. He left the hospital March 27, 1866, for his home in Philadelphia. The exarticulated portion of the femur presented a characteristic example of necrosis following osteomyelitis. A long loose sequestrum was found encased in a new deposit of porous bone, and was not limited to the diaphysis, but extended quite into the neck, and then projected through the ulcerated capsular ligament. The head of the femur was ulcerated. The acetabulum was healthy. On May 10, 1866, the patient was able to get about on crutches. On the 20th, he left for New Jersey to fill a situation as telegraph operator. On July 24, 1866, he sent a letter to this office from Milford, New Jersey, announcing that his health was excellent, and a few weeks subsequently he corroborated this statement by transmitting his photograph (FIG. 119). On October 27, 1866, he was supplied with an artificial limb by Clement, of Philadelphia. On June 28, 1867, Mr. Ulmer wrote to this office that he had never had a day's illness since the hip joint amputation was performed, and had never been in better health than then. He was stouter than ever before, weighing one hundred and seventy-five pounds, or twenty-five more than his average weight when he had both lower extremities. His stump was firm and solid and gave him no pain or inconvenience. He considered his artificial limb an excellent one, but found it inconvenient at his work, which required him to sit all day on a high stool. In a letter addressed to the Surgeon General's Office from the publishing house, 1630 Wellington Street, Philadelphia, October 15, 1878, Mr. Ulmer reported his health as most excellent, his weight at 173 pounds, or 25 pounds more than before exarticulation. He had an artificial limb from Clement, but had to abandon it.[1]

FIG. 117.—Shot comminution of lower half of left femur. *Spec.* 3734, A. M. M. ¼

FIG. 118.—Cylindrical sequestrum from femur. *Sp.* 107, A. M. M. ½

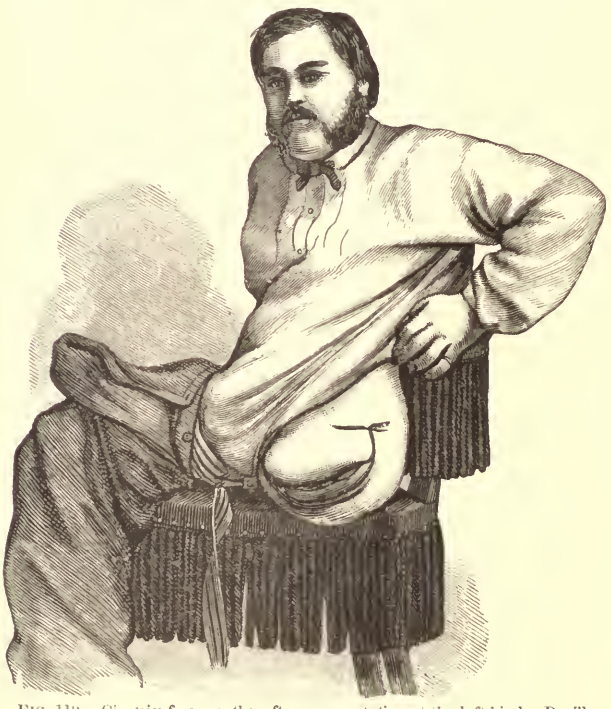

FIG. 119.—Cicatrix five months after reamputation at the left hip by Dr. T. G. MORTON. [From a photograph.]

FIG. 120.—Exarticulated necrosed upper portion of femur. [From a photograph by WILLARD.]

[1] MORTON (T. G.), *loc. cit.*, Vol. LII, p. 26. LIDELL (J. A.), *On Secondary Traumatic Lesion of Bone, etc.*, in *U. S. San. Com. Memoirs*, 1870, Surg. Vol. I, p. 440. *Circular* No. 7, S. G. O., 1867, pp. 51, 65.

CASE 334.—Private *R. A. Vick*, Co. E, 43d North Carolina, aged 37 years, received a shot wound of the knee joint, at Cedar Creek, October 19, 1864, and underwent primary amputation at the lower third of the right thigh. On December 19th, he was sent to the hospital at Staunton. On January 1, 1865, the stump had almost cicatrized, but there were apertures through which pus issued. On February 15, 1865, an exploration with a silver probe revealed bone denuded of periosteum and roughened. Another aperture led to a somewhat superficial fistulous track of six or eight inches. It was determined to open the face of the stump, with a view to the removal of the diseased bone. The operation was performed on March 11, 1865, by the surgeon in charge of the hospital, Dr. A. M. Fauntleroy, assisted by Drs. T. W. Glocker and R. K. Carter. Chloroform was administered. A transverse incision was then made over the face of the stump. At the exposed extremity of the femur was a redundant mass of new bone, which was sawn off. It was then found that the carious shaft of the bone was encircled by a soft porous osseous deposit. About six inches of this formation was stript off by the gouge, yet the limits of morbid action had not been reached. An incision on the outer side of the thigh, between the vastus externus and biceps, was extended upward to a point between the great trochanter and the anterior iliac spine, and revealed the fact that the entire femur was diseased. It was now decided to disarticulate at the hip joint. The femoral artery was compressed upon the pubic bone and anterior and posterior flaps were formed, the arteries being secured as they were cut. The loss of blood was trifling. The flaps were brought together by silver sutures, and the stump was dressed with dry lint. As soon as consciousness was restored the patient was freely stimulated, and warmth was applied to the surface of the body; the patient rallied in a few hours. At bed-time the pulse beat 120. On the following morning the patient was doing well. Pulse still the same in quickness and frequency. On March 13th, his condition was satisfactory; his appetite was remarkably good; he ate soft-boiled eggs and drank largely of rich milk. Suppuration having commenced, cold water was directed to be constantly applied to the stump to lessen the secretion of pus. He was ordered twenty drops of the tincture of the sesquichloride of iron thrice daily, and ten grains of Dover's powder at bed time. Suppuration amounted to half a pint during the day. On March 20, 1865, he was still doing well. Suppuration was diminished in quantity and was laudable. Sutures were removed, and adhesive strips used to support the flaps and maintain them in apposition. The patient's bowels had been regular since the operation. His tongue had at no time been furred. The stump was doing well. The discharge had abated to three or four ounces. March 28th, the progress of the patient was highly favorable. March 29th, the patient's condition was comfortable and favorable; his appetite continued good. The stump along the lower surface seemed to have united firmly; on the side, granulations were healthy; the pus discharged was laudable. On April 24th the face of the stump had entirely healed. There was still a granulating sore at the outer angle. On July 18, 1865, the patient started for his home, near Tarborough, in Edgecomb, North Carolina. He was in excellent health, and walked about on crutches with facility. A year subsequently he was in Lynchburg, Virginia. Since that date no intelligence has been received from him, and it is not known whether he still survives.[1] Dr. A. M. Fauntleroy, the operator, courteously transmitted to the Surgeon General's Office a photograph of the diseased exarticulated femur, which is copied in the wood-cut (FIG. 121), and the photograph of the patient and of his stump sixteen months after the operation, July, 1866, which is represented in the wood-cut, FIG. 122.

FIG. 121.—Exarticulated carious femur. [From a photograph sent by Dr. FAUNTLEROY.]

FIG. 122.—Cicatrix sixteen months after reamputation at the right hip. [From a photograph.]

CASE 335.—Henry Campbell, aged 23 years, received, in March, 1863, at New Orleans, a pistol shot in the left knee. Primary amputation at the junction of the middle and lower thirds of the thigh was performed by Acting Assistant Surgeon Avery. Osteomyelitis supervened and resulted in necrosis. After a few months the patient was removed to his home in Connecticut. In October, 1864, eighteen months subsequent to the injury, he was visited by Dr. Bauer, of New York, who laid open the cicatrix, crowded with fistulous openings, and removed a cylindrical sequestrum five inches in length. For a few months after the removal of this sequestrum the health of the patient improved, and hope was entertained of his recovery without further operative interference; but persistent pain and constitutional disturbance then recurred with augmented intensity. The lower part of the stump was riddled with sinuses and the tissues were much indurated. The probe detected dead bone, or morbid bone formation, in every direction. In October, 1866, the medical attendants resolved that an operation should be performed for the radical removal of the diseased bone. It was hoped that it would be only necessary to remove a portion of the shaft of the femur. On October 22d, the patient was placed under the influence of chloroform, and Dr. James B. Whitcomb, assisted by Dr. Charles Bliss, of Willimantic, and others, proceeded with the operation. An exploratory incision was made on the outside of the thigh, extending quite up to the trochanter. On exposing the new osseous formation at the end of the stump it was found to be more than twice the normal diameter of the shaft of the femur, rough, porous, and fragile. The immensely thickened periosteum was studded with plates and spines of new bone, and in many cases there were foliaceous masses of callus unconnected with the shaft. Toward the upper extremity of the femur the periosteum appeared less diseased,

[1] FAUNTLEROY (A. M.), *Hip Joint Amputations*, in *Richmond Medical Journal*, 1866, Vol. I, p. 7. EVE (P. F.), *Contribution to the Hip Joint operations performed, etc.*, in *Trans. Am. Med. Ass'n*, 1867, Vol. XVIII, p. 254. *Circular* No. 7, S. G. O., 1867, pp. 50, 65. LÜNING (A.), *loc. cit.*, p. 103, CASE 368.

but the bone was found to be softened and disorganized quite up to the great trochanter. It was therefore decided to amputate at the hip joint. Ether was administered. Pressure with the thumb on the femoral artery served to control the hæmorrhage. A large antero-internal flap was formed and disarticulation effected. There was very little loss of blood, but the patient was greatly prostrated by the shock of the operation, which, from the beginning of the exploration to the completion of the amputation, lasted fifty minutes. The free administration of ammonia and brandy brought about reaction; but it was temporary, and the case terminated fatally, five hours after the operation, October 22, 1866.[1]

CASE 336.—Private Lewis Larry, Co. A, 1st New Orleans Regiment, aged 23 years, was shot through the left knee by a sentry, July 18, 1864, while attempting to avoid arrest. He was carried to the University Hospital. It was found that the condyles of the femur were badly comminuted. Synovial fluid was dribbling from the wound, with little hæmorrhage. Amputation at mid-thigh was promptly performed, under chloroform, by double flaps. The patient did well for about three weeks, when he was attacked with persistent diarrhœa. Erysipelas now attacked the stump. Sloughing phagedæna of the flaps ensued, and purulent sinuses extended upward along the femur, the necrosed extremity of which protruded from the stump. Amputation at the hip joint was performed by Acting Assistant Surgeon F. Hassenburg, on September 21, 1864. The patient was under the influence of chloroform. The artery was controlled at the groin, an anterior flap was formed by transfixion, the capsule divided and disarticulation effected, and a posterior flap cut from within outward. The hæmorrhage was inconsiderable, and the patient promptly rallied from the shock of the operation. For a few days his appetite and general health improved; then the wound assumed an unhealthy aspect, and finally sloughed. Symptoms of pyæmic infection set in, and death ensued on September 30, 1864. On dissecting the removed portion of the thigh it was found riddled with abscesses. The periosteum was enormously thickened and contained flaky ossific deposits. The shaft of the femur was necrosed up to the trochanters, the dead bone being included in a redundant friable involucrum. The preparation was forwarded to the Army Medical Museum by Surgeon Samuel Kneeland, U. S. V.[2]

FIG. 123.—Diseased stump of femur from a case of coxo-femoral disarticulation. *Spec.* 3738, A. M. M. $\frac{1}{4}$

CASE 337.—Charles H. Hawkins, a second lieutenant in Co. C, 4th New York Cavalry, aged 23 years, was wounded in a reconnoissance near Strasburg, Virginia, on the night of June 1, 1862. A conoidal ball, from a Colt's cavalry pistol, entered the posterior surface of the right thigh, and, passing downward and forward, fractured the femur at the lower part of the middle third, and lodged under the skin about five inches above the knee. The wounded man lay out all night in the rain, and in the sun next day until three in the afternoon, when he was brought into camp and had the ball removed by his regimental surgeon. He was then conveyed in an ambulance to a hospital in Strasburg, where his limb was dressed with a straight splint, moderate extension and counter-extension being maintained. After ten days he was carried on a stretcher to a private house, where he remained seventeen days. Two fragments of bone were extracted during this period. He was next transferred to a tent hospital, five miles distant, near Middletown, and after a sojourn of nine days was again transferred to a hospital at Winchester. The splints were removed and the limb was bandaged. On July 19th he was conveyed to Baltimore, and admitted to the Camden Street Hospital on July 20th. His condition was very unpromising; there was much irritative fever, a copious suppuration, and partial union of the fracture, with three inches shortening and much angular deformity. No apparatus was applied; but the limb was maintained in an easy position by pillows, and attention was mainly directed to improving the condition by wholesome diet. Two months subsequently the patient had gained ground, and an operation to remove the diseased bone and to break up the faulty union of the fragments was determined on. On October 1st, the posterior orifice was enlarged, a number of denuded fragments of bone were removed by forceps, and the deformed callus was chiseled and gouged away. Temporary improvement ensued. The limb was put in a proper position and the wound was daily syringed out by iodine injections. After a time, however, it became manifest that the broken extremities of the femur were still diseased. On April 5, 1863, the patient was transferred to the Ladies' Home Hospital, New York City, where he was received on April 8th, greatly reduced in strength. The wounds discharged profusely, and he complained of much pain. On April 29th, Surgeon A. B. Mott, U. S. V., amputated the limb at mid-thigh. Evidence that the femur was diseased above the point at which it was sawn soon became apparent, and, after a protracted effort to induce healthy action, the flaps were freely laid open and the femur was resected, four inches of the shaft being removed. After this the patient was put upon a full diet, with an allowance of brandy and of porter daily. The stump still failed to assume a healthy action, but became much enlarged, undergoing apparently a fatty degeneration. On April 4, 1864, Lieutenant Hawkins was mustered out of the military service, and was transferred to St. Luke's civil hospital, and came under the care of Dr. Gurdon Buck. The patient was anæmic, his appetite capricious; he was compelled to keep his bed continually on account of the pain he suffered when the stump was in a dependent position. For over five months every means were used to bring the patient up to a condition in which an operation for the removal of the diseased femur stump might be safely undertaken. On September 21st, he was placed under the influence of sulphuric ether, and Dr. Buck proceeded to disarticulate. It was found necessary to bisect the stump, uncovering the neck of the bone on the inner as well as the outer aspect, by an incision which commenced above the great trochanter and ran around the extremity of the bone to near the tuberosity of the ischium. During the operation the administration of ether was suspended on account of the extreme feebleness of the circulation, and brandy was freely given, and warm applications were made to the trunk. The loss of blood was not great, but every possible means had to be called into requisition to bring about a partial reaction after the operation, so great was the prostration and so feeble the recuperative powers. After twenty-four hours of great apparent suffering, the patient died in a syncope, September 22, 1864. The portion of the femur removed consisted of the head, neck, and trochanters, with four inches of the shaft. The head and neck were much softened and the shaft was atrophied and fatty.[3]

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[1] *Circular* No. 7, S. G. O., 1867, pp. 52, 65.

[2] *Circular* No. 6, S. G. O., 1866, p. 50. *Circular* No. 7, S. G. O., 1867, pp. 48, 65.

[3] WATERS (E. G.), *Shot Fractures of the thigh*, in *Am. Med. Times*, 1863, Vol. VI, p. 185. HAMILTON (F. H.), *Amp. in Shot Fractures of the Femur*, in *Am. Med. Times*, 1864, Vol. VIII, p. 1. *Circular* No. 6, S. G. O., 1865, p. 50. *Circular* No. 7, S. G. O., 1867, pp. 47, 65.

TABLE XVIII.

Summary of Nine Cases of Reamputation at the Hip Joint.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Operation.	Operation and Operator.	Result and Remarks.
1	Cotter, W., Pt., E, 9th New Hampshire, age 27.	July 30, 1864.	Musket ball fract. lower third right femur; prim. amp. thigh, mid. third. Nov. 29, '64, seq. rem.; osteomyelitis. June, '66, exc. four inches end of stump. Subsequent operation rem'd dead bone.	Oct. 15, 1871.	Reamp. thro' extend'g incision of later operation upward sufficiently to allow ready exarticulation of head, neck, and trochanteric portion of femur, by Dr. N. S. Lincoln, Washington, D. C.	April, 1872, w'd cicatriz'd firmly. 1873, abscesses unhealed; constant irritation. Died Jan. 21, '74. *Specs.* 252, 4954, 5946. *Photos.* 61, 180, 324. OTIS (G. A.), in *Boston Med. and Surg. Jour.*, Feb. 7, '78, Vol. XCVIII. p. 166, and *Circular* 3, S. G. O., Washington, 1871, p. 283.
2	Fabry, J., Pt., Battery K, 4th Artillery, age 38.	Aug. 16, 1864.	Shrapnel shot wound left knee joint; prim. amp. lower third thigh. Aug. 28, ball and pc. of fuse ext.; necro.; abscesses opened. 1866, discharge profuse; exfol. fistulous open'gs. Oct. 27th, dead bone removed. 1867 to 1870, abscesses cont'd to form and dead bone to exfo.	May 15, 1870.	Long semi-lunar flap; incision from point on tuberosity of ischium to point midway between ant. sup. spin. process of ilium and troch. major, by Ass't Surg. G. A. Otis, U. S. A.	Reaction prompt. May 18th, w'nd united nearly $\frac{3}{4}$ full extent by first intention. June 5th, about on crutches. July 13th, completely cicatrized. *Specs.* 5684, 5685, 5687, 5699, 5702. *Photos.* 274, 275, 276.
3	Francis, L., Pt., 1, 14th New York State Militia, age 42.	July 21, 1861.	Bayonet thrust opening right knee joint (14 other bayonet stabs); gangrene; extensive abscess on thigh. Oct. 28th, amp. mid. third thigh. Nov. –, femur protruded; exsected. May, 1862, necrosed end of femur exsected.	May 21, 1864.	Antero-posterior flap reamputation at hip joint, by Surg. A. B. Mott, U. S. V. (Bone found extensively diseased close up to head.)	Rapid recovery: stump sound. 1867, confined to bed; copiously discharging ulcer, fistula in ano. 1870, about on crutches, stump apparently healed. Died, May 30, 1874, suddenly.
4	Smith, E. E., Pt., A, 11th Maine, age 19.	Aug. 16, 1864.	Musket ball fract. head of right tibia. Sept. 14th, hæm.; amp. low. third thigh. Sept. 17th, hæm.; lig. fem. Nov. 5th, necrosis; four ins. end of femur resected; frequent abscesses.	Jan. 19, 1865.	Anterior and posterior flap amputation at hip joint, by A. A. Surg. J. H. Packard. (Femur found necrosed up to trochanters.)	Extreme depression. Jan. 27, '65, hæm.; lig. external iliac artery. Feb. 19th, hæm.; compression. Disch'd May 27, 1865, sound stump. *Specs.* 81, 3709. *Photos.* 29, 174, 203.
5	Ulmer, E. D., Serg't, G, 15th New Jersey, age 21.	Oct. 19, 1864.	Conoidal ball com'nuted fract. left femur, fissures extending into knee j t and upw'd seven inches: ball ext. Nov. 14th, hæm.; amp. mid. third. Mar., '65, seq. removed. Jan., '66, hæm. from end of stump; osteomyelitis.	Feb. 17, 1866.	Anterior and posterior flap amputation at hip joint, by Dr. T. G. Morton, Penn. Hospital. (Bone diseased as high as neck.)	Rapid recovery. Left hospital March 27, 1866. 1877, continues in good health; stump in healthy condition. *Specs.* 107, 3734.
6	*Vick, R. A.*, Pt., E, 43d N. Carolina, age 37.	Oct. 19, 1864.	Shot wound right knee joint; prim. amp. lower third thigh. Jan. 1, '65, almost cicatrized. Feb. 15th, increased disch'rge of pus. Exploration revealed entire femur diseased.	Mar. 11, 1865.	Anterior and posterior flap amputation, by Surg. A. M. Fauntleroy, C. S. A., assisted by Drs. T. W. Glocker and R. K. Carter.	April 24, 1865, stump entirely healed. Last heard from July, 1866, in excellent health.
7	Campbell, H., Sutler's Cl'k, age 23.	Mar. —, 1863.	Pistol shot in left knee; prim. amp. junct. low. thirds thigh; osteomyelitis; necrosis. Oct., 1864, seq. removed; stump riddled with sinuses.	Oct. 22, 1866.	Large anterior internal flap, by Dr. J. B. Whitcomb. (New osseous formation at end of stump was twice the diameter of shaft of femur; bone soft and diseased up to troch.)	Died October 22, 1866, five hours after operation.
8	Hawkins, C. H., Lieut., C, 4th New York Cavalry, age 23.	June 1, 1862.	Conoidal pistol ball fract. mid. third right femur; ball extr'd. July 20th, bone partially united. Oct. 1st, fragments and calloused bone removed. Apr. 29, '63, amp. mid. third; exc. four inches of femur.	Sept. 21, 1864.	Tissues of stump indurated and inelastic; stump bisected by an incision commencing above great troch., running around end of bone to near tuberosity of ischium: antero-posterior flap, by Dr. G. Buck.	Only partial reaction. Died September 22, 1864, in a syncope, after twenty-four hours of great apparent suffering.
9	Larry, L., Pt., A, 1st New Orleans, age 23.	July 17, 1864.	Shot wound left knee comminuting condyles of femur; prim. amp. mid. third thigh; erysip. attack'd stump, flaps slough'd, necrosed end bone protruded.	Sept. 21, 1864.	Anterior flap formed by transfixion, posterior flap cut from within outward, by A. A. Surg. F. Hassenburg.	Rallied promptly; wound became unhealthy and sloughed. Died Sept. 30, 1864; pyæmia. The shaft of femur was necrosed up to trochanters. *Spec.* 3738.

These nine cases of reamputation at the hip comprise only three deaths, giving the low mortality rate of 33.3 per cent. In three instances the exarticulation had been preceded by amputation in the lower third of the thigh, and, in six cases, the disarticulation was subsequent to amputation in the middle third of the thigh. In two of the cases the prior amputation was done on account of shot fracture of the shaft of the femur, in six for shot fractures involving the knee joint, and, in one, for a bayonet stab of the knee. In six instances extraction of sequestra or resection of the necrosed extremity of the femur had been practised in the interval between the amputation in the continuity and the disarticulation. In the three fatal cases the prior amputation had been primary in two instances; secondary in the third case. One patient survived the shock of the operation only a few hours; another died in a syncope after twenty-four hours of great apparent suffering, and

the third succumbed to pyæmia eight days after the exarticulation. Of the six patients who survived the operation, three, J. Fabry (CASE 330), E. E. Smith (CASE 332), and E. D. Ulmer (CASE 333), were living in August, 1879. Of the Confederate soldier, Vick (CASE 334), no information has been received since 1866, and it is not known whether he still lives. Two survivors of the operation have since died: Cotter (CASE 329), in 1874, two years and three months after the operation; Francis (CASE 331), in 1874, over ten years after the exarticulation.

The nine cases cited in TABLE XVIII, and the operations performed by G. J. Guthrie,[1] in 1812, and by T. G. Morton,[2] in 1878, are, it seems, the only recorded examples of reamputations at the hip in military surgery. From the records of the surgery of civil life twenty-five cases may be collected, making a total of thirty-six[3] exarticulations at the hip after previous amputations in the thigh, with fourteen deaths, a mortality of 38.8 per cent. Of the eleven cases in military surgery, four, or 36.3 per cent., proved fatal, while, of the twenty-five operations in civil practice, ten, or 40.0 per cent., had a fatal termination.

Summing up the sixty-six cases of amputation at the hip detailed in the preceding pages, it will be seen that twenty-five were primary, twenty-three intermediary, nine secondary, and nine were reamputations. In each of the twenty-five primary cases the amputation was performed within twenty hours of the infliction of the injury, the average interval between the reception of the wound and the operation being about four hours. Sixteen died within twelve hours, one survived thirty-six hours, two about forty-eight hours, and one lingered eight days; in two instances the period between the operation and death could not be ascertained; the average period of death being about twenty hours. Of the three survivors after primary amputation at the hip, one was in comfortable health over fifteen years after the operation; the other two patients were heard from two and six months, respectively, after the date of the operation, but the hope expressed in *Circular* No. 7, at page 23, that the subsequent histories of these men might be traced has not been attained; and there might be some question regarding the justness of citing these cases as well authenticated instances of recovery. In TABLE XIV, on page 127, *ante*, these cases have been classed among the recoveries, thus arriving at a fatality of 88.0 per cent. Should they be excluded, the fatality of the primary amputations at the hip during the war of the rebellion would be 95.6 per cent. The femoral vessels were torn in six of the primary amputations, to wit: Compton's case (273) of *Robinson;* Carnochan's case (280) of Gordon; Lay's case (284) of a private of the 3d Missouri, in which the femoral artery was ligated prior to amputation; Brock's case (286) of Waters, in which the opposite leg was also amputated at the point of election; Davis's case (287) of Wayland, and Lanning's case (289) of Brookins.

The twenty-three intermediary exarticulations at the hip had fatal results. The interval between the reception of the injury and the date of the operation varied from twenty-four hours to thirty days, the mean length being a little over nine days. Only two survived

[1] See CASE 12 in *Note* 1 on page 128, *ante.* [2] See CASE 184 in *Note* on page 130.

[3] In note 1 on page 152, *ante*, reference was made to 32 instances of exarticulation at the hip after previous amputation in the continuity of the thigh. The prior operations had been performed in 9 instances for shot injury, in 2 for punctured and incised wounds, in 5 for bad fractures of the femur, in 8 for ostitis or ill defined lesions, and in 8 for malignant growths. Particulars of 4 additional instances have since been ascertained, viz: three exarticulations at the hip after amputations in the thigh for ill defined lesions: E. S. O'GRADY, in 1874 (*Dublin Journal of Med. Sciences*, 1876, Vol. LXI, p. 78); T. G. MORTON, in 1877 (*Cincinnati Lancet and Clinic*, 1879, Vol. II, N. S., p. 9, and letter of Dr. T. G. MORTON to the editor, dated February 19, 1879); B. BECK, in 1878 (*Archiv für Klin. Chir.*, Berlin, 1879, B. XXIII, p. 654); and a reamputation at the hip by T. G. MORTON, in 1878: Boasso Dominico (not Dominico Ludovess, as indicated in CASE 184 in note on p. 130, *ante*), aged 24; wounded in the right thigh, by a cannon ball, at Sedan, in 1870; amputation in middle third; reamputation at hip, December 14, 1878. Recovery (*Cincinnati Lancet and Clinic*, 1879, Vol. II, N. S., p. 9, and Dr. T. G. MORTON'S letters to the editor, dated February 19, March 18, and May 28, 1879). Of the 36 reamputations at the hip, 14 had a fatal termination, a mortality of 38.8 per cent.

the amputation eight days; nine died within the first twenty-four hours, four on the second day, one on the third, three on the fourth, two on the sixth, and in two, the date of death could not be ascertained; the average duration of life after the operation in the intermediary series was only about thirty-five hours. In four instances gangrene, and, in two, pyæmia, supervened. In one case (Surgeon P. Pineo's case of Private P. Johnson, CASE 306, p. 141, *ante*) it is stated that the femoral artery was divided by the missile, and in one (Surgeon E. Bentley's case of L. Carroll, CASE 298, p. 139, *ante*) the amputation had been preceded by a primary partial excision in the shaft of the femur.

Of the nine secondary amputations at the hip, two resulted successfully. George W. Lemon (CASE 320, p. 145, *ante*) enjoyed good health in 1879, nearly fifteen years after the operation. In the case of the Confederate soldier *W. W. Longmoor* (CASE 321, p. 146, *ante*), the following additional information was received shortly after the case had been sent to press:

CASE 321, p. 146 (continued): Mr. Longmoor, who, at the present writing, is clerk of the court at Cynthiana, Kentucky, writes, under date of April 2, 1879: "I have had two abscesses form in my stump, * * the first one was very severe indeed, and kept me confined to my bed for several weeks, and discharged copiously for about one week of that time. The next and last abscess was not near so severe, and did not confine me to my bed for more than about two weeks. The discharge was not near so great, and the pain accompanying the formation not near so severe. I have a *constant* pain in my stump; an uneasy, restless sort of a pain that never ceases but is always with me—at times much worse than others, and often taking the form of neuralgia, especially before or during damp or falling weather. I suffer a great deal from neuralgia—acute, very acute, lasting generally four or five days; sometimes compelling me to leave my office, at which times I usually resort to heavy doses of quinine. I use morphine every day. I take about one-fourth of a grain three times a day—have been doing this ever since I was wounded. During these times my stump becomes very sore, and hurts me when I walk. I have never been able to wear an artificial limb, in fact have never tried, knowing its utter impossibility, for I could not bear the weight of the limb much less the pressure on the stump."

Of the seven fatal cases after secondary amputation at the hip, one patient died from phthisis and lithiasis, one from secondary hæmorrhage and phlebitis, one from the giving away of the femoral artery at the point of ligation, one from surgical fever and erysipelatous inflammation of the stump, and three from the shock of the operation. The shortest interval between the operation and the date of death was one hour, the longest one hundred and nineteen days, the average duration of life being a little above twenty-two days. The average interval between the date of injury and the date of operation was about four hundred and twenty-nine days, the shortest interval being forty-three days, the longest two years, nine months and twenty-one days.

The sixty-six exarticulations at the hip were practised in forty-five instances with seven recoveries on Union soldiers, in twenty instances with four recoveries on Confederate soldiers, and, in a fatal instance, on a citizen employé. In twenty-nine instances with six recoveries, the right limb was removed; in twenty-eight with five recoveries, the left; and, in nine, the side was not stated. Chloroform was the anæsthetic administered in thirty-eight of the sixty-six cases, ether in ten, chloroform and ether in three. In one instance (Dr. B. D. Lay's CASE 284, p. 135, *ante*), stimulants and morphia only were given, and in fourteen instances this point is not mentioned. Considering the ages of the patients we find that three operations, performed on patients under twenty, were fatal; that of thirteen operations performed on patients between the ages of twenty and twenty-four inclusive, three were successful; of ten between the ages of twenty-five and twenty-nine inclusive, two had a successful issue; of seven between the ages of thirty and forty, four recovered; and of four above forty, two had a successful termination. In twenty-nine instances the age of the patient was not recorded.

Fragments or splinters of bone were removed prior to the exarticulation at the hip

joint in the cases of *W. W. Longmoor* (CASE 321, p. 146, *ante*) and of M. O'Neil (CASE 327, p. 150, *ante*). The ball and detached fragments of bone were extracted in Bowman's case (CASE 322, p. 147, *ante*), and the ball, with some wadding, in the case of Antonio Mutieres (CASE 326, p. 150, *ante*).

Of the different modes of amputating at the hip joint, the operation by the antero-posterior flap method was most commonly selected. It was used in twenty-nine of the sixty-six cases of exarticulation at the hip described in the preceding pages, and in five of the eleven cases of recovery, viz: in Dr. E. Bentley's case of Lemon (p. 145, *ante*); in Dr. A. B. Mott's case of Francis (p. 154, *ante*); in Dr. J. H. Packard's case of E. E. Smith (p. 155, *ante*); in Dr. T. G. Morton's case of Ulmer (p. 156, *ante*); and in Dr. A. M. Fauntleroy's case of *Vick* (p. 157, *ante*). The single flap method was successfully employed in three instances: by Dr. Shippen in the primary case of Kelly (p. 131, *ante*), by Dr. J. T. Gilmore in the case of *Williamson* (p. 132, *ante*), and by Dr. G. A. Otis in the case of Fabry (p. 153, *ante*), and unsuccessfully in twelve cases. Drs. William M. Compton and G. C. Blackman adapted, with success, the circular method in the cases of *Robinson* (CASE 273, p. 132, *ante*) and *Longmoor* (CASE 321, p. 146, *ante*). Larrey's method of amputating at the hip by two lateral flaps was preferred in eight instances; the oval was employed only once, in Dr. J. M. Carnochan's case of Gordon (CASE 280, p. 134, *ante*). In Dr. N. S. Lincoln's successful operation at the hip, in the case of Cotter (CASE 329, p. 152, *ante*), the disarticulation resembled an excision or enucleation rather than a reamputation. The mode of operation is not indicated in ten instances.

Prothetic apparatus, that might in some measure compensate the survivors after hip joint amputation for the loss of the limb, and relieve them of the necessity of continually using crutches, have been devised by Charrière, Foullioy,[1] and others. In 1867, Dr. E. D. Hudson devised a lined and padded gutta-percha bonnet conforming to the entire ilio-lumbar parts, and some eight inches in length, firmly strapped to the pelvis by a broad chamois-lined canvas band. To this artificial stump an ordinary apparatus for thigh stumps could be fitted. This simple apparatus, which is fully described by Dr. E. D. Hudson in his pamphlet: *Mechanical Surgery*, New York, 1878, p. 29, was tried by Kelly and Lemon; but, although great hopes were entertained that it would answer the purpose for which it was designed, it seems that this, as well as similar appliances, have now been discarded as useless, even by those survivors who, at the first, were favorably impressed with their utility. Mr. Ulmer, who wrote to this Office in June, 1867, that he considered his "artificial limb an excellent one," in a letter dated October 15, 1878, states that after several attempts to wear the artificial limb he had to abandon it, "as it gave intense pain; the weight of the body pressing the top of the limb too severely against the pelvic bone. Another objection is the absence of motive power in the stump to propel the limb. As this has to be given by a swinging motion of the body, the effort is too fatiguing." James E. Kelly, under date of July 30, 1870, writes: "The leg I got from Dr. Hudson is of no benefit to me whatever, nor ever will be. I tried it sufficiently to know that I cannot wear it." Lemon advises this Office on July 31, 1870, that: "The artificial limb is not now nor ever has been of the least service to me." Longmoor has never tried an artificial limb as he "knew it would be useless." Fabry never attempted to wear one, and there is no record that

[1] See GAUJOT (G.) et SPILLMANN (E.), *Arsenal de la Chirurgie contemporaine*, Paris, 1872, T. II, p. 153. M. DEBOUT (*Appareils destinés aux amputés qui ont subi la désarticulation de la cuisse*, in *Bulletin Général de Thérapeutique Méd. et Chir.*, Paris, 1862, T. 62, p. 283) relates that Cauzeret, a soldier of the Light Infantry, on whom BAUDENS successfully performed intermediary amputation at the hip, in Africa, in 1836 (CASE 38, *Note* 1, p. 128, *ante*), wore the apparatus of Foullioy for 11 years, from March, 1837, to October, 1848.

Cotter, *Williamson*, *Robinson*, *Vick*, or Francis essayed a trial. In the case of E. E. Smith the cicatrix remained too tender to allow the wearing of an artificial limb.

While the preceding pages were in press, a report of an unsuccessful primary amputation[1] at the hip by Assistant Surgeon Edward B. Moseley, U. S. A., was received from Fort Robinson, Nebraska. This, with three additional cases given in the foot-note,[2] increases the total number of exarticulations at the hip to two hundred and fifty-four,

[1] "Private Bernard Kelley, Co. E, 3d Cavalry, aged 39, while in the field in pursuit of Cheyenne Indians, on January 11, 1879, was struck by a carbine ball (said to have been an accidental shot from one of his own company), which entered at a point just over the centre of the sacrum, half an inch to the left of the median line, passed downward and outward through the gluteal muscles, and struck the left femur just between the two trochanters, fractured it, and escaped from the front of the thigh about two inches above its middle, and an inch to the outside of the median line. He was brought to the post hospital at Fort Robinson the same day, and was found to be suffering from a high degree of shock; he was pale, cold, and weak from hæmorrhage, which had occurred at intervals since the receipt of the wound. He was given one grain of morphia, and hot water was placed to his feet, and small quantities of beef essence given at frequent intervals. During the night he reacted a little from shock, but complained greatly of pain in the wound and of weakness. The thigh was supported in a comfortable position by pillows, and wet compresses were kept over the wounds. About one p. m., a brisk hæmorrhage commenced from the posterior wound, which, on examination, was found to be of such a serious nature as to require immediate interference to save the man's life. He was immediately placed under the influence of chloroform, and the posterior wound was freely enlarged, with the idea that the hæmorrhage came from the sciatic artery. This was found not to be the case, however, the blood flowing from the deeper portion of the wound, and probably originating from the branches of the profunda femoris. This opening allowing of a free introduction of the finger, the wound was thoroughly explored, and the femur was found to be hopelessly comminuted. The bleeding still continuing, it was decided to amputate the limb at the hip joint, which was done at once by Assistant Surgeon E. B. Moseley, U. S. A., assisted by Acting Assistant Surgeon C. V. Petteys. The femoral artery was compressed against the brim of the pelvis by Dr. Petteys, and the limb was removed by transfixion from without, joining the incision made previously to explore for the seat of hæmorrhage to that forming the anterior flap, which was rather long, and forming the posterior flap from the muscles on the back of the thigh. About four ounces of blood were lost, as well as could be judged, mostly from a general oozing from the surface of the flaps. The neck of the bone was seized by forceps and the head was removed from the acetabulum with some difficulty, owing to the short leverage obtained. The vessels were tied with silk ligatures and the flaps brought together with silver wire. The patient was then covered with blankets and bottles of warm water placed about him, and, as soon as possible after he reacted from the chloroform, he was given teaspoonful doses of brandy and water. He had taken the anæsthetic well and seemed to come out of it in good condition, recognized those about him, asked if his leg was off, and complained of pain, etc.; his pulse gradually improved in strength and decreased in rapidity. While in this improving condition, and before he could be stopped by the attendants, he suddenly raised his head and shoulders quite high and looked down at where his leg had been, then instantly fell back; the eyes rolled up, respiration became irregular, and he was dead inside of three minutes. Death occurred about two hours after the completion of the operation." The specimen of the fractured femur was forwarded to the Army Medical Museum, with the foregoing report, by the operator, Assistant Surgeon E. B. Moseley, and is numbered 6914 of the Surgical Section. Two views of the specimen are shown in the wood-cuts (FIGS. 124, 125).

FIG. 124.—Shot comminution of upper portion of left femur. *Spec.* 6914.

FIG. 125.—Anterior view of the same specimen.

[2] To the examples of amputations at the hip joint for shot injury cited in Note 1 on page 128, *ante*, should be added the following: 185. A primary operation performed by Assistant Surgeon J. M. STEINER, U. S. A. Private Hall, Co. K, 14th U. S. Infantry, was struck, at the battle of Chapultepec, September 12, 1847, by a round shot, just below the trochanter major of the left thigh. The femur was fractured and the soft parts lacerated for some inches. The patient survived only until evening. The case is reported by the operator, Dr. J. M. STEINER, in the *Medical Examiner and Record of Medical Science*, Philadelphia, 1849, N. S., Vol. V, p. 15.—186. Another primary operation to be added to the examples of exarticulation at the hip, in Note 1, p. 128, *ante*, is cited by M. CHENU from a report of Dr. DE POTOR (*Stat. Méd.-Chir. de la Camp. d'Italie, en* 1859 *et* 1860, Paris, 1869, T. II, p. 693). On June 25th, 1859, an Austrian, wounded at Solferino the night before, was brought to the Cavalry Hospital. The neck of the femur and the cotyloid cavity were comminuted. Coxo-femoral exarticulation was performed by Dr. EHRMANN. The patient survived only two hours.—187. A third primary operation to be added was performed by Dr. W. A. EAST, of San Antonio, Texas. A negro, aged 25, received, in the latter part of 1864, in Lavaca County, Texas, a shot wound at the outer and upper margin of the trochanter major. The head of the femur was comminuted. About ten hours after the injury Dr. EAST exarticulated at the hip by LARREY's method. He recovered, and was last heard from in the winter of 1865–66, through Dr. DOUGLASS (W. A. EAST, *Gunshot Wound—Fracture of the Head of the Os Femoris—Amputation at the Hip Joint—Recovery*, in *Southern Jour. of Medical Science*, 1866, Vol. I, p. 232). It will be noticed that I have omitted from the list of examples of amputations at the hip joint for shot injury in Note 1, p. 128, *ante*, several cases heretofore referred to by writers on this subject as authenticated instances of this exarticulation. I believe, with Dr. A. LÜNING (*Ueber die Blutung bei der Exarticulation des Oberschenkels und deren Vermeidung*, Zürich, 1877, p. 56), that the three cases ascribed to A. BLANDIN, of which two are reported to have been successful, and the successful case of PERRET, are apochryphal. Mr. PH. F. BLANDIN, who cites the successful cases of amputation at the hip in his article *Amputation*, in *Dict. de Méd. et de Chir. Prat.*, Paris, 1829, T. II, p. 280, does not mention these cases, and they are, as far as I have been able to ascertain, first mentioned by VELPEAU (*Nouv. Élém. de Médecine Opératoire*, Paris, 1832, T. I, p. 514); but the latter author, who, in the second edition of his *Nouv. Élém. de Méd. Opérat.*, Paris, 1839, T. II, p. 539, attempts to cite the authorities for his statements, omits to state the sources from which the BLANDIN and PERRET cases are derived. MALGAIGNE, in the discussions of the National Academy of Medicine at Paris, on August 8, 1848 (*Bull. de l'Acad. Nat. de Méd.*, Paris, 1847–48, T. XIII, p. 1278), refers to "a very remarkable thesis" on amputations by "ALEXANDRE BLANDIN, aide-major" to LARREY. In his *Reflexions sur plusieurs points de Chirurgie*, read to the first class of the Imperial Institute on March 6, 1815, and an extract of which is published in *Jour. de Méd. de Chir. et de Phar. Mil.*, Paris, 1815, T. I, p. 132, LARREY states that "Mr. MILLENGEN, Surgeon in Chief of the British Armies in Spain, assured him that he had made, with success, according to his method [of M. LARREY], two amputations" at the hip. I have omitted these cases, as it is probable that Mr. J. G. V. MILLINGEN, who was Chief Surgeon of the British Armies in Spain and Portugal, in 1811 and 1812, had reference to the cases of BROWNRIGG. It would, to say the least, appear strange that British writers on military surgery, who cite BROWNRIGG's and GUTHRIE's cases of amputation at the hip, should have failed to record the cases ascribed to MILLINGEN, who, as late as 1830, was chief surgeon of the British Armies. M. VELPEAU (*Nouv. Élém. de Méd. Opérat.*, Paris, 1839, T. II, p. 540) refers to a successful exarticulation at the hip by WEDEMEYER, and LEGOUEST in his paper *De la désarticulation coxo-fémorale au point de vue de la chir. d'armée*, in *Rec. de Mém. de Méd. de Chir. et de Phar. Mil.*, Paris, 1855, 2me sér., T. XV, p. 224, and *Traité de Chirurgie d'Armée*, Paris, 1863, pp. 669, 670, ascribes two fatal cases of amputation at the hip to the same operator. VELPEAU gives as his authority the *Bulletin de Perussac*, T. II, p. 165; LEGOUEST, the same *Bulletin*, T. III, p. 161. In the second volume of the *Bulletin des Sciences Médicales*, Paris, 1824, "*publié sous la direction de M. le Baron de* PERUSSAC," on p. 161, Obs. III, reference has been made to a case of amputation at the hip cited from an article by Dr. WEDEMEYER. *Amputa-*

with twenty-eight recoveries, two hundred and twenty-five deaths, and one instance in which the result was not ascertained, giving the slightly modified mortality rate of 88.9 per cent., instead of 89.1, as indicated on page 130, *ante*. Of these two hundred and fifty-four cases there were eighty-two primary,[1] with seventy-five deaths, or 91.4 per cent. fatality; fifty-five intermediary, with fifty-two deaths (94.5 per cent.); forty secondary, with thirty-three deaths (82.5 per cent.); eleven reamputations, with four deaths (36.3 per cent.); and sixty-six cases with sixty-one deaths, and one unknown result (93.8 per cent.) in which the time of the operation was not ascertained. According to these statistics it would seem that intermediary operations offer the least chance of recovery, that the results of primary operations are more favorable; that secondary exarticulations give one recovery in twelve cases, and that of the instances of reamputation one in about three proves successful; and I can, therefore, only reiterate what I have already stated on page 78 of *Circular* No. 7, that the statistics "tend to show that unless the nature of the injury is such that the operation can be delayed until the secondary period, it is better that it should be done at once,"[2] although it would appear that the dire results of amputations at the hip,[3] performed for shot injury during the Schleswig-Holstein War of 1864, the Austro-Prussian War of 1866, and the Franco-Prussian War of 1870–71, have had a tendency to raise doubts regarding the expediency of especially the primary exarticulation at the hip.[4]

tion nahe am Hüftgelenke, wegen Osteosteatoma, etc., in *Mag. für die gesammte Heilkunde*, B. XIII, Berlin, 1823. The article will be found at page 45 of the *Magazin*, and it is there stated that the amputation was performed in May, 1821, the width of a hand below the hip joint ("eine Handbreit unter dem Hüftgelenke"). The patient, a soldier named Kloppner, recovered. I have vainly searched Baron FERUSSAC'S *Bulletin* for the fatal cases cited by M. LEGOUEST. The case of fatal secondary exarticulation at the hip by Dr. JOHN WRIGHT, of Illinois, in the case of Private J. W. Spradling, Co. A, 33d Illinois, detailed by the operator in *The Cincinnati Lancet and Observer*, Vol. XI, No. 5, p. 257, May, 1868, and reported also in *Circular* No. 2, War Department, S. G. O., Washington, 1869, p. 109, and mentioned by LÜNING, *loc. cit.*, p. 108, No. 397, I have omitted from the secondary coxo-femoral amputations for shot injury. The records of this Office show that the original shell wound in the *right* side, received at Black River, May 17, 1863, healed, leaving a large cicatrix; that a bedsore formed on the *left* hip, and that the left femur became diseased and was exarticulated on February 20, 1867. It is apparent that the original wound had only a remote connection with the disease for which the operation was performed. Dr. WRIGHT afterwards reported to the Pension Office that "soon after the amputation Spradling was taken with diarrhœa and that dropsy followed, which continued off and on until the date of his death, September 28, 1872."

[1] LARREY'S successful instance of amputation at the hip in the case of the lieutenant of dragoons wounded at Borodino, September 7, 1812, has been cited by M. LEGOUEST (*De la désarticulation coxo-fémorale*, in *Rec. de Mém. de Méd. de Chir. et de Phar. Mil.*, 1855, 2me sér., T. XV, p. 234, and *Traité de Chir. d'Armée*, Paris, 1863, p. 699) as an instance of successful intermediary exarticulation at the hip. This was undoubtedly a primary operation, and I have classed it as such. M. LARREY (*Mém. de Chir. Mil. et Camp.*, Paris, 1817, T. IV, p. 51) details the case and remarks of the operation: "Que j'entrepris, quoique sur le champ de bataille, avec d'autant plus de confiance qu'il la demandait instamment."

[2] Professor B. v. LANGENBECK, in his article: *Ueber die Schussverletzungen des Hüftgelenks*, in *Archiv für Klinische Chirurgie*, Berlin, 1874, B. XVI, p. 299 (republished in his *Chirurgische Beobachtungen aus dem Kriege*, Berlin, 1874), remarks: "As heretofore, I am still quite convinced that disarticulation of the thigh ought not to disappear from military surgery, and that if we do not regard all very severe shot fractures of the hip joint and thigh from the beginning as lost, in all these cases primary exarticulation ought to be performed if possible during the first 12–24 hours. In this connection I can only repeat what I have said in 1868, and what I may again emphasize, that the only two primary exarticulations that I performed in the Schleswig War, 1848, recovered, and that one of the patients operated upon is still alive." I cannot omit here to call attention to the translation of Professor B. v. LANGENBECK'S article by Dr. JAMES F. WEST, F. R. C. S. The translation is published in *The Birmingham Medical Review*, Vol. V, 1876, pp. 29, 88, and 166. At page 100, Professor LANGENBECK is made to say: "The results of the American War, with its great numbers, have been sufficient for settlement of the question of disarticulation of the thigh. We must regard it as an operation which, at the least, ought to be excluded from military practice, and one that ought at the most to be thought of in the light of reamputation." From this Prof. LANGENBECK would appear to be in favor of excluding exarticulation at the hip from the field of military surgery. Nothing could be more erroneous. What Prof. LANGENBECK (*Archiv für Klin. Chir.*, 1874, B. XVI, pp. 298, 299) really says is: "The results of the American War, with its great numbers, have become decisive as regards the value of hip joint exarticulation. It has been designated as an operation which it would be best to exclude from military practice, and which should at the most be thought of in the light of reamputation," and further on he continues with the remark cited in the beginning of this note.

[3] The two exarticulations at the hip for shot injury performed during the Schleswig-Holstein campaign of 1864, and the seven operations performed during the Austro-Prussian War of 1866, proved fatal. Of the forty-four cases of amputation at the hip performed for shot injury received during the Franco-Prussian War, 1870–71, cited in note on page 130, *ante*, the only successful one, as far as I have been able to ascertain, was the case of reamputation at the right hip performed by Professor T. G. MORTON, of Philadelphia, on a soldier named Boasso Dominico (not Dominico Ludovess, as first erroneously communicated in note on page 130, *ante*), whose thigh had been amputated after the battle of Sedan, September 1, 1870.

[4] HOLMES (T.) (*A Treatise on Surgery, its Principles and Practice*, Philadelphia, 1876, p. 344): "The following are, I believe, the main maxims of practice in gunshot injuries of the extremities. . . II (p. 345). In *the lower extremity* gunshot fractures involving the hip joint or the upper third of the femur are usually fatal, however treated. Primary amputation is so fatal in these cases that it is almost abandoned. Several cases have recovered under strictly conservative treatment; a few cases of successful excision are on record; and secondary amputation has been decidedly more successful than primary. The surgeon must use his own discretion in each case, but all surgeons nowadays have a well founded horror of primary amputation at the hip, believing that the operation is almost necessarily fatal, while the injury is not so." BECK (B.) (*Chir. der Schussverletzungen*, Freiburg, 1872, p. 852) remarks: "Exarticulation at the hip . . is only to be performed, as a primary operation, in cases of extensive comminution of the bones with laceration of the soft parts, especially of the large vessels, and where amputation high up is not possible. In injuries which involve the femur in its continuity close to the joint, conservative expectant treatment should be employed, and operative interference should only be had in the further course, as it is known that the secondary operation is more readily tolerated. I have not yet seen in the various campaigns at the places of first dressing a case really adapted to primary exarticulation; either expectation was yet admissible, or resection or high amputation could be performed; or the lesions were of such a nature that there was no prospect of a cure. The wounded of the last category I left to their fate as incurable, ligating only the larger vessels."

Generalarzt B. Beck[1] proposes "to let secondary exarticulation at the hip be preceded by resection," and considers this procedure as not unworthy of the consideration of his colleagues. During the Franco-Prussian War, 1870–71, he had selected a patient[2] for this mode of treatment, and had excised the hip and intended to remove the limb fourteen days later; but he was compelled to leave the patient, who died about a month after the excision. Professor J. Neudörfer,[3] in the case of an Austrian soldier, Johann Schranz, during the Italian War of 1859, resected, on November 27, 1859, the head of the femur for shot injury received at Palestro, May 30, 1859, and, on December 1st, removed the limb at the hip. The patient recovered. This seems to be the only case of this kind on record in military surgery. In civil surgery six instances[4] may be cited in which the exarticulation at the hip had been preceded by excision at the hip joint. Five of the six cases had a successful issue, giving the favorable result of a mortality of 16.66 per cent.

The evidence set forth in the preceding pages in regard to the three plans of treatment of gunshot injuries of the hip joint received during the American civil war shows that of the cases of undoubted intracapsular shot fracture of the hip treated by conservation, 98.8 per cent. had a fatal termination; that in sixty-six cases treated by excision[5]

[1] BECK (B.), *Chirurgie der Schussverletzungen*, Freiburg, 1872, p. 855.

[2] BECK (B.) (*loc. cit.*, p. 854) remarks: "In another case I had performed resection, and intended to disarticulate 14 days later; but I had to leave the patient, who reacted well, and he died of pyæmia afterwards, because my plan was not followed, to wit: to let, at the proper time, when it became evident that recovery could not be achieved in this manner, the resection be followed by exarticulation." The patient he had selected for this manner of operation was Sergeant Major B——, of the 3d French Infantry (see BECK, *loc. cit.*, p. 894, and note on page 91, *ante*, CASE 53), who had survived a shot fracture of the neck and trochanter of the femur at Wörth, August 6, 1870. In the latter part of August the head and neck and more than one-third of the shaft of the femur were excised. But Dr. BECK was sent away before the time for the removal of the limb had arrived. Professor BECK continues: "In another case, which, to my sorrow, I also had to leave before the proper time for the operation, there was an extreme oblique and longitudinal fracture extending into the capsule, with considerable infiltration of the soft parts. When I left Dijon I had ordered that, as soon as the swelling would somewhat go down, the limb should be amputated high up, and that subsequently the remaining bone should be extirpated, provided acute septicæmia should not supervene. Several days after my departure the latter complication appeared; energetic interference was not attempted, and only the projecting end of bone fragment was resected. The patient died shortly afterwards."

[3] NEUDÖRFER (J.), *Handbuch der Kriegschir.*, 1872, B. II. Abth. II, S. 1468, and notes on pp. 90 (CASE 13) and 129 (CASE 120), *ante*.

[4] HEYFELDER (J. F.) (*Ueber Resectionen und Amputationen*, Breslau und Bonn, 1854, p. 155) resected the hip joint on January 11, 1848, in a tailor, Carl Eckstein, aged 20, for caries of the joint, and exarticulated the limb on May 20, 1851. The patient died in two hours.—2. T. CARR JACKSON (*Transactions of the Path. Society of London*, London, 1872, Vol. XXIII, p. 191), for disease of the hip joint, excised, in 1871, the head of the femur in a young man aged 19, and, in 1872, successfully removed the limb.—3. Dr. TEALE (*Medical Times and Gazette*, July 26, 1872, Vol. II, p. 93) excised, on December 28, 1871, the head of the femur for hip disease, in a boy aged 16, and, on July 18, 1872, the limb was successfully removed at the hip.—4. In a girl, aged 7, suffering from hip disease, Mr. HANCOCK performed excision of the head of the femur in the early part of 1871, and, on November 2, 1872, amputation at the hip was performed by Dr. RICHARD BARWELL. The girl recovered (*London Lancet*, April 5, 1873, Vol. I, p. 105).—5. Dr. RUSHTON PARKER (*London Lancet*, 1875, Vol. II, p. 699), on a boy, aged 6, with inflammation of the hip joint, excised the head of the femur on July 31, 1874, and amputated at the hip, November 21, 1874. The boy survived.—6. Professor SPENCE (*London Lancet*, 1875, Vol. II, p. 549), Thomas H——, aged 20; hip disease; excision at the hip October 29, 1864. Amputation April 13, 1875, by Prof. SPENCE; the patient recovered.

[5] Besides the works referred to on pages 89 to 126, *ante*, by ABBOTT, ALCOCK, ASHHURST, CHENU, CALHOUN, CULBERTSON, DEININGER, DUBREUIL, EVE, H. FISCHER, G. FISCHER, GUTHRIE, GRELLOIS, GROSS, HEINE, HODGES, KADE, LANGENBECK, LOHMEYER, LONGMORE, LOSSEN, MATTHEW, MACLEOD, MUNN, MAUNOURI, MURSICK, NEUDÖRFER, OTIS, OPPENHEIM, OPPENHEIMER, PAILLARD, READ, ROBERTSON, SEUTIN, SCHWARTZ, D. P. SMITH, STROMEYER, K. TEXTOR, and C. WAGNER, the following may be consulted on excision at the hip joint: ADAMS (Z. B.), *Excisions of Joints for Traumatic Cause*, in *Boston Med. and Surg. Jour.*, 1867, Vol. 76, p. 229; BALLARUE (D. P.), *Beiträge zur Statistik der Hüftgelenks Resection*, Leipzig, 1868. BECK (B.), *Zur Statistik der Amputationen und Resectionen*, in LANGENBECK'S *Arch. für Klin. Chir.*, B. V, pp. 245, 256, and *Kriegschir. Erfahrungen während des Feldzuges*, 1866, *in Süddeutschland*, pp. 266, 351, and *Die Schusswunden*, Heidelberg, 1850, p. 332. BÉRARD (A.), *Résection de l'articulation coxo-fémorale*, in *Dict. de Méd. en* 30, 1837, T. XV, p. 82. BILLROTH (TH.), *Ueber die Resectionen*, in *Deutsche Klinik*, B. V, p. 220. BLANDIN (P. F.), Article *Résection*, in *Dict. de Méd. et de Chir. prat.*, Paris, 1835, T. XIV, p. 266. BONINO (E.), *De la résection de la tête du fémur*, in *Annal. de la Chir. Franç et Etrang.*, Paris, 1844, T. X, p. 385. BOWMAN (WM.), *Resection of the Hip Joint*, in *Medical Times and Gazette*, London, 1860, Vol. II, p. 210. BRYK (A.), *Beiträge zu den Resectionen*, in LANGENBECK'S *Archiv für Klin. Chir.*, 1873, B. XV, p. 273. CHAMPION (L.), *Traité de la Résection*, etc., Thèse, Paris, 1815. CHEEVER (D. W.), *Two successful cases of Excision of the Head of the Femur*, in *Boston Med. and Surg. Jour.*, Vol. LXXVII, p. 281. COOTE (H.), *Remarks on the operation of Resection of the Head of the Femur*, in *British Medical Journal* January 2, 1858, p. 2. DIRCKS (C. J. M.), *Diss. inaug. de resectione capitis femoris*, Wirceb, 1846. DECAISNE, *Des moyens d'éviter les amputations et les résections osseuses*, Bruxelles, 1855. EULENBURG (ALBERT), *Beiträge zur Statistik und Würdigung der Hüftgelenkresection*, in *Archiv für Klin. Chir.*, 1866, B. VII, p. 701. FOCK (C.), *Bemerkungen und Erfahrungen ueber die Resection im Hüftgelenk*, in *Archiv für Klin. Chir.*, Berlin, 1861, B. I, p. 172. GERDY (J. V.), *De la résection des extrémités articulaires des os*, Paris, 1839, p. 157. GOOD (R. R.), *De la résection de l'articulation coxo-fémorale pour carie*, Paris, 1869. GOOD (R. R.), *Comparative Mortality after resection of the hip joint in France and in England*, in *Med. Times and Gaz.*, London, 1869, Vol. I, p. 355. GOSSELIN, *Résection de la hanche*, in *Bull. de l'Acad. de Med.*, Oct. 15, 1861. GURLT, *Resection im Hüftgelenk*, in LANGENBECK'S *Archiv*, 1867, B. VIII, p. 903. HANCOCK (H.), *On Excision of the Hip Joint*, Lancet, 1857, Vol. II, p. 84. HEYFELDER (J. F.), *Ueber Resectionen und Amputationen*, Breslau, 1854, p. 154. HEYFELDER (O.), *Lehrbuch der Resectionen*, Wien, 1863. HUETER (C.), *Die Resectionen*, in LANGENBECK'S *Archiv*, B. VIII, p. 94. JACOBSEN (L.), *Om Resektion af Hofteleddet i Tilfälde af caries og suppuration*, Kbhvn, 1874. JAEGER (M.), *Operatio resectionis conspectu chronologico adumbrata*, Erlangen, 1832. JAEGER, Article *Decapitatio*, in J. N. RUST'S *Handbuch der Chirurgie*, 1831. B. V, p. 626. KINLOCH (R. A.), *A case of Excision of the Hip Joint for morbus coxarius, with Remarks upon the Propriety of such an Operation, and a Summary Account of the recorded Cases up to the present Time*, in *Charleston Med. Jour. and Rev.*, 1857, Vol. XII, p. 307. KRETSCHMAR (G. A.), *Ueber Hüftgelenkresection*, Jena, 1867. LARGHI (B.), *Résection de tête et du col du femur*, in *Gaz. Méd. de Paris*, 1857, T. XII, p. 8. LE FORT (LEON), *De la résection de la hanche dans les cas de coxalgie et de plaies par armes à feu*, in *Mém. de l'Acad. Imp. de Méd.*, 1861, T. XXV, p. 445. LEISRINK (H.),

the fatality was 90.9 per cent., and that in sixty-six cases treated by exarticulation[1] it was 83.3 per cent.; but from these results it should not be concluded that operative interference was always indicated, and that amputation was preferable to excision. On page 121, of *Circular* No. 2, I have already pointed out that the question as to the most eligible treatment of shot injuries of the hip joint is not susceptible of a purely arithmetical solution, and that the variety of the conditions under which the patients are placed, the diversity in the extent of their injuries, and the inevitable imperfection of all surgical records forbid any such rigorous comparison. Not less than nine[2] of the sixty-six cases of excision at the hip were complicated with such lesions of the pelvic walls and viscera as made any

Zur Statistik der Hüftgelenk Resection, in *Archiv für Klin. Chir.*, Berlin, 1870, B. XII, p. 134. LEPOLD (F.), *Ueber die Resection des Hüftgelenkes*, Inaug. Diss., Würzburg, 1834. LÜCKE (A.), *Beiträge zur Lehre von den Resectionen*, in *Archiv für Klin. Chir.*, Berlin, 1862, B. III, p. 291. LYON (IRVING W.), *Excision of the Knee and Hip Joints*, in *Am. Jour. Med. Sci.*, 1865, N. S., Vol. XLIX, p. 49. MOHNS (J.), *Beiträge zu den Resectionen der Knochen*, Jena, 1866. PAGENSTECHER, *Zur Resection des Hüftgelenkes*, in LANGENBECK'S *Archiv*, 1862, B. II, pp. 312–315. PERCY et LAURENT, Article *Résection*, in *Dictionnaire des Sciences Médicales*, Paris, 1820, T. XLVII, p. 553. RIED (F.), *Die Resectionen der Knochen*, Nüremberg, 1860, p. 385. ROUX (P. J.), *De la résection ou de rétrenchment de portions d'os malades*, Paris, 1862, p. 49. SAUNDERS (D. D.), *Excision or Resection of the Bones and Joints of the Lower Extremity*, in *Memphis Med. Monthly*, April, 1866, Vol. I, p. 77. SAYRE (L. A.), *Exsection of the Head of the Femur and Removal of the Upper Rim of the Acetabulum for morbus coxarius, with perfect recovery*, in *New York Jour. of Med.*, 1855, Vol. XIV, p. 70. SCHEDE (M.), *De resectione articulationis coxæ*, Halis Saxonum, 1866. SCHILLBACH (L.), *Beiträge zu den Resectionen der Knochen*, Jena, 1861. SÉDILLOT (C.), *De la résection coxo-fémorale*, in *Gaz. Méd. de Paris*, 1866, T. XXI, p. 691. SENFTLEBEN (H.), *Beobachtungen und Bemerkungen ueber die Indikationen, den Heilungsprocess und die Nachbehandlung der Resectionen grœsserer Gelenke*, in LANGENBECK'S *Archiv für Klin. Chir.*, Berlin, 1862, B. III, p. 112. SIEBERT (L.), *Statistik der Resectionen*, etc., Jena, 1868. STARK (W.), *Beiträge zu der Statistik und den Endresultaten der Gelenkresectionen*, in *Beiträge zur Operativen Chirurgie*, von Dr. V. CZERNY, Stuttgart, 1878, p. 183. STEVENS (G. F.), *On Excisions in Cases of Gunshot Wounds*, in *Trans. Med. Society of New York*, 1866, p. 132. SWINBURNE (J.), *Exsection of the Hip Joint*, and *Conservative Surgery*, in *Med. and Surg. Reporter*, 1861, Vol. VII, p. 198, and Vol. IX, 1863, p. 377. SYME (JAMES), *Treatise on the Excision of Diseased Joints*, Edinburgh, 1831, p. 125. SZYMANOWSKY (J.), *Ueber die Resection des Hüftgelenkes*, in LANGENBECK'S *Archiv*, 1865, B. VI, p. 787. TALLICHET, *Dissert. de resecto femore ex articulo*, Halæ, 1808. TEXTOR (CAJETAN), *Ueber die Wiedererzeugung der Knochen nach Resectionen*, Würzburg, 1842. TOSTIVINT (A. L. M.), *Sur les résections coxo-fémorales dans les cas de coxalgie*, Thèse, Paris, 1868. WAGNER (A.), *Ueber den Heilungsprocess nach Resection und Extirpation der Knochen*, Berlin, 1853, p. 14. WAGNER, Article *Decapitatio ossium*, in *Encyclopädisches Wörterbuch der Med. Wissenschaften*, von W. H. BUSCH, Berlin, 1833, B. IX, p. 188. WINNE (C. K.), *Statistical Inquiry as to the Expediency of Excision of the Head of the Femur*, in *Am. Jour. Med. Sci.*, 1861, Vol. XLII, p. 26.

[1] The literature of amputation at the hip joint is copious. In the foot-notes on pages 127 to 159 I have referred to the various sources of information on this subject by ALCOCK, ASHHURST, AVERILL, BAUDENS, BECK, BERTHERAND, CHENU, COSTELLO, W. S. COX, DEININGER, GUTHRIE, J. F. HEYFELDER, D. J. LARREY, H. LARREY, LANGENBECK, LEGOUEST, MACCORMAC, MACLEOD, MATTHEW, MORTON, NEUDÖRFER, OTIS, J. ROUX, P. J. ROUX, STROMEYER, C. TEXTOR, J. THOMSON, and others. To these may be added: ARMAND (A.), *Histoire médico-chirurgicale de la guerre de Crimée d'après les travaux des médecins militaires*, Paris, 1858, p. 19. BARBET, in *Prix de l'Acad. roy. de Chir.*, Paris, 1819, T. IV, p. 45, relates the operation by LA CROIX, and defends the exarticulation at the hip. BECK (B.), *Zur Auslösung des Femur im Hüftgelenk*, in *Archiv für Klin. Chir.*, Berlin, 1879, B. XXIII, p. 654. CARPIO (L. H.), *Una observacion de desarticulacion coxo-fémoral*, in *Gaceta Médica de Mexico*, 1865, T. I. p. 346. 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[2] See CASE 209, p. 93, of Pt. *C. Beard*, 12th Miss.; CASE 227, p. 96, of Pt. C. Morrison, 185th N. Y.; CASE 235, p. 98, of Capt. T. R. Robeson, 2d Mass.; CASE 236, p. 98, of an unknown private soldier of the First Corps; CASE 238, p. 99, of an unknown soldier; CASE 247, p. 105, of Pt. C. E. Marston, 1st Mass.; CASE 257, p. 109, of Corp'l H. C. Sennett, 122d N. Y.; CASE 259, p. 110, of Lieut. *D. N. Patterson*, 46th Va.; and CASE 269, p. 118, of Pt. *A. Toney*, 16th N. C.

operative interference useless; among the sixty-six coxo-femoral amputations probably all successful cases have been recorded, while some fatal cases may remain unpublished; and in the three hundred and four cases treated by conservation, the correctness of the diagnosis may be questioned in many instances. The character of the injury must determine the choice of treatment; but the general rules regarding shot wounds of the hip joint[1] laid down in *Circular* 2 are uncontroverted: that "expectant treatment is to be condemned in all cases in which the diagnosis of direct injury to the articulation[2] can be clearly established;" that "primary excisions of the head or upper extremity of the femur should be performed in all uncomplicated cases of shot fracture of the head or neck;" that "intermediary excisions are indicated in similar cases where the diagnosis is not made out till late;" that "secondary excisions are demanded by caries of the head of the femur or secondary involvement of the joint;" that amputation should be performed: "1. When the thigh is torn off, or the upper extremity of the femur comminuted with great laceration of the soft parts, in such proximity to the trunk that amputation in the continuity is impracticable. 2. When a fracture of the head, neck, or trochanters of the femur is complicated with a wound of the femoral vessels. 3. When a gunshot fracture involving the hip joint is complicated by a severe compound fracture of the limb lower down, or by a wound of the knee joint."

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[1] A number of authors especially on excision or exarticulation at the hip have already been cited, but many additional facts in regard to injuries of the hip joint may be derived from the works of: BALLINGALL (Sir GEORGE), *Outlines of Military Surgery*, London, 5th ed., 1855, p. 397. BARWELL (RICHARD), *A Treatise on Diseases of the Joints*, London, 1865. BELL (JOSEPH), *A Manual of the Operations of Surgery*, London, 1866, p. 111. BLENKINS (G. E.), Article *Gunshot Wounds*, in COOPER'S *Dictionary of Practical Surgery*, London, 8th ed., 1861, Vol. I, p. 838. BRINTON (J. H.), *Consolidated Statement of Gunshot Wounds, Circular* No. 9, S. G. O., Washington, July 1, 1863, p. 12. BRIOT (M.), *Histoire de l'Etat et des Progrès de la Chirurgie Militaire en France pendant les Guerres de la Revolution*, Besançon, 1817, p. 177. CHAUSSIER, *Précis d'expériences sur l'amputation des extrémités articulaires des os longs*, in *Mém. de la Soc. Méd. d'Emulation*, an VIII, T. III, p. 399. 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K.), *The Insertion of the Capsular Ligament of the Hip Joint and its relation to intra-capsular fractures of the Neck of the Femur*, in *Med. and Surg. Reporter*, Vol. VII, p. 244, *et seq.* SMITH (STEPHEN), *Handbook of Surgical Operations*, New York, 3d ed., 1862, p. 221. SOLLY (S.), *Clinical Lectures on Injuries and Diseases of the Joints*, delivered at St. Thomas's Hospital, in *London Lancet*, 1852, Vol. II, pp. 121, 144. SYME (JAMES), *The Principles of Surgery*, edited by Dr. MACLEAN, Philadelphia, 1866, p. 694. SZYMANOWSKI (JULIUS), *Additamenta ad Ossium Resectionem*, Dorpati Livonorum, 1856. TEXTOR (CAJETAN), *Grundzüge zur Lehr der Chirurgischen Operationen*, Würzburg, 1835. S. 310, 348. VELPEAU (A. L. M.), *Nouveau Elements de Médecine Opératoire*, Paris, 1833, T. I, p. 582. VERMANDOIS, *Sur le traitement de quelques maladies chirurgicales de l'articulation du femur avec l'os innominé*, in *Journal de Médicine, Chirurgie, Pharmacie, etc.*, 1786, T. LXVI, p. 51. VOGEL (A. F.), *Observationes quasdam chirurgicas defendit*, Kiliae, 1771. WARREN (EDWARD), *An Epitome of Practical Surgery*, Richmond, 1863. WHITE (C.), *Cases in Surgery*, in *Philosophical Transactions*, Vol. LIX for the year 1769, London, 1770, p. 45. WILLIAMSON (G.), *Military Surgery*, London, 1863. WOODHULL (A. A.), *Catalogue of the Surgical Section of the U. S Army Med. Museum*, Washington, 1866, p. 234. ZANG (C. B.), *Darstellung blutiger heilkünstlerischer Operationen*, Wien, 1821, Theil 4, pp. 287, 300.

[2] Professor H. H. SMITH (*Princ. and Pract. of Surgery*, 1863, Vol. I, p. 526) pronounces "compound fractures involving the hip joint are exceedingly dangerous. If left alone death usually results." . . "Some few cases of recovery have resulted after injuries in this locality, but in them the fracture may not have entered the joint, and these few exceptions to the general fatal result certainly offers no encouragement for their repetition. LÖFFLER (F.), *Grundsätze und Regeln für die Behandlung der Schusswunden im Kriege*, Berlin, 1859, Erste Abtheilung, p. 66), speaking of shot injuries of the hip joint, remarks: "The conservative treatment of this injury, according to the experience hitherto acquired, gives no prospect of saving life. Even if pyæmia does not supervene, death ensues sooner or later from exhaustion following endless suppuration."

The preceding portions of this Section were already in print when Professor E. Gurlt's[1] excellent and elaborate work on resections of joints was received. On page 1261 he enumerates one hundred and thirty-seven cases of excision[2] at the hip, of which the results were ascertained in one hundred and thirty-six instances, with sixteen recoveries, a mortality rate of 88.23 per cent.; and on page 1319 he states that, considering the severity of wounds of the hip joint and the great mortality that has hitherto followed them, this result must be regarded as favorable.

[1] GURLT (E.), *Die Gelenk-Resectionen nach Schussverletzungen. Ihre Geschichte, Statistik, End-Resultate*, Berlin, 1879, pp. 1333. Professor GURLT cites the following additional cases of excision at the hip for shot injury not hitherto published: Dr. BRYK (GURLT, *loc. cit.*, p. 63) excised the head of the right femur in the case of Nagy Lajos, age 27, wounded at Buda, May 21, 1849; excision May 24; death June 2, 1849. Dr. ABEL (GURLT, *loc. cit.*, p. 317), Pt. J. Poulsen, 20th Danish Infantry; Düppel, April 18, 1864; neck of right femur; intermediary excision May 4; death May 4, 1864. Dr. HAHN (GURLT, *loc. cit.*, p. 317), P. Rasmussen, 5th Danish Infantry, age 25; Alsen, June 29, 1864, in left trochanters; resection July 4, death July 6, 1864. BURCHARDT (GURLT, *loc. cit.*, p. 483), F. Haberditz, Austrian Infantry, age 42; Koeniggratz, July 3, 1866, through left hip; resection August 6; fatal. BUSCH (GURLT, *loc. cit.*, p. 395), N. Breidt, 6th Rhenish Infantry, Koeniggratz, July 3, 1866, right hip; excision July 20; death July 21, 1866. BUSCH (GURLT, *loc. cit.*, p. 483), F. Harlitschek, Austrian Infantry, age 74; Koeniggratz, July 3, 1866; right trochanter major; excision August 9; death August 13, 1866; pyæmia. KLOPSCH (GURLT, *loc. cit.*, p. 484), N. N. Oest, Austrian Infantry, Koeniggratz, July 3, 1866, left hip; excision July 7; death July 9, 1866. C. REYHER (GURLT, *loc. cit.*, p. 1159), W. Jowanowitsch, age 45; Russo-Turkish War, August 24, 1876; excision Sept. 8; death Sept. 12, 1876. On p. 1154 Dr. GURLT tabulates 2 additional cases of excision at the hip during the Russo-Turkish War, 1876–1878, but gives no details.

[2] The operation of excision at the hip was first proposed in 1769, by CHARLES WHITE, F. R. S., Surgeon to the Manchester Infirmary, at the conclusion of an account of a successful excision of the head of the humerus performed by him April 14, 1768. The paper is recorded in the *Philosophical Transactions* for 1769, Vol. LIX, p. 45, and is republished the following year in CHARLES WHITE'S *Cases in Surgery*, 1770, p. 76. Prior to this a surgeon had, in 1730, according to J. D. SCHLICHTING (*Observationis variæ medico-chirurgicæ*, in *Philosophical Transactions*, London, 1744, Vol. XLII, for the years 1742 and 1743, p. 274), extracted the carious head of the femur in a girl, aged 14, by dilating a fistulous opening over the hip. The girl recovered in six weeks. Similar instances in which the diseased head of the femur was spontaneously eliminated or was extracted were reported by A. F. VOGEL (*Observationes quasdam chirurgicas defendit*, Kiliae, 1771), in 1771; T. KIRKLAND (*Thoughts on Amputations, etc.*, London, 1780), in 1780; HOFMANN (*Vom Schaarbocke*, Munster, 1782), in 1782; OHLE (SCHMIDT'S *Jahrbucher*, 1834, B. II, S. 116), in 1815 or 1816; SCHMALZ (cited by HEDENUS (A. G.), *Commentatio chirurgica de femore in cavitate cotyloidea amputando*, Lipsiæ, 1823, p. 65), in 1817. In the meantime experiments had been made in excising the joints of animals by VERMANDOIS (*Jour. de méd. chir. et phar.*, Janv.-Mar., 1786, T. LXVI, p. 73), in 1785; G. L. KOELER (*Experimenta circa regenerationem ossium*, Gottingen, 1786, experiments 14, 15, 16, pp. 84–98), in 1786; CHAUSSIER (*Magazin Encycloped.*, 5ème annee, T. VI, No. 24), in 1801; F. ROSSI (*Elém. de Méd. Opéral.*, Turin, 1806, T. II, p. 224), in 1806; and G. H. WACHTER (*Dissertatio Chirurgica de Articulis Extirpandis*, Groningen, 1810, pp. 91–94), in 1810; but the first excision of the head of the femur upon the living human subject was performed by Mr. ANTHONY WHITE, of Westminster Hospital, London, in April, 1821. The date of this operation has been variously stated. O. HEYFELDER (*Lehrbuch der Resectionen*, Wien, 1863, p. 78) gives the date as 1815, and, on page 88, as 1818, and refers to an article by LIONEL J. BEALE, in the *London Medical Gazette*, 1832, Vol. IX, p. 853; but Mr. BEALE gives no date for the operation. In COOPER'S *Dictionary of Practical Surgery*, 1872, Vol. II, p. 151, it is also stated that the operation was performed in 1818, and Mr. FERGUSSON speaks of the operation as done in 1818 in his paper in the *Medico-Chirurgical Transactions*, 1845, Vol. X, p. 578, and in his *System of Practical Surgery*, 1870, 5th ed., p. 497. FOCK (C.), (*Bemerkungen und Erfahrungen über die Resection im Hüftgelenk*, in *Archiv für Klinische Chirurgie*, Berlin, 1861, B. I, S. 172) and GOOD (R. R.), (*De la résection de l'articulation coxo-fémorale pour carie*, Paris, 1869) correctly state that the operation was performed in 1821. HODGES (R. M.). (*The Excision of Joints*, Boston, 1861, p. 91) and CULBERTSON (H.), (*Excision of the Larger Joints of the Extremities; Prize Essay*, in *Transactions of the American Medical Association*, 1876, Supplement to Vol. XXVII, p. 40) give 1822, and LEPOLD (F.), (*Ueber die Resection des Hüftgelenkes*, Inaugural Thésis, Würzburg, 1834, p. 15) 1824, as the year of the operation. However, in Mr. FERGUSSON'S *Lecture on Hip Disease*, at King's College Hospital, reported in the *Lancet*, April 7, 1849, at page 361, is quoted Mr. ANTHONY WHITE'S own account of the operation on the boy John West, a twin: "In April, 1821, we met, and the boy being placed on a table, I proceeded," etc., etc., with the operation. This would seem to be conclusive as to the date of the operation. Mr. ANTHONY WHITE'S account states further on in the same page (361) that this boy, five years after the operation, became phthisical, and died of diseased lungs in the Westminster Hospital. The pathological specimen was presented by Mr. A. WHITE to the Museum of the Royal College of Surgeons, and numbered 941, and is described at page 230 of Vol. II, 1847, of the quarto catalogue. The patient was a boy, 14 years old, who had suffered from hip disease following a fall received at the age of nine. The head and neck of the femur were excised. The wound healed quickly and quite a useful joint was obtained. The second excision at the hip was performed in 1828, by Mr. HEWSON, of Dublin. The date of HEWSON'S operation is given as 1823 by BONINO (E.), (*De la résection de la tête du femur*, in *Annales de la Chirurgie Française et Étrangère*, 1844, T. X, p. 391); HODGES (R. M.), (*loc. cit.*, p. 91); SAYRE (L. A.), (*Exsection of the Head of the Femur and Removal of the Upper Rim of the Acetabulum for Morbus Coxarius, with perfect recovery*, in the *New York Journal of Medicine*, 1855, Vol. XIV, p. 81); LE FORT (LEON), (*La resection de la hanche, etc.*, Paris, 1860), and others; but the correct date of the operation seems to be 1828, as given by LEPOLD (F.), (*Ueber die Resection des Hüftgelenkes*, Inaugural thesis, Würzburg, 1834); OPPENHEIM (F. W.), (*Die Extirpation des Schenkelkopfes aus der Gelenkhöhle*, in *Zeitschrift für die gesammte Medicin*, 1836, B. I, S. 137); FOCK (C.), (*Bemerkungen und Erfahrungen über die Resection im Hüftgelenk*, in *Archiv für Klinische Chirurgie*, Berlin, 1861, B. I, S. 172); OTIS (G. A.) (*loc. cit.*, p. 10); GOOD (R. R.), (*De la résection de l'articulation coxo-fémorale pour carie*, Paris, 1869). HARGRAVE (WILLIAM), (*A System of Operative Surgery*, Dublin, 1831, p. 514) states that the operation was performed "a short time since." The third excision of the head of the femur, and the first example of the performance of the operation for shot injury, was done by Dr. OPPENHEIM of Hamburg, in 1829. Professor LONGMORE, in his article on *Gunshot Wounds of the Lower Extremity*, in the second edition of *A System of Surgery*, of Mr. T. HOLMES, New York, 1870, Vol. II, p. 230, remarks: "It is a curious fact, in a historical point of view, that Sir CHARLES BELL proposed excision of the upper fragments in 1818 [1815?] at Brussels, in the case of François de Gay, who had been wounded nineteen days before at Waterloo, and on whom Mr. GUTHRIE successfully practised amputation at the hip joint the next day instead. The reasons for his advice are preserved in some manuscript notes made about the time of the occurrence, in a diary presented to the Army Medical School by Lady Bell, his widow. The chief points are the following: 'My proposal is to extract the head of the bone, and do no more. Mr. GUTHRIE'S proposal is to amputate the thigh at the hip joint. If the bone be taken out, there is a great cavity and suppuration certainly; but by this means the shock and violence will be saved. I fear the shock of so great an injury, especially as now the wound cannot be cut off (alluding to its extent and sloughing condition), and its injury must be superadded to that of the incisions. The man will readily allow of my proposal, but not of G.'s. However, next day he said he would consent. In the meantime I was forced home by business,' etc. The separated head and neck of the femur in GUTHRIE'S case is preserved in the Museum of the Army Medical Department at Netley, and, both from its intrinsic interest and because it almost exactly corresponds with the fragment in the Crimean case in which resection was successfully performed, a drawing of it is appended." A reduced copy of this drawing is reproduced in the wood-cut (FIG. 126).

FIG. 126.—Head, neck, and part of shaft of femur, from GUTHRIE'S successful intermediary amputation at the hip, in the case of François Duguet. *Spec.* 2929, in Army Med. Museum at Netley. [After Prof. LONGMORE.]

SECTION III.

INJURIES OF THE SHAFT OF THE FEMUR.

In this Section will be considered only injuries of the shaft of the femur unattended by primary injury of the hip or knee joints, and inflicted by weapons of war. Simple and compound fractures produced by other causes are reserved for consideration in Chapter XII of this volume. No sword or bayonet injuries of the femur are recorded on the registers of this Office, and it is, therefore, only necessary to consider the shot injuries of and the operations performed in the continuity of the femur. There are recorded 6,738 shot injuries of the femur. Of these, 3,620 were treated by the expectant conservative mode; 11 were followed by excision at the hip; 29 by exarticulation of the hip joint; 1 by excision in the shaft and subsequent disarticulation at the hip; 6 by excision in the shaft and subsequent amputation of the thigh; 168 by excision in the shaft; 2 by amputation of the thigh and subsequent exarticulation at the hip,[1] and 2,901 by amputation of the thigh. The total number of amputations of the thigh to be recorded in this Section will be 6,238, the discrepancies in numbers being due to the many examples of amputation through the thigh in which the operation was performed for shot lesions of the knee joint or leg. The shot injuries of the femur were accompanied by flesh wounds of the upper or lower extremities, of the back, and of the chest. Some were attended by fracture of the pelvic bones, of the bones of the leg, and of the upper extremities; and, in a few instances, by penetrating wounds of the chest or abdomen. These instances will be alluded to in the various subdivisions of this Section.

At page 666 of the *Second Surgical Volume* the number of shot injuries of the shaft of the humerus is stated as 8,245, and, on page 697 of the same volume, the number of amputations in the arm recorded is 5,456. Comparing these figures with the injuries and amputations of the thigh, it will be seen that while the shot fractures of the humerus exceed the shot injuries of the shaft of the femur by 1,407, the amputations in the thigh are in excess of the amputations in the humerus by 782. The latter fact is, perhaps, to be attributed to the perilous nature of shot injuries of the knee joint. Of the 6,738 cases of shot injuries of the femur, 162 were shot contusions and 6,576 were shot fractures.

SHOT CONTUSIONS OF THE SHAFT OF THE FEMUR.—In treating of shot injuries of the shaft of the humerus in the *Second Surgical Volume*, at pages 667 and 817, only twenty-two instances of contusion of the humerus could be cited. The examples of shot contusion of the femur are not rare, one hundred and sixty-two instances of this class being found on the registers of this Office: fifty in the upper, thirty in the middle, and forty-two in the lower third; while in forty instances the precise seat of the injury was not stated. Amputation in the thigh became necessary in nine instances, with seven

[1] The cases of excisions and exarticulations at the hip for shot injuries of the shaft of the femur have already been considered in the preceding section of this Chapter. For the 11 instances followed by excision at the hip see CASES 206, 208, 216, 220, 229, 233, 239, 243, 261, 263, 266, *ante*. The 29 cases followed by exarticulation at the hip are: CASES 272, 275, 277, 278, 280, 284, 285, 286, 289, 290, 291, 293, 294, 295, 297, 299, 303, 305, 308, 309, 311, 314, 319, 320, 321, 323, 324, 325, 328, *ante*. In CASE 298 excision in the shaft was followed by amputation at the hip, and in CASES 329 and 337 exarticulation at the hip joint had been preceded by amputation of the thigh.

fatal results, a mortality of 77.7 per cent., while of the remaining one hundred and fifty-three cases treated without operative interference, thirty-five, or 22.8 per cent., proved fatal:

TABLE XIX.

Numerical Statement of One Hundred and Sixty-two Cases of Shot Contusion of the Shaft of the Femur.

POINT OF CONTUSION.	AGGREGATE.	TREATED BY CONSERVATION.				TREATED BY AMPUTATION OF THE THIGH.			
		Cases.	Recovered.	Died.	Ratio of Mortality.	Cases.	Recovered.	Died.	Ratio of Mortality.
Upper Third of Femur	50	49	33	16	32.6	1	.....	1	100.
Middle Third of Femur	30	28	23	5	17.8	2	1	1	50.
Lower Third of Femur	42	36	32	4	11.1	6	1	5	83.3
Part of Femur not specified	40	40	30	10	25.0	.....	.....	.....	.....
Total	162	153	118	35	22.8	9	2	7	77.7

It is probable that in many cases in which the periosteum or the external layer of the femur was only slightly bruised the injury to the bone remained unnoticed, and that the wound, treated as a simple flesh wound, healed without complication; but generally, after a few weeks' suppuration, the surface of the bone became roughened and sometimes slight exfoliation followed:

CASE 338.—Private H. H. Coombs, Co. D, 6th Maine, aged 22 years, was wounded at Fredericksburg, May 3, 1863, and entered Douglas Hospital, Washington, five days afterwards. Assistant Surgeon W. Thomson, U. S. A., reported: "He was struck by a bullet on the outer side of the right thigh. The missile was extracted from below the crest of the ilium on May 14th, the operation demanding a very extensive incision, which was kept freely open to permit the discharge to escape. The femur had been denuded of its periosteum for several inches, the ball evidently having been deflected upward after impinging upon that bone. This man recovered, and was transferred to Lovell Hospital, Portsmouth Grove, July 3d." The patient subsequently entered Cony Hospital, Augusta, Maine, whence he was returned to duty October 24, 1864. On June 28, 1865, he was mustered out of service, and subsequently he was admitted on the Pension Roll. The Bangor Examining Board, October 4, 1873, certified to the injury, and adds: "The scar is three inches long, and deep, permitting the finger to pass through the fascia and feel roughened bone. Slight lameness results." Examiner C. Fuller, of Lincoln, Maine, reported, October 20, 1877: "The cicatrix is now so depressed that the little finger can be laid in it, and the bone below is a little hollowed, the parts around being very tender on pressure. A disagreeable pricking sensation is also produced there on percussion at the bottom of the heel." The pensioner was paid December 4, 1878. The extracted missile, a conical ball, was contributed to the Museum by Assistant Surgeon W. Thomson, and constitutes Specimen 4277 of the Surgical Section.

In two cases of shot contusions of the middle third, and in ten of the lower third of the femur, anchylosis or stiffening of the knee joint resulted. One example[1] will be cited:

CASE 339.—Private W. A. Currier, Co. B, 22d Massachusetts, aged 33 years, was wounded at Fredericksburg, December 13, 1862, and admitted into Harewood Hospital, Washington, four days afterwards. Surgeon T. Antisell, U. S. V., recorded the following history: "A minié ball entered the outer side of the right thigh at the middle third, striking against the femur. The missile was extracted on December 18th, being found to have moulded itself to the cylindrical form of the shaft of the bone. The patient's general health was good. Simple dressings were applied to the wound. On February 11, 1863, the bone was found to be re-covered with periosteum excepting a very small portion, and the wound was allowed to close. On February 20th it had healed; but, on this day, erysipelas set in, spreading rapidly, and invading the whole leg and the body to the umbilicus. The leg swelled enormously and vesicated over a large portion of its surface, the cellular tissues being distended with serum. Punctures being made, several quarts of serum were discharged. By April 22d the patient had recovered, though he was still debilitated, and there was yet some enlargement. He was discharged from service May 9, 1863, by reason of an œdematous and stiffened condition of the wounded leg." Examiner A. L. Monroe, of Medway, Massachusetts, certified, January 12, 1864: "The knee cannot be flexed perfectly; the leg is swollen, and the fascia of the thigh seems to have been destroyed by the erysipelatous inflammation. The limb will improve, but it will never be perfectly restored." The Boston Examining Board, in 1873, certified to "varicose condition of the veins of the thigh and leg, phlebitis, etc." Pensioner was paid March 4, 1879.

[1] Partial or complete anchylosis of the knee joint following shot contusion of the femur were noted also in the cases of: Pt. D. Brown, E, 8th Maryland. Pt. S. Clark, B, 14th Infantry, anchylosis of knee, necrosis, exfoliation. Pt. H. B. Baker, A, 16th Maine; in this instance there was almost complete anchylosis at the hip and knee. Corporal J. C. Noteman, D, 8th Wisconsin, partial anchylosis and paralysis. Pt. R. B. Pierce, F, 7th Wisconsin. Pt. H. Schocker, B, 12th Ohio Cavalry. Lieutenant A. D. Detweiler, C, 116th Pennsylvania. Pt. J. D. Page, K, 57th Illinois. Pt. E. J. Russell, G, 10th Regiment Veteran Reserves, partial anchylosis of knee joint, and false anchylosis of ankle joint. Pt. F. De Brayman, E, 53d Pennsylvania. Pt. J. W. Bowlinger, M, 4th Cavalry.

Of the grave complications after shot contusions of the shaft of the femur, pyæmia was the most frequent; it supervened in eighteen instances, of which sixteen proved fatal. There were thirteen cases in which serious secondary hæmorrhage followed. Two of the patients recovered, eleven died. Three cases of recovery from gangrene, and three fatal cases were reported:

FIG. 127.—Shot contusion of left femur. *Spec.* 4341.

CASE 340.—Private J. White, Co. A, 4th New Jersey, aged 19 years, was wounded before Petersburg, April 2, 1865, and admitted to the field hospital of the 1st division, Sixth Corps, where Surgeon R. Sharpe, 15th New Jersey, recorded: "Shot wound of left thigh." On the following day he was conveyed to the Depot Hospital at City Point, and one week afterwards he was transferred to Washington. Surgeon R. B. Bontecou, U. S. V., who removed the missile from the patient's limb, made the following report: "He was admitted to Harewood Hospital April 12th with a wound of the upper third of the thigh, the ball entering posteriorly, passing upward and inward, impinging against the femur and denuding it of a small portion of its periosteum, and lodging beneath the vastus externus muscle. On April 17th, the ball was extracted by incision, the patient being under the influence of chloroform. The condition of the injured parts and the constitutional state of the patient at the time of the operation were poor. He was suffering from diarrhœa and his progress was unfavorable. On April 19th, pyæmic symptoms were developed. The treatment consisted of alteratives, and was supporting throughout. The patient gradually sank, and died April 27, 1865." The upper third of the injured femur was contributed to the Museum by Surgeon Bontecou, and is represented in the adjacent wood-cut (FIG. 127).

In the following fatal instance of shot contusion of the shaft of the femur, gangrenous osteomyelitis[1] was found at the autopsy:

FIG. 128.—Shot contusion of left femur. *Spec.* 4201.

CASE 341.—Private J. Kagrice, Co. F, 198th Pennsylvania, aged 30 years, was wounded during the engagement at White Oak Road, March 31, 1865. Surgeon W. R. DeWitt, U. S. V., recorded his admission to the field hospital of the 1st division, Fifth Corps, with "shot wound of left thigh," and his transfer to City Point on the following day. Several days afterwards the wounded man was transferred to Douglas Hospital, Washington, whence Assistant Surgeon W. F. Norris, U. S. A., contributed the specimen (*Cat. Surg. Sect.*, 1866, p. 258, *Spec.* 4201), with the following history: "The injury was a severe gunshot contusion of the left femur at its middle third. The patient was in good health and spirits at the time of his admission and doing well. The wound was carefully examined, but the ball could not be traced. On April 23d, a large abscess was opened on the anterior aspect of the thigh near the trochanter. On the 29th, another similar incision was required in order to give free exit to pus. The patient, however, continued pretty well until May 5th, when he had a chill. This recurred on May 7th and 8th, and on the 9th, 12th, 13th, and 14th, he had two chills a day. The thigh became painful, the discharge thin and fetid. On May 16th, the patient became delirious, had another chill, and his tongue became swollen and inflamed. He died on the following day. At the *autopsy* no pleurisy or effusion was found in either thoracic cavity. The lungs, liver, spleen, kidneys, and brain were carefully examined for pyæmic abscesses, but appeared healthy. On examining the femur it was found that the ball had struck it at its middle third, contused the bone without fracturing, and, being deflected from its course, had lodged in the hollow above the acetabulum. The hip joint was healthy and uninjured. A longitudinal section was made of the femur, which exhibited well marked gangrenous osteomyelitis, the medulla being of a dirty greenish color, dry, pulverulent, and excessively fetid. The interspaces between the cancelli contained a dark greenish liquid, a quantity of which escaped in sawing the bone, and was also extremely offensive. The bone where the missile had struck had become necrosed and nearly separated, and around this partial exfoliation a ring of new bone had formed. A portion of the injured femur is illustrated in the adjacent wood-cut (FIG. 128).

Besides the specimens referred to in the preceding two cases the Army Medical Museum possesses nine representations of shot contusions of the shaft of the femur,[2] and several missiles flattened by impact with the bone.[3]

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[1] Dr. J. A. LIDELL in his excellent paper on *Contusion and Contused Wounds of Bone, with an Account of Thirteen Cases*, in *Am. Jour. Med. Sci.*, 1865, Vol. L, p. 17, gives the following as the principal pathological effects of contusions of bone: 1. Ecchymosis of the osseous tissue; 2. Ecchymosis of the medullary tissue; 3. Osteomyelitis of a simple character; 4. Necrotic osteitis; 5. Suppurative osteomyelitis; and 6. Gangrenous osteomyelitis.

[2] *Specimen* 291 (*Cat. Surg. Sect.* A. M. M., 1866, p. 259): The upper third of the right femur, necrosed one inch below the trochanter minor; the adjacent bone is honeycombed by suppuration. *Spec.* 759 (*Cat.*, p. 334), showing exfoliation and some periosteal thickening in the lowest third of the right femur. *Spec.* 1671 (*Cat.*, p. 259): Section of right femur, showing an exfoliation about to separate, and some necrosed action. *Spec.* 2075 (*Cat.*, p. 259): Contusion at the inner surface of the middle third of the right femur; the bone is necrosed and greatly roughened by suppuration. *Spec.* 3106 (*Cat.*, p. 258): Portion of shaft of middle third of left femur contused by a ball, which split and escaped in two pieces; the bone is necrosed where struck by the ball; an abscess was found in the medullary canal corresponding with this spot. *Spec.* 3873 (*Cat.*, p. 258): A section of the upper third of the left femur contused by shot; there is a slight degree of caries with widespread periosteal disturbance. *Spec.* 6716: Part of the left femur slightly contused. The specimen is sawn longitudinally, exhibiting diseased action of the bone. *Spec.* 2437 (*Cat.*, p. 283): The lowest third of the left femur amputated for contusion above the inner condyle, where it is locally carious. *Spec.* 1985 (*Cat.*, p. 258), see CASE 34, p. 21, *ante*.

[3] *Specimen* 4277 (*Cat. Surg. Sect.* A. M. M., 1866, p. 609) has been alluded to in CASE 340. *Spec.* 2726 (*Cat.*, p. 598): A spherical ball, with a small concave impression caused by contact with the shaft of the femur, in the case of J. C——, Co. I, 1st Ohio Artillery. *Spec.* 3009 (*Cat.*, p. 604): A conoidal rifle ball from which a smooth slice has been removed on one side; case of T. McG——, 1st Vermont Cavalry.

Ligations after Shot Contusions of the Femur.—At page 47 were tabulated, it will be remembered, one hundred and twenty-seven cases of ligation of the femoral artery for shot flesh wounds of the thigh, with ninety-one deaths, a mortality rate of 71.7 per cent. To this series of operations must be added seven instances of ligations of the femoral following shot contusions of the femur, the patients perishing in every instance:

CASES 342–348.—Private G. Coleman, Co. F, 94th New York, aged 19 years; wounded August 29, 1862; slight injury of upper third of femur. December, 1862, ligation of femoral artery on account of secondary hæmorrhage; pyæmia. Died December 3, 1862.—Sergeant G——, 16th Illinois; minié ball passed through left thigh about three and a half inches above the knee joint, grazing the femur; admitted into the hospital of the 2d division, Fourteenth Corps. Surgeon E. Batwell,[1] 14th Michigan, reported that on the eleventh day considerable hæmorrhage occurred, eight or ten ounces of blood being lost. The tourniquet was loosely applied. The bleeding recurred on the twelfth and thirteenth days, when Dr. Batwell cut down and tied the main vessel in the middle stage of its course. He seemed comfortable for about thirty-six hours; but notwithstanding all the efforts used to keep up the temperature of the leg and to nourish and support his system, he gradually sank into a comatose condition, and died on the eighteenth day after the reception of the injury.—Private A. Kitzing, Co. H, 57th New York, aged 40 years; wounded at Fredericksburg, December 13, 1862, a musket ball passing through the left popliteal space. December 20th, violent hæmorrhage from inner orifice of wound. Surgeon J. P. Prince,[2] 36th Massachusetts, immediately placed a ligature on the femoral at the angle formed by the sartorius and adductor magnus muscles, which entirely controlled the hæmorrhage. The bleeding recurred and continued to increase, notwithstanding the use of styptics and pressure, and, on December 23d, the left thigh was amputated at the upper part of the lower third. Pyæmia developed, and the patient died January 12, 1863. The specimen of the injured knee was forwarded to the Army Medical Museum by the operator, Dr. Prince, and is numbered 535 of the Surgical Section. The femur has been grazed above the condyle and the popliteal artery cut across by a bullet (*Cat. Surg. Sect.*, A. M. M., 1866, p. 457).—Private J. Roberts, Co. A, 9th West Virginia, aged 31 years; wounded at Winchester, July 20, 1864; shot wound of left thigh, denuding upper third of femur of its periosteum; missile lodged, and was extracted July 27th; hæmorrhage set in on July 29th, and Surgeon J. B. Lewis, U. S. V., ligated the femoral artery. Typhoid symptoms supervened, and the patient died August 24, 1864.—Private J. Scott, Co. D, 69th New York, aged 30 years; wounded at Petersburg, July 24, 1864; ball entered upper part of left thigh, striking the femur and denuding it of its periosteum for two inches. August 4th, hæmorrhage to the extent of one pint; limb bandaged from distal extremity and wound plugged with lint saturated with persulphate of iron. Bleeding recurred on the next day, and Acting Assistant Surgeon H. M. Dean ligated the femoral artery in Scarpa's space, about three inches below Poupart's ligament. The case progressed favorably until August 20th, when he had a slight chill followed by profuse perspiration. He died August 21, 1864, of pyæmia. The pathological specimens in the case, consisting of the femoral artery, the contused portion of the shaft of the femur, and the femoral vein, were forwarded to the Army Medical Museum, and are numbered 3105, 3106, and 3118, respectively, of the Surgical Section. They were contributed by the operator, Dr. Dean.—Sergeant S. Van Wie, Co. B, 62d Ohio, aged 25 years, was admitted into the hospital at Beverly, New Jersey, August 21, 1864, with a shot wound of the left thigh, injuring the bone, received at Deep Bottom, August 16, 1864. Parts in sloughing condition. September 28th, secondary hæmorrhage to extent of eight ounces. Acting Assistant Surgeon J. C. Morton ligated the femoral artery. Patient died September 29, 1864, from exhaustion.—Private *A. Young*, Co. F, 1st Missouri Cavalry, was wounded at Cape Girardeau, April 26, 1863. He was admitted into the post hospital at Cape Girardeau, and Surgeon H. A. Martin, U. S. V., reported that a minié ball entered the lower third of left thigh, struck the femur without fracturing it, and lodged in the perineum. The ball was removed, in a flattened state, May 8th. Profuse hæmorrhage occurred on May 11th. The femoral artery was ligated above and below the seat of injury on May 17th. The hæmorrhage did not recur, but the patient sank, and died May 20, 1863.

One fatal instance of ligation of the profunda for secondary hæmorrhage following shot contusion of the shaft of the femur is found recorded on the registers of the Office:

CASE 349.—Corporal James Sturgis, Co. G, 85th Pennsylvania, received at Deep Bottom, Virginia, August 16, 1864, a shot wound of the left thigh, the missile injuring the femur. He was admitted into the hospital at Beverly, New Jersey, August 21st. The parts began to slough; hæmorrhage to the amount of sixteen ounces occurred, and, on November 1st, the profunda was ligated in the continuity by Acting Assistant Surgeon J. C. Morton. Hæmorrhage recurred from the point of ligation, and death ensued November 6, 1864.

Adding to this the six cases of ligation of the profunda for hæmorrhage following shot flesh wounds of the thigh, recorded on page 49, *ante*, we have seven instances of this operation with five deaths, in shot injuries of the thigh without fracture of the femur.

Amputations consequent on Shot Contusions of the Shaft of the Femur.—In nine instances of shot contusions of the shaft of the femur amputation of the thigh was performed. Four were intermediary, five secondary operations; the former proved fatal; of

[1] BATWELL (E.), *Notes of Army Practice—Ligation of the Femoral Artery for Secondary Hæmorrhage*, in *Med. and Surg. Rep.*, 1865, Vol. XII, p. 254, and LIDELL (J. A.), *United States Sanitary Commission Memoirs*, New York, 1870, *Surgical Volume* I, p. 186.

[2] PRINCE (J. P.) (*Surgical Cases—Wound in the Popliteal Space—Secondary Hæmorrhage—Amputation*, in *Boston Med. and Surg. Jour.*, 1863, Vol. LXVIII, p. 70) gives a detailed account of the case.

the latter, two recovered. The seat of contusion was in the upper third in one instance, in the middle in two, and in the lower in six instances; while four amputations, with one recovery, were practised in the upper third; one, fatal in the middle third; and four, with one successful issue, in the lower third. The cases will be briefly detailed:

CASES 350–358.—Private H. F. Rugg, Co. H, 2d New York Heavy Artillery; wounded at Cold Harbor, June 3, 1864; a minié ball passed through the middle third of the right thigh, injuring the bone and causing necrosis. Circular amputation of the thigh at the upper third was successfully performed at Blairsville, Pennsylvania, on January 24, 1866, by Drs. St. Clair and T. M. Laney. The pensioner was paid in 1878.—Lieutenant W. D. Templin, Co. D, 32d Iowa, aged 26 years; wounded at Bayou de Glaze, Louisiana, May 18, 1864; missile entered two inches above knee internally and posteriorly and passed downward and outward, slightly grazing the femur. On July 22d, Surgeon E. Powell, 72d Illinois, amputated the left thigh at the lower third. The patient recovered and was discharged March 30, 1865, with a sound stump.—Private *R. L. Donald*, Co. B, 27th North Carolina, wounded at Antietam, September 17, 1862, through the middle of the left thigh, and admitted to the hospital at Chester, Pennsylvania, October 2d. Necrosis and hectic supervening, and death being imminent, amputation at the junction of the middle and upper thirds of the thigh was performed by Dr. J. Ashhurst, jr.,[1] by circular incision, November 6, 1862. The patient, with great difficulty, rallied from the shock of the operation; but subsequently sank suddenly, and died seven hours afterwards. Dr. Ashhurst contributed the specimen of the injured femur to the Army Medical Museum. It is numbered 863 of the Surgical Section, and consists of "five inches of the shaft of the left femur, showing local necrosis after contusion by a conoidal ball in the upper third. A moderate deposit of callus has occurred adjacent to the seat of injury. The specimen is an interesting illustration of serious injury without complete fracture." (FIG. 129.) (*Cat. Surg. Sect.*, A. M. M., 1866, p. 288.)—Private B. A. Elmore, Co. B, 6th Michigan Cavalry, aged 18 years, received, near Old Church, Virginia, May 28, 1864, a shot wound of the left knee joint. "A conical ball entered the joint from the front, and passing backward and upward, impinged against the inferior epiphysis of the femur, glanced, and passing upward, lodged high among the muscles of the thigh, deep. Knee and thigh considerably swelled. Track of bullet emphysematous, filled with thin, dirty looking, offensive pus. The emphysema and suppuration extended as high up as the junction of the middle and superior thirds of the thigh. June 5th, thigh amputated high up in the upper third by the double flap method. The bullet dropped out while cutting the posterior flap. There was but trifling loss of blood during the operation, and the patient reacted promptly. June 6th, feverish and restless, pulse rapid. June 10th, pyæmia developed. Died June 17, 1864." The operator, Surgeon John A. Lidell, U. S. V., contributed the portion of the femur removed, together with the history of the case, to the Army Medical Museum. The specimen is numbered 2437 of the Surgical Section, and consists of the "lowest third of the left femur. It is contused above the inner condyle, where it is locally carious. The specimen is sawn open longitudinally, exhibiting diseased action to the center of the bone." (*Cat. Surg. Sect.*, A. M. M., 1866, p. 283.)—Captain G. Grecheneck, Co. A, 72d New York, received, at Williamsburg, Virginia, May 4, 1862, a gunshot wound of the right popliteal space. Surgeon R. B. Bontecou reported that a minié ball transfixed the thigh between the hamstrings and condyles of the femur, grooving that bone slightly at the attachments of the gastrocnemius muscles and injuring the artery and nerve. The foot became gangrenous, and amputation in the lower third of the thigh, by circular operation, was done. Gangrene attacked the stump on the 15th, and he died May 16, 1862.—Private *Lafayette Hogan*, Co. G, 14th Tennessee, was admitted into Lincoln Hospital, Washington, December 23, 1862, with a gunshot wound of the right knee. Amputation at the lower third of the thigh was performed on the day of admission. The patient died January 1, 1863, from hæmorrhage. Assistant Surgeon G. M. McGill, U. S. A., forwarded the pathological preparation (*Specimen* 1891, Section I) to the Army Medical Museum. It consists of "a ligamentous preparation of the bones of the right knee, except the patella, amputated in the lowest fourth, apparently for a contusion just above and behind the outer condyle." (*Cat. Surg Sect.*, A. M. M., 1866, p. 338.)—Private J. L. Hudson, Co. I, 59th Illinois, aged 18 years, received, at Nashville, December 15, 1864, a shot wound of the right thigh just above the knee joint, the ball grazing the femur and denuding it of its periosteum. The wound progressed favorably until December 30th, when the structures of the joint became implicated. An abscess made its appearance just below the patella. The patient became much debilitated. On January 25, 1865, Acting Assistant Surgeon F. B. Nossinger amputated the right thigh at the middle third by the circular method. Great prostration followed. Irritative fever ensued, and the patient died February 1, 1865.—The case of Private A. Kitzing, Co. H, 57th New York; wounded at Fredericksburg, December 13, 1862, whose thigh was amputated on account of recurrent bleeding after ligation of the femoral artery, has been alluded to on page 172, *ante*, CASE 344.—Private M. Shay, Co. B, 61st New York, aged 20 years, received, at Antietam, September 17, 1862, a shot wound of the anterior aspect of the right thigh; the femur was bruised; ball lodged. October 20th, ball found lying against the femur, at upper third, and removed. The discharge became profuse and offensive and the patient failed daily. November 15th, flap amputation of right thigh at the upper third by Surgeon H. S. Hewit, U. S. V. The patient died November 24, 1862. Dr. Hewit contributed the specimen shown in the wood-cut (FIG. 130). There is "a large portion of necrosed bone nearly detached, with very little callus." He also forwarded the preparation of the right femoral artery to the Museum. It is numbered 853 of the Surgical Section.

FIG. 129.—Shot contusion of shaft of left femur. *Spec.* 863.

FIG. 130.—Necrosis of the right femur. *Spec.* 1096.

[1] Dr. ASHHURST, in a published account of this case (*Surgical Cases, Illustrating some Practical Points*, in *Am. Jour. Med. Sci.*, 1863, Vol. XLV, p. 345), states that: "The wound, which appeared to be simply a flesh wound, did well, and was nearly healed, when, from some then unknown cause the track reopened, and by the probe and little finger dead bone was detected about the middle of the left femur."

The left thigh was amputated in three, the right in six instances; of the latter, two recovered. The modes of operation selected were: The circular amputation five times, the flap operation twice; in two instances the manner of operation was not indicated. Seven amputations were practised on Union, two on Confederate soldiers.

Comparing the results of cases of shot contusion in the shaft of the femur with the results of analogous cases in the shaft of the humerus, we find that of one hundred and sixty-two contusions in the femur forty-two, or 25.9 per cent., proved fatal, while of twenty-two patients with contusion of the humerus only four, or 18.1 per cent., succumbed, and that while in not a single instance of contusion of the humerus operative interference was deemed necessary, nine amputations of the thigh were practised for complications following shot contusions of the femur.[1] The serious consequences ascribed to injuries of this nature by Dr. Lidell have been alluded to on page 171, *ante*. Professor L. Stromeyer, Dr. H. Gibbons, Professor A. Lücke, M. Jobert (de Lamballe), Dr. C. Heine, and Dr. J. Arnold[2] have noted the complications accompanying shot contusions of the femur; but only a few writers on military surgery have cited instances of such injuries.[3]

SHOT FRACTURES OF THE SHAFT OF THE FEMUR.—Shot fractures of the shaft of the femur were considered as almost universally fatal by the older writers on military surgery, and amputation of the thigh was regarded by many as the only means of saving the patient's life.[4] But the many successful attempts at preservation of the limb in cases of shot fracture of the femur within the last twenty years leave no doubt as to the value of the conservative treatment of such fractures.[5] Six thousand five hundred and

[1] SCHWARTZ (H.) (*Beiträge zur Lehre von den Schusswunden*, Schlesswig, 1854, p. 147), in a very interesting chapter, carefully notes the frequently serious consequences following shot contusions of the femur, and remarks that: "Notwithstanding the most careful treatment, the attempts at conservation not rarely necessitate consecutive amputation as a last means of saving the life of the patient." A. J. JOBERT (de LAMBALLE) (*Plaies d'armes à feu*, Paris, 1833, p. 255) refers to contusions with denudation of the femur, and cites a case in which he amputated the thigh unsuccessfully.

[2] STROMEYER (L.), *Ueber die bei Schusswunden vorkommenden Knochen verletzungen*, Freiburg, 1870, p. 3. GIBBONS (H.), *Contused Wounds of Bone*, in the *Pacific Med. and Surg. Jour. and Press*, San Francisco, 1866, Vol. VIII, p. 284. LÜCKE (A.) (*Kriegschirurgische Aphorismen aus dem Zweiten Schleswig Holsteinschen Kriege im Jahre* 1864, Berlin, 1865, p. 67) remarks that contusions of the femur by musket balls are very severe injuries, frequently misapprehended, and followed by ostitis, osteomyelitis, and even osteophlebitis, and cites three cases of which one proved fatal. JOBERT (A. J. de LAMBALLE), *Contusion des os*, in *L'Union Medicale*, Paris, 1865, T. XXV, pp. 263, 337. HEINE (C.), *Die Schussverletzungen der unteren Extremitäten*, Berlin, 1866, p. 164, etc. ARNOLD (J.) (*Anatomische Beiträge zu der Lehre von den Schusswunden*, Heidelberg, 1873) describes the pathological changes following contusions of the femur as observed in his autopsies of six cases of this injury.

[3] LARREY (H.) (*Hist. Chir. du siege de la Citadelle d'Anvers*, Paris, 1833, p. 202, etc.) cites three successful instances of shot contusion of the femur, and adds: "Les resultats consécutifs de cette blessure, constatés à l'hôpital, ont été l'adhérence de la principale cicatrice, l'atrophie et l'ankylose du genou." CHENU (J. C.) (*Rapport, etc., pendant la Campagne d'Orient en* 1854, 1855, 1856, Paris, 1865, p. 374) tabulates 146 cases of shot contusion of the femur with 22 deaths, a mortality of 15.0 per cent. MATTHEW (T. P.) (*Med. and Surg. Hist. of the British Army*, etc., London, 1858, p. 355) tabulates 43 cases of shot contusions and partial fractures of the lower extremities, but it is impossible to eliminate from his tabulations the number of shot contusions of the femur. CHENU (J. C.) (*Stat. Med. Chir. de la Camp. d'Italie en* 1859 *et* 1860, Paris, 1869, p. 715) groups 103 shot contusions of the femur with 13 deaths. SCHINZINGER (A.) (*Das Reserve-Lazareth Schwetzingen im Kriege* 1870 *und* 1871, Freiburg, 1873, p. 69) observed 10 cases of shot contusion of the femur. One of the cases proved fatal from pyæmia, another succumbed to anæmia following arterial bleeding. SCHÜLLER (MAX.) (*Kriegschirurgische Skizzen aus dem Deutsch-Französischen Kriege*, 1870–71, Hannover, 1871, p. 66) cites 2 cases of shot contusion of the femur, one in the middle, the other in the lower third; both recovered. BECK (B.) (*Chir. der Schussverletzungen*, Freiburg, 1872, p. 677) reports 15 cases of shot contusions of the femur in the Bavarian (XII) Corps during the Franco-Prussian War, 1870–71, of which 3, or 20 per cent., proved fatal, and remarks: "That the shot contusions, although entirely innocuous looking in the beginning, are apt, in the progress of the case, to prove dangerous, and to convince the surgeon how careful he must be not to overlook the sneaking initiatory processes of inflammation of the periosteum and the interior of the bone."

[4] RAVATON (*Chirurgie d'Armée ou Traité des Plaies d'armes à feu*, etc., Paris, 1768, p. 323): Les coups de feu qui fracassent l'os de la cuisse dans son entier, sont si fâcheux que j'ai vu périr tous ceux qui l'ont eu fracture." SCHMUCKER (J. L.) (*Vermischte Chir. Schriften*, Berlin und Stettin, 1785, p. 42): "If the fracture is in the lower part of the bone, the danger is relatively a great deal less, as the muscles are not very powerful here, and, in such a fracture, amputation should not be at once performed, but all other means should first be tried; and very frequently I have happily cured fractures of this kind; but if the femur is fractured and splintered in the middle or above the middle, I never wait for complications, but perform the operation before they occur, and several times I have cured patients where the operation has been done soon." BAUDENS (L.) (*Clinique des plaies d'armes à feu*, Paris, 1836, p. 460) remarks: "Toute fracture de cet os [femur] par coup de feu exige l'amputation immediate," and, on page 461, adds, that of 25 cases with fracture of the femur treated by expectation, only two recovered with deformed limbs, incapable of fulfilling their functions. MACLEOD (*Notes on the Surgery of the War in the Crimea*, London, 1858, p. 296) advises primary amputation in fractures of the middle and lower thirds of the femur; but where the fracture is in the upper third of the bone he concludes "that slight as the chance of saving life is in any case, it is still our part to attempt consolidation in preference to amputation." LARREY (D. J.) (*Mém. de Chir. Mil. et Camp.*, Paris, 1812, T. II, p. 503) refers to a case of simple shot fracture of the femur without notable lesion of the soft parts for which amputation had been performed on the 40th day, and remarks: "Je ne désapprouve point cette opération; car mon expérience m'a appris que toutes les plaies avec fracture de la cuisse sont tres-fâcheuses, et exigent toutes en général l'amputation qu'on ne peut pas toujours pratiquer dans les premiers momens, et c'est un des cas où elle peut être faite consécutivement."

[5] HEINE (C.) (*Die Schussverletzungen der unteren Extremitaten*, Berlin, 1866, p. 234) declares: "To-day it must be accepted as an axiom that in all cases of shot fractures of the femur by small projectiles, uncomplicated by injury of the femoral artery or by opening of the knee joint, the conservative treatment should by all means be tried."

seventy-six shot fractures of the diaphysis of the femur were found on the returns, furnishing examples of every variety of partial fracture, of comminution of bone, of longitudinal fissuring, of oblique or transverse fracture, and of detachment of large fragments. Of these six thousand five hundred and seventy-six shot fractures of the femur three thousand four hundred and sixty-seven were treated by conservation, and three thousand one hundred and nine were followed by excision either in the shaft of the femur or at the hip joint, or by amputation of the thigh or exarticulation at the hip.

TABLE XX.

Numerical Statement of Sixty-five Hundred and Seventy-six Shot Fractures of the Shaft of the Femur unattended by Primary Injury of the Hip or Knee Joint.

TREATMENT.	FRACT. IN UPPER THIRD.					FRACT. IN MIDDLE THIRD.					FRACT. IN LOWER THIRD.					POINT OF FRACTURE UNSPECIFIED.				
	Cases.	Recovered.	Died.	Undetermined.	Ratio of Mortality.	Cases.	Recovered.	Died.	Undetermined.	Ratio of Mortality.	Cases.	Recovered.	Died.	Undetermined.	Ratio of Mortality.	Cases.	Recovered.	Died.	Undetermined.	Ratio of Mortality.
Conservation	1,254	669	572	13	46.0	855	500	342	13	40.6	620	375	232	13	38.2	738	145	538	55	78.7
Excision at the Hip Joint	11	4	7	....	63.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Amputation at the Hip Joint	25	2	23	.....	92.0	3	1	2	.....	66.6	1	.....	1	....	100.0	.....	.....	.....	.....	.....
Excision in Shaft of Femur	73	25	47	1	65.2	56	17	38	1	69.1	16	4	10	2	71.4	23	3	16	4	84.2
Excision in Shaft of Femur and Amp. at Hip	1	....	1	.....	100.0	.....	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Excision in Shaft of Femur and Amp. in Thigh	1	....	1	.....	100.0	3	1	2	.....	66.6	2	1	1	.....	50.0	.....	.....	.....	.....	.....
Amputation in Thigh	92	24	66	2	73.3	355	156	195	4	55.5	1,120	606	496	18	45.0	1,325	461	801	63	63.4
Amputation in Thigh and Consec. Amp. at Hip	.....	.....	.....	.....	.....	2	1	1	.....	50.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Aggregate	1,457	724	717	16	49.7	1,274	676	580	18	46.1	1,759	986	740	33	42.8	2,086	609	1,355	122	68.9

It was found impracticable to eliminate from the large number of cases aggregated in TABLE XX the instances of partial shot fractures of the shaft of the femur, as frequently the diagnosis was too vague to allow a distinction to be made between a complete fracture or a partial fracture. The Army Medical Museum possesses eighteen[1] specimens of partial

[1] *Specimen* 126 (*Cat. Surg. Sect. Army Med. Museum*, 1866, p. 260), the upper part of the left femur, the great trochanter being carried away by a grape shot. *Spec.* 134 (*Cat.*, page 260), upper half of left femur with a section of the shaft just below the great trochanter gouged out: Pt. A. B——, Co. G, 152d New York, aged 34; wounded June 10, 1864; died, of asthenia, August 29, 1864. *Spec.* 1594 (*Cat.*, p. 261), the upper portion of the left femur, with the great trochanter badly grooved by a musket ball: Corporal J. M——, E, 39th Massachusetts, aged 19; wounded at Petersburg, April 1, 1865; died, exhausted after pleuro-pneumonia, August 17, 1865. *Spec.* 2132 (*Cat.*, p. 259), the upper fourth of the right femur, the great trochanter being partly fractured. *Spec.* 2197 (*Cat.*, p. 258), the right femur chipped and contused on anterior and inner face: Pt. G. S——, Co. E, 88th Illinois, aged 27; wounded at Mission Ridge, November 27, 1863; died, from exhaustion, February 18, 1864. *Spec.* 2995 (*Cat.*, p. 260), the upper third of the left femur partially fractured at the level of the trochanter minor: Pt. E. P——, Co. A, 38th Mass., aged 19; wounded at Port Hudson, June 14th; died, from exhaustion, July 27, 1863. *Spec.* 3433 (*Cat.*, p. 259), the upper third of the left femur contused and partially fractured: Pt. W. V——, Co. F, 12th Penn. Cavalry, aged 20; wounded at Winchester, July 24th; died, of typhoid fever, September 29, 1864. *Spec.* 3956 (*Cat.*, p. 261), the shaft of the left femur sawn longitudinally, showing an oblique partial fracture by a conoidal ball, which chipped the shaft in its outer border: Serg't J. O'B——, Co. F, 42d New York, aged 30; wounded at Antietam, September 17, 1862; died, from pyæmia, February 17, 1863. *Spec.* 140 (*Cat.*, p. 260), the lowest third of the left femur grooved two inches above the condyles: Serg't H. D——, Co. E, 2d N. Y. S. M.; wounded at Bull Run, August 30th; died October 10, 1862. *Spec.* 916 (*Cat.*, p. 260), the lower half of the left femur, penetrated in the lowest third, with a slight osseous deposit on the neighboring portion of the shaft: Serg't L. B——, Co. A, 7th Wisconsin; wounded at South Mountain, September 14th; died December 29, 1862. *Spec.* 1104 (*Cat.*, p. 259), the lower half of the left femur severely contused in the lowest third, with an oblique fissure around the bone. *Spec.* 1757 (*Cat.*, p. 261), the lowest third of the right femur obliquely perforated above the external condyle: Pt. M. K——, 4th Ohio Cavalry; wounded July 10th; ligation of popliteal and femoral arteries on account of recurrent hæmorrhage; died, from exhaustion, August 14, 1863. *Spec.* 1788 (*Cat.*, p. 260), the lower half of the right femur partially split, with a longitudinal fragment nearly detached: Pt. O. B. N——, Co. K, 3d Michigan Cavalry; wounded near Jackson, July 15th; died October 2, 1863, of pyæmia. *Spec.* 1924 (*Cat.*, p. 260), the lowest third of the left femur grooved on the outer aspect from before backward: Pt. S. T. G——, Co. E, 17th Kentucky; wounded at Chickamauga, September 19th; died November 5, 1863. *Spec.* 2370 (*Cat.*, p. 261), the lower half of the right femur chipped by a bullet on the outer side; part of the injury repaired by a deposit of callus: Pt. A. R——, Co. A, 2d Penn. Cavalry; wounded at Mine Run, November 29, 1863; taken prisoner, paroled, and admitted into hospital, Baltimore, April 18, 1864; died, May 22, 1864, of pyæmia. *Spec.* 4271 (*Cat.*, p. 261), the lowest third of the left femur, showing partial fracture of the laminated portion of the shaft just above the condyles, with a longitudinal fissure upward: Corp'l J. E. D——, Co. G, 34th Massachusetts; wounded at Newmarket, May 15th; died, with typhoid symptoms, June 5, 1864.

shot fractures of the shaft of the femur. Two instances will here be cited, and then the shot fractures of the femur treated by expectation, according to the seat of the injury in the upper, middle, and lower thirds, will be considered.

FIG. 131.—Partial shot fracture of right femur. *Spec.* 3339.

CASE 359.—Private O. C. Higgins, Co. D, 31st Maine, aged 24 years, was wounded before Petersburg, June 23, 1864. Surgeon J. Harris, 7th Rhode Island, reported his admission into the field hospital of the 2d division, Ninth Corps, with a "shot wound of thigh caused by a musket ball." From the field hospital the wounded man passed to the Depot Hospital at City Point, and thence, on July 3d, to the Third Division Hospital at Alexandria. Surgeon E. Bentley, U. S. V., in charge of the latter, reported the following description of the injury and its result: "A conical explosive ball entered the external aspect of the middle third of the right thigh anteriorly, and, exploding, scattered fragments of lead through the thigh and partially fractured the femur, not, however, preventing the patient from using his leg at will. Water dressings were applied. When admitted the patient was not in good condition, having been suffering from diarrhœa for some time, for which astringents were given. On July 6th, he was somewhat improved. The cold-water dressings were changed to warm. By July 10th the diarrhœal discharges had ceased, but the wound was very much inflamed. On July 15th, a slight discharge of dark and unhealthy pus set in, and flaxseed poultices were applied. Tonics and stimulants were administered. On July 21st, the patient felt better, and his treatment was continued. Two days later there were dark and unhealthy discharges from the wound, but the patient looked bright and his tongue was cleaning. Death occurred suddenly at 4 A. M., on July 24, 1864, the patient having been given water to drink about an hour previously by the nurse, and no signs of rapid exhaustion being then apparent. The *post-mortem* examination, made nine hours after death, showed the thigh filled with fragments of the bullet, and a partial fracture of the femur; there was profuse suppuration above and around the bone, and great emaciation. The viscera were found to be perfectly healthy." The upper two-thirds of the injured femur were contributed to the Army Medical Museum by Dr. Bentley, and are represented in the wood-cut (FIG. 131). The specimen shows the existence of local necrosis, with trivial osseous deposit near by, and the traces of profuse suppuration following the fragments of lead are seen in the roughening of the shaft.

In another instance of partial shot fracture of the shaft of the femur, the ball, at the autopsy, was found lodged in the medullary cavity:

CASE 360.—Corporal J. Higgins, Co. A, 159th New York, aged 19 years, was wounded at Irish Bend, April 14, 1863. Surgeon T. B. Reed, U. S. V., reported his admission to the field hospital of the 4th division, Nineteenth Corps, with a "shot wound of leg." Assistant Surgeon P. S. Conner, U. S. A., contributed the pathological specimen represented in the annexed wood-cuts (FIGS. 132, 133), with the following history: "The patient entered University Hospital, New Orleans, April 17, 1863.

FIG. 132.—Lowest third of right femur, with ball in medullary canal. *Spec.* 1296.

Upon examination he was found to have a wound just below and external to the head of the left fibula, the track of the ball being upward and inward. The missile had not been extracted nor could it be detected. There being no evidence of fracture, the case was regarded as a simple flesh wound and treated accordingly. On the seventh day after admission hæmorrhage supervened, but upon cutting down through the popliteal space no bleeding vessel could be detected, and no further hæmorrhage occurred. On passing the finger along the track of the wound the superior margin of a cavity was felt, which appeared to be a portion of the femur partially split off and thrown backward. There being no displacement or other evidence of fracture extending entirely across the shaft, and the man being unable to give any account of his position at the time of receiving the injury, it was concluded that the ball had lodged in the femur. Though much prostrated by the loss of blood the patient was rallied by careful nursing. As a precautionary measure the limb was placed in an anterior splint after a few days, from which time the case progressed quite favorably until May 15th, when rigors came on and the patient failed rapidly. He died on May 18, 1863, thirty-five days after being wounded. At the *post-mortem* examination no inflammation of the knee joint was discovered, but little pus at the seat of the injury, and no abscesses in the lungs or liver. An inspection of the specimen indicates that the leg must have been strongly flexed on the thigh at the time the man was shot." The specimen shows longitudinal fractures on the anterior surface of the bone, with some periosteal thickening, and the ball lodged in the medullary canal.

FIG. 133.—Anterior view of *Spec.* 1296.

SHOT FRACTURES OF THE SHAFT OF THE FEMUR TREATED BY CONSERVATION.—The shot fractures of the shaft of the femur treated by conservation numbered three thousand four hundred and sixty-seven. The result of the injury could not be ascertained in ninety-four instances. Sixteen hundred and eighty-nine patients recovered, and sixteen hundred and eighty-four, or 49.9 per cent., died. The injury was on the right side in fourteen hundred and thirty-one instances, with a mortality rate of 47.0 per cent.; on the left in sixteen hundred and five, of which 47.1 per cent. died; in four hundred and thirty-one cases the side of the injury was not specified. The seat of fracture

was in the upper third in twelve hundred and fifty-four instances; in the middle third, in eight hundred and fifty-five; in the lower third, in six hundred and twenty cases; and in seven hundred and thirty-eight instances the precise seat of fracture was not stated.

Shot Fractures of the Upper Third of the Femur treated by Conservation.—Very few instances of recovery after shot fractures in the upper third of the femur treated by expectation seem to have been reported by the older authors on military surgery, and I have been unable to find more than eight examples of recovery after this class of injury prior to the beginning of the present century. In the subjoined foot-note[1] an attempt is made to collect the instances of recovery after fractures in the upper third of the femur, to show that in later years these cases have been by no means as rare as has generally been believed, and, indeed, the results obtained in the American Civil War, and, subsequently,

[1] The earliest instance of shot fracture of the upper third of the femur that I have been able to trace is a case reported by Dr. JOSEPH SCHMIDT. In his *Speculum Chirurgicum oder Spiegel der Artzney*, Augspurg, 1656, p. 144. J. von Meda, of Captain Newmann's company, received a shot fracture of the upper third of the femur, August 31, 1648, at Memmingen. He recovered and was able to go about on crutches. PURMANN (M. G.) (*Funfftzig Sonder-und Wunderbahre Schusswunden Curen*, Franckfurt, 1721) reports three cases of recovery after shot fracture of the upper third of the femur, viz: The case of a soldier wounded at Türckshausen, in November, 1671 (Obs. I, p. 32); the case of Corp'l C. Endte, wounded before Stettin in 1677 (Obs. XVIII, p. 213), and the case of M. Leschke, wounded before Wolgarth in October, 1675 (Obs. XXXIII, p. 250). BELLOSTE (*Le Chirurgien d'Hôpital*, 3d ed., Paris, 1716, p. 206) relates the case of Sergeant LeGrand, who received, in 1686, a shot fracture of the upper portion of the right femur, and, after copious suppurations with exfoliations, recovered. The ball and a fragment of the femur were extracted eighteen months after the injury. RAVATON (*Chirurgie d' Armée*, Paris, 1768, p. 338) relates that at the battle of Dettingen, July 5, 1743, a lieutenant of cavalry received a shot fracture of the right lesser trochanter. On the 55th day five pieces of bone came away, and the wound cicatrized without further accident. MOSCATI (*Mém. de l'Acad. de Chir.*, Paris, 1768, T. IV, p. 625) relates the case of a soldier of 35, who, at the battle of Crevelt, June 23, 1758, received a shot fracture just below the trochanters of the right femur. He recovered, and was sent to the Invalides, at Paris, where he died April 13, 1764. Two copperplates well represent the fracture united by large masses of callus. DESAULT (*Jour. de Chirurgie*, Paris, 1792, T. III, p. 104) reports the case of Louis Waymet, shot in Paris, Feb. 28, 1791. The ball passed through both thighs and fractured the left femur in the upper third. The patient recovered and walked well. FENECH (E.) (*Obs. recueillies à l'Armée d'Espagne sur les plaies d'armes à feu aux extrémités*, Paris, Thesis, 1813, p. 10) cites the case of Lieut. Larque, 70th regiment, wounded near the right great trochanter, at Busaco, Portugal, September 27, 1810, and recovered. LEGOUEST (*De la Désarticulation Coxo-fémorale*, in *Mém. de la Soc. de Chir. de Paris*, 1863, T. V, p. 166): M. X—— was shot in the left trochanter in 1812. He recovered with four or five inches shortening, and was presented by H. LARREY, in 1854, to the surgical clinic of Val de Grace. FORGET (*Bull. de la Soc. de Chir. de Paris pendant* 1855-56, p. 230) reports that a captain at Waterloo, in 1815, received a shot fracture of the femur near the trochanter. Pieces of bone continued to come away, and suppuration and fistulæ yet existed in 1852. HENNEN (J.) (*Principles of Military Surgery*, London, 1829, p. 131) states that a French prisoner was brought to Brussels after the battle of Waterloo, June, 1815, whose right femur had been struck by three musket balls, splintering the bone from the middle of the upper third to within two inches of the condyles; enormous suppuration followed, and extensive incisions were made to extract bones and balls, and the patient recovered. Four cases of recovery after shot fractures in the upper thirds of the femur, received in the Paris revolution in 1830, are reported by A. J. JOBERT (DE LAMBALLE) (*Plaies d'armes à feu*, Paris, 1833, pp. 262, 264). LARREY (H.) (*Relation chirurg. des événemens de Juillet*, 1830, Paris, 1831, pp. 102, 106) relates two instances of recovery after shot fracture of the upper third of the femur: Cases of M. de Saint C., and H——, 7th regiment. ARNAL (*Mém. sur quelques peculiarités des plaies par armes à feu*, in *Jour. Hebd. de Méd. et de Chir. prat.*, Paris, 1831, p. 36) reports two cases. A member of the National Guard of Lyon recovered after a shot fracture of the neck of the femur, in 1831 (GENSOUL, *Note sur les blessés reçus à l'Hôtel-Dieu de Lyon, pendant les troubles de* 1831, in *Gaz. Med. de Paris*, 1833, No. 43, p. 300). LARREY (H.) (*Hist. chir. du siége de la Citad. d'Anvers*, Paris, 1833, p. 216) cites four cases of shot fractures of the upper portion of the femur treated successfully during the siege of Antwerp, in 1832. LEGOUEST (*loc. cit.*, p. 167) gives the successful case of Tanguel of the 2d light infantry, wounded in the right trochanter, at Cherchell, in January, 1841. The same author states that SÉDILLOT successfully treated a shot fracture of the right trochanter in a lieutenant of artillery, wounded in a duel in 1843. According to HUGUIER (*Bulletin de la Soc. de Chir. de Paris pendant* 1855-56, Paris, 1856, p. 230), Dr. GERDY successfully treated a shot fracture of the trochanter in 1848. (This is probably the case of Guiton, alluded to in *Gaz. des Hôp.*, 1848, p. 98.) BAUDENS (*Des plaies d'armes à feu—Communications faites, etc.*, Paris, 1849, p. 231) cites a case of shot fracture of the upper third of the femur in 1848; the patient recovered. AMUSSAT (*Des Plaies d'armes à feu—Communications, etc.*, Paris, 1849, p. 55, refers to a case of recovery. During the discussion on disarticulation at the hip at the meetings of the Surgical Society of Paris (*Bulletin de la Soc. de Chir. de Paris*, 1855-56, pp. 230-234), on October 24 and October 31, 1855, GIRALDÉS, ROBERT, and DENONVILLIERS gave details of three cases of recovery after shot fractures of the upper third of the femur. SCHWARTZ (H.) (*Beiträge zur Lehre von den Schusswunden*, Schleswig, 1854, pp. 154 and 167) cites two cases: J. G——, wounded at Altendorf, April 21, 1848, fracture of the great trochanter; fragments of bone removed; recovery. C. B——, of the Berlin volunteers; fracture of trochanter minor; recovery in four months. HUTIN (*Recherches sur le résultat des fractures de la moitié supérieure de la cuisse*, in *Rec. de Mém. de Méd. de Chir. et de Phar. Mil.*, 1854, 2me série, T. XIV, p. 263) found among the inmates of the *Hotel des Invalides* at Paris, from 1847 to 1853, seventeen patients who had recovered from shot fractures of the upper third of the femur. MATTHEW (*loc. cit.*, Vol. II, pp. 361, 362) relates two cases of recovery after shot fracture of the upper third of the femur: An officer of the 17th regiment, wounded September 8, 1855, by a rifle ball, which fractured the trochanter major of the left femur. On November 11th, the bone had united, and there was only slight shortening of the limb. J. Fitzball, 62d regiment, received, September 8, 1855, a shot fracture of the femur at the junction of upper and middle thirds. He recovered, with 1½ inches shortening. LONGMORE (T.) (HOLMES'S *System of Surgery*, 2d ed., 1870, Vol. II, p. 225) details the case of Lieut. D. M——, 19th regiment, who received a shot fracture of the left femur on September 9, 1855. On February 22d, the union of bone was firm. In 1856, "the stiffness of joints gradually disappeared, and the patient was enabled to return to duty." Among the 282 pensioners after injuries of the thigh, recorded by name by M. CHENU in his *Rapport, etc., pendant la Campagne d'Orient en* 1854, 1855, 1856, Paris, 1865, pp. 375-397, 37 cases of recovery are found after shot fracture of the upper third of the femur. From the same campaign, L. BAUDENS (*La Guerre de Crimée*, Paris, 1858, pp. 330, 331, 336) reports a case of recovery after shot fracture of the upper third of the femur among the French troops, not recorded by CHENU: J. Albaric, 80th line, upper third of right femur, Sept. 8, 1855; and two cases of recoveries among the Russian prisoners: Jusef Testanief, left femur, just below the trochanter major, and S. Zarepa, fracture of right femur at the trochanter major. WILLIAMSON (G.) (*Military Surgery*, London, 1863, pp. 141, 142) records six cases of recovery after shot fracture of the upper third of the femur: Private P. Carty, 64th regiment, wounded at Lucknow in 1857. Private J. Ashworth, 53d regiment, wounded November 1, 1857; July 14, 1858, wounds healed. Private J. Hewitt, 52d regiment, wounded July 12, 1857; wounds healed July 20, 1858; and Private E. Collins, 75th regiment, wounded at Delhi, June 8, 1857; September 6, 1858, sent to modified duty; and cases of Williams and Curtis, on p. 151. In the Italian War of 1859, H. DEMME (*Militär-Chir. Studien*, Würzburg, 1864, B. II, p. 365) tabulates 43 cases of shot fractures of the upper third of the femur treated conservatively among the Austrian troops, of which 18 recovered, giving a fatality of 58.1 per cent. Among the French wounded in the same campaign, named by CHENU (*Stat. med. chir. de la Campagne d'Italie en*

in the Franco-Prussian War, 1870-71, have been highly encouraging.[1] From the statistics in TABLE XX, *ante*, it will be seen that of twelve hundred and fifty-four cases of shot fracture of the upper third of the femur treated by expectation, six hundred and sixty-nine recovered, and five hundred and seventy-two proved fatal; while in thirteen instances the result could not be ascertained, giving a mortality of only 46.0 per cent.

Recoveries after Shot Fractures of the Upper Third of the Femur treated by Conservation.—Of the six hundred and sixty-nine cases of this group, two hundred and ninety-eight were on the right, and three hundred and thirty-four on the left side; in thirty-seven instances the side was not specified. Five hundred and fifty-one patients were Union, and one hundred and eighteen were Confederate soldiers.

CASE 361.—Private W. Rigney, Co. G, 21st New York Cavalry, aged 18 years, was shot near Bladensburg, May 27, 1865. Surgeon B. B. Wilson, U. S. V., reported his admission to Stanton Hospital, Washington, May 29th, with "shot wound of right nates and right thigh, fracturing the femur, received while running the guard." The method of treatment, however, was not stated. On September 13th the patient was transferred to Harewood Hospital, whence Surgeon R. B. Bontecou, U. S. V., described his condition as follows: "He was admitted convalescing from a fracture of the upper third of the femur, caused by a revolver ball, the injured bone having firmly united with two inches shortening and very slight deformity. His constitutional condition was good, and he was able to go about on crutches and had good prospects of a useful limb." One month afterwards the man was transferred to De Camp Hospital, David's Island, New York, and on June 26, 1866, he was discharged from service and pensioned. Examiner W. G. Davis, of Lyons, New York, certified, July 1, 1872: "Pistol shot wound of right thigh, the ball entering posteriorly and fracturing the femur just below the trochanter major. There is considerable deformity and two and a half inches shortening. Pieces of bone discharged. Has pain in the limb in damp weather. Cannot rotate the thigh or flex it upon the pelvis, and has pain in it if he works, stands long, or lifts heavy loads." No material changes were

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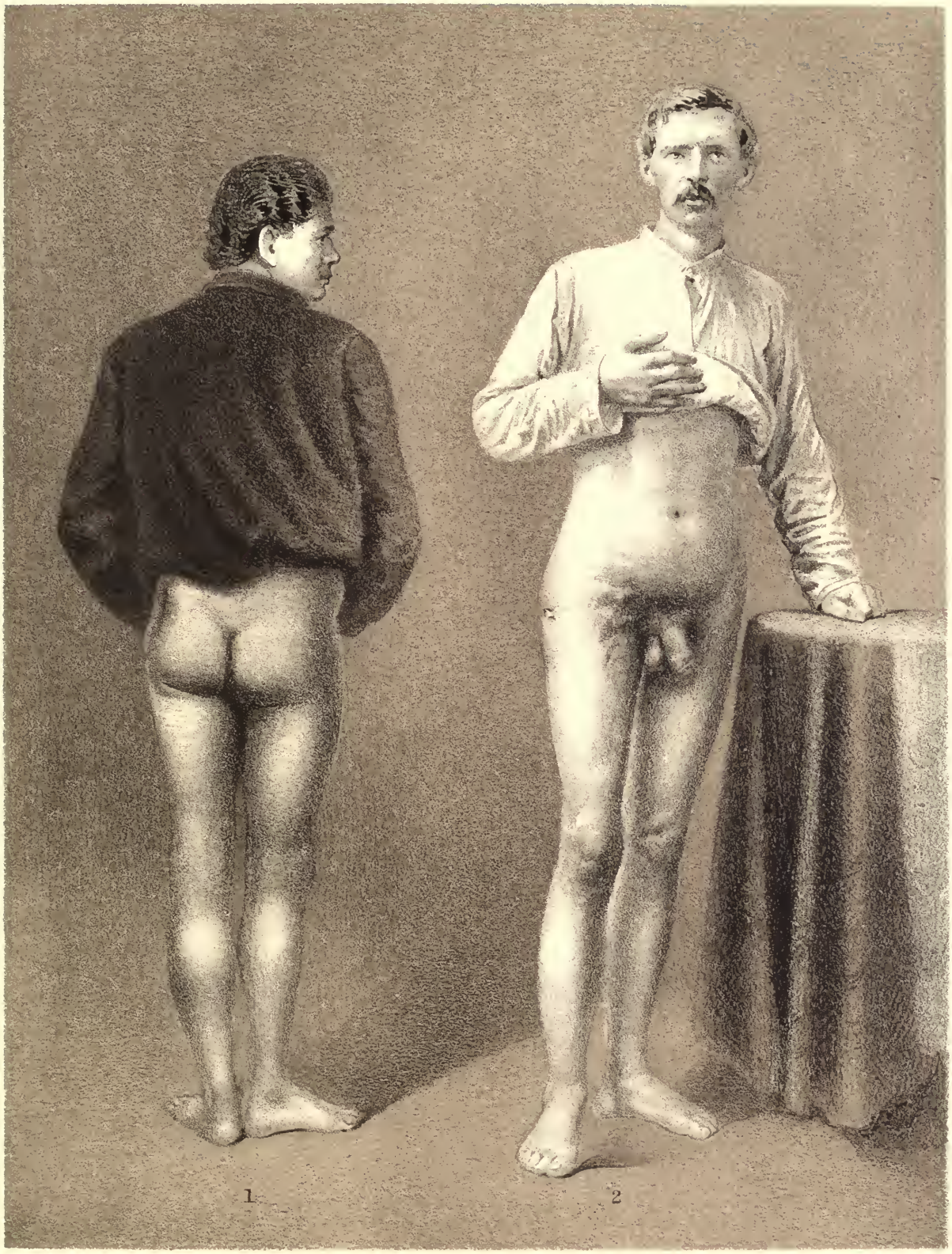
1859 *et* 1860, Paris, 1869, T. II, p. 715, etc.), 50 cases of recovery are found after shot fracture of the upper third of the femur treated by conservation. ROUX (J.) (*D'articulation de la cuisse*, Paris, 1860) cites 9 cases of recovery after shot fracture of the upper third of the femur in the Italian campaign of 1859–60, not contained in CHENU'S list, viz: Barka-ben-Brahim, 3d Turks; G. Barbet, 100th line; B. Girel, 65th line; J. Hyvan, 1st Zouaves; J. Labastoule, 15th line; P. Mignucci, 1st Zouaves; J. Pamary, 85th line; F. Rousselot, 5th Battalion; C. Rossignol, 6th line. GHERINI (A.) (*Relazione chirurgica dell' Ospedale militare provisorio di S. Filippo*, in *Annali Universali di Medicina*, Milano, 1860, pp. 459, 460) tabulates 9 cases. MOUAT (*The New Zealand War of* 1863–64–65, in *Stat. San. and Med. Reports for the year* 1865, London, 1867, Vol. VII, pp. 502–3) tabulates 2 cases of recovery. HEINE (C.) (*Die Schussverletzungen der Unteren Extremitäten*, Berlin, 1866, p. 251): J——, shot fracture of upper portion of right femur, April 18, 1864; recovered, with 1¾ inches shortening. From the Austro-Prussian campaign of 1866, B. BECK (*Kriegschirurgische Erfahrungen*, 1867, p. 294) reports 4 cases; STROMEYER (L.) (*Erfahrungen über Schusswunden im Jahre* 1866, Hannover, 1867, p. 53) 3 cases; R. BIEFEL (LANGENBECK'S *Archiv*, 1869, B. XI, p. 445) 1 case; and MAAS (*Kriegschirurgische Beiträge*, Breslau, 1870, p. 40) 3 instances of recovery after shot fracture of the upper third of the femur. GRITTI (R.) (*Nuovi documenti in favore della cura conservativa, etc.*, in *Annali Universali di Medicina*, Milano, 1868, Vol. CCV, p. 518, *et. seq.*) gives details of 10 successful cases of fracture of the upper third of the femur. From various sources it has been possible to collect 264 instances of recovery after shot fractures of the upper third of the femur, received during the Franco-German War of 1870–71. Of these cases were reported among the German forces: By B. BECK (*Chirurgie der Schussverletzungen*, Freiburg, 1872, p. 694), 28 cases; by W. KOCH (*Notizen über Schussverletzungen*, in LANGENBECK'S *Archiv*, 1872, B. XIII, p. 474, etc.), 5; by A. SOCIN (*Kriegschir. Erfahr.*, Leipzig, 1872, p. 134), 6; by G. FISCHER (*Dorf Floing und Schloss Versailles*, in *Deutsche Zeitsch. für Chir.*, Leipzig, 1872, B. I, pp. 185 and 224, etc.), 8; by OTT (*Würtemburg. Med. Correspondenz-Blatt*, 1871, p. 169), 5; by H. FISCHER (*Kriegschir. Erfahr.*, Erlangen, 1872, p. 171, etc.), 4; by CZERNY (*Bericht über die im College Stanislaus in Weissenburg behandelten verwundeten*, in *Wiener Medizinische Wochenschrift*, 1870, No. 57, p. 1373), 3; by A. SCHINZINGER (*Das Reserve-Lazareth Schwetzingen*, Freiburg, 1873, pp. 70, 71), 3; by H. LOSSEN (*Kriegschir. Erf.*, in *Deutsche Zeitschrift für Chir.*, 1873, B. II, p. 112), 2; by TH. BILLROTH (*Chir. Briefe*, Berlin, 1872, p. 228), 2; by KÜCHLER (*Memorabilien*, 1871, B. XVI, p. 141), 2; by GRAF (E.) (*Die Königlichen Reserve-Lazarethe zu Düsseldorf während des Krieges* 1870–71, Elberfeld, 1872, p. 62), 2; and by C. KIRCHNER (*Aerztlicher Bericht über das K. P. Feldlazareth im Palast zu Versailles*, Erlangen, 1872, p. 56), by GUTEKUNST (*Zeitschrift für Wundärzte und Geburtshülfe*, 1870–71, p. 146), by GOLTDAMMER (*Berliner Klinische Wochenschrift*, 1871, B. VIII, p. 150), by STALL (*Bericht aus dem K. Württembergischen 4 Feldhospital*, in *Deutsche Mil. Zeitschrift*, 1874, B. III, p. 197), 1 each; a total of 74 cases among the German troops. Of the cases of recovery after shot fracture of the upper third of the femur among the French troops in 1870–71: SÉDILLOT (*Fractures des membres par armes de guerre*, in *Arch. Gén. de Méd.*, 1871, 6me sér., T. XVII, p. 423, etc.) reports 10 cases; A. W. ROALDÉS (*Des fractures compliquées de la cuisse*, Paris, 1871, pp. 43, 44, 46), 4; A. CHIPAULT (*Fractures par armes à feu*, Paris, 1872, pp. 4, 7, 19, *et seq.*), 3; and WM. MACCORMAC (*Notes and Recollections of an Ambulance Surgeon*, London, 1871, pp. 120, 129), 4; CHRISTIAN (J.) (*Relation sur les plaies de guerre*, in *Gaz. Méd. de Strassbourg*, 1872, p. 283), 4; FELTZ et GROLLEMUND (*Rel. Clin. sur les Ambulances de Hagenau*, in *Gaz. Méd. de Strassbourg*, 1871, No. 11, p. 133), 5; JOESSELL (*Ambulance du Petit Quartier à Haguenau*, in *Gaz. Méd. de Strassbourg*, 1871, p. 8), 3; MOYNIER (E.) (*Ambulance de la Rue Saint Lazare*, in *Gaz. des Hôp.*, 1871, Vol. XLIV, p. 445), 1; PANAS (F.) (*Mém. sur le traitement des blessures*, in *Gaz. Hebd. de Méd. et de Chir.*, 1872, T. IX, p. 391), 2; VASLIN (L.) (*Étude sur les plaies par armes à feu*, Paris, 1872, pp. 114, 120, etc.), 3; and among the pensioners enumerated by M. CHENU (*Aperçu hist. stat. et clin., etc., des armées pendant la guerre de* 1870–71, Paris, 1874, p. 153, *et seq.*), 156 cases are found. Five of these are included in the reports of SÉDILLOT (1), CHIPAULT (2), ROALDÉS (1), MACCORMAC (1), *ante*, leaving 151 additional cases. To these should be added 9 cases of French pensioners reported by MOSSAKOWSKY (*Stat. Bericht ueber* 1514 *Französische Invaliden*, in *Deutsche Zeitschrift für Chir.*, 1872, B. I, p. 342, *et seq.*), not contained in CHENU; and 4 cases of German invalids, detailed by BERTHOLD (*Deutsche Militair-ärztl. Zeitschrift*, 1872, B. I, p. 522). One case is reported by G. TILING (*Bericht ueber die* 124 *im Serbisch-Türkischen Kriege* (1876), *etc., behandelten Schussverletzungen*, Dorpat, 1877, p. 66). The 489 cases of recovery of shot fractures in the upper third of the femur under conservative treatment, here referred to, must convince the reader that recoveries under such circumstances are not as infrequent as the older writers on military surgery contended.

[1] BECK (B.) (*Chir. der Schussverletzungen*, Freiburg, 1872, p. 694, etc.) details 37 cases of shot fractures of the femur in the upper third, of which 28 recovered and 9 proved fatal, and remarks: "Unfortunately, I have not been able to give an entirely precise account regarding the proportion of the seat of the fractures in the various parts of the femur, and the corresponding mortality, as frequently the seat of the fracture was not clearly designated. But I can say this much, that I had reason to be very well satisfied with the results of the fractures in the upper third, providing the lesion was not too extensive and severe. The fractures in the middle third at the junction with the upper always made the most unfavorable impression upon me, on account of the frequent injuries and lesions of the bloodvessels, which, through frequent and even profuse bleedings, etc., easily lead to fatal results, and which should, therefore, be carefully investigated at the place of first dressing, and, if necessary, at once subjected to the proper operation."



Ward phot. J. Bien lith

PLATE LIX.—CONSOLIDATED GUNSHOT FRACTURES OF THE FEMUR.

Fig. 1. Case of Private W. Rigney
21st New York Cavalry.

Fig. 2. Case of Corporal T. Crassley
69th New York.

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reported at subsequent examinations. The pensioner was paid June 4, 1879. Photographs taken at the Harewood Hospital in October, 1865, were contributed by Surgeon Bontecou. (*Photo's of Surgical Cases*, Vol. 8, No. 4, *Card Photo's*, Vol. 3, p. 32.) A copy, taken at the Army Medical Museum (*Photo. Series*, No. 111), is represented in FIG. 1 of PLATE LIX, opp. p. 178.

CASE 362.—Captain D. Lewis, Co. G, 8th Ohio, aged 26 years, was wounded at the Wilderness, May 6, 1864, by a minié ball, which entered the external part of the left thigh about the junction of the upper and middle third, fractured the femur, and made its exit at the left buttock two inches from the anus. He was conveyed to Fredericksburg and treated with a double inclined plane for three weeks. On May 26th he was removed to a private dwelling in Washington, where he was attended by Acting Assistant Surgeon G. K. Smith, who applied Buck's method of treatment. There was but little suppuration or constitutional disturbance, and by July 9th the fracture had so far united as to permit the patient to walk on crutches. On July 13, 1864, Captain Lewis was mustered out by reason of expiration of service, and pensioned. In October following his wound had entirely healed, and soon afterwards he was able to walk on the injured limb. Subsequently he was for some years an employé in the Treasury Department. On August 22, 1865, his photograph was taken at the Army Medical Museum (*Photo. Series of Surgical Cases*, No. 91, A. M. M.), at which time he was in excellent health, and the injured limb showed no other deformity than one and a half inches shortening. The St. Louis Examining Board, in September, 1874, certified to "occasional lameness and soreness." The pensioner was paid March 4, 1879. His photograph is represented in FIG. 1 of PLATE LVIII, opp. p. 180.

CASE 363.—Private John Durkin, Co. G, 11th Infantry, aged 30 years, was wounded at Gettysburg, July 2, 1863, by a conoidal ball, which entered the outer side of the upper third of the left thigh, and, passing obliquely inward and downward, produced a comminuted fracture of the femur. On the 3d he was admitted to the Seminary Hospital at Gettysburg, where, on the 8th, Assistant Surgeon W. R. Ramsey, U. S. A., made an incision three inches in length a short distance below and opposite the point of entrance, and extracted the ball. On the 31st he was transferred to the Camp Letterman Hospital, where, so far as recorded, expectant treatment only was used. At this hospital a surgeon, who took charge of the case on August 19th, "found the limb lying in bed, without either splints or bandage; wounds discharging freely; considerable shortening of leg; ordered junk bags, placed Barton's handkerchief to foot, and made extension and counter-extension." On the next day the leg was reported the same length as the right one. On September 10th there was very little suppuration, and the bones were uniting; but, on the 30th, the discharge still continued, and the patient was reported "sinking." On November 8th, he was transferred to the Newton University Hospital at Baltimore, where, on December 2d, Acting Assistant Surgeon W. S. Smull made an incision, three inches in length, down to the injured part, and removed a small fragment of bone. On February 19, 1864, the wound was still suppurating freely, and presented indications of the presence of necrosed bone. The limb was shortened four inches. The patient was furloughed on June 30, 1864, and at its expiration was admitted to the post hospital at Fort Independence, Boston Harbor, the recruiting depot of the 11th Infantry, where he was discharged the service April 30, 1865, for disability arising from gunshot fracture and "excision of four inches of the upper third of the femur, performed previous to admittance." The wound was still suppurating, and there was partial anchylosis of knee. Prior to his admission to the latter hospital there is no mention of an excision. The patient became an inmate of Old Soldiers' Home; and on August 3, 1868, he visited the Army Medical Museum and had his photograph (FIG. 134) taken. He states that Dr. Smull excised four inches of the shaft of femur at Newton University Hospital in December, 1863; that, at the time of the operation, there was profuse suppuration from the wound and abscesses in the thigh, and that Smith's anterior splint was used. At the date of his visit to the Museum open fistulous sinuses remained. The patient's statement at Fort Independence undoubtedly led to the above diagnosis; and, from the treatment pursued prior to his admission to Newton University Hospital, coupled with the report of the operation made the same month, it is most plausible to believe that the great shortening is not to be attributed to excision. The Boston Examining Board in September, 1873, reported the wound of entrance to be still discharging. The pensioner was paid March 4, 1874, since when he has not been heard from.

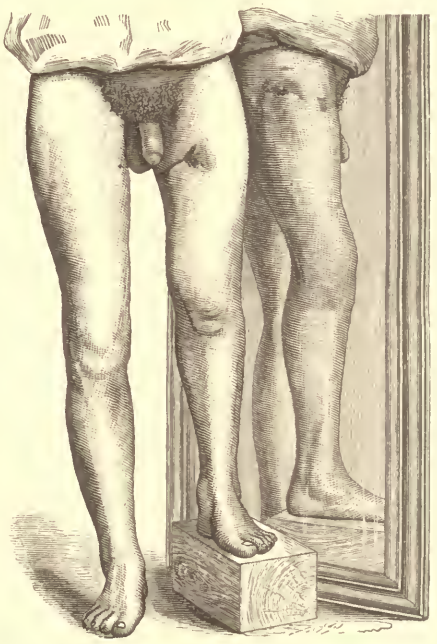

FIG. 134.—Result of shot fracture in the upper third of the femur. [From a photograph.]

CASE 364.—Private A. F. Dinsmore, Co. E, 3d Michigan, aged 19 years, was wounded at Fair Oaks, May 31, 1862, and admitted to Hygeia Hospital, Fort Monroe, four days afterwards. On June 12th the wounded man was transferred on board of the Hospital Steamer Fulton and conveyed to New York. Surgeon J. Simons, U. S. A., reported that he was admitted to De Camp Hospital, David's Island, June 15th, and discharged from service April 9, 1863, by reason of "shot fracture of left thigh." Several months afterwards the man entered the Veteran Reserve Corps, and after serving in that organization for three years he was mustered out and pensioned. Subsequently the pensioner received employment as clerk in the General Land Office, and in December, 1866, he visited the Army Medical Museum, where his photograph was taken (*Photo. Series of Surgical Cases*, No. 157, A. M. M.). At that time he was in good health, though the missile, a musket ball, which fractured the femur at the upper third, was still lodged in the limb. The bone was firmly united, union having occurred, according to his statement, about seven months after the injury, and his treatment having been by moderate extension and counter-extension. He also stated that numerous detached fragments were removed. Examiner J. B. Bascom certified, September 4, 1873: "Gunshot fracture of left femur. The ball remains in the hip. A fistulous opening finally healed, but occasionally breaks out again. There is a large indurated cicatrix over the trochanter major and several smaller ones, caused by the opening of abscesses." The pensioner was paid June 4, 1879. A copy of the photograph is shown in FIG. 2 of PLATE LVIII, opp. p. 180.

CASE 365.—Private H. A. Wiggins, Co. K, 37th Massachusetts, age 24 years, was wounded in the left thigh, at the Wilderness, May 5, 1864. Three weeks afterwards he was admitted to hospital in Alexandria, whence Surgeon E. Bentley, U. S. V., reported the injury as a "shot fracture of the upper third of the femur, caused by a musket ball." In April, 1865, the patient was transferred to Dale Hospital, Worcester, and subsequently to DeCamp Hospital, David's Island, where he was ultimately discharged September 21, 1865, Assistant Surgeon W. Webster, U. S. A., certifying to "angular union of the fractured bone, with five inches shortening; wasting and powerlessness of the limb, and anchylosis of the knee joint. Wound not healed." One month after leaving the service the man was supplied with an apparatus for the injured limb by Dr. E. D. Hudson, of New York City. In a communication, received during July, 1866, and corroborated by a statement by Dr. W. J. Sawin, late Surgeon 2d Vermont, the pensioner related the following in regard to his case: "The ball and eight pieces of bone were removed from my leg on the field, and a second operation was performed at the Fredericksburg hospital, where Surgeon Sawin extracted four pieces of bone." He also alleged that a third operation was performed while he was an inmate of the Alexandria hospital, and that he had recently removed a fragment of bone himself, making altogether some fifty-five pieces that were removed from the limb. Three fistulous openings were described as existing in the injured thigh. The pensioner further represented himself as having been able for two months to move about with the aid of a cane and without crutches, and added that since he was wounded his weight had become reduced from one hundred and seventy-four pounds to one hundred and twenty-nine, and was steadily decreasing. Examiner E. Barton, of Orange, Massachusetts, certified, January 2, 1867: "There is an open ulcer near the hip, from which fragments of bone are frequently discharged; the knee joint is nearly perfectly anchylosed, and from the loss of bone the limb is five and a half inches shorter than the other. The foot is distorted, and he does not know when it is cold. With the aid of an apparatus he walks very comfortably." No new facts were reported at subsequent examinations. The pensioner was paid March 4, 1879. His card photograph, taken at his home in July, 1866, was contributed (*Card Photos.*, A. M. M., Vol. II, p. 21), an enlarged copy of which, taken at the Army Medical Museum (*Surg. Phot. Series*, No. 152), is represented in the wood-cut (FIG. 135).

FIG. 135.—Result of shot fracture of upper third of left femur. [From a photograph.]

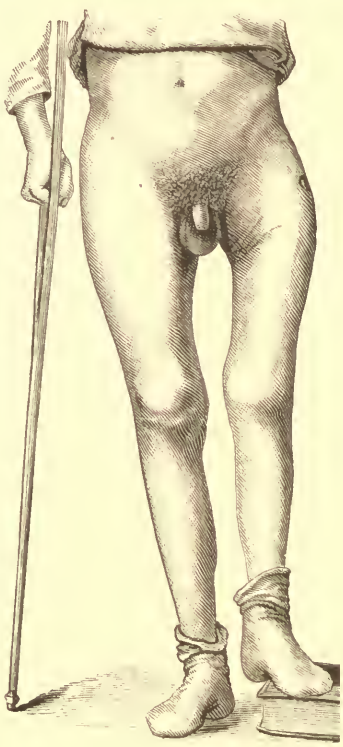

FIG. 136.—Result of shot fracture of upper third of left femur. [From a photograph.]

CASE 366.—Private I. Wetzel, Co. I, 184th Pennsylvania, aged 21 years, was wounded in the left thigh during the siege of Petersburg, October 3, 1864. He was admitted to a field hospital of the Second Corps, and transferred to Armory Square, Washington, five days afterwards. In July, 1865, Acting Assistant Surgeon H. A. Robbins reported the following description of the injury and its result: "A conical ball entered the anterior aspect of the limb one inch below Poupart's ligament, passed backward, fracturing the femur near the trochanters, and made its exit at the apex of the left nates. The limb was treated in Hodgen's splint without extension. The bone is now united with three and a quarter inches shortening; the foot is everted and the limb slightly turned outward. Incomplete anchylosis of the knee joint exists, and there is still a discharge of healthy pus amounting to about one ounce daily. The patient is not yet able to use crutches, but from present appearances he soon will be." The patient was discharged from service on August 21, 1865, and pensioned. Various Pension Examiners, at successive dates, certified to "shortening of the limb and partial anchylosis of the knee;" and in March, 1877, Dr. J. Y. Shindell reported as follows: "I find the left knee joint quite stiff, also evidences of occasional abscesses in the muscular portions of the leg. He says that about once a year matter does form, and that he continually wears bandages around the thigh as a support." In September, 1877, the Examiner stated: "The pensioner's general physical condition is not good. He is now confined to his bed, and has been for the last two weeks, on account of his wound, which is again suppurating. * * * But the greatest trouble now seems to be in the hip joint and its neighborhood. On probing the opening a little above the joint the body of the ilium seems to be of a honey-combed nature, diseased, and, no doubt, the cause of these frequent attacks of suppuration which occur every three or four months. * * * His leg trouble will very likely cause death some time." The pensioner was paid March 4, 1879. The wood-cut (FIG. 136) represents a photograph taken at the Army Medical Museum on July 6, 1865. (*Surg. Phot Series*, No. 67, A. M. M.)

In the next case perfect consolidation of the ends of the fractured femur took place in less than five weeks. The patient recovered with a strong, sound limb, and, in 1879, while engaged in active business, has walked six miles without difficulty, limping but little.

CASE 367.—Lieutenant J. S. Lowery, Co. D, 146th New York, aged 21 years, was wounded at Bethesda Church, June 3, 1864. Surgeon W. R. DeWitt, jr., U. S. V., recorded his admission to a Fifth Corps field hospital, with a "severe wound of the right thigh caused by a minié ball." Surgeon D. W. Bliss, U. S. V., reported that the patient entered Armory Square Hos-

Ward phot. J. Bien lith

PLATE LVIII.—CONSOLIDATED GUNSHOT FRACTURES OF THE FEMUR.

Fig 1. Case of Captain D. Lewis
8th Ohio.

Fig 2. Case of Private A.F. Dinsmore
3d Michigan.

pital, Washington, June 7th, and described his injury as a "shot fracture of the upper third of the femur," but gave no account of any treatment but that of simple dressings. Dr. T. M. Flandrau, late Surgeon 146th New York, who attended Lieutenant Lowery at the field hospital, gives the following details: The patient was wounded by a rifle ball while on picket duty. The missile entered at the middle of the thigh, toward its inner aspect, and was cut out on the field by Assistant Surgeon G. H. Fossard, 146th New York, above the trochanter. The femur was fractured in its upper third. The patient was brought six miles on a stretcher to the field hospital of the 2d division, Fifth Corps, where I determined not to amputate, and supported the limb on folded blankets, so that it was very comfortable. He was then carried by some men belonging to the Quartermaster's Department fifteen miles further to the White House, and placed on a steamboat and sent to Washington. He was left on his stretcher while on board of the transport and was not removed from it until placed on a bed in Armory Square Hospital, four days after receiving the injury. At the latter place, Acting Assistant Surgeon T. O. Bannister had immediate charge of the case. According to the patient's statement the limb was placed in a box, little extension being used and no counter-extension. Three or four small pieces of bone were discharged within a short time, and another small piece was cut since from under the skin. An abscess was opened on the outer side of the thigh, the scar of which is conspicuous in the photograph. When the patient left the hospital he used crutches, the wound having closed in four or five weeks and the bone united firmly. He continued to use his crutches until the following April. The limb is shortened two and five-eighths inches; the thigh cannot be fully flexed on the pelvis, but the limb is strong, sound, and freely movable, with the afore-mentioned exception. When wearing a boot slightly thickened in the sole he limps but little. Lately he has walked six miles without difficulty, and is actively engaged in business." In a previous communication Dr. Flandrau stated that the very expeditious recovery of the patient was, no doubt, to be attributed in a large measure to his good fortune of having unusually comfortable transportation. Lieutenant Lowery became a pensioner from the date of his discharge from service, January 13, 1865. Various surgeons have examined him at regular intervals, and certified to lameness, etc., as resulting from the injury, up to April, 1872, since when he has been exempted from further examinations, owing to the permanent character of his disabilities. He was paid June 4, 1879. A photograph of the patient was prepared under the direction of Dr. Flandrau, who contributed it to the Army Medical Museum. It is numbered 265 of the *Surgical Photographic Series*.

In the following instance a rifle ball fractured the upper third of the left femur, and passing through the right thigh chipped off a piece of the upper third of the right femur; a second ball shattered the head of the left fibula; a third ball caused a flesh wound of the leg; and a fourth missile struck over the sacrum:

CASE 368.—Sergeant W. Shakespeare, Co. K, 2d Michigan, aged 18 years, was wounded in both lower limbs at Jackson, July 11, 1863. He was treated at a field hospital of the Ninth Corps for several weeks, and was then transferred by steamer to Cincinnati, where, on August 12th, he entered Washington Park Hospital. On June 1, 1864, the patient was discharged from service and pensioned. Examiner H. O. Hitchcock, of Kalamazoo, Michigan, in March, 1866, furnished the following description of the case: "Shakespeare was struck by a minié ball, which, after passing through the upper third of the left thigh and fracturing the femur, entered the right thigh and either fractured the right femur or perhaps chipped off a piece of bone, making its exit on the outer side of that limb. A minié ball about the same time shattered the head of the left fibula, and another ball produced a flesh wound of the leg; and while lying on the field he was severely wounded by some missile over the sacrum. From this last injury he suffered long and severely. Before being taken from the field several corps surgeons advised amputation of the left thigh, which operation was opposed by Surgeon E. J. Bonine of the regiment, on the ground that it would not add to the chances of recovery. When the patient reached Cincinnati, union of the fragments had taken place, with about seven inches shortening, the fragments crossing each other at a considerable angle and one of them protruding from the wound. Acting Assistant Surgeon A. D. Norton, on August 14th, broke up the temporary union of the parts of the left femur and extended the limb. Three months later, when the case was examined by several surgeons, the parts were still ununited. At present there is complete union of bone, the right leg being one and one-fourth inches shortened, and the left leg one and three-fourths inches shorter than the right. The left femur is a little straighter than normal; the left leg can be flexed upon the thigh to an angle of about 30°; the foot is contracted, rather stiff, and sometimes painful. He suffers considerably from neuralgia, is not as robust as formerly, and walks with the aid of a cane, his gait being rather slow and halting." Several years afterwards the same Examiner reported that the wound in the left thigh frequently opened and discharged pieces of bone and bits of lead. Drs. E. J. Bonine and H. A. Clelland, late Surgeon and Assistant Surgeon of the 2d Michigan, both testify to the injury of both femurs, as well to the fact of amputation having been advised or ordered to be performed at the field hospital, and that the operation was refused or deferred. The former in his report on October 4, 1874, states: "The present condition of the pensioner, as I find by critical examination, is as follows: 'An open, suppurating, and discharging wound in the superior third of the left thigh,' the bone, having been crushed, lapping in the healing, so as to shorten the leg from two to three inches. Bone denuded; partial anchylosis of knee," etc. Examiner Hitchcock, at subsequent dates, lastly in December, 1877, added that "there is a sinus leading down to diseased bone in the left thigh, which is open and discharging more or less nearly all the time. The left knee is nearly anchylosed and is swollen; the foot is tender and the toes are stiffened in a deformed position," etc. The pensioner was paid June 4, 1879. Pension Examiner O. H. Hitchcock presented to the Army Medical Museum a card photograph of the patient (Vol. I, p. 2, *Card Photographs*). A copy is represented in the wood-cut (FIG. 137).

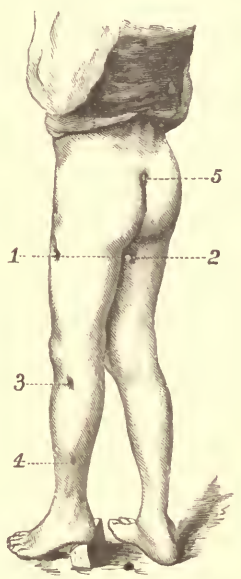

FIG. 137.—Shot fractures of the upper thirds of both femurs. [From a photograph.]

Forty-six of the five hundred and fifty-one Union soldiers who recovered after shot fracture in the upper third of the femur died during the fourteen years that have passed since the close of the American civil war, a fatality of less than 0.6 per cent. a year. In the following two instances the patients survived the injuries eleven and ten and a half years, respectively:

CASE 369.—Corporal T. Crassley, Co. E, 69th New York, aged 34 years, was wounded at Fort Steadman, March 25, 1865, and admitted to the field hospital of the 1st division, Second Corps, where Surgeon F. M. Hammond, 126th New York, noted: "Shot wound of hip by minié ball." Assistant Surgeon C. A. Leale, U. S. V., reported that the wounded man was admitted to Armory Square Hospital, Washington, April 1st, and discharged from service July 25, 1865, by reason of "shot fracture of upper third of right femur, resulting in one inch shortening." The Albany Examining Board, consisting of Drs. R. B. Bontecou, W. H. Craig, and C. H. Porter, certified, September 11, 1873: "The ball entered near the right trochanter, injuring the bone seriously. Numerous portions of bone were removed. The missile passed deeply through the muscular tissue and escaped near the inner border of the right nates. The limb is greatly weakened, and occasionally ulcers appear near the entrance wound, owing to necrosed bone." The pensioner died at the National Military Asylum at Dayton, Ohio, January 8, 1876. The immediate cause of his death has not been ascertained. A photograph, taken at the Army Medical Museum in July, 1865 (*Surg. Phot. Series*, No. 76), is copied in FIG 2 of PLATE LIX, opp. p. 178.

CASE 370.—Private M. Murthra, Co. H, 159th New York, aged 18 years, was wounded in the right thigh, at Irish Bend, April 13, 1863, and admitted to the Marine Hospital, New Orleans, four days afterwards. Surgeon J. Bockee, U. S. V., described the injury as a "compound fracture of the femur at or near the trochanter," and reported that the patient was assigned to the Veteran Reserve Corps March 9, 1864. Surgeon G. Sutton, U. S. V., recorded his entrance into Augur Hospital, Alexandria, with "chronic ulcer," and his transfer to Sickels Hospital several days afterwards. On May 31, 1865, the man was discharged from service, Surgeon E. Bentley, U. S. V., certifying to "great deformity resulting from the fracture." Examiner C. Rowland, of Brooklyn, reported, July 28, 1865: * * * * "Many pieces of bone have been extracted from a large abscess still existing. The leg is three inches shorter than the other and quite lame. He is obliged to walk with a crutch," etc. The pensioner subsequently entered the National Military Asylum at Augusta, whence Surgeon J. O. Webster contributed his photograph in August, 1869, with the following recapitulation of his case: "The wound was caused by a minié ball, which entered the anterior aspect of the thigh in the upper third, emerging posteriorly, nearly opposite, and lodging in the pants. On admission to the hospital the limb was treated by sand bags, and by manual extension once a day. The femur united in bad shape, and another Surgeon coming in charge, it was rebroken and a straight splint applied. He was able to bear his weight on the leg eight months after the injury. The wounds have never healed, and the thigh now discharges in four places. Several splinters of bone have come away. He can walk comfortably with a cane." The Augusta Examining Board certified, August 6, 1873: * * * "The parts being thickly invested by muscles, masses of new bone have been thrown out around the fragments from the surrounding inflamed tissues. Owing to the nature of the fracture, it being greatly comminuted, proper apposition could not be maintained. Masses of new bone were deposited as supports and the splinters enveloped with provisional callus, producing an enlargement of the limb at the point of the fracture. We are of the opinion that superficial exfoliation is going on in some part of the bone on account of the nature and quantity of the discharges, the limb having to be dressed several times during the day. The pensioner has, at short intervals, profuse hæmorrhage from the posterior opening near the ischium. These bleedings are no doubt produced by sharp spiculæ of bone cutting small arteries." The pensioner died December 26, 1873. A copy of his photograph, taken at the Army Medical Museum (*Surg. Phot. Series*, No. 236), is represented in the wood-cut (FIG. 138).

FIG. 138.—Result of shot fracture of femur. [From a photograph.]

In the next case the patient died from extensive inflammation and suppuration of the injured limb, caused by a fall, eleven and a half years after the injury:

CASE 371.—Lieutenant E. L. Postley,[1] Co. D, 176th New York, aged 39 years, was wounded at Winchester, September 19, 1864. Surgeon E. S. Hoffman, 90th New York, reported his admission to the field hospital of the 2d division, Nineteenth Corps, with a "severe wound of the thigh, caused by a minié ball." On September 23d the patient was moved to the Depot Hospital at Winchester, where Surgeon L. P. Wagner, 114th New York, recorded the following description of the injury: "The missile entered the right thigh at the upper third, one and a half inches below Poupart's ligament, passed through the limb outside the femoral vessels, and emerged one and a quarter inches below the trochanter major, fracturing and comminuting the femur. The limb was kept in a splint for ten days, after which some extension was made, and subsequently a sort of a Desault splint was applied for five weeks. No bad symptoms occurred. The wound discharged very freely. Not much bone came out, but some was removed at the time of the injury. By November 27th there was firm union of bone, with two and a half inches shortening and some outward curvature at the seat of the fracture, and the patient was able to throw his leg up." On December

[1] The case of Lieutenant Postley is noticed by Assistant Surgeon JOHN HOMANS, jr., in his article: *Cases of Gunshot Fractures of the Thigh and Wounds of the Chest, showing the Results of Conservative Surgery in the Former*, in *Boston Med. and Surg. Journal*, 1865, Vol. 72, p. 11.

Ward phot. W. Sinclair & Son. lith

PLATE LV. — TWO VIEWS OF A UNITED SHOT FRACTURE OF THE UPPER EXTREMITY OF THE RIGHT FEMUR OVER 11 YEARS AFTER INJURY.

Case of Lieutenant E. L. Postley, 176th New York.
Spec. 6596, Surgical Section A.M.M.

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9th he was transferred to Camden Street Hospital, Baltimore, and in the following month he obtained a leave of absence and proceeded to his home. He was ultimately mustered out April 13, 1865, and pensioned. Examiner J. Neil, of New York City, certified, April 24, 1867: "The thigh is shortened about four inches; the limb is crooked and feeble; he requires the aid of a crutch." The pensioner subsequently entered the National Military Asylum at Hampton, whence Surgeon W. M. Wright reported him, in 1873, as being in good general health, his wound as well healed, and the fractured bone united, with five inches shortening, also that stiffness of the knee joint resulted from extensive adhesions of the muscles of the thigh. Two years afterwards spiculæ were reported to have been removed from the wound, and, on March 6, 1876, Dr. Wright communicated that the pensioner had died on the previous day, stating that "he was able to walk well without the aid of a crutch or cane," and that "two weeks ago he fell, while intoxicated, upon his disabled thigh, which resulted in extensive inflammation and suppuration, from which he died." The greater part of the injured femur, comprising the two upper thirds, was contributed to the Museum by Dr. Wright, and constitutes *Specimen* 6596 *of the Surgical Section*. Illustrations of the bone are shown in PLATE LV, opp. p. 182.

CASE 372.—Corporal E. Worthen, Co. B, 2d Vermont, aged 25 years, was wounded in the right thigh, at the Wilderness, May 5, 1864, and admitted to hospital in Alexandria three weeks afterwards. Surgeon E. Bentley, U. S. V., described the wound as a "shot fracture of the upper third of the femur," but the progress of the case was not recorded. On March 17, 1865, the patient was transferred to Sloan Hospital, Montpelier, whence Surgeon H. Janes, U. S. V., contributed the following history: "The wound was caused by a minié ball, which entered the thigh in front, passed directly through and emerged posteriorly, at the lower border of the glutei muscles, comminuting the femur for about three inches. From the field the wounded man was taken to the hospital of the 2d division, Sixth Corps, at Fredericksburg, and thence by boat to Alexandria, where the limb was first adjusted, and kept in position by sand bags without extension. He stated that no other apparatus was ever used. Subsequently he had typhoid fever and erysipelas. The first fragment of bone was removed in July, 1864, and since that time about fifty pieces have come away. When admitted to Sloan Hospital the wound was still slightly discharging, but the patient was able to go about on crutches. About three months afterwards the bone had become so firmly united that he could walk a short distance without crutch or cane. When discharged from service, June 23, 1865, the patient was in good general health, and able to walk a considerable distance on smooth ground without crutch or cane, the injured limb being shortened two and a half inches and considerably deformed. There was also necrosed bone remaining, and the wound still slightly discharging." Examining Surgeon C. L. Allen, of Rutland, Vt., reported, September 24, 1866: "The right limb is now three inches shorter than the left. An opening (the wound of entrance) still exists in front of the trochanter, into which a probe passes about four inches; another opening posteriorly (the wound of exit) allows the probe to pass in about three inches. A third opening exists near the middle of the inside of the thigh, having been made by the Surgeon for the discharge of the burrowing pus." The same examiner subsequently certified that he was called on to visit the pensioner on October 23, 1870, and found him "suffering from pyæmia, resulting from the wound breaking out anew, from the effects of which he died October 25, 1870." A card photograph of the patient, taken at the Sloan Hospital, was contributed by Surgeon Janes (*Card Photos.*, A. M. M., Vol. II, p. 22), an enlarged copy of which, taken at the Army Medical Museum (*Surg. Phot. Series*, No. 129), is shown in wood-cut (FIG. 139).

FIG. 139.—Result of a shot wound of upper third of femur. [From a photograph.]

FIG. 140.—Shot fracture of upper third of right femur. [From a photograph.]

CASE 373.—Private G. Ruoss, Co. G, 7th New York, aged 27 years, was wounded near Petersburg, March 31, 1865, and admitted to the field hospital of the 1st division, Second Corps, where Surgeon F. M. Hammond, 126th New York, noted: "Shot fracture of right thigh." On the day following the injury the wounded man was sent to the Depot Hospital at City Point, and several days afterwards he was conveyed to Washington, where he entered Campbell Hospital, and subsequently Stanton Hospital. Surgeon R. B. Bontecou, U. S. V., reported his admission to Harewood Hospital September 12th, and his condition as follows: "The patient was suffering from great deformity of the right limb, the result of a shot wound of the upper third of the thigh, fracturing the femur. When admitted he had so far recovered as to be able to sit up, and his constitutional state was tolerably good. The fractured parts had firmly united but with great deformity; the wound of entrance had healed, but there were still some discharges from sinuses in the thigh, and small fragments of necrosed bones were daily removed. The prospects of usefulness of the limb are unfavorable; otherwise the patient is doing tolerably well." At the closing of Harewood Hospital, May 1, 1866, the patient was transferred to the Post Hospital at Washington, where he was operated on by Assistant Surgeon W. Thomson, U. S. A., who described the injury and operation as follows: "The wound was caused by a minié ball, which entered on the anterior and outer aspect of the thigh about three inches below the great trochanter, passed inward and a little downward, comminuting portions of the upper and middle thirds of the femur, and escaped posteriorly near the middle of the gluteal fold. On June 8th, the patient was etherized and a triangular incision, three by three and a half inches, was made on the upper and outer side of the thigh, and several pieces of bone were removed. On September 30th the wound had almost healed. Three sinuses, evidently

leading to necrosed bone, however, still existed, two of which were located on the upper and one on the lower surface. The patient's health was not very good, having suffered from several attacks of diarrhœa, and a severe attack of erysipelas which commenced near the wound and soon spread over the entire surface of the leg and foot. On December 31st, the sinuses were still open and discharging, and there was great deformity, with about five inches shortening, and almost complete anchylosis of the knee joint." Assistant Surgeon J. Brooke, U. S. A., who took charge of the patient in November, 1867, reported the termination of the case: "I found the limb in much the same condition as described by Dr. Thomson, except that a collection of pus, which had formed on the inner aspect of the thigh just above the knee, had been opened and a sinus found to connect with the seat of the fracture. This sinus, as well as those already described by Dr. Thomson, remained open, and the patient continued extremely feeble, became greatly emaciated, and suffered much from diarrhœa and frequent attacks of almost total loss of appetite. These symptoms continued until his death, which occurred on June 27, 1868. At the *autopsy* the liver was found to be enormously enlarged, weighing ten pounds and ten ounces, and the right lung contained a small mass of calcareous matter." The injured femur, with the os innominatum and patella attached, and portions of the tibia and fibula were contributed to the Museum by Dr. Brooke, and constitute specimen 5450 of the Surgical Section. The femur is imperfectly united, with great displacement and a deposit of foliaceous callus, and shows that extensive periostitis has taken place, and the patella and upper portions of tibia and fibula also show similar pathological changes. The photograph represented in the wood-cut (FIG. 140) was obtained at the Harewood Hospital, and contributed by Surgeon Bontecou. Other photographs of the patient, taken at the same hospital and at the Army Medical Museum, are represented by No. 40, Vol. 8, of *Photo's of Surgical Cases, S. G. O.; Card Photo's*, Vol. 2, p. 21, and Vol. 3, p. 27, and *Surgical Photograph Series*, Nos. 139, 178, 179, and 292.

Fatal Cases of Shot Fractures of the Upper Third of the Femur treated by Conservation.—Of the twelve hundred and fifty-four cases of shot fractures of the upper third of the femur tabulated in TABLE XX, on page 175, *ante*, five hundred and seventy-two proved fatal. Four hundred and eighty were Union and ninety-two Confederate soldiers. The side on which the injury was received was noted in four hundred and eighty-one instances, the right side being involved in two hundred and nineteen, the left, in two hundred and sixty-two cases. A few fatal examples will be cited:

CASE 374.—Private J. Northrup, Co. K, 77th New York, aged 21 years, was wounded before Yorktown, April 29, 1862, and entered the Douglas Hospital, Washington, May 15th. Assistant Surgeon W. Webster, U. S. A., forwarded the specimen (FIG. 141), and recorded the following history: "The wound was caused by a conoidal ball, which entered on the outer side of the lower portion of the upper third of the left thigh, and was extracted through the gluteus maximus muscle on a level with and two inches from the anus, same side. The missile produced a compound fracture of the femur at the upper third and shortened the limb to the extent of two inches. On admission, the patient, who was of robust and healthy appearance, had considerable fever and constipation of the bowels. There was extensive swelling of the integuments, and he was suffering acute pain. Vedder's long splint was applied, and extension from the ankle and counter-extension by a perineal band was made. By these means the limb was lengthened one inch and retained in that position. The acute pain rendered any further extension impracticable. The patient was ordered to take one-half ounce of castor oil, and sulphate of morphia at night to relieve the pain. May 18th, the wound has been dressed with poultices of flaxseed meal; the swelling has somewhat subsided and there is no fever. The pain continues, and to relieve it and promote sleep a mixture of two drachms of elixir of opium and one ounce of camphor water is given in two doses every evening. June 2d, the discharge has ceased and the external wound is nearly closed. There are some signs of union and of the deposition of abundant provisional callus. June 10th, the splint was removed; the shortening of the limb now amounts to three inches. June 16th, the patient was this morning attacked with chills and the initiatory symptoms of fever, a frequent and very weak pulse and red tongue, also great tenderness in the epigastric region, with frequent vomiting. The above symptoms continued without intermission until terminated in death, at 11 o'clock P. M., on June 18, 1862. The *autopsy*, ten hours after death, confirmed the previous diagnosis of acute gastro-enteritis. The coats of the stomach were found to be intensely congested, with disorganization of the mucous membrane, which appeared to be greatest about the greater curvature of the stomach. The fracture was found firmly consolidated, with abundant deposition of provisional callus." The specimen consists of the upper half of the fractured femur, showing partial union at right angles and the shaft roughened by the action of pus, also callus somewhat copiously thrown out and entangling the fragments, but the inner surfaces being carious.

FIG. 141.—Left femur shattered below trochanters. *Spec.* 27.

FIG. 142.—Shot fracture of left femur. Callus without union. *Spec.* 1810.

CASE 375.—Private F. Smith, Co. C, 121st New York, was wounded at Fredericksburg, May 3, 1863. Surgeon E. F. Taylor, 1st New Jersey, noted his admission to the field hospital of the 1st division, Sixth Corps, with "shot wound of thigh," and his transfer to general hospital June 13th. Surgeon A. Heger, U. S. A., contributed the specimen, shown in the adjoining wood-cut (FIG. 142), with the following description of the case: "The patient was wounded by a round ball, causing fracture of the left femur at the upper third. He was admitted to hospital at Point Lookout, June 14th, very much reduced, abscesses and sinuses extending through the whole thigh from the pelvis to the knee. He

PLATE XXV. SECONDARY INFLAMMATION OF THE KNEE JOINT.

Case of Pt William Zilliox F 29th New York

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seemed to gain a little strength, but died July 11, 1863, from exhaustion." The specimen consists of a portion of the femur with the missile attached. The bone was shattered below the trochanters and shows considerable effusion of callus, but no union seems to have occurred.

CASE 376.—Private *M. Sullivan*, Co. K, 6th Louisiana, aged 30 years, was wounded at Antietam, September 17, 1862, and admitted to hospital at Frederick two weeks afterwards. Assistant Surgeon R. F. Weir, U. S. A., recorded the following history: "The patient was wounded by five balls. The first entered about one and a half inches above and a little inside of the left patella, and, passing through, fractured and comminuted the femur, and emerged on the outside about three and a half inches above the knee joint. The second ball entered the left thigh near the junction with the perinæum, merely making a flesh wound. The third entered about three and a half inches below and a little posterior to the trochanters of the right thigh, fracturing the femur, and, going directly through, emerged at the junction of the thigh with the perinæum. The fourth missile produced a flesh wound, entering just over the junction of the dorsal and lumbar vertebra, and was not found; and the fifth grazed the left thigh posteriorly at the junction of the upper and middle thirds. After the battle he was carried to the White House Hospital, where his limbs were placed in long board splints, and in that condition he was sent to the Seminary Hospital at Frederick, where the splints were removed and Buck's apparatus was substituted, with two bricks on each leg for extension. No bone was extracted. Two abscesses formed, one near the right knee, which was opened and discharged copious quantities of bloody pus. The wounds in the right thigh also discharged considerable quantities of curdy matter. The second abscess was opened near the first and the discharge was similar in character. While in the Seminary the patient's treatment consisted of tonics and stimulants. On January 15, 1863, when admitted to hospital No. 1, both limbs were very much swollen, and tight bandages were ordered to be applied. On the 17th an abscess made its appearance on the posterior part of the right thigh just below the buttock, and the ball, which had entered the back and could not be discovered at first, was taken out with two pieces of bone, one being about two inches long and one and a half inches wide, and the other a small fragment. 23d, the limbs are slowly improving and are considerably reduced in size, the left leg measuring thirty-three inches and the right one thirty-two and a half inches; general health tolerable; treatment consisting of iron and quinine, with generous diet. 28th, opened an abscess on left side of left knee; abscess under right thigh gradually healing. 30th, a bloody sanious pus is being discharged from the abscess in the left knee, and the burrowing includes a space of about eight inches square. Introduced a tent into the opening of both abscesses. The patient's bowels being rather costive, three compound cathartic pills were given. February 1st, abscesses looking well and gradually filling up with healthy granulations; patient slowly improving. 9th, general condition not so good; has some hectic fever at night, also diarrhœa. Abscesses healing and limbs appear to be doing well. 17th, slowly improving; appetite better. Discovered a sinus leading from the external wound of the left thigh posteriorly, at the bottom of which there is some necrosed bone. 21st, abscess on knee cicatrized; small abscess making its appearance on the anterior aspect of the upper third of left thigh; discharge from sinus increased; wound on right thigh discharging considerable healthy pus. Patient had a chill this morning. His bowels being constipated, castor oil was prescribed. March 3d, improving. Abscess on under surface of upper third of right thigh is closing up, but a portion of the necrosed femur is yet felt by the probe. The left thigh is discharging healthy pus, and from its external wound an abscess opened extending about two inches, from which there is now protruding a large portion of necrosed bone, which will be removed by exsection as soon as the patient's health will permit. 13th, general health improving; sinus discharging as usual. Wound in posterior aspect of thigh probed and found to be very extensive; necrosed bone apparently covered by healthy granulations. April 5th, patient rapidly improving; has an excellent appetite; bowels regular. Wounds on posterior aspect of right thigh entirely closed and the other wounds doing well. 15th, patient has had a severe attack of erysipelas in his left leg, also a high fever and attacks of vomiting; leg much inflamed and greatly swollen. It was painted with tincture of iodine and lead and opium wash was applied. Stimulants were also ordered. 20th, considerable swelling of the knee joint. Urine was drawn off, he being unable to pass it. 22d, patient much worse. An incision was made near the right knee joint and a large quantity of pus discharged. The urine was again drawn off. Death occurred April 22, 1863. *Post-mortem* examination five hours after death: On opening the chest pleuritic adhesions were found on both sides; lungs healthy and partially covered with seropurulent lymph; liver highly congested and fatty and weighing fourteen ounces; kidneys weighing eight ounces, of light color, and external surface mottled; heart healthy and weighing eight ounces." The pathological specimens represented in the wood-cuts were contributed to the Museum by Acting Assistant Surgeon G. M. Paullin. FIGURE 144 shows the right femur united with two inches shortening after fracture in the upper third, a large fragment being bound fast, a small sequestrum nearly loose, the ends well rounded, and the lower extremity diseased as far as the condyles. The other specimen (FIG. 143) consists of the lower third of the left femur; showing a fracture firmly united by profuse bone deposits, with lateral deformity and two and a half inches shortening, the lower fragment forming an angle with the shaft of about fifteen degrees forward.

FIG. 143.—United shot fracture of lowest third of left femur. *Spec.* 3882.

FIG. 144.—United shot fracture of upper third of right femur. *Spec.* 3881.

CASE 377.—Private William Ziliox, Co. F, 29th New York, aged 31 years, was wounded at Chancellorsville, May 3, 1863. He was standing erect and in the act of firing. The missile, a conoidal ball, entered the outer and middle portion of the left thigh, passed upward, fractured the femur, and lodged in the surrounding muscles. He was left on the battle-field and fell into the hands of the enemy, and received no treatment until his return within our lines, May 15, 1863. He was then admitted into the field hospital of the Eleventh Corps, at Brook's Station, where his leg was dressed in splints. On June 14th, he was admitted into the Lincoln Hospital, Washington. Assistant Surgeon H. Allen, U. S. A., reports: "When admitted his affected

limb looked as though no extension had been employed. The ball had not been extracted, there was no union, and there was four and a half inches shortening. Acting Assistant Surgeon D. Weisel, under whose care the patient was placed, removed the splints and applied the anterior splint. This treatment was continued until June 20th, when, suppuration becoming so great, fear was entertained of pus burrowing toward the hip joint, and it was discontinued, and sand bag supports and extension, produced by a bag of stones suspended by a rope run through a pulley and attached to the base of the foot, substituted. The case progressed favorably. August 1st, small abscesses appeared near the knee, not, however, troublesome. There was little burrowing of pus. August 7th, Dr. Weisel opened a small abscess on the posterior portion of the thigh immediately behind the seat of fracture. August 26th, several spiculæ of bone were extracted through this opening, together with the bullet, which was flattened and contorted to a very irregular form. Early in September, the pus was observed extending down the inner side of the thigh and opening two inches above the internal condyle of the femur. By pressure pus could, at any time, be made to pass out of this opening, it, no doubt, communicating with the injury above. The constitutional symptoms were still favorable. October 1st, effusion in the knee joint of the corresponding side was first noticed; the skin over the joint had an erysipelatous hue, and the joint was swollen. It was at first thought that the opening on the inside of the thigh communicated with the joint, and that pyarthrosis was caused thereby; but it was afterwards thought to be a case of suppurative arthritis and in no direct way connected with the pus-producing surface about the seat of fracture. From the first appearance of this complication the patient sank rapidly, the tongue became dry and brown, the stomach rejected all aliment; hiccough was a constant and distressing symptom. Severe pain was experienced in the limb. These signs of constitutional exhaustion continued without relief until the day of his death, October 6, 1863." The secondary inflammation of the knee joint is shown in PLATE XXV, opposite p. 184. The fractured femur, showing fractures in the upper third, large deposits of callus, but without union, is *Spec.* 1761 of the Surgical Section, A. M. M. (FIG. 145.)

FIG. 145.—Shot fracture of upper third of left femur. *Spec.* 1761.

FIG. 146.—Shot fracture of right femur below trochanters. *Spec.* 233.

CASE 378.—Private W. Reed, Co. H, 83d Pennsylvania, aged 29 years, was wounded and captured at Gaines's Mills, June 27, 1862. He remained in the hands of the enemy for a month, when he was paroled and conveyed to Philadelphia. Acting Assistant Surgeon R. P. Thomas, in charge of the Episcopal Church Hospital, recorded the following description of the wound and its result: "The ball entered the outer side of the right thigh about five inches below the anterior superior spinous process of the ilium, fractured the femur, and made its exit on a horizontal line with the point of entrance and five inches from it. The man entered this hospital on July 30th in a miserable condition. The thigh was much shortened, and an opening formed in the buttock within four inches of the wound of exit, discharging very freely and resulting from the passage of a piece of bone. The patient was also suffering from diarrhœa and a diphtheritic exudation in the mouth and fauces. He was taking stimulants and chlorate of potassa. Death resulted on September 26, 1862, from pyæmia and exhaustion. The *post-mortem* showed no metastatic abscess. The femur was found to be extensively fractured high up and to consist mainly of two fragments, around the free ends of which and adherent to them were several other pieces of large size. The specimen, represented in the cut (FIG. 146), was contributed by Acting Assistant Surgeon A. C. Bournonville, and shows considerable deposit of callus imprisoning the larger fragments and affording partial union.

CASE 379.—Private *E. Vehorn*, Co. F, 13th South Carolina, was wounded at Gettysburg, July 3, 1863, and was treated in hospital at Chester. Acting Assistant Surgeon B. Brinton contributed the specimen, shown in the annexed cut (FIG. 147), and described the injury as a "shot wound of the right hip, fracturing the femur near its neck. Patient died of exhaustion October 13, 1863." The specimen consists of the upper portion of the femur, showing oblique fracture through the lesser trochanter, with a moderate deposit of callus, but without union.

FIG. 147.—Shot fracture of left femur through lesser trochanter. Callus without union. *Spec.* 2070.

CASE 380.—Private T. Manley, Co. A, 63d New York, aged 26 years, was wounded at Gettysburg, July 2, 1863, and admitted to Camp Letterman one month afterwards. Acting Assistant Surgeon R. S. L. Walsh described the injury as a "compound fracture of the upper third of the right femur," and reported: "There is no history of the case previous to admission. The general health of the patient is good; the wound discharging profusely. Tonics and stimulants were given, and the limb treated by the double-inclined plane. The patient did tolerably well for some days, but his general condition became worse about August 31st." Acting Assistant Surgeon J. Newcombe, into whose hands the case passed on September 4th, reported the following termination: "On taking charge of the patient he was sinking rapidly. The fracture was disunited and the limb was shortened about five inches. The patient was also troubled with profuse night sweats and had a large bed-sore on his back. He died September 8, 1863, of exhaustion. At the *post-mortem* examination the fractured ends were found overlapping each other, the lower being, as usual, drawn upward and inward by the adductor muscles, while the upper was carried forward by the psoas and iliacus and outward by the external rotators. The fracture ran obliquely upward and inward, and considerable callus had been thrown out on the inner side only. A false joint had formed between the fragments, the lower playing in a rude socket formed by the upper, and both being covered by a dense, smooth, glistening, and apparently fibrous membrane." The pathological specimen (FIG. 148) consists of the upper portion of the injured femur, and was contributed by Acting Assistant Surgeon E. P. Townsend.

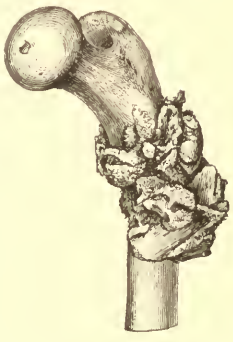

FIG. 148.—Shot fracture of right femur below trochanters. Callus without union. *Spec.* 1935.

Shot Fractures of the Middle Third of the Femur treated by Conservation.—Eight hundred and fifty-five cases of shot fracture of the middle third of the femur treated without operation were collected from the registers in this Office. In thirteen instances the result could not be ascertained; five hundred patients recovered and three hundred and forty-two died, a mortality of 40.6 per cent.

Cases of Recovery after Shot Fractures of the Middle Third of the Femur treated by Conservation.—The five hundred cases of recovery after shot fracture of the middle third of the femur included four hundred and twenty-one Union, and seventy-nine Confederate soldiers. In two hundred and eight cases the injury was on the right, and in two hundred and sixty-seven on the left side:

CASE 381.—Private J. H. Green, Co. E, 14th New York Heavy Artillery, aged 46 years, was wounded at Bethesda Church, June 2, 1864, and admitted to the field hospital of the 1st division, Ninth Corps, where Surgeon M. K. Hogan, U. S. V., recorded: "Gunshot fracture of right thigh." Two days afterwards the wounded man was moved to the Depot Hospital of the Ninth Corps, and on June 14th he reached Washington. Acting Assistant Surgeon H. A. Robbins reported: "He was admitted to Armory Square Hospital, having been wounded by a conoidal ball, which entered the anterior aspect of the right thigh at a point above the junction of the middle and lower thirds, producing comminuted fracture, and made its exit at a point on the posterior surface opposite to that of entrance. The limb was treated in Hodgen's splint without extension. During the month of March, 1865, several spiculæ of bone were removed, varying in size, the longest being two and a half inches in length. These were extracted without enlarging the opening. The patient came under my care June 1, 1865. The bone is now united with five and a half inches shortening. The femur is bowed out and the foot is considerably inverted. The knee joint is considerably stiffened, so that it can only be flexed to an angle of about twenty degrees. About one ounce of healthy pus is now discharged during twenty-four hours. The patient's health is very good." On July 6th he was brought to the Army Medical Museum, when the photograph, shown in the cut (FIG. 149), was taken. On the following day he was transferred to the Ira Harris Hospital at Albany, whence Assistant Surgeon J. H. Armsby, U. S. V., contributed a cast of the injured limb (*Cat. Surg. Sect.*, 1866, p 535, *Spec.* 1356). The patient was discharged from service October 3, 1865, and pensioned. Examiner S. L. Parmelee, of Gouverneur, New York, certified, September 4, 1873: "The ball entered five inches above the knee, anteriorly, fracturing the femur, and splitting, with two points of emergence, on the posterior aspect of the thigh. Result: Stiff knee; femur curved outward at an angle of twenty degrees," etc. At a subsequent examination substantially the same was reported. The pensioner was paid March 4, 1879.

FIG. 149.—Shot fracture of middle third of right femur. [From a photograph.]

CASE 382.—Private W. D. Gilbert, Co. C, 6th Vermont, aged 20 years, was wounded in the right thigh at the Wilderness, May 5, 1864. Three weeks afterwards he arrived at Alexandria and entered the Mansion House Hospital, whence Surgeon C. Page, U. S. A., reported the injury as a "shot fracture of the middle third of the femur." Subsequently the patient was transferred to Sickels Hospital, and lastly to Sloan, Montpelier. Surgeon H. Janes, U. S. V., in charge of the latter hospital, contributed the following history: "The patient, a man of strong constitution, was wounded by a minié ball, which passed through the thigh at the junction of the middle and lower thirds, comminuting the femur for several inches. The day after the injury he was sent by ambulance to Fredericksburg, no retentive apparatus having been applied, and two weeks later he was moved by cars and boat to Alexandria, the limb being kept in a fracture-box during the trip. At Alexandria, it was put upon an anterior splint and extension was made by brick and pulley. In June several pieces of bone were removed. Suppuration was profuse, and about August 1st his appetite failed and he became so much debilitated that his life was despaired of. After this he gradually but slowly improved, though not without occasional relapses. On January 1, 1865, the splint was removed and the patient allowed to sit at the bedside, and no retentive apparatus was used for more than two or three days after that time. About the last of January he could walk about the ward on crutches, though unable to bear any weight upon the limb. On March 17th the patient was transferred to this hospital, during which journey the limb became considerably inflamed, resulting in his confinement to bed for three days. On May 29th the limb, having again become inflamed and discharging very offensive pus, was freely opened for

FIG. 150.—Shot fracture of middle third of right femur. [From a photograph.]

about four inches, and several large pieces of necrosed bone, one of which measured one by three inches, were removed. The cavity in the callus, which contained these fragments, was found to be large and seemed to extend quite or nearly to the cancellated structure of the condyles. After the operation suppuration became healthy and the wound mended rapidly for four weeks, when the improvement became checked. On September 7th, the limb was again laid open freely and a small piece of bone was removed, after which there was no further interruption in the progress of the patient up to October 12, 1865, when he was discharged from service. At this time the wound still suppurated to the amount of two ounces per day, and a considerable cavity existed between the ends of the bone, but no necrosis could be detected by the probe. The limb was shortened three inches, and there was ligamentous anchylosis of the knee joint, permitting the patient to move it about ten degrees. He was in general good health, able to bear half his weight on the injured leg for a short time, and seemed to have a fair prospect of obtaining a useful limb. There had been no hæmorrhage, gangrene, or diarrhœa since the injury, and his appetite had been good nearly all the time, having taken nutritious food freely and stimulants moderately." Examiner W. McCollom, of Woodstock, Vermont, November 14, 1866, certified to the injury, and stated: "The bone has united with three inches shortening. Exfoliations are thrown off occasionally, and the wound in the soft tissues has not entirely healed. He is totally disabled from performing manual labor at present." Examiner O. W. Sherwin stated, September 4, 1873: "There is considerable loss of tissue, and the knee is permanently flexed so as to keep the heel two inches from the floor," and, in September, 1877, he reported the following: "During the present year a large abscess formed at the seat of the injury, with exfoliation of bone. I attended him during two months of confinement in bed from the aforesaid cause." A card photograph of the patient, taken at the Sloan Hospital, was contributed by Surgeon Janes (*Card Photos*, A. M. M., Vol. 2, p. 22), an enlarged copy of which, taken at the Army Medical Museum (*Surg. Phot. Series*, No. 130), is represented in the cut (FIG. 150). The pensioner was paid March 4, 1879.

CASE 383.—Lieutenant J. Buckley, Regimental Quartermaster of the 140th New York, aged 22 years, was wounded at Spottsylvania, May 8, 1864, by a minié ball, which fractured the right thigh at the middle third. From the field he was, on May 12th, admitted to hospital at Alexandria, and five days afterwards he was transferred to the Seminary Hospital, Georgetown. Surgeon H. W. Ducachet, U. S. V., in charge of the latter, reported the character of the injury and that the patient remained under treatment until November 12th, when he obtained a leave of absence and departed for his home. On January 13, 1865, Lieutenant Buckley was mustered out of service and pensioned. Dr. T. M. Flandrau, formerly Surgeon 146th New York, who saw this officer at the time of the injury, and also after he left the service, communicated his observations in March, 1870, as follows: "I decided to save the limb, and, aided by Surgeon H. C. Dean, 140th New York, dressed it in Smith's anterior splint, suspending it from the bows of an army wagon, in which, with his servant steadying the foot, he was carried to Belle Plain. When he reached the Georgetown Hospital the thigh was found shortened five inches. During the second, third, and fourth months after the injury he was treated by an extension weight of sixteen pounds, a counter-extending band, and lateral sand bags. On August 20th he had three profuse hæmorrhages, jeopardizing his life, which were controlled without operation. He used crutches when leaving the hospital, but threw them aside five months afterwards. He has since been employed as a bookkeeper. There is two and a half inches shortening, and the knee is somewhat stiffened. A fistulous opening still exists on the back of the thigh and discharges a little. The limb is very useful, and the limp is not conspicuous." The Utica Examining Board reported, January 3, 1872: * * * "There has been extensive exfoliation of bone, leaving several deep cicatrices, and there is still an open sinus extending to the bone and attended with bloody sanious discharge, indicating that there is still disease of the bone," etc. Examiner C. B. Coventry, September 6, 1873, certified to several pieces of bone having been removed, some of them since the previous examination. The pensioner was paid March 4, 1879. FIG. 1 of PLATE LX, opp., is a representation of a photograph of the pensioner, taken in Rome, New York, March, 1870, which was contributed by Dr. Flandrau, and copied at the Army Medical Museum. (*Surg. Phot. Series*, No. 266, A. M. M.)

CASE 384.—Private J. Hamilton, Co. I, 1st Delaware, aged 19 years, was accidentally shot, while on picket duty at Camp Hamilton, November 24, 1861. On the following day he was admitted to Hygeia Hospital, Fort Monroe, whence Surgeon R. B. Bontecou, U. S. V., reported: "Gunshot fracture of right thigh, above the middle, by a conical ball. The bone, though considerably comminuted, finally united at the expiration of five weeks; suppuration and exfoliation kept up with occasional intermission until June, 1862. The wounds were, at times, dilated with sponge tents to keep them free. Constant slight extension was used, and some portions of bone were removed from time to time. On June 14, 1862, the patient was discharged from service, and sent home with limb sound and shortened not more than an inch." Examiner D. W. Maull, of Wilmington, Delaware, certified to "shot fracture of the femur and shortening of the limb, with pain and occasional suppuration." A Pension Examining Board reported, in September, 1877: "An inch shortening; deep cicatrices; one of the wounds has been suppurating within six weeks, when a piece of dead bone came out." The pensioner was paid June 4, 1879. Photographs of the patient were furnished by Surgeon Bontecou (*Photos. of Surgical Cases*, Vol. 8, No. 54, and *Card Photos.*, Vol. 2, p. 21, and Vol. 3, p. 22), an enlarged copy of which (*Surg. Phot. Series*, No. 119) is represented in FIG. 2 of PLATE LX, opp.

CASE 385.—Sergeant A. Ryder, Co. B, 121st New York, aged 22 years, was wounded before Petersburg, April 2, 1865, and admitted to the field hospital of the 1st division, Sixth Corps, where Surgeon R. Sharpe, 15th New Jersey, noted: "Shot fracture of left thigh; splints applied." On the day following the injury the wounded man was sent to the Depot Hospital at City Point, and, on April 12th, he was transferred to Armory Square Hospital, Washington, whence Acting Assistant Surgeon G. K. Smith reported the following history: "The wound was caused by a conoidal ball, which struck the femur about six inches above the patella, fracturing the shaft of the bone and lodging. But slight constitutional disturbance took place, and the quantity of discharge from the wound was very moderate. The position of the ball could not be ascertained. The patient was treated on Dr. Gurdon Buck's plan. Two weeks after his admission, the injured limb was found to be shortened one and one-quarter inches. By June 9th the wound had healed, but bony union was still incomplete and extension by weights was continued. On July 8th the femur was found to be firmly consolidated, and the patient was allowed to go about on crutches. He was mustered out of service August 2, 1865, his general health being good and his injured leg shortened less than an inch." Examiner J. C. Tibbets, of Warsaw, New York, certified, October 14, 1872: "The ball passed through the rectus muscle, fractured the bone, and lodged in the posterior part of the thigh among the muscles, where it still remains. The muscles in the

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PLATE LX.—CONSOLIDATED GUNSHOT FRACTURES OF THE FEMUR.

Fig 1. Case of Lieutenant J. Buckley 140th New York.

Fig 2. Case of Private J. Hamilton 1st Delaware

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back of the leg and thigh are contracted, so that walking or even much resting on the limb causes spasms (cramps), etc." The pensioner was paid March 4, 1879. His photograph, taken at the Army Medical Museum on July 25, 1865 (*Surg. Phot. Series*, No. 72), is represented in FIG. 1 of PLATE LXI.

CASE 386.—Private J. Friederick, Co. F, 127th New York, aged 19 years, was wounded in the right thigh at Honey Hill, November 30, 1864. Assistant Surgeon J. F. Huber, U. S. V., reported his admission to hospital at Hilton Head, on the day following the injury, with "compound fracture of femur, treated with splints," and his transfer to Washington, May 7, 1865, but gave no account of the progress of the case. The following notes were furnished by Acting Assistant Surgeon G. K. Smith, from Armory Square Hospital, and by Assistant Surgeon W. Webster, U. S. A., in charge of DeCamp Hospital, David's Island, New York. The wound was caused by a round ball, which entered the inner side of the thigh at its middle third, passing obliquely outward and forward, fracturing the femur and lodging. An attempt to stand on the limb after receiving the injury caused the thigh to bend to an obtuse angle at the seat of the fracture. The wounded man was placed on a shelter tent and conveyed to a steamboat, about eight miles distant, no examination of the wound having been made and no local support having been applied to the broken bone. During the night following the injury the ball was removed through an incision on the external aspect of the thigh. Cold-water applications were used, and a partial support was given by an arrangement of blankets around the parts. On arriving at the Hilton Head Hospital a surgical examination was made under chloroform, but with no operative result, the limb being exceedingly tumefied. Smith's anterior suspensory apparatus was then applied, and the topical applications of cold water were continued. This treatment was kept up until January 7th, when side splints, extending below the foot, were substituted, and the limb was maintained in a straight position. This apparatus was continued for nearly two months, and during this stage of the treatment the swelling greatly subsided, and about a half dozen pieces of bone were removed by the attending surgeon at various intervals. The largest of these is represented to have been about three inches long, one-half inch wide, and one-eighth inch thick. An abscess also opened, spontaneously, about two inches below Poupart's ligament. In the latter part of March the side splints gave way to a fracture-box, the cold-water dressings being still persevered in. On May 1st all local supports by means of splints were cast aside, bandages and pillows being sufficient from that period in consequence of the advanced stage of bony consolidation. On May 10th, when the patient was admitted to Armory Square Hospital, the fractured femur had firmly united, with seven inches shortening, a marked deformity by an outward curvature of the thigh, and very limited motion of the knee joint. There was still a slight discharge, and the extremity of the upper fragment lapping by the lower fragment presented itself on the outer aspect of the limb, close to the external condyle, at which point the skin was ulcerated through, exposing the end of the bone. By June 1st the patient's recovery was so far advanced as to enable him to walk about the ward with the aid of crutches. About the last of June, however, he was compelled to resume his bed in consequence of the appearance of an abscess on the outer side of the thigh, which was opened and gave exit to about eight ounces of sanious and offensive pus. Up to this time the purulent discharges from the wound had been moderate in quantity and healthy in character. On July 5th, however, the several openings were attacked by gangrene, which rapidly extended up the thigh and destroyed the skin and superficial and deep fascia nearly the whole length of its external surface. This disease was, at length, arrested by the application of bromine, and by August 15th the wound had become filled with granulations, and cicatrization was progressive. On August 17th the patient was transferred to Douglas Hospital, where a subsequent exploration of the limb resulted in the removal of six small sequestra from the external wound. Simple dressings were now used, and no further operative interference was required in the case until after the arrival of the patient at DeCamp Hospital, where he was transferred on October 23d. At this date he was strong enough to walk from the steamboat landing to his ward on crutches, and his general health was excellent. There were three apertures, two on the external and one on the posterior surface of the thigh, from which pus of a healthy appearance found exit in small quantities. An examination of the wound by means of a probe revealed secondary splinters, but not sufficiently approachable to warrant an attempt at their removal. The amount of new osseous deposit was considerable, but unfortunately the sequestra were found so intimately embedded in it as to cause their removal to be attended with great difficulty and even impossibility, and involving the sacrifice of so much new growth as to endanger the limb. On February 25, 1866, however, the further removal of necrotic pieces was induced by constitutional symptoms, which manifested themselves and indicated local irritation. Portions of the involucrum were removed by the trephine and chisel, where necessary for the purpose, and small masses of dead bone were extracted from each of the orifices. One of the pieces, deeply situated, measured about two inches in length. As a seeming consequence of the operation the unfavorable constitutional symptoms entirely disappeared, and the condition of the patient and his wounds became highly satisfactory." In June following he was supplied with an apparatus for the injured limb by E. D. Hudson, of New York City, and four months later he left for his home, having been discharged from service November 25, 1865, but re-admitted to the hospital one month afterwards. The Examining Board of Augusta, Maine, certified, in May, 1873, and in December, 1876: "The leg is withered and badly deformed, and there are discharging ulcers all the time. He can perform no manual labor of any kind, and is confined to his bed a large part of the time. The leg, from knee to foot, is nothing but skin and bone." The pensioner was paid June 4, 1879. The wood-cut (FIG. 151) represents a photograph of the patient, taken August 15, 1865. (*Photo's of Surgical Cases*, Vol. 9, p. 16, and *Surg. Phot. Series*, No. 90.)

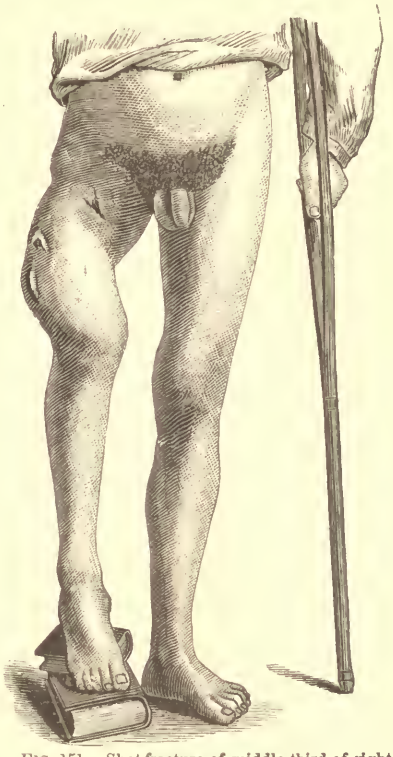

FIG. 151.—Shot fracture of middle third of right femur. [From a photograph.]

Card photographs, taken at a subsequent date at the DeCamp Hospital, were contributed by Assistant Surgeon Webster. (*Card Photo's*, Vol. 2, p. 22, A. M. M.)

CASE 387.—Private T. Miller, Co. G, 116th Pennsylvania, aged 18 years, was wounded at the Wilderness, May 5, 1864, and admitted to Armory Square Hospital, Washington, three weeks afterwards. Surgeon D. W. Bliss, U. S. V., described the injury as a "fracture of the upper third of the left femur, caused by a minié ball," but the progress of the case, further than an attack of pleuro-pneumonia, in March, 1865, was not reported. On August 15, 1865, the patient was transferred to Harewood Hospital, whence Surgeon R. B. Bontecou, U. S. V., reported the following history: "When admitted he was convalescent from a wound of the thigh, the missile entering and fracturing the femur at the junction of the upper and middle thirds, passing through and coming out on the inner side, near the tuberosity of the ischium. According to the patient's statement his constitutional condition at the time of the injury was very good, although the wound was very painful. Severe hæmorrhage followed the injury, with great tumefaction of the whole limb. The fracture box was used and counter-extension, and the treatment was supporting throughout. The patient had so far recovered as to be able to be about on crutches. The thigh had shortened about two inches and three-fourths; but otherwise the man was in good condition and in a fair way of having a useful limb." Two weeks afterwards he was transferred to Mower Hospital, and subsequently to the Post Hospital at Philadelphia, and in October he was finally sent to Harrisburg to be mustered out, his term of service having expired July 14, 1865. An apparatus for the injured limb was furnished on December 6, 1865, by J. M. Gemrig, of Philadelphia. Dr. J. A. McArthur, Surgeon of the Soldiers' Home, Philadelphia, October 17, 1866, certified to anchylosis of the knee joint as resulting from the injury, and described the wound as still open and requiring treatment. The Philadelphia Examining Board reported "almost complete anchylosis of the knee," in September, 1873, and two years afterwards the same Board stated: "The femur is curved antero-posteriorly—concavity forward. There are several scars on the front of the thigh, where spiculæ were removed, and the muscular structure of the thigh is much wasted. He alleges constant pain in walking." The pensioner was paid June 4, 1879. A photograph of the patient, taken at the Harewood Hospital in October, 1865, was contributed by Surgeon Bontecou, and copied at the Army Medical Museum. (*Photos. of Surgical Cases*, Vol. 8, No. 142, and *Surg. Phot. Series*, No. 114, A. M. M.) A representation is shown in FIG. 2 of PLATE LXI, opp.

CASE 388.—Private H. Shetter, Co. D, 7th Wisconsin, aged 30 years, was wounded at Gravelly Run, March 31, 1865, and admitted to the field hospital of the 3d division, Fifth Corps, where Surgeon A. S. Coe, 147th New York, recorded: "Fracture of middle third of right thigh by a minié ball." On the second day after the injury the wounded man was moved to the Depot Hospital at City Point, and several days later he was sent to Washington. Acting Assistant Surgeon G. K. Smith reported the following history: "The patient was admitted to Armory Square Hospital April 5th. The missile had entered the external portion of the thigh, producing fracture and lodging. On April 19th, a small opening ulcerated through the skin on the inner side of the thigh, about two inches below the perinæum, through which the ball was removed by the forceps. The limb was bandaged in its whole length and laid upon a mattress, being supported by sand bags and extended by weight and pulley. On July 5th the patient was able to ride about the ward in an invalid chair, and a few days later he walked on crutches. By July 16th the bone had firmly united, with only one inch shortening, though there was still a slight discharge from the wound. The patient's general health was remarkably good." He was subsequently transferred to Harvey Hospital, Madison, and ultimately discharged from Camp Randall November 15, 1865, Acting Assistant Surgeon A. W. Greenleaf certifying to "shortening and total loss of power and strength of the limb." Examiner A. J. Ward, of Madison, Wisconsin, on September 8, 1873, reported over three inches shortening of the limb and anchylosis of the knee joint; and two years later he stated that the pensioner "will never be any better." The pensioner was paid March 4, 1879. FIG. 2 of PLATE LXII, opp. p. 192, is a copy of a photograph of the patient, taken at the Army Medical Museum on July 16, 1865. (*Surg. Phot. Series*, No. 71, A. M. M.)

CASE 389.—Private H. E. Gumberts, Co. E, 136th Indiana, aged 18 years, was shot in the left thigh, at Camp Carrington, May 13, 1864. Acting Assistant Surgeon J. M. Kitchen reported his admission to hospital at Indianapolis on the day of the injury, and described the wound as a "fracture of the femur, caused by a musket ball." The patient was discharged by reason of expiration of service September 2, 1864, and subsequently he was placed on the Pension Rolls. In January, 1866, Dr. Kitchen communicated that he received a letter from the man stating that he could "run and jump as well as ever," and representing "the injured limb, with the exception of a little shortening, just as good and useful as the other." Examiner H. M. Harvey, of Evansville, Indiana, certified, August 12, 1871: "The ball entered the thigh about midway between the knee and hip joints, on its outer aspect, passed inward, backward, and slightly downward, fracturing the shaft of the femur in its course, and emerging on the inner side of the limb. There is a large amount of callus around the seat of the fracture, and the limb is shortened about one and one-quarter inches. He complains of pain in the knee joint, and cannot completely flex the leg upon the thigh." At a subsequent examination the pain in the knee was reported to be increasing. The pensioner was paid June 4, 1879. His photograph was obtained in July, 1866, and contributed by Dr. Kitchen to the Museum, where it was copied. (*Surg. Phot. Series*, No. 153, A. M. M.) A representation of it appears in FIG. 1 of PLATE LXII, opp. p. 192.

Of the four hundred and twenty-one Union soldiers discharged the service on account of shot fracture of the middle third of femur, thirty-three have died in the course of fourteen years since the close of the war, and one committed suicide. In the following two instances the patients died nine and twelve years after the reception of the injury:

CASE 390.—Captain R. T. Shillinglaw, Co. I, 79th New York, aged 32 years, was wounded in the left thigh, both upper extremities, and the right temple, at Bull Run, July 21, 1861. The injury of the thigh was caused by a conoidal ball, which fractured the femur obliquely at the middle third. He was made a prisoner and conveyed to Richmond, where the fracture was treated at the Alms House Hospital, by a Desault splint for one week, and by Smith's anterior splint for twelve weeks subsequently. Slight suppuration continued for nearly a year after the injury, with occasional elimination of bits of necrosed

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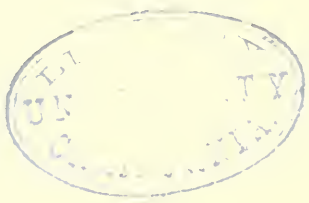
PLATE LXI.— CONSOLIDATED GUNSHOT FRACTURES OF THE FEMUR.

Fig 1. Case of Sergeant A Ryder
121st New York

Fig 2 Case of Private T Miller
116th Pennsylvania.



bone. Having been exchanged on December 31, 1861, he proceeded to his home in New York City, where he was treated, for a time, by his family physician. Some months afterwards he returned to the field, and served as Acting Aid-de-Camp to General Wilcox until January 20, 1863, when he resigned the service. In August following, Captain Shillinglaw was commissioned in the Veteran Reserve Corps, in which organization he remained until August 2, 1865, when he was finally mustered out and pensioned. After leaving the service he took up his residence in Washington City, and obtained employment in the U. S. Treasury Department. The photograph, represented in the annexed cut (FIG. 152), was obtained in June, 1866, when he visited the Army Medical Museum. At that time the injured limb was shortened nearly three inches, but he could walk briskly and without a limp. He used no cane and experienced little or no inconvenience from his wounds. Examiner J. Phillips certified, February 6, 1869: "Gunshot wound of left thigh, left arm, right hand and arm, and right temple. Compound comminuted fracture of thigh bone. The bone has united crookedly, and is about three inches shorter than its fellow; the muscles are attenuated, and the nerves of the limb so affected that he is constantly suffering. Gunshot wound of left elbow joint; ball lodged near the joint, which is now so weakened as to be unserviceable for labor. Flesh wound of right hand from piece of shell. The right arm was pierced by a piece of shell, scraping the bone. This wound impairs the usefulness of the limb. A ball struck the right parietal bone. He suffers but little from this wound." This pensioner died April 14, 1870, of consumption, superinduced by an attack of pleuro-pneumonia and gunshot wounds.

FIG. 152.—Shot fracture of middle third of left femur. [From a photograph.]

CASE 391.—Private J. Moran, Co. K, 25th Ohio, aged 22 years, was wounded at Bull Run, August 30, 1862, and admitted to hospital at Alexandria four days afterwards. Surgeon E. Bentley, U. S. V., reported: "A ball entered on the anterior side of the left thigh, at the top of the middle third, passed though the limb, fracturing the bone, and emerged on the inner side of the thigh, at the bottom of the middle third. The patient was treated by rest and position, and the bone united with considerable shortening. He was discharged from hospital January 30, 1863." The man subsequently joined the Veteran Reserve Corps, and was ultimately discharged from service March 28, 1865, and pensioned. Examiner S. S. Thorn, of Toledo, Ohio, October 3, 1865, certified to the "shot fracture of the femur, followed by three and a half inches shortening, anchylosis of knee, and impaired power of limb;" also to "the wound being still open and exfoliating bone." Examiner S. M. Smith, of Columbus, one year later reported the injured femur as affected with necrosis, and Examiner T. A. Reamy, of Cincinnati, in September, 1873, describes the "muscles firmly adherent to the bone at the point of the injury, an open sinus communicating with the bone anteriorly, and great angular deformity at the union of the fractured bone." The attending physician of the pensioner certified that he died November 11, 1874, of debility superinduced by necrosis of the injured femur, which was attended by continued exfoliation and suppuration.

Fatal Cases of Shot Fractures of the Middle Third of the Femur treated by Conservation.—Three hundred and forty-two cases of shot fracture of the middle third of the femur treated by conservation had fatal terminations. Eighty-six were Confederate and two hundred and seventy-four Union soldiers:

CASE 392.—Private J. Shimrock, Co. A, 55th Ohio, aged 20 years, was wounded at Chancellorsville, May 3, 1863. Surgeon G. Suckley, U. S. V., reported that he was left in the hands of the enemy, and described his injury as "a shot fracture of the femur." Twelve days after being wounded the man was paroled and admitted to the Eleventh Corps field hospital at Brook's Station, and one month later he was transferred to the Stanton Hospital at Washington. Surgeon J. A. Lidell, U. S. V., contributed the specimen (FIG. 153) and made the following report of the case: "Examination at the time of admission showed that the right femur was broken near the junction of the lower with the middle third, and that union had not yet taken place. There was a copious discharge of thin pus from the wound of the soft parts. The fracture had been treated in a simple straight fracture-box, and the limb was still in it when the patient was brought to this hospital. He stated that the bullet had not yet been extracted from the wound. He was pale, thin, and weak, with a frequent pulse. His tongue was smooth, dry, and red, and he complained of diarrhœa, but said this was an old affair, and that he had also had chills and fever some time back. The prognosis was very unfavorable. The broken limb was placed in Hodgen's splint; pills of camphor and opium were given to control the diarrhœa, and the system was supported with a nourishing diet, using eggs, milk, beef tea, farina, etc., together with milk-punch. June 18th, diarrhœa checked; tongue continues red and smooth; has considerable irritability of the stomach. The pills were suspended, but the supporting treatment continued. 22d, secondary hæmorrhage from the wound, to the extent of about three ounces, occurred this morning; there was also slight bleeding yesterday, some branch of the profunda being the probable source. Two drachms of solution of persulphate of iron was injected into the bottom of the wound through a catheter, and the hæmorrhage did not again occur. 24th, complained of pain in the thigh, was restless, and had some diarrhœa. Gave one-grain opium pills every four hours until the 26th, when the diarrhœa was again checked. Suppuration continued profuse; tongue smooth and red. July 2d, patient appeared to be slowly failing. Fluctuation having been detected above the internal condyle of the femur, an incision was made and about two ounces of pus evacuated. Two grains of quinine was prescribed three times a day, and six ounces of whiskey daily was substituted in place of the milk-punch, which, the patient thought, did not agree with him. 8th, patient began to exhibit night sweats, with increase of pallor and anæmia; suppuration profuse, unhealthy and fetid; necrosed bone at the bottom of the wound firmly impacted. 18th, had a chill, followed by a hot and sweating stage. Administered ten grains of quinine three times a day: chills did not return for four days. 20th, patient very pale

and feeble, with smooth red tongue; in addition to quinine he takes muriated tincture of iron, and porter two pints daily, with nourishing diet. 21st, diarrhœa returned and was checked by pills of opium. 22d and 23d, chills occurring at irregular intervals, associated with hot flushes and profuse perspiration. 25th, some unhealthy fetid pus was evacuated from the inner side of the thigh by incision. 27th, had pyæmic rigors and sweats again; is much emaciated and very pale; pulse 120 and feeble; tongue glazed and of bright red color. 29th, continuance of pyæmic rigors and sweats, the perspiration being very profuse; left leg and thigh œdematous and blue colored, the superficial veins looking like dark blue knotted cords; all of which denotes obstruction of the left iliac and femoral veins. The patient continued to sink, and died of exhaustion on July 31, 1863. *Post-mortem* twenty hours after death: Fracture of right thigh firmly united; necrosed bone closely surrounded by involucrum; muscles of right thigh extensively infiltrated with pus. The missile, a conical and much flattened bullet, was found at the lower and inner side of the thigh. The femoral artery opposite the seat of the injury contained an oval-shaped clot of blood (embolus) which completely occluded it; no other abnormity of the artery was noticed. On examination of the left thigh a metastatic abscess was found in the popliteal space containing about an ounce of pus, and the external iliac and femoral veins were discovered to be distended with coagulated blood. The femoral and iliac veins of the injured limb appeared to be normal. The liver was somewhat enlarged, nutmegged and fatty; kidneys beginning to be granular; spleen enlarged, softened, and reddish brown in color; lungs containing some frothy serum, otherwise natural; left ventricle of heart containing some coagulated blood." The specimen consists of the lower half of the injured femur with a battered piece of lead attached, and exhibits a fragment four inches long by one and a half wide, which preserved the vitality of its periosteal surface. The effusions from this fragment connect, as a bridge, the broken shaft; its internal surface is carious. Besides this, other and smaller fragments are entangled in the newly formed bone, some of which are necrosed and some serve as bonds. A wet preparation of portions of the common and external iliac and femoral arteries of the right side, showing an embolus in the latter near the seat of the fracture of the thigh, was also contributed by Surgeon Lidell,[1] and constitutes Specimen 3454 of the Surgical Section of the Army Medical Museum.

FIG. 153.—Fracture of right femur at junction of middle and lower thirds. *Spec.* 1536.

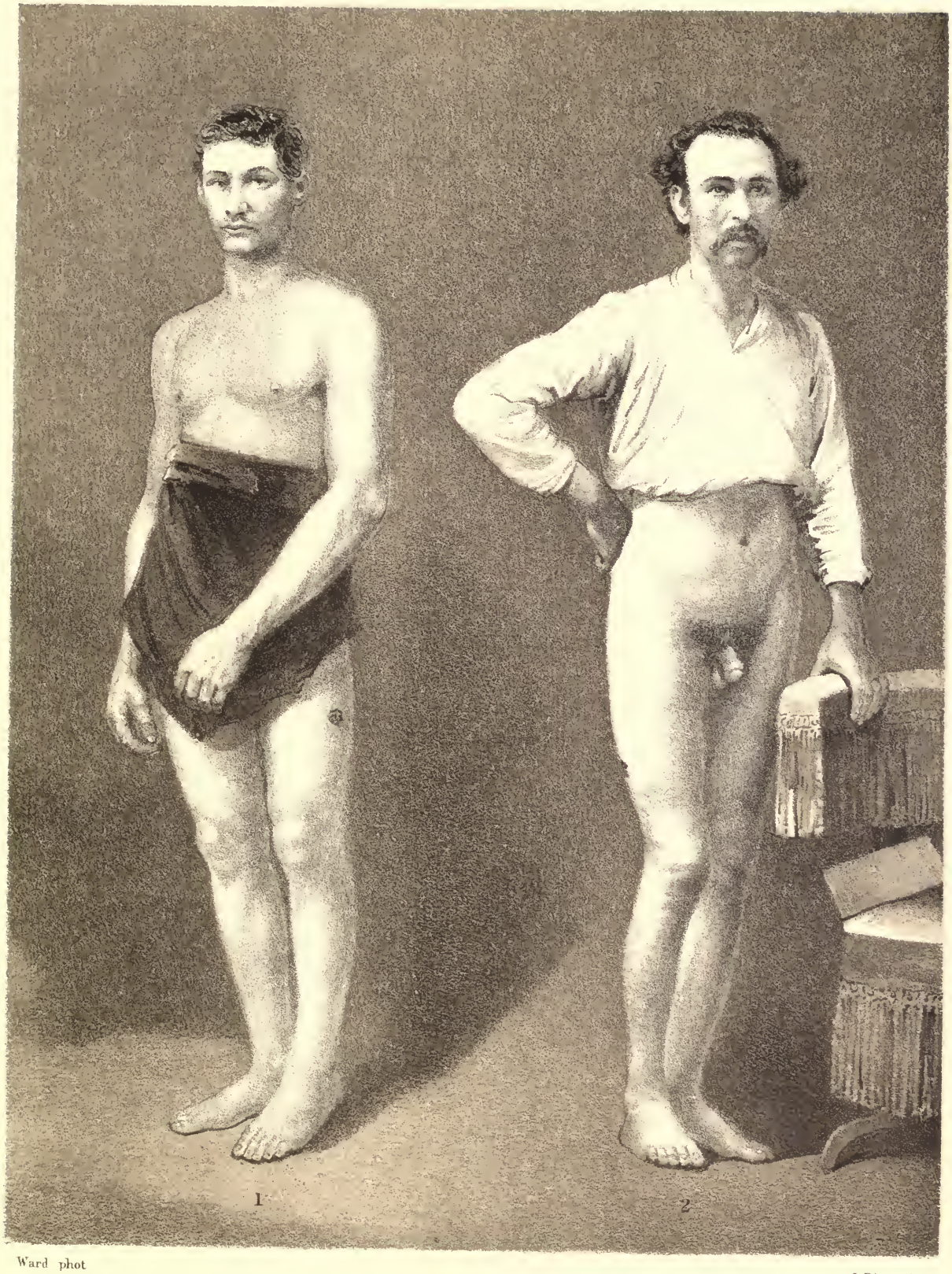
CASE 393.—Corporal W. Ford, Co. B, 1st Colored Regiment, aged 20 years, received a shot wound at Petersburg, June 15, 1865, and was conveyed to Baltimore twelve days afterwards. Surgeon L. W. Read, U. S. V., reported his admission to McKim's Mansion Hospital with "shot fracture of left thigh." On July 25th, the patient was transferred to Hick's Hospital, whence Assistant Surgeon G. M. McGill, U. S. A., forwarded the specimen, shown in the annexed cut (FIG. 154), with the following account of the case: "The patient suffered with a wound of the left thigh. The ball had entered the posterior part of the outer aspect of the middle third, passing inward, forward, and slightly upward, and lodged. It was sought for several times but could never be detected. A large detached piece of necrosed bone was taken out of the opening of entrance during the month of September, 1865. The patient complained of continual pain, aggravated by pressure in both lumbar regions, in which regions there was extended flatness on percussion. He continued very weak, had several attacks of erysipelas, and finally sank, after a severe attack, on February 20, 1866. The injured thigh was greatly swollen, its skin shiny and somewhat tuberculated about the sinuses and slow-healing incisions. The diagnosis of fatty degeneration (interstitial formation and proper) was made for the left thigh and leg and inferred for the great organs. Ford was a long time dying: For seventy hours or more his death was expected from hour to hour. Before death the surface of his body, in appearance, was waxen. The left leg and foot were gangrenous. There was a tumor (result of periosteal action) of the diaphysis of the left femur. The ball (much flattened) was found beneath the sartorius muscle and vessels in the middle third of the thigh. There was pus in the left knee joint, in the left hip joint, and in the superficial fascia of the left leg. No disease of the vessels was observed." The specimen consists of the left femur, obliquely fractured in the middle third and partly consolidated by an excessive deposit of new bone on the posterior surface, the adjacent surfaces being carious, with a necrosed fragment remaining at the upper portion.

FIG. 154.—Oblique fracture of left femur in middle third. *Spec.* 255.

FIG. 155.—Left femur fractured in middle third. *Spec.* 1043.

CASE 394.—Private C. Hill, Co. K, 7th Michigan, was wounded at Antietam, September 17, 1862. Surgeon G. Chaddock, 7th Michigan, reported his admission to the Stone House Hospital, near the battle-field, with "shot wound of the thigh." Surgeon B. A. Vanderkieft, U. S. V., forwarded the specimen, shown in the wood-cut (FIG. 155), with the following history: "The patient was wounded by a musket ball, which passed through the middle third of the right thigh, fracturing the femur. He came under my care six weeks after the injury, there being no previous history other than his statement that a small piece of bone was extracted a few days after the reception of the wound. On account of the normal appearance and length of the leg, the slight suppuration, the absence of other fragments and of any crepitation whatever, I diagnosed an incomplete compound fracture of the thigh, such as is often the result of an injury by a spherical ball received at short distance. (Patient stated that he distinctly saw the man who shot at him.) His general condition was very satisfactory. The fractured limb presented two fistular openings, one on the inner and the other on the outer side of the thigh at the middle third, and discharging but little pus. There was no shortness whatever, and if there had been a complete

[1] Dr. LIDELL, in an article on *Thrombosis and Embolism*, in the *American Journal of Medical Sciences*, 1872, Vol. LXIV, N. S., p. 343, gives a minute account of this important case.



Ward phot

J. Bien lith

PLATE LXII – CONSOLIDATED GUNSHOT FRACTURES OF THE FEMUR.

Fig 1 Case of Private H E Gumberts
136th Indiana.

Fig 2 Case of Private H. Shetter
7th Wisconsin.

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division of the bone consolidation had already followed. The limb was placed between two sand bags, acting as splints, and a plain dressing was applied. A very nourishing diet was prescribed. By the 17th of December the patient was doing very well; the inner fistular opening was closed, while the one on the outside was still of the same dimension, but discharging an ichorous pus mixed with small pieces of bone in the form of sand, such as is often noticed in caries of the long bones. On January 9, 1863, notwithstanding the continuation of the discharge of the aforementioned character, the patient felt well enough to sit up a short time in an arm-chair, but, on returning to his bed, he accidentally fell down, and, owing to the fragility of the injured parts, he fractured the same precisely at the corresponding point of the passage of the ball. Notwithstanding the most careful attendance no consolidation could be obtained, the whole femur seeming to be in a state of molecular disorganization, and having lost its normal firmness even as in rachites. The discharge of ichorous pus increased daily, and the patient died of exhaustion on March 19, 1863, no signs of pyæmia having been noticed. The use of phosphate of lime against the existing osteomalacia did not afford the slightest relief. According to the patient's statement, there was no constitutional predisposition." The specimen consists of the injured femur, and shows the formation of an immense sequestrum in the lower half and disease of the lower two-thirds of the shaft.

CASE 395.—Sergeant T. Bechtold, Co. C, 93d Pennsylvania, aged 34 years, was wounded at Fair Oaks, June 1, 1862, and entered Hygeia Hospital at Fort Monroe nine days afterwards. Surgeon R. B. Bontecou, U. S. V., reported: "He received a shot while in line of battle, the ball entering the anterior and middle third of the right thigh, and making its exit nearly opposite on the posterior portion of the limb; and while on the ground he was hit again by a conical ball, which entered the back below the inferior angle of the scapula and was cut out in the axilla. On June 12th, secondary hæmorrhage from the wound in the axilla set in, which continued from time to time for four days, when it was finally controlled by pressure and plugging. The thigh was swung up in Smith's anterior splint, and imperfect union took place under unfavorable circumstances, the patient being very much emaciated and suffering from bedsores and diarrhœa. He was sent to his home in August, 1862, and I learned that he subsequently died from the exhausting suppuration, which, from the first, kept up from the thigh wound. Sequestra were removed whenever discovered, and the fascia of the thigh relieved to prevent burrowing." The patient died at Lebanon, Pennsylvania, on September 24, 1862, whence the specimen represented in the wood-cut (FIG. 156) was contributed by Dr. B. F. Schenk. The specimen embraces a portion of the fractured femur, and shows a remarkable instance of reparative effort. The fragments are thoroughly involved with callus, and a large sequestrum is nearly detached. There is also an accidental *post-mortem* fracture of the specimen one inch below its superior border.

FIG. 156.—Portion of right femur fractured in middle third. *Spec.* 370.

CASE 396.—Private *Tobias Bever*, Co. C, 57th North Carolina, aged 30 years, was wounded and taken prisoner at Rappahannock Station, Virginia, November 7, 1863. Surgeon John A. Lidell, U. S. V., reported: "The bullet entered the left limb one and a half inches to the inner side of the inner margin of the patella, passed upward and outward, fractured the femur five or six inches above the knee joint and lodged; its locality could not be ascertained. He was admitted into Stanton Hospital November 9th, his general condition being favorable. The synovial pouches were apparently unopened. The limb was placed in Hodgen's splint and a moderate amount of extension applied; the wound was kept wet with cold water. Some synovial effusion into the cavity of the joint occurred on November 21st, but no other untoward symptoms were present. November 30th, doing well, wound healing, but little effusion in the knee joint; general health good; bullet still unextracted. December 1st, the external wound is healed; there is a hard substance, feeling like a portion of bone, or perhaps the ball, to be felt in the outer and back part of the thigh at a point corresponding with the fracture. December 25th, femur united and quite strong. The ball still remained in the limb, and its location was not surely known. On January 1, 1864, the extension was discontinued. He could move the limb very well; the amount of shortening was two inches, which was occasioned by overlapping at the seat of fracture. His general health was excellent, and he was out of bed almost every day, and appeared to be doing well until February 1, 1864, when the wounded thigh had become swollen (not circumscribed) and painful. Ordered to stay in bed for the purpose of resting the limb and to apply a lotion of lead and opium. The tumefaction of the thigh partially subsided on February 14th, but the lymphatic glands of the groin had become swollen, painful, and tender. March 2d, the swelling about the track of the bullet has increased and is very painful. Fluctuation is also detected. The cicatrix of the wound is tense and puffy; incised it and evacuated about two ounces of laudable pus. March 3d, the pain has ceased and the swelling has partially subsided. The discharge from the wound is thin, straw colored, and flaky. Directed the tincture of iron to be continued, with the addition of six ounces of whiskey daily. On March 20th, the swelling and soreness of the thigh had again increased. The discharge continued free. There was also diffuse redness of the skin, extending from the wound up the inner side of the thigh. He was pale, anæmic, and felt very weak. Stimulants were directed to be continued, with such articles of diet as he could take. It was now apparent that he would not recover without amputation of the thigh, but we were compelled to await the subsidence of the diffuse inflammation of the soft parts in order to perform that operation with any hope of success. March 22d, the discharge continues copious. It is thin and there is some blood mixed with it. He is somewhat emaciated and slowly failing in strength. March 24th, copious hæmorrhage from the wound, apparently parenchymatous in character, occurred this morning, and about half a pint of blood was lost before it could be controlled. Injected about two ounces of solution of persulphate of iron through a catheter carried deep into the wound, after which there was no more external hæmorrhage. The loss of blood reduced him very much. He gradually sank, and died on the morning of March 27, 1864. At the autopsy, in dissection, great œdema of the areolar tissue of the thigh was found. There was a large cavity beneath the fascia lata and surrounding the seat of fracture. It extended from the synovial pouches of the knee joint up to the trochanter major. It was lined with a moderate amount of plastic exudation. It contained about a quart of dark colored blood mixed with some pus. At the bottom of it, and toward the inner side of the femur, a minié ball was discovered. A piece had been split off from the side of it which could not be found. The medulla of the femur above the fracture was found to be bright red in color and soft in consistence. It presented the appearance described by Virchow as the 'red inflammatory marrow' (osteomyelitis). The fracture was firmly but irregu-

larly united. Examination of the specimen showed that the bullet passed upward and outward from the orifice of entrance at the inner side of the knee, but without opening the joint cavity, and impinged against the femur about three and a half inches above the extremity of the condyles, fracturing the bone very obliquely with comminution, so obliquely, indeed, that while the line of fracture commences about three and a half inches above the extremity of the condyles, as already stated, it terminates about seven inches above the extremities of the femoral condyles, so that the lower fragment of the broken femur is, in all, about seven inches long. The fragments of comminution had all united with more or less irregularity of position, but portions of some of them appeared likely to exfoliate. The two principal fragments had united at something of an angle opening forward and a little inward, so that the femur bowed backward and somewhat outward on that account. The marrow at the place of examination, a few inches above the fracture, was bright red in color, and presented a striking resemblance to newly formed granulations. A few spots appeared to be undergoing the process of conversion into bone." The pathological preparation, *Specimen* 2167, was contributed to the Army Medical Museum by Dr. Lidell. A colored drawing of the specimen, prepared by Hospital Steward E. Stauch, U. S. A., is copied in the chromo-lithograph (PLATE XXIV) opposite.

Shot Fractures of the Lower Third of the Femur treated by Conservation.—Six hundred and twenty cases of shot fractures of the lower third of the femur were treated without operative interference. Instances of shot fracture of the lower third of the femur, in which the knee joint was primarily involved, are not included in this series; they will be considered in Section IV of this Chapter, with injuries of the knee joint. Three hundred and seventy-five of the six hundred and twenty patients recovered; two hundred and thirty-two died, and in thirteen instances the result remained undetermined, giving a ratio of mortality of 38.2 per cent. Five hundred and two were Union, and one hundred and eighteen were Confederate soldiers, and the proportion of deaths among the former was 38.7, among the latter 36.0 per cent.

Successful Cases of Shot Fractures of the Lower Third of the Femur treated by Conservation.—Three hundred and four of the three hundred and seventy-five survivers of shot fracture of the femur in the lower third were Union soldiers, and an account of the pension record has been obtained in two hundred and thirty-nine instances:

FIG. 157.—Result of shot fracture of lower third of right femur. [From a photograph.]

CASE 397.—Private C. H. Schellenger, Co. C, 9th New York Heavy Artillery, aged 35 years, was wounded at Petersburg, April 2, 1865, and admitted to the field hospital of the 2d division, Sixth Corps, where Surgeon W. A. Childs, 10th Vermont, recorded: "Shot fracture of right femur; splints applied." Surgeon E. Griswold, U. S. V., reported the patient's entrance into Judiciary Square Hospital April 12th, and the fracture as being located at the "middle third" of the bone. He also stated that the treatment at first consisted of simple dressings, and afterwards splints and sand bags were used, and that "the progress of the case was favorable throughout, the wound being nearly healed about the middle of June, with one and a half inches shortening of the limb." The patient was discharged from service June 22, 1865, and pensioned. Examiner E. Hall, of Auburn, New York, certified, November 25, 1865, to "shot wound through right thigh above the knee, breaking the femur obliquely, the ball coming out on the inside of the leg near the scrotum. Limb shortened and knee quite stiff from thickened cartilage." The Syracuse Examining Board reported, April 5, 1876: * * * "The limb, he alleges, is lame, weak, and subject to spasms upon fatigue." The pensioner was paid June 4, 1879. His photograph, taken at the Army Medical Museum in June, 1865 (*Surg. Phot. Series*, A. M. M., No. 45), is represented in the wood-cut (FIG. 157).

In the following instance the patient recovered with such excellent use of the limb that the Pension Examining Board recommended, in 1876, that the pensioner's name be dropped from the Rolls, as the disability had ceased and the injured limb was as well nourished as the other:

CASE 398.—Private J. Durst, Co. D, 69th New York, aged 21 years, was wounded at Hatcher's Run, March 25, 1865. On the following day he was admitted to the Depot Hospital of the Second Corps, at City Point, and, on March 30th, he reached Washington, where he entered Armory Square Hospital. Acting Assistant Surgeon G. K. Smith contributed the following history: "A minié ball entered the anterior aspect of the right thigh at the junction of the middle and lower thirds, passing backward and fracturing the femur, and made its exit opposite the wound of entrance. The injury produced very little constitutional disturbance, and the discharge from the wound did not exceed two drachms in twenty-four hours at any time. The limb was treated in Hodgen's splint, without extension, until April 14th, when it was placed on a mattress with a sand bag

PLATE XXIV. OSTEOMYELITIS IN A FRACTURED FEMUR

Case of Pvt. Tobias Beaver, Co. "C" 96th Ohio Infantry.

on each side to keep it in position, and extension was applied by Buck's method. On June 9th the extension was removed and the bone was found to be firmly united, with one and one-fourth inches shortening. The patient was now walking on crutches. The anterior wound had healed for about a week, but the posterior wound was still discharging very slightly. By June 23d he had good movement of the knee and could bend the leg to a right angle with the direction of the thigh. The discharge from the wound at this time did not amount to over one drachm in a week. No fragments of bone were ever removed, and the limb healed almost as kindly as a simple fracture, showing no deformity except the shortening." The patient was subsequently transferred to DeCamp Hospital, David's Island, New York, and, on August 19, 1865, he was discharged and pensioned. Examiner W. M. Chamberlain, on August 22, 1866, certified to a "well united fracture of the right femur, with only one inch shortening, and some lameness and debility of the limb." Substantially the same was reported at subsequent examinations until January 19, 1876, when the New York Board certified to the injured thigh being as well nourished as the other, and to the disability as having ceased, in accordance with which the pensioner was dropped from the Pension Rolls. A photograph of the patient, taken at the Army Medical Museum in June, 1865 (*Surg. Phot. Series*, No. 46, A. M. M.), is represented in PLATE LXIII, opp. p. 196.

CASE 399.—Private E. P. Allen, Co. D, 12th Infantry, aged 19 years, was wounded at Gettysburg, July 2, 1863, and admitted to the field hospital of the 2d division, Fifth Corps. The injury was caused by a minié ball, which lodged in the anterior portion of the lower third of the left thigh, and was removed on the following day by Assistant Surgeon E. DeW. Brenneman, U. S. A. The missile was contributed to the Museum by the operator and is represented in the annexed wood-cut (FIG. 158). It consists of a conoidal ball beaten into nearly a triangular pyramid with very sharp edges. From the field hospital the patient was, on July 25th, transferred to the Cotton Factory Hospital at Harrisburg, whence Acting Assistant Surgeon W. S. Woods reported that he was discharged from service December 21, 1863, by reason of "compound fracture of left thigh." Examiner C. Hard, of Ottawa, Illinois, certified, May 1, 1869: "There is a compound comminuted fracture of the lower third of the left femur. The bones have united, with three inches shortening, leaving great and incurable deformity, and there is partial anchylosis of the knee joint, making him permanently lame." In September, 1873, the same Examiner stated that "the heel is drawn up, the foot turned out, and the limb atrophied from foot to body." The pensioner was paid June 4, 1879.

FIG. 158.—Battered conoidal ball removed from thigh. *Spec.* 3028.

CASE 400.—Private M. Burns, Co. B, 28th Massachusetts, aged 22 years, was wounded at Hatcher's Run, March 25, 1865. Surgeon F. M. Hammond, 126th New York, noted his entrance into the field hospital of the 1st division, Second Corps, with "shot wound of left thigh." The wounded man reached Washington April 3d, and was admitted to the Armory Square Hospital, whence Acting Assistant Surgeon G. K. Smith reported the following history: "The missile, a minié ball, entered the anterior portion of the thigh at the junction of the middle and lower thirds, and, passing horizontally backward, fractured the femur and made its exit posteriorly. The constitutional disturbance resulting from the injury was very slight, the discharge of pus from the wound amounting to only about half an ounce in twenty-four hours. The limb was shortened two inches. It was placed on a mattrass, between two sand bags, and extension was applied with a sixteen pound weight. Muriated tincture of iron was ordered; but no stimulants were given. By April 15th, the discharge amounted to only one drachm daily, and the limb was shortened only one and a quarter inches. On May 11th, believing the fragments to be firmly united, I allowed the extension to be removed and the patient to ride on the invalid chair, and, on measuring the limb, I found that it was still shortened three-quarters of an inch. I reapplied the weight; but this contraction could not be overcome by any amount of extension that the patient could bear. He was now kept in bed until June 9th, at which time the fragments had firmly united and he commenced walking on crutches. No fragments of bone were ever removed from the limb." The patient was transferred to the Readville Hospital July 5th, and subsequently to Dale Hospital, Worcester, where he was discharged and pensioned August 28, 1865, Surgeon C. N. Chamberlain, U. S. V., certifying to "fracture of femur, with moderate deformity and shortening and slight contraction of the flexors of the thigh." The pensioner enlisted in the 43d Infantry on August 21, 1867, and was again discharged June 10, 1869. Examiner I. F. Galloupe, of Lynn, Massachusetts, certified, in 1869: "A musket ball passed through the left thigh, fracturing the femur. The wound is healed and the bone appears to be sound. The limb is shortened and he walks slow and with difficulty," etc. In June, 1874, the same Examiner reported: "In walking he does not touch the heel, but rests on the forward part of the foot, thus making locomotion slow and fatiguing. The limb is painful when much used and in cold weather. The femur is enlarged and the foot is swollen." The pensioner was paid June 4, 1879. FIG. 2 of PLATE LXIII, opp. p. 196, represents a copy of a photograph of the patient taken at the Army Medical Museum on June 25, 1865 (*Surg. Phot. Series*, No. 47, A. M. M.).

CASE 401.—Corporal L. Tenney, Co. F, 82d New York, aged 20 years, received a comminuted fracture of the lower third of the right femur, at Gettysburg, July 2, 1863. The following history of the case and its result was obtained from reports of Surgeon Z. E. Bliss, U. S. V., in charge of Camden Street Hospital, Baltimore, and Assistant Surgeon W. Webster, U. S. A., in charge of DeCamp Hospital, David's Island, New York Harbor: "The ball, believed to be cylindro-conoidal, struck the anterior surface of the bone external to the median line, and passed directly backward through the posterior surface of the thigh. The patient stated that the limb bent beneath him, at the point of the fracture, directly the injury was received. Soon afterwards he was borne from the field on a blanket, and was deposited temporarily in a neighboring barn. The following day he was removed in an ambulance about the distance of a mile to a temporary hospital. There he first received professional attendance, and was placed under the influence of chloroform preparatory to amputation of the thigh. The examination, however, to which he was submitted, appears to have decided the attending surgeon in favor of endeavors to preserve the limb. A rough fracture-box was accordingly adopted, in which the limb remained subjected to cold-water dressings for six days, when the disclosure to the surgeon of three inches contraction of the femur induced him to substitute a double-inclined plane. The patient alleged that by this new apparatus the limb was restored to its normal length. About three weeks after the reception of the injury the double-inclined plane gave place to Smith's wire splint, which was employed during a space of five weeks. In the mean time the patient was transferred to the Corps Hospital at Gettysburg, where he remained until October 21st. The fracture appears to have been

thought sufficiently consolidated on August 20th to warrant the removal of all mechanical support from the limb on that date. Tenney stated that the limb was at that time of primitive length, and that he could raise the heel from the bed by the unaided muscular power of the leg. The posterior aperture gave constant exit to pus of a healthy character throughout the treatment. The perpendicular direction of the wound, in the recumbent posture of the patient, is believed to have had a beneficial influence in this instance, as it has in several other successful cases whose treatment has come under observation, in protecting the patient from accumulations of pus and securing an otherwise happy result. It will be observed that the fracture of the femur suffered by this patient was one of those typically favorable cases described by Stromeyer, where the femur is struck by the bullet on the outer side, remote from the great vessels, and the limb traversed in an antero-posterior direction, affording free escape to the secretion of the wound during treatment. About the middle of October the patient was able to move about on crutches, and on the 20th of that month he was removed from Gettysburg to Baltimore. On January 1, 1864, he walked a distance of three miles without the aid of cane or crutch. One week afterwards an exploration of the wounds discovered small necrosed portions of the shaft, which were removed by Surgeon Bliss, under chloroform, by making an incision two and a half inches in length anteriorly, and another internally three and a half inches long. On April 26th the patient was transferred to DeCamp Hospital, at which time he was able to walk about freely without cane or crutch. The osseous case of new bone which surrounded the fracture was very large, and an operation performed by Acting Assistant Surgeon E. DeWitt, on February 18, 1864, for the further removal of necrosed bone, necessitated the penetration of the involucrum by the trephine to a depth of two inches and a half. Nine spiculæ of old bone were removed during the operation, the largest of which was one inch long, a half inch wide, and one-fourth of an inch in thickness. About three weeks afterwards a thin fragment of sequestrum, two inches long and a half inch wide, was removed by the same channel. The patient received his discharge from service October 1, 1864, after which he was employed for nearly two years, in the capacity of a wardmaster, at DeCamp Hospital. At the date of the report, March 5, 1866, he was one of the most accomplished and indefatigable skaters at the hospital, and suffered no inconvenience from the injured limb, although the two wounds had not yet permanently cicatrized." Examining Surgeon T. F. Smith, of New York City, September 17, 1873, certified to the injury, and stated: "There are eight adherent cicatrices, with great loss of bone and muscular substance; movements of knee joint limited one-half," etc. The New York City Examining Board, two years later, reported that "the bone united with great thickening," etc.; also that "the cicatrices on the anterior, outer, and posterior surfaces of the limb are attached to the bone and at times take on ulceration." Substantially the same was reported at an examination in September, 1878. The pensioner was paid June 4, 1879.

CASE 402.—Private R. Hanlon, Co. C, 5th Cavalry, aged 21 years, was wounded at Beverly Ford, June 9, 1863. On the following day he was admitted to Lincoln Hospital, Washington, subsequently to Judiciary Square, and lastly to Carlisle Barracks, whence he was discharged May 16, 1864, and pensioned. Acting Assistant Surgeon G. K. Smith contributed the following history: "He was wounded by a minié ball, which entered the external aspect of the left thigh near its middle, comminuting the greater portion of the middle third of the femur, and splitting the lower third longitudinally nearly down to the knee joint. The missile lodged and could not be found. Ether was administered and the wound enlarged, and seventeen fragments of bone, comprising three inches of the continuity of the shaft, were removed. On June 23d, an abscess opened on the inner aspect of the thigh, near the perinæum, through which the ball was extracted. The limb was bandaged in its whole length, placed on a mattrass, and kept in position by a sand bag on either side. Owing to the loss of bone no extension was resorted to until October 1st, at which time the patient was able to roll his injured limb on the mattrass, the fragments having united, though the callus had not yet become firm and hard. I then applied a ten pound weight, suspended by a cord and pulley, and succeeded in reducing the shortening one-half inch. This amount of extension was continued until I left Lincoln Hospital, on November 8th, but was removed soon afterwards. On December 16th, while moving about on crutches, the patient fell and refractured the bone. The surgeon in charge then applied a long splint to the posterior aspect of the limb, retaining it in that position and preventing any motion of the knee joint until the fragments had reunited. The wound healed in the beginning of March, 1864, but broke open again in the middle of June, and continued to discharge slightly until March, 1865, during which time, however, the man was able to walk about and to serve as a watchman at the Government Repair Shops in Washington. On June 20th, 1865, the limb appeared perfectly sound, and at this period the man could walk all day without feeling tired, though there was fibrous anchylosis of the knee joint." Various pension examiners have certified at different dates to "anchylosis of the knee and about three inches shortening of the limb." The pensioner was paid June 4, 1879. PLATE LXIV, FIG. 1, opp. p. 198, represents his photograph, taken at the Army Medical Museum in June, 1865.—(*Surg. Phot. Series*, No. 55, A. M. M.)

CASE 403.—Private J. O'Conner, Co. F, 16th Michigan, aged 16 years, was wounded at Cold Harbor, June 2, 1864. He reached the Fifth Corps Hospital at White House three days after the injury, and was thence conveyed to Washington, where he entered the Armory Square Hospital June 10th. Acting Assistant Surgeon G. K. Smith made the following report of the case: "A minié ball entered the external aspect of the left thigh three inches above the patella, and, passing obliquely inward and upward, fractured the shaft of the femur through the upper end of the lower third, making its exit posteriorly. The patient was treated by Acting Assistant Surgeon T. O. Banister. Hodgen's splint was used, and no extension was applied other than the tying of the foot to the foot-board with a bandage. During the treatment eight small fragments of bone were removed. On December 27th the patient, though his wound had not entirely healed, was transferred to the Veteran Reserve Corps and placed on guard duty; but being unable to perform it, he was readmitted to the hospital for treatment several weeks afterwards. He came under my care on June 22, 1865, at which time he was in good health, but slightly lame and able to walk without a cane. There was still a slight discharge of sero-purulent fluid from the wound. The limb was shortened one and one-fourth inches, and, at the seat of the fracture, it was a little larger than normal but not otherwise deformed. On July 18, 1865, the patient was mustered out of service, with his wound still open." Examiner W. G. Wilkinson, of Farwell, Michigan, May 16, 1876, certified to the wound, and stated: "The fracture has been followed by necrosis of bone, several pieces having been removed during the year 1875. The sciatic nerve was injured, and the veins are in a varicose condition. The wound has continued open." The pensioner was paid June 4, 1879. His photograph, taken at the Army Medical Museum in June, 1865 (*Surg. Phot. Series*, No. 49, A. M. M.), is copied in PLATE LXIV, FIG. 2, opp. p. 198.

Ward. phot. J. Bien. lith.

PLATE LXIII. — CONSOLIDATED GUNSHOT FRACTURES OF THE FEMUR

Fig 1. Case of Private J. Durst
69 th New York.

Fig 2. Case of Private M. Burns
28 th Massachusetts

The records of the Pension Office show that, of the three hundred and four Union soldiers who recovered after shot fracture of the lower third of the femur under conservative treatment, twenty-five have died since the termination of the War. In the following instance the patient survived the injury fourteen and a half years:

CASE 404.—Assistant Surgeon T. S. Stanway, 102d Illinois, aged 33 years, was wounded during a fight with Guerrillas, between Lavergne and Nashville, December 21, 1863, a pistol ball entering the left thigh about four inches above the knee joint, passing downward and out about two inches above the knee, fracturing the femur in two places. The limb was treated with simple dressings and kept upon a double-inclined plane. About two weeks after the injury an abscess formed, which was evacuated through the lower wound. The wound healed rapidly, without loss of bone, and union took place between the fractured ends. About two months after the reception of the wound the patient obtained a leave of absence and went to his home, and on April 29, 1864, he returned to his regiment with a good limb of proper length. Soon afterwards he started with his command on the Atlanta campaign. In the course of six weeks, however,—owing to the want of sufficient nutrition,—scurvy set in, and the newly formed callus was gradually absorbed. Although keeping the limb supported by starch bandages, he became almost unable to step upon it, in consequence of which he resigned August 13, 1864. Some months after reaching his home partial union again took place, but the limb remained shortened to the extent of three inches. Dr. Stanway became a pensioner, and was examined on April 17, 1865, by Examiner J. A. Young, of Monmouth, Illinois, who described his condition as follows: "There is displacement of the upper portion of the femur downward and outward, with consequent shortening of nearly two inches. At present he suffers from pain, particularly during locomotion, owing to the slipping of the tendon of the vastus externus over the projecting end of the femur." The San Francisco Examining Board, in September, 1873, reported "an apparent movement in the bone at the point of the fracture," and several years later, "slight overlapping of the extremities, occasioning deformity, also lameness," etc., was alleged. The pensioner died at Los Angelos, California, prior to May, 1878.

Fatal Instances of Shot Fracture of the Lower Third of the Femur treated by Conservation.—Two hundred and thirty-two such cases are reported:

CASE 405.—Sergeant Sewell T. Douglas, Co. G, 1st Maine Heavy Artillery, aged 28 years, was wounded at the battle of Spottsylvania, May 19, 1864, and was admitted to Emory Hospital, at Washington, May 22, 1864. A musket ball entering posteriorly, had fractured the lower third of the left femur and lodged in the medullary cavity. The injured limb was placed on a double-inclined plane and moderate extension was used. Internally, stimulants and tonics were employed. In August, 1864, the patient suffered from severe diarrhœa. There was a copious ill-conditioned discharge from the wound. The patient died September 26, 1864, from exhaustion, and, at the autopsy, a deposition of callus was found at the seat of injury, enclosing several necrosed splinters and a battered musket-ball. The specimen (FIG. 159) was contributed to the Army Medical Museum by Acting Assistant Surgeon J. M. Downs.

FIG. 159.—Partially consolidated gunshot fracture of left femur. *Spec.* 3267.

CASE 406.—Private E. A. Dickerson, Co. C, 5th New Hampshire, was wounded in the right thigh, at Fair Oaks, June 1, 1862, and was admitted to the Fifth and Buttonwood Streets Hospital, Philadelphia, ten days afterwards. Acting Assistant Surgeon A. C. Bournonville reported the nature of the injury and its result as follows: "A compound comminuted fracture of the femur at the junction of the middle and lower thirds. At date of admission the wound was suppurating freely, with no effort at repair, though the patient was doing well. The treatment was by weights and sand bags. Death occurred on September 5, 1862." The specimen represented in the cut (FIG. 160) consists of a portion of the femur, obliquely fractured in the lower third, showing considerable but irregular effusion of callus without union, and the formation of a sequestrum in the upper fragment. It was contributed by Acting Assistant Surgeon W. Hunt.

FIG. 160.—Oblique fracture of lower third of right femur. *Spec.* 240.

CASE 407.—Private *O. Hales*, Co. F, 61st Georgia, aged 34 years, was wounded at Monocacy, July 9, 1864, and entered the General Hospital, at Frederick, three days afterwards. Acting Assistant Surgeon T. E. Mitchell contributed the pathological specimen (*Cat. Surg. Sect.*, 1866, p. 468, *Spec.* 3934) and the following history: "The patient was admitted into this hospital with gunshot fracture of the left femur, lower third. He came under my care on August 29th, Smith's anterior splints having been applied to the injured limb. He complained very much of pain in his leg, which was swollen and discharging freely from the wound. His appetite was good, but his appearance was quite anæmic. I prescribed tincture of iron and quinine, with milk punch three times a day. On September 10th, I removed the splint and substituted Buck's apparatus with sand bags to the outside of the leg. Under this treatment his condition remained much the same as when I first saw him. By October 1st, suppuration was still continuous, and the patient was very much reduced in strength. On November 1st, his appetite was better and his general condition slightly improved, though as yet there was no union of bones. On November 12th, I made counter-openings into the thigh and found sinuses extending nearly to the hip. On November 19th hæmorrhage, amounting to about four pints, took place from the femoral artery, from the effects of which he died. The *post-mortem* examination proved that non-union of the bones was due to a small spicula of loose bone between the broken ends of the femur. The hæmorrhage was the result of sloughing of the femoral artery, which, in all probability, was wounded in making the counter-opening." The specimen consists of a wet preparation of portion of the femoral and popliteal arteries, injected with wax, and shows the accidental wound of the vessel, enlarged by ulceration, from which the secondary hæmorrhage occurred.

Shot Fractures of the Femur without Indication of the Seat of Injury treated by Conservation.—Besides the shot fractures in the upper, middle, and lower thirds of the femur treated by conservation, considered in the preceding pages, there were seven hundred and thirty-eight cases in which the precise seat of injury was not indicated. In fifty-five of these cases the result as to fatality is undetermined. Of the six hundred and eighty-three determined cases, five hundred and thirty-eight died principally in the field hospitals a few days after the reception of the injury, giving the large death rate of 78.7 per cent. The histories of these cases are brief, and give little information beyond the mere fact that the femur had been fractured; it is, therefore, not considered necessary to detail examples of this group. In two hundred and eighty-three cases the right femur was involved; in two hundred and eighty-two, the left; and in one hundred and seventy-three the side was not specified. Six hundred and two of the patients were Union and one hundred and thirty-six were Confederate soldiers.

Pseudarthrosis after shot fractures of the femur was not frequent. Sixteen instances are reported among the three thousand four hundred and sixty-seven shot fractures of the femur treated by expectant measures. In seven cases the fracture was in the upper third, in three in the middle third, and in six in the lower third. Two examples[1] will be cited:

CASE 408.—Corporal E. G. Abbott, 4th Indiana Battery, aged 21 years, was wounded at Stone River, December 31, 1862. He remained at a field hospital of the Fourteenth Corps for nine days, when he was conveyed to Murfreesboro'. Two months later he was transferred to hospital at Nashville, and subsequently to Louisville, at all of which places his injury was recorded as a "shot wound of left thigh." On April 14, 1863, the patient was discharged from Camp Chase, Acting Assistant Surgeon J. S. Bailey certifying to "Shot fracture of left femur, resulting in nearly two inches shortening." In January, 1871, Dr. A. L. Lowell, Special Examiner of the Pension Office, who saw the man several years previously, furnished the following description of the injury and its result, which he obtained partly from his own observations and partly from a personal communication of Examiner L. T. Ballou, of Newark, Ohio: "A conoidal ball struck the left thigh anteriorly, about four inches below the great trochanter, and, fracturing the femur, passed backward and made its exit about one inch below the gluteal fold. He states that neither splints nor extension were ever applied to the limb. About September 1, 1863, the external wound had healed, but there was still some tenderness about the seat of the fracture, and as he further improved and began to use the limb with less care, he observed that it would rotate. At present he is able to shorten the distance between the knee and trochanter six inches by a sudden swinging and extending motion of the limb, which appears to throw the lower fragment to one side and is followed by voluntary contraction of the muscles. While in this position he is able to support his weight (140 pounds) on the limb, and he can then extend the same again to its former position by a little shaking, or, as he describes it, by a 'wiggle,' the thigh in either attitude being firm and inflexible. He can evert the left foot so as to place its heel to the toes of the right foot, thus placing the outer margin of the left foot in apposition with the inner margin of its fellow. These malpositions are completed without eversion of the trochanter. The lower part of the shaft of the femur appears to slide up on the anterior and internal surface of the upper fragment. The upper and middle thirds of the injured thigh exceed the corresponding portions of its fellow one inch in circumference. This increased size is doubtless due to a large ensheathing callus which surrounds the lower portion of the upper third of the femur, and which is distinctly perceptible by digital compression. Sometimes, though only with great care, the man is able to walk well, his gait showing only a slight irregularity of step. The limb is often pain-

[1] The remaining 14 instances of pseudarthrosis in the femur after fracture treated by conservation are: 1. Pt. J. Kissee, 1st Arkansas Cavalry, aged 29; fracture of upper third of right femur; Arkansas River, May 16, 1864; discharged March 20, 1865; recovery, with 1½ inches shortening and a false joint.—2. Pt. Joseph Patterson, G, 40th Indiana, aged 20; shell fracture of upper third of left femur; Stone River, Tennessee, December 31, 1862; discharged April 21, 1863; there is 3 inches shortening, and the ligamentous union or false joint renders locomotion uncertain.—3. Pt. Franklin Rosenbery, A, 148th Pennsylvania, aged 36; shot fracture of upper third of right femur; Spottsylvania, May 12, 1864; discharged May 15, 1865; 1 inch shortening: there is cartilaginous union—the limb can be rotated on the thigh, and the foot is entirely reversed.—4. Pt. H. Meyers, B, 157th New York, aged 30; shot fracture of upper third of left femur; Gettysburg, July 1, 1863; discharged December 3, 1863; shortening about 2½ inches, with false joint at point of fracture.—5. Lieut. B. Button, B, 76th New York, aged 46; shot fracture of upper third of left femur; Gettysburg, July 1, 1863; discharged November 9, 1863; nearly 3 inches shortening and false joint.—6. Corp'l Franklin Cusick, H, 108th New York, aged 21; shot fracture of upper third of right femur; Wilderness, May 5, 1864; discharged March 31, 1865; shortening of 1½ inches, leaving a false joint with eversion of toes.—7. Pt. J. F. Hutchinson, B, 7th Maine, aged 24; shot fracture of right femur at middle third; Wilderness, May 5, 1864; discharged July 7, 1865; false joint and 2 inches shortening.—8. Pt. P. S. Chase, I, 2d Vermont, aged 20; shot fracture left thigh, middle third; Wilderness, May 5, 1864; discharged May 16, 1865; false joint and shortening of the thigh 2 inches.—9. Pt. J. L. Hanna, D, 95th Pennsylvania, aged 42; compound fracture of left femur at middle; West Point, Virginia, May 10, 1862; discharged August 29, 1862; false joint at point of fracture, and 3½ inches shortening; muscles atrophied.—10. Pt. L. Paul, C, 12th Wisconsin, aged 24; shot fracture of lower third of femur; Kenesaw Mountain, June 15, 1864; discharged September 1, 1865; false joint and 2 inches shortening; varicose veins covering all the leg and lower thigh.—11. Pt. L. D. Boyd, K, 85th Pennsylvania, aged 24; shot fracture left thigh just above the condyles; Ware Bottom Church, May 20, 1864; discharged November 22, 1864; artificial joint and about 3 inches shortening.—12. Corp'l E. H. Morrison, F, 35th Illinois, aged 20; shot fracture right thigh about 2½ inches above knee joint; Chickamauga, September 19, 1863; discharged January 19, 1864; false joint and about 2½ inches shortening.—13. Pt. H. P. Mayer, A, 1st West Virginia, aged 22; shot fracture left femur, lower third; New Market, May 15, 1864; discharged October 10, 1864; weak cartilaginous union; can bring the bottom of his foot against his face.—14. Pt. B. Whiting, C, 9th New York Heavy Artillery, aged 27; shot fracture right femur about 4 inches above knee; Cold Harbor, June 3, 1864; false joint above knee; limb shortened about three inches.

Ward phot

J Bien lith

PLATE LXIV.—CONSOLIDATED GUNSHOT FRACTURES OF THE FEMUR.

Fig 1. Case of Private R. Hanlon
5th U.S. Cavalry.

Fig 2 Case of Private J. O'Connor
16th Michigan

ful, and frequently he is obliged to suspend his occupation as a laborer. During the winter of 1869 he could not walk without pain, and was unable to put on his boot." Subsequent examiners report no changes in the condition of the limb. The pensioner was paid June 4, 1877.

CASE 409.—Private E. Gilroy, Co. F, 6th Vermont, aged 22 years, was wounded and captured at Savage Station, June 29, 1862. After remaining in the hands of the enemy for one month, he was exchanged and conveyed to Philadelphia. Acting Assistant Surgeon J. Neill, in charge of Broad and Cherry Streets Hospital, reported the following description of the injury: "A musket ball entered the right thigh anteriorly, three inches above the knee joint, passed backward and fractured the femur, and was removed by a surgeon on the field. The wounded man was admitted to this hospital on July 30th, at which time there was considerable swelling and inflammation of the thigh, also slight sloughing of the edges of the wound, which discharged healthy pus. The foot was everted and there was two inches shortening of the limb. The patient's health was good. A stimulating poultice was applied to the part and the limb kept in a Dessault apparatus, with side-extension and counter-extension, for six weeks. At the end of this time the wounds had healed, but there was very little, if any, union at the seat of the fracture. Two moulded splints of binder's board, with bandage, were then applied to the thigh, and Dessault's apparatus continued." Subsequently, on November 18th, "union of bone, with one inch shortening and fair indication of a good cure," was noted in the case; but at the date of the patient's discharge from service, February 23, 1863, the fracture was reported as remaining ununited. Examiner T. B. Nichols, of Plattsburgh, New York, reported April 15, 1858: "The leg is five inches shorter than its fellow and swings loosely, except when he lets his weight down upon it. In this position it supports him, but in no other is it of any use." In September, 1873, the same examiner described the injured limb as being shortened six inches, and stated that the man "can lift his right foot with his hand up against his breast." The pensioner was paid June 4, 1879.

Comments on the various complications of shot fractures of the femur treated by conservation—pyæmia, tetanus, gangrene, erysipelas, and hæmorrhage—and on the different modes of treatment, will be reserved for the concluding pages of this section of Chapter X.

EXCISIONS IN THE CONTINUITY OF THE FEMUR FOR SHOT INJURY.

The results of excisions in the continuity of the femur performed during the American civil war have been discouraging, and justify the disfavor with which this operation is regarded among American[1] as well as European[2] surgeons. One hundred and seventy-five cases have been reported.[3] In eight instances the terminations could not be ascertained.

[1] HAMILTON (F. H.) (*A Treatise on Military Surgery and Hygiene*, New York, 1865, p. 517) remarks that he has never seen a case of shot fracture of the femur that would justify excision. "The great depth of the bone and the attachment of the muscles to almost every point of the surface of the bone are, perhaps, the chief circumstances which render these operations so unsuccessful." GROSS (S. W.) (*Military Surgery*, in *Am. Jour. Med. Sci.*, 1867, Vol. LIV, p. 478): "Resection of the femur in its continuity has proved to be a more fatal procedure than amputation at the hip, and should, therefore, not be repeated." ASHHURST (JOHN, jr.,) (*The Principles and Practice of Surgery*, Philadelphia, 1878, p. 167) asserts that "excision in the continuity of the femur is a bad operation and should be definitely rejected from military practice."

[2] SCHWARTZ (H.) (*Beiträge zur Lehre von den Schusswunden, etc.*, Schleswig, 1854, p. 166): "The resection of the splintered ends of the fracture for the purpose of converting the comminuted fracture into a simple fracture, as well as any resection in the continuity, is to be rejected in the femur." DEMME (H.) (*Militär-Chirurgische Studien, etc.*, Würzburg, 1861, B. II, p. 285): "The facts hitherto known justify the total rejection of resection in the continuity of the femur, even more so than the resection in the shaft of the humerus." NEUDÖRFER (J.) (*Handbuch der Kriegschirurgie, etc.*, Leipzig, 1872, B. II, Zweite Hälfte, p. 1521): "Even as an advocate of resection in the continuity of bone, one cannot defend resection in the continuity of the femur, as, in this bone, the indication for the resection is relatively rarely found, and as the risks attending its execution are very great. It is possible that a resection in the continuity for total caries of the injured bone at the point of fracture may prove successful; but, as yet, no such cases have been observed. It is also probable that, even in the most favorable case of recovery after resection for caries, the resected ends of bone would not unite, and that pseudarthrosis would be the result of the resection."

[3] Instances of excision in the shaft of the femur for shot fracture are not frequent in military surgery: 1. ROSS (G.) (*Militairärztliches aus dem Ersten Schleswigschen Feldzuge im Sommer*, 1848, Altona, 1850, p. 54) excised 1½ inches of the shaft of the left femur in a Prussian soldier, wounded at Düppel, June 5, 1848; death from gangrene.—2. SCHWARTZ (H.) (*Beiträge zur Lehre von den Schusswunden*, Schleswig, 1854, p. 167) relates the case of a Danish volunteer, wounded at Kolding, April 23, 1849; fracture at junction of upper and middle thirds of the right femur; excision April 26; death April 28, 1849.—3. STROMEYER (L.) (*Maximen, etc.*, Hannover, 1855, p. 757) tabulates a third fatal instance of excision in the shaft of the femur from the Schleswig-Holstein War, 1848-50.—4-14. CHENU (J. C.) (*Stat. Med. Chir. de la Camp. d'Italie en* 1859 *et* 1860, Paris, 1869, T. II, p. 763) tabulates 6 cases of excisions in the shaft of the femur, with 5 deaths, and, on page 762, gives an extract from a report of Dr. BIMA, of the Sardinian army, who states that of 5 excisions in the shaft of the femur by the subperiosteal method, performed at the hospital at Vercelli, 4 proved fatal: A. Paschit, Regiment Archduke Leopold, admitted into hospital May 31, 1859; shot comminution of femur; excision June 5, after extraction of missile; sent to Verona, Aug. 4, 1859; able to walk with the aid of a cane. E. Rigovich, Regiment Archduke Leopold, admitted into hospital May 31, 1859; shot comminution of lower third of femur; excision June 18; death September 13, 1859. E. Opodopic, Regiment Archduke Leopold, admitted May 31, 1859; comminuted fracture lower third of femur; excision of three centimeters of bone June 22; death July 6, 1859. L. Gerbitz, Austrian, admitted into hospital May 31, 1859; comminuted fracture lower third of femur; excision June 23; death July 23, 1859. M. Geldschmitt, Regiment Wimpfen, admitted May 31; comminuted fracture middle third of femur; excision June 4; death July 17, 1859.—15-16. HEINE (B.) (*Die Schussverletzungen der Unteren Extremitäten*, Berlin, 1866, p. 293) reports that in the Schleswig-Holstein War of 1864, excision in the shaft of the femur was only performed twice by Dr. NEUDÖRFER; the result is not indicated.—17. LOTZBECK (*Zur Resection des Trochanter major*, in *Aerztliches Intelligenz Blatt*, München, 1870, B. XVII, p. 438) cites the case of Sergeant W. S——, 9th Infantry; fracture of left trochanter major, July 4, 1866; excision of trochanter in September; death November 9, 1866.—18-21. BECK (B.) (*Chirurgie der Schussverletzungen Freiburg*, 1872, p. 912) tabulates 4 cases of excision of the shaft of the femur in the Austro-Prussian War of 1866; only one patient survived.—22-37. CHENU (J. C.) (*Aperçu Hist. Stat. et Clin., etc., pendant la guerre de* 1870-71, Paris, 1874, p. 493) tabulates 16 cases of excision of the shaft of the femur, with 14 deaths, from the Franco-Prussian War, 1870-71; four cases reported by FELTZ and GROLLEMUND, and two by ROALDES, seem not to be included in M. CHENU'S *Statistics*.—38-41. FELTZ et GROLLEMUND (*Relation Chir. sur les Ambulances de Haguenau*, in *Gaz. Méd. de Strasbourg*, 1871, No. 11, pp. 131-134) relate 4 cases: J. Debat, 47th Line, aged 22, fracture of upper third of left femur, in August, 1870; secondary excision September 26; death October 2, 1870. Beschia Mohammed, 3d Tirailleurs; fracture of middle third of right femur; excision September 26; death October 2, 1870. Thomas Ferray, aged 20, 1st Algerian Tirailleurs; shot fracture of middle third of femur, prior to August 8, 1870; excision August 28; recovery. E. Plichon, 3d Zouaves, aged 22; fracture of middle third of right femur, prior to August 9, 1870;

Fifty-one cases had a successful, and one hundred and sixteen a fatal issue, giving a mortality of 69.4 per cent.

TABLE XXI.

Numerical Statement of One Hundred and Seventy-five Excisions in the Shaft of Femur for Shot Injury.

OPERATIONS.	CASES.				EXCISION IN THE UPPER THIRD.				EXCISION IN THE MIDDLE THIRD.				EXCISION IN THE LOWER THIRD.				PART EXCISED NOT SPECIFIED.			
	Recovered.	Died.	Undeterm'd.	Ratio of Mortality.	Recovered.	Died.	Undeterm'd.	Ratio of Mortality.	Recovered.	Died.	Undeterm'd.	Ratio of Mortality.	Recovered.	Died.	Undeterm'd.	Ratio of Mortality.	Recovered.	Died.	Undeterm'd.	Ratio of Mortality.
Primary Excisions	20	65	6	76.4	13	30	....	69.7	6	21	1	77.7	....	4	2	100.0	1	10	3	90.9
Intermediary Excisions	9	39	....	81.2	1	17	....	94.4	6	14	....	70.0	2	5	....	71.4	....	3	....	100.0
Secondary Excisions	15	3	1	16.6	9	1	....	10.0	4	2	....	33.3	2	....	....	00.0	....	....	1	00.0
Time Unknown	7	9	1	56.2	2	1	1	33.3	2	3	....	60.0	1	2	....	66.6	2	3	....	60.0
Aggregates	51	116	8	69.4	25	49	1	66.2	18	40	1	68.9	5	11	2	68.7	3	16	4	84.2

Primary Excisions in the Shaft of the Femur.—Ninety-one, or more than one-half of the total number of cases of excision in the shaft of the femur, belong to the primary group. In six instances the result remains undetermined; twenty proved successful, and sixty-five were fatal, giving a mortality rate of 76.4 per cent.

Cases of Recovery after Primary Excision in the Shaft of the Femur.—Of the twenty patients who survived this operation, four were Confederate and sixteen were Union soldiers. The point of excision was in the upper third in twelve instances, in the upper and middle thirds in one, in the middle third in five, in the middle and lower thirds in one, and in one instance the point of excision was not indicated. Thirteen of the sixteen Union soldiers were pensioned and were living in 1879. In the following case four inches of the upper and middle thirds of the shaft of the femur were excised:[1]

FIG. 161.—4¾ inches of right femur excised for oblique fracture. *Spec.*2159.

CASE 410.—Lieutenant W. M. Tirtlot, Co. F, 105th Illinois, aged 24 years, was wounded at Resaca, May 15, 1864, by a shell, which fractured the right femur. He was admitted to the field hospital of the 3d division, Twentieth Corps, where excision was performed but not recorded. On June 22d he was transferred to hospital No. 2, Chattanooga, and several days afterwards to the Officers' Hospital at Nashville. Surgeon J. E. Herbst, U. S. V., in charge of the latter, reported: "Shot fracture of femur, middle third. Primary excision of about four inches of the shaft at the middle third was performed on the field by Surgeon A. W. Reagan, 70th Indiana. The limb was treated in straight splints, and simple dressings were applied. Tonics and a generous diet were prescribed." The patient went on leave of absence July 21st, and on November 28, 1864, he was mustered out and pensioned. The excised portion of the femur was contributed by Surgeon G. W. McMillin, 5th Tennessee, and is represented in the cut (FIG. 161). Examiner A. Steele, of Oberlin, Ohio, certified, March 21, 1867: "Part of the femur is gone and the leg is short in proportion. There is exostosis of the femur, and suppuration is nearly constant; also anchylosis of what is left of the knee joint; unimpaired health," etc. Examiner A. H. Steele, of Olympia, W. T., certified, October 4, 1873: * * "There is lateral motion of the knee joint, caused by the proximity of the injury destroying the lateral

secondary excision October 25; recovery.—42-43. ROALDES (A. W.) (*Des fractures compliquées de la cuisse par armes de guerre*, Paris, 1871, p. 58, etc.) details 2 cases of excision in the shaft of the femur: Ch. Huart, Adjutant 193d Batt. Nat. Guards, nged 32; fracture of right femur at union of upper and middle thirds, May 21, 1871; excision June 2; death January 15, 1871. A. Cavarré, Lieutenant of Marines; shot fracture of upper third of right femur, May 21, 1871; excision June 10; recovery.—44-46. SOCIN (A.) (*Kriegschirurgische Erfahrungen*, Leipzig, 1872, pp. 135, 136) cites 3 cases of excision in the shaft of the femur: A. Leonhardt, shot fracture of left femur at juncture of middle and upper thirds, Gravelotte, August 18, 1870; excision of 7 centimeters of lower fragment; recovery. A. Leroy, shot fracture of right femur near trochanter, at Noisseville, August 31, 1870; excision September 24; death September 27, 1870. A. Primault, shot fracture of middle third of right femur, Wörth, August 6, 1870; excision October 26; recovery, with 12 centimeters shortening.—47. FISCHER (G.) (*Dorf Floing und Schloss Versailles*, in *Deutsche Zeitschrift für Chirurgie*, Leipzig, 1872, B. 1, p. 187) tabulates a fatal instance of secondary excision in the shaft of the femur.—48-50. BECK (B.) (*Chir. der Schussverletzungen*, Freiburg, 1872, p. 900) reports 3 cases of excision of shaft of the femur in the 14th Corps during the Franco-Prussian War, 1870-71. One recovered, one died; the result in the third instance is not recorded.—51. TRITTON (W. P.) (*Excision of a Large Portion of the Femur after Gunshot Wound*, in *The Lancet*, London, 1879, Vol. I, p. 117) resected the shaft of the femur on an Arab of the Turkish army, in December, 1877. The patient recovered, with 1½ inches shortening of the limb. Of the 51 cases here cited, the results could not be ascertained in 3 instances; 12 patients recovered, and 36 died, a mortality rate of 75.0 per cent.

[1] The extent of bone excised in the remaining cases was: One inch in 2 cases; two inches in 1; two and a half inches in 1; three inches in 2; three and a half inches in 2; four inches in 1; four and a half inches in 3; five inches in 1; six and a half inches in 1; trochanter major or a portion thereof in 3; and in 2 cases this point was not defined.

ligaments. There are also extensive cicatrices which are tender and painful. The limb at this time is more of an impediment than an advantage." The pensioner was paid March 4, 1879. In January, 1870, he was furnished with an apparatus for his injured limb by the firm of Marsh & Corliss, of Cincinnati.

CASE 411.—Lieutenant Dwight Beebe,[1] Adjutant 3d New York Veteran Vols., was wounded on October 27, 1864, while in command of a skirmish line on the Darbytown Road, near Richmond. He was, on the same day, admitted into the Flying Hospital of the Tenth Corps, near Chapin's Farm. Dr. C. M. Clark, late Surgeon 39th Illinois, under date of September 17, 1869, gives the following description of the case: "The wound was made with a conoidal ball, which entered the right thigh, outer surface, at the junction of middle with upper third, passing upward and inward, and making its exit at the upper and inner angle of Scarpa's triangle, slightly abrading the scrotum in its passage. On examination of the wound I found an extensive comminution of the femur, and removed sixteen (16) fragments before the operation was decided upon. * * I made a longitudinal incision from the great trochanter down, to the extent of five inches, and took away the upper fragment with a chain saw at its junction with the capsule (the bone above being sound). I then removed all the spiculæ attaching to the periosteum (which was preserved) and muscle, cleansing the wound thoroughly; then turned out the lower portion and removed it smoothly with the common amputating saw. Dr. N. Y. Leet assisted me in the operation." On October 28th, Lieutenant Beebe was taken to the landing near Deep Bottom, and placed on board a hospital transport and conveyed to Fortress Monroe, and admitted into the Chesapeake Hospital on the evening of November 1st. He was placed upon a fracture bed and received the best attention. There was a profuse discharge and the patient soon became exhausted. The upper extremity of the lower fragment necrosed, and a ring of bone seven-eighths of an inch in length exfoliated. This occurred in the middle of January, 1865. After the dead bone was eliminated, Lieutenant Beebe rallied. On May 17, 1865, he was able to be moved comfortably, and obtained a leave of absence and went to his home in New York. He returned to the hospital July 9th, and, in September, 1865, again went to the north with his regiment to be mustered out at the expiration of its term of service (*Circular* 2, p. 33). In a letter dated Havana, October 27, 1868, Mr. Beebe says: "I continued to improve until I was able to get around with a cane and supposed I was as well as I would ever be, until August, 1867, when my wound broke out and discharged terribly for about three weeks. The medical men here thought it was brought on by irritation, being on it too much. Now, with the exception of the limb being quite weak, it only troubles me in damp weather, when it has a dull heavy ache. It has all healed. The flesh on the outside of the thigh is quite numb. My knee is stiff. My general health is not good, and my physician cautions me to be very careful of myself. The limb measures 3⅛ inches short. Resection, 2¼ inches; necrosis of the bone, ⅞ inch." Pension Surgeon G. D Baley, of Havana, N. Y., examined Lieutenant Beebe in November, 1867, and reported: "Right leg is three inches shorter and three inches smaller in circumference than the other. There is anchylosis of the knee joint. The patient has repeatedly been confined to his room six weeks at a time. The wound is now discharging, the limb is weak and painful. He is constantly liable to fall in walking." In a letter to the editor, dated April 30, 1869, Dr. Baley describes the portion of the femur shown to him by Lieutenant Beebe's father, the upper division of the bone being "just below the greater trochanter obliquely downward from the outer side of the bone, to the middle of the lesser trochanter on the inner side; the lower division being a transverse cut embracing 1¼ or 1½ inches of the upper section of the bone. I think the head of the bone could not have been removed, as there is now, and was at the time of my first examination, the full development of the greater trochanter and neck of the femur. There is at this time great tenderness and pain both above and below the section of excision, with frequent suppurations. There is also evidence of a loss of portion of bone two or three inches below the lower section of the operation." Pension Surgeon F. J. Bancroft, of Denver, Colorado, reported, in September, 1875: "Ball entered anterior portion of thigh, fracturing upper third, and made its exit near the anus. Resection of two inches of the upper third of the femur was performed, causing shortening of three inches. The muscles are softer and smaller in this limb." Since that time the pensioner has been exempted from biennial examination, his disability being considered permanent. A copy of the photograph, furnished by the patient (*Contributed Photographs*, Vol. XII, p. 17), is represented in FIG. 162. He was paid March 4, 1879.

FIG. 162.—Result of excision in the upper third of the femur. [From a photograph.]

[1] The case of Lieutenant D. Beebe, Adjutant 3d New York, has been cited on page 32 of *Circular* 2, War Department, S. G. O., 1869, as an example of excision of the head of the femur. It had been stated by Lieutenant Beebe, in a communication to the editor, dated Havana, N. Y., November 2, 1868, shortly before the publication of *Circular* 2, that "the head of the bone was not taken out." A letter of inquiry was thereupon addressed to Dr. N. Y. LEET, late Surgeon 76th Pennsylvania, who had been officially reported as the operator on the register of the Tenth Corps field hospital, requesting information in the case of Lieutenant Beebe, and, in an answer dated Scranton, Penn., March 9, 1869, Dr. LEET stated that "about four inches of the femur, including the head, was removed," and, in a second communication, dated April 20, 1869, Dr. LEET asserted that "the style of the operation was first a longitudinal incision, cutting directly in the direction the ball took until I opened the capsule, thus exposing the head of the bone; by carrying the limb over the opposite thigh and pushing the limb upward I removed the head of the bone by sawing through the trochanter with a chain saw." These positive assertions of Dr. LEET led the editor to accept, in such a matter of anatomical detail, the statement of the surgeon rather than the impression of the patient. However, in September, 1869, after the publication of *Circular* 2, a letter dated Chicago, September 17, 1869, was received from Dr. CHARLES M. CLARK, late Surgeon 39th Illinois. In this communication Dr. CLARK gave the account of Lieutenant Beebe's case as detailed in CASE 411, above, and added that Dr. N. Y. LEET assisted him in the operation. Immediately upon receipt of this communication, on September 20, 1869, a copy of Dr. CLARK'S letter was forwarded to Dr. N. Y. LEET, at Scranton, for comment on the issue as to matter of fact between Dr. CLARK and himself; but no answer was ever received. In the meantime a letter had been sent by the editor to Dr. G. D. BALEY, Pension Examining Surgeon, of Havana, where Mr. Beebe then resided, asking whether, in his opinion, the head of the femur in the case of Lieut. Beebe had been removed. Dr. BALEY'S answer, dated April 30th, is included in the history (CASE 411), and corresponds with the statements of Dr. CLARK in regard to the extent of the operation. A letter from Lieut. Beebe, dated September 25, 1869, corroborated Dr. CLARK'S statement, and gave a description of the excised portion of the femur, then in the possession of his father. In addition to these facts, a letter was received from Dr. D. R. BROWER, late Assistant Surgeon U. S. V., dated Chicago, Decem-

In the next case six and one-half inches of the shaft of the femur, from the great trochanter downwards, were excised. By means of a prothetic apparatus and with the aid of a small cane the patient is enabled to make good use of his limb, although it is shortened six and one-half inches:

CASE 412.—Private J. W. Joslin, Co. I, 7th New York Heavy Artillery, aged 20 years, received a shot fracture of the right thigh at Cold Harbor, June 3, 1864. He was captured, and while in the hands of the enemy underwent the operation of excision of the femur. After being a prisoner for more than two months he was paroled and conveyed by steamer to hospital at Annapolis, where Surgeon B. A. Vanderkieft, U. S. V., recorded his admission, August 26th, with "shot wound of right femur." On November 28th the patient was transferred to Jarvis Hospital, Baltimore, whence Assistant Surgeon D. C. Peters, U. S. A., reported that "the parts were nearly healed on admission, and entirely so on December 31st, when the patient was furloughed, at which time the limb was shortened six inches and could be swung backward and forward, but could not be exercised in lateral or rotary motion." One month afterwards the man entered Dale Hospital at Worcester, whence Surgeon C. N. Chamberlain, U. S. V., reported his condition as follows: "He is in perfect health; the parts are free from tenderness, and the limb is movable in every direction and perfectly under the control of the muscles. The upper end of the femur is enlarged, apparently by new osseous growth, to almost twice its normal diameter, and it has a good false joint." On August 29th the patient was finally transferred to DeCamp Hospital, David's Island, whence Assistant Surgeon W. Webster, U. S. A., contributed the following history: "The wound was inflicted by a minié ball, which entered the gluteal region about four inches external to the os coccygis, passed downward, and struck the femur a little below the trochanter major, producing a compound comminuted fracture of the upper half of the shaft of the bone. Excision of six and a half inches of the femur, extending downward from a point immediately below the great trochanter, was performed by a surgeon of the Confederate army. This operation was done fifty-four hours after the injury, by a linear incision seven and a half inches long in the axis of the limb, beginning from a point opposite the superior portion of the trochanter major, and on the same day the patient was transferred thirteen miles in an ambulance to Richmond, where he was placed in hospital No. 21. He stated that he was in a very weak and exhausted condition when he reached Richmond. His limb was then placed in a fracture-box, and whiskey was administered twice daily, his diet consisting of corn and wheat bread and inferior soup. Extensive sloughing of the soft parts of the thigh occurred in the third week. On October 26, 1865, the patient was discharged from service, at which time a careful examination of the injured thigh revealed union of the trochanter major with the upper extremity of the lower fragment of the resected femur. There was also extensive deposit of new bone, and the degree of shortening amounted to six and a half inches. He could bear his entire weight upon the injured limb without producing any apparent yielding of the united bone. The flexion of the thigh was natural, and when it was rotated the trochanter major performed its entire and natural circuit. The thigh and leg were very much atrophied, but the knee joint flexed freely, and the cicatrix, though extensive on account of the sloughing of the parts, was firm and healthy. The gastrocnemius and extensor muscles of the foot were rigidly contracted, and the foot was extended to its utmost capacity." One week before receiving his discharge the patient was furnished by Dr. E. D. Hudson, of New York City, with a prothetic apparatus,[1] consisting of a case of raw hides, laced upon the thigh and leg, and terminating in an artificial foot with ginglymoid articulations at the ankle and toes. By means of this appliance he was enabled to walk with ease, requiring only the aid of a light cane. In a communication from the pensioner in March, 1868, he stated that "the apparatus works very well," considering the condition of the limb, and added that he had not had any abscesses about the hip or any part of the injured leg. Various examining surgeons at successive dates certified to the injury and operation resulting in shortening, etc., and the San Francisco Board added, in 1877: "The result is good, and

FIG. 163.—Result of primary excision in the shaft of the femur. [From a photograph.]

ber 24,1877, in which the following occurs: "CASE XXX, of the same *Circular*, in my opinion, is not correctly reported. I treated Lieut. Beebe from his admission into the Chesapeake Hospital until he was considered well enough to be sent north. This case, in my judgment, was not of the magnitude the report represents it. The fractured portions of the femur were removed, and the ends of the bone smoothed off; the head of the femur was not removed from the cotyloid cavity. In this opinion, I am pleased to say, I am sustained by Surgeon D. G. RUSH of this city, who was one of the staff of the Chesapeake Hospital at the time the patient was under my treatment, and who repeatedly saw the case with me. He recollects distinctly to have felt, at the time the man was admitted, the head of the femur in its proper position. Surgeon CLARK, of the 39th Illinois regiment, told me, a year or two afterwards, that *he* performed the operation, and described it just as I have done above." From a careful examination of all the correspondence and records on file in this Office, it is evident that the head of the femur was not removed from the cotyloid cavity, that an excision in the upper third of the shaft of the femur was performed by Dr. C. M. CLARK, and not by Dr. N. Y. LEET, and that the account of the injury and of the operation as published on page 32 of *Circular* 2, on the authority of Dr. N. Y. LEET, is erroneous. On July 17, 1879, another letter was addressed to Dr. N. Y. LEET, asking him whether he would deny the correctness of the account of the case as furnished by Dr. C. M. CLARK and the pensioner, Mr. D. Beebe. To this, as well as to a prior letter of similar tenor, no answer has been received at the date of this writing (September 8, 1879). This case has been published as an excision of the hip joint by Dr. H. CULBERTSON (*Excision of the Larger Joints of the Extremities*, Philadelphia, 1876, p. 64), and as a resection of the hip joint by Professor E. GURLT (*Die Gelenk-Resectionen nach Schussverletzungen*, Berlin, 1879, p. 203), and it is to be regretted that the erroneous version of the operation has misled these reliable authorities on excisions.

[1] The apparatus is figured on page 33 of E. D. HUDSON'S *Mechanical Surgery, Prothetic Appliances and Apparatus for Amputations, Resections, Ununited Fractures, Diseases of Joints, Deformities, Curvatures of Spine and Paralysis*, New York, 1878.

the leg, by the use of a mechanical apparatus, is of use to the man." The pensioner was paid March 4, 1879. Photographs of the patient, taken in 1865, and showing his appearance without and with the apparatus, were contributed by Dr. Webster (*Contr. Photo's*, A. M. M., Vols. 9 and 10, pp. 31, 32, and 33) and copied at the Army Medical Museum (*Surg. Phot. Series*, Nos. 106 and 107). The former is represented in the wood-cut (FIG. 163).

CASE 413.—Captain S. V. Shipman, Co. E, 1st Wisconsin Cavalry, aged 38 years, was wounded in the right thigh during the engagement at Whitewater River, April 24, 1863. Two days after the reception of the injury he was admitted to the Post Hospital at Cape Girardeau, whence Surgeon W. McClellan, 1st Nebraska, reported the wound as "a fracture of the femur, caused by gunshot, for which primary resection of three and a half inches at the upper third was performed, the ends of the bone being clipped off. Patient left the hospital on leave of absence July 17th." Captain Shipman was subsequently promoted to Major, and ultimately mustered out as Brevet Colonel on July 19, 1865. In his application for pension he alleged that the ball was not found nor removed from his thigh until eight months after the reception of the wound. Examiner A. J. Ward, of Madison, Wisconsin, October 23, 1866, certified to the injury and operation resulting in contraction of the leg and stiffness of the knee, and added: "The pensioner has had an abscess form three different times; the last time it laid him on his back some six weeks. It may recur any time, as there is evidently diseased bone in the femur." Dr. H. A. Martin, late Surgeon, U. S. V., in a letter, dated Boston, April 24, 1869, makes reference to this case as follows: "When I was stationed at Cape Girardeau a most interesting case, that of Captain Shipman, was under my care to a perfect successful issue. He lost nearly four inches of the whole shaft of the femur, including portion of the trochanters, and is now living, with a limb shortened some two and a half inches." This pensioner was paid June 4, 1879.

TABLE XXII.

Summary of Twenty Cases of Recovery after Primary Excision of the Shaft of the Femur for Shot Injury.

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	INJURY, OPERATION, AND RESULT.
1	Beebe, D., Adjutant, 3d New York, age 25.	Oct. 27, 27, '64.	Right; three and a half ins. from junct. with caps. to level of troc. minor, by Surg. C. M. Clark, 39th Ill. Mustered out Sept., 1865. *Surg. Phot.* 210; pens'd.
2	*Brewer, J. W.*, Pt., C, 4th Tenn. Cav., age 40.	Aug. 14, 14, '64.	Right; four and a half ins., including great trochanter, by Surg. — Sevenson, 4th Tenn. Cav'y. Released June 16, '65; two and a half ins. shortn'g. *Circular* 2, 1869, p. 58.
3	[1] Button, F. H., Musician, I, 14th Mich., age 18.	July 6, 6, '64.	Left; four ins. upper third, by Surg. E. Batwell, 14th Mich. Disch'd May 5, 1865; pens'd; ligamentous union; three inches shortening.
4	[2] B——, S., 7th Kentucky Mounted Inf'y, age —.	April 6, 6, '62.	——; two and a half inches from upper third, by Surgeon S. F. Clardy, C. S. A. Recovered; ends of bone united well; limb of great use.
5	*Calhoun, W. F.*, Serg't, F, 5th Virginia, age 25.	Mar. 25, 25, '65.	Right; mid. third, by Surg. G. R. Sullivan, 39th N. J. Erysipelas. Released June 11, 1865.
6	Conner, S., Colonel, 19th Maine, age 25.	May 6, 6, '64.	Right; two ins., fragment, middle third, by Surg. J. F. Dyer, 19th Mass.; June, hæms.; Sept., bone extracted. Disch'd April 7, '66, as Brig. General; pensioned; anchylosis of knee joint; leg entirely useless.
7	Gebhardt, J., Pt., B, 149th New York, age 22.	July 2, 3, 1863.	Left; about two ins. up. third, by Surg. J. V. Kendall, 149th N. Y. Disch'd March 1, 1865; pens'd; shortening, ulceration, and deformity. *Cont. Phot. Series*, Vol. 4, No. 8.
8	Harris, B. F., Lieut.-Col., 6th Maine, age 32.	Nov. 7, 7, '63.	Left; three ins., neck, trochanter, upper third. Discharged July 19, 1864; pensioned; shortened three inches.
9	Hartman, L., Pt., E, 24th Mich., age 16.	June 1, 1, '64.	Right; three ins., upper third, by Surg. J. H. Beech, 24th Mich.; gang. Disch'd Aug. 22, 1865; pens'd; four ins. shortening.
10	Hayes, W. J., Pt., L, 16th Penn. Cavalry, age 18.	June 11, 11, '64.	Right; five ins. middle third, by Surg. F. Le Moyne, 16th Penn. Cav.; necrosis. Disch'd June 20, 1865; pensioned; three inches shortening; fistulous opening.
11	Joslyn, J. W., Pt., I, 7th New York Heavy Artillery, age 20.	June 3, 5, '64.	Right; six and a half ins. from great troch. downward, by Conf. surg. Disch'd Oct. 26, 1865; pens'd; seven ins. shortening. *Surg. Phot. Ser.*, Nos. 106, 107. *Circ.* 6, 1865, p. 68.
12	Keyser, M., Pt., E, 9th Kansas Cav., age 40.	June 17, 20, '63.	Left; one inch middle third, by A. A. Surg. J. Thorne. Also exc. r't radius. Disch'd March 1, 1864; compl. union; two ins. shortening; not pensioned.
13	McLaughlin, G. H., Lt., H, 2d Infantry, age —.	July 2, 3, '63.	Left. Duty Oct. 9, 1864; retired Dec. 31, 1870.
14	[3] Reynolds, J. C., Pt., E, 5th N. Jersey, age 24.	May 5, 8, '62.	Left; portion of trochanter major. Disch'd Aug. 18, '64; not pens'd.
15	Shanley, J., Pt., A, 76th New York, age 24.	May 24, 26, '64.	Left; portion of trochanter major. Duty Nov. 15, 1864; pensioned; hip joint stiffened; necrosis.
16	[4] *Shelley, J. H.*, Pt., L, 3d Kentucky Cavalry, age 15.	June 10, 10, '64.	Four and a half ins. middle third, by Surg. S. F. Clardy, C. S. A. Disch'd Dec., 1864; union complete; four and a half ins. short'g.
17	Shipman, S. V., Capt., E, 1st Wisconsin Cav., age 38.	April 24, 24, '63.	Right; three and a half ins. upper third and portion of troch. maj. Promoted Maj. Disch'd July 19, 1865; pensioned; two and a half ins. shortening; aneh. knee.
18	Shock, A., Pt., A, 4th Penn. Reserves, age 23.	Mar. 11, 12, '62.	Right; four and a half ins., fragments, up. third, by Ass't Surg. J. S. Billings, U. S. A. Disch'd Oct. 10, 62; pensioned; five ins. short'g. *Med. and Surg. Hist.*, Pt. II, Vol. II, p. 367.
19	Thibaut, F. W., Capt., A, 7th New York, age 28.	Dec. 13, 13, '62.	Left; trochanter major, by Surg. C. Gray, 7th N. Y. Also amp. left ring finger. Disch'd May 8, 1863; pensioned.
20	Tirtlot, W. M., Lieut., F, 105th Ill., age 24.	May 15, 15, '64.	Right; four ins. middle third, by Surg. A. W. Reagan, 70th Ind. Disch'd Nov. 28, 1864; pens'd; limb an impediment. *Spec.* 2159.

The injuries are reported to have been inflicted by shell fragments in two instances, by a fuse plug in one, and by small projectiles in seventeen cases. Sixteen of the twenty operations were performed by Union and four by Confederate surgeons.

[1] BATWELL (E.), *Notes on Exsection*, in *Med. and Surg. Reporter*, 1865, Vol. XII, p. 221.

[2] THOMPSON (J. W.), *Resection of the Long Bones*, in *Med. Record*, 1868-9, Vol. III, Case VI, p. 29.

[3] PRAY (O. M.), *Reports of Hospitals*, in *Am. Med. Times*, 1863, Vol. V, Case IX, p. 77.

[4] MAUGHS (G. M. B.), *Conservative Treatment of Compound Comminuted Fractures of the Femur*, in *Confederate States Med. and Surg. Jour.*, 1865, Vol. II, Case 8, p. 8. THOMPSON (J. W.), *Cases of Resections, etc.*, in *Nashville Med. Jour.*, 1868, N. S., Vol. I, p. 340. THOMPSON (J. W.), *Resection of the Long Bones*, in *Med. Record*, 1868-9, Vol. III, Case I, p. 28.

Fatal Cases of Primary Excision in the Shaft of the Femur.—Of the sixty-five cases of this group, the operation was performed on Union soldiers in fifty-three and on Confederate soldiers in twelve instances. The right femur was involved in thirty, the left in twenty-six cases; in nine the side of the injury was not indicated.

CASE 414.—Private A. A. Shaw, Co. C, 9th Missouri State Militia Cavalry, was accidentally wounded in the left thigh by a conical ball, April 1, 1863. He was admitted to the general hospital at Rolla, and operated on by Surgeon H. Culbertson, U. S. V., who described the case as follows: "A compound comminuted fracture of the femur at the lower third, the bone being broken into small fragments, and small spiculæ being thrown over the internal surface of the wound; orifice of exit two and a half inches in diameter, and located on inner side of thigh. The vasti, biceps, semi-membranosis, and tendinosis, rectus, and adductors (below) were lacerated as high as the middle third and down to the knee joint, which was not involved. The large vessels were uninjured. The patient was vomiting, being cold and prostrated; pulse 140. Under these circumstances I determined, on consultation, to stimulate and anæsthetize, then remove all loose portions of bone and resect the ends of the femur as far as they were denuded of periosteum, amputation being precluded by the great prostration. In three hours, the pulse having become somewhat fuller and slower and the general surface warmer, I performed the resection. Under the influence of chloroform the patient's pulse grew stronger, and after the operation he seemed better. He recovered from the effects of the anæsthetic in due time, but never rallied fully from the shock of the injury, and his system gradually failed, though supported by full doses of morphia and brandy. He died eighteen hours after the reception of the injury, being conscious of his approaching end."

CASE 415.—Private *Jonathan Wallace*, Co. F, 21st Georgia, aged 38 years, was wounded by a conoidal ball, in the charge on Fort Steadman, March 25, 1865. The missile entered on the external surface of the left thigh at the lower portion of the middle third, passed obliquely upward and inward, fractured the femur through the middle third, and emerged on the internal surface an inch above the wound of entrance. He was taken to the field hospital of the 2d division, Ninth Corps, where Surgeon G. W. Snow, 35th Massachusetts, reports that "resection at the middle third of the femur was performed by Surgeon G. R. Sullivan, 39th New Jersey, and anterior splints applied." On April 10th, he was admitted into the Armory Square Hospital, Washington. Acting Assistant Surgeon George K. Smith reports "that the injured limb was shortened one inch; extension was applied (Buck's method) with a weight of eleven pounds, after which there was no shortening. Patient did remarkably well until June 8th, when he was attacked with diarrhœa, which was arrested at the end of three days. On June 23d, the bone appeared to be firmly united with half an inch shortening, and, on July 2d, extension was removed, and the patient rode about the ward in an invalid chair. July 28th, it was discovered that the limb had shortened two and one-fourth inches; extension was reapplied with a weight of sixteen pounds, and, on August 5th, it measured three-fourths of an inch shorter than its fellow. On August 15th, a photograph of the patient was taken [No. 92 of the *Surgical Photograph Series* of the Army Medical Museum, a reduced copy of which is represented in the wood-cut, FIG. 164]. On August 17th, the wound had nearly healed, his condition was remarkably good, and the bone had apparently united." On this date he was transferred to the Douglas Hospital, Washington, to the care of Assistant Surgeon W. F. Norris, U. S. A., who reports: "The wound was still open and discharging a small quantity of matter, but there was firm union of the broken femur, and the patient could without assistance raise his leg from the bed. His general health seemed to be improving, and he daily rode about the ward in a wheeled chair, the limb being supported in an extended position. August 26th, several small loose fragments of bone were removed. August 28th, had a severe chill; on the 29th, had an attack of erysipelas in the thigh, and, on the following day, a loose piece of necrosed bone, one and a half inches in length, was removed. On September 2d, erysipelas had spread down to ankle joint. 11th, erysipelas had disappeared; another small sequestrum was removed from the posterior wound. 16th, had two chills, diarrhœal passages, and vomiting. 21st, he steadily grew weaker; the wound had almost ceased to discharge. There was slight icterus; the countenance was pinched and anxious and the breathing labored. 22d, he had pain in chest and abdomen, and was unable to pass his urine. These symptoms continued until the evening of the 23d, when death ensued from pyæmia. At the autopsy, fifteen hours after death, the brain appeared healthy; but there was a large amount of serous subarachnoid effusion. Both lungs were adherent and thickly studded with pyæmic patches, most of which were dark colored and hardened, a few only having softened, and containing pus. There was considerable serous effusion in the left pleural sac. The spleen was enlarged but not softened; the other thoracic and abdominal viscera appeared healthy. The fractured femur [which is represented in the adjoining wood-cut, FIG. 165] was removed and sawn longitudinally; above the fracture the marrow and interspaces between the cancelli presented a reddish chocolate hue, below, it appeared reddened and inflamed; it had not, in either locality, any gangrenous odor. The femoral vein [represented in PLATE XXX, opposite] was found to contain old and partially disintegrated blood clots, and in some portions also a quantity of healthy looking creamy pus; its walls were much thickened. It continued to present the same appearance up to about two inches below its

FIG. 164.—Appearance five months after excision in middle third of femur. [From a photograph.]

FIG. 165.—Ends of fractured left femur united six months after shot injury. *Spec.* 1354.

PLATE XXX. OBSTRUCTED FEMORAL VEIN

junction with the internal iliac vein; here the clots ceased, and the coats of the vein, although of reddish hue, did not appear much thickened. The pus was carefully examined with the microscope and presented its usual round corpuscles, which under the application of acetic acid exhibited distinctly their characteristic double and triple nuclei. The femoral artery appeared to be healthy."

CASE 416.—Private W. J. Beck, Co. D, 2d Pennsylvania Heavy Artillery, aged 18 years, was wounded at Petersburg, June 18, 1864. Surgeon M. K. Hogan, U. S. V., recorded his admission to the field hospital of the 1st division, Ninth Corps, with "shot wound of left thigh." Surgeon N. R. Moseley, U. S. V., reported the following: "The patient was admitted to Emory Hospital, Washington, June 24th, with fracture of the middle of the upper third of the left femur, caused by a minié ball, and resulting in resection, which operation was performed on the field on June 19th. The treatment consisted of cold-water dressings, and stimulants and nutritious diet. Death occurred July 8, 1864." The upper third of the injured femur was contributed to the Museum by Acting Assistant Surgeon W. H. Ensign, and is represented in the cut (FIG. 167). The specimen shows no bony deposit, and the shaft is stripped of periosteum for some distance below the seat of the injury.

FIG. 166.—Upper portion of right femur, showing excision. *Spec.* 2947.

FIG. 167.—Upper third of left femur, showing excision. *Spec.* 2816.

CASE 417.—Private J. Fearing, Co. G, 21st Massachusetts, aged 23 years, received a gunshot fracture of the right thigh at Cold Harbor, June 3, 1864. He was admitted to the field hospital of the 1st division, Ninth Corps, where the operation of resection was performed but not recorded, and several days afterwards he was conveyed to Washington. Acting Assistant Surgeon P. O. Williams described the injury and its result, as follows: "The patient was admitted to Emory Hospital, June 7th, with compound comminuted fracture of the femur at the upper third, caused by a minié ball, which entered anterior to the femoral artery, passed backward and outward, and emerged on the opposite side. Two and a half inches of the bone had been excised the day after the injury, through an incision four inches in length. The general treatment consisted of tonics, stimulants, astringents, and generous diet. Pulley extension, sand bags, and bandages were applied to the limb and cold-water dressings to the wound. Small spiculæ of bone and a small piece of lead about the size of a pea were removed on June 30th. The patient died August 3, 1864, of exhaustion resulting from the excessive discharge of the wound and from severe diarrhœa, which had troubled him the last two weeks. The *post-mortem* revealed necrosis of both excised extremities, extending from one to one and a half inches. There was abundant deposit of osseous matter on the upper portion, but upon the lower part only a little was found on the posterior aspect." The upper half of the injured femur was contributed by Surgeon N. R. Moseley, U. S. V., and is shown in the cut (FIG. 166).

In the following case severe hæmorrhage occurred on the twentieth day after the injury, and amputation in the upper third of the thigh was performed:

CASE 418.—Corporal J. W. Soule, Co. D, 6th Michigan Cavalry, aged 27 years, was wounded in the right thigh at Boonesboro', July 8, 1863. Surgeon S. B. W. Mitchell, 8th Pennsylvania Cavalry, recorded his admission to the Cavalry Corps field hospital, and noted that a resection was performed. On July 21st the wounded man was transferred to the Frederick Hospital, whence Acting Assistant Surgeon J. H. Bartholf contributed the specimen (FIG. 168), with the following history: "The wound was caused by a rifle ball, which entered below the nates and fractured the femur at the lower part of the upper third. A portion of the bone was removed on the evening following the injury, and sand bags were kept to the sides of the limb until the day before the patient was removed to this hospital, when a long outer splint was applied. On admission the limb was in very good condition and shortened only one and three-quarter inches. On July 23d the long splint had become displaced and was doing harm, when I removed it and substituted Buck's extension (pulley, weight, and sand bags). On the following day the patient felt comfortable and the wound looked well; the shortening now amounted to two and three-quarter inches. On the next day the extension was increased by additional weight. A moderate flow of hæmorrhage from the wound took place on July 26th, which could not be controlled by pressure on the common femoral artery, and did not cease until after five minutes' continuance of the pressure. The amount of blood lost was estimated at six ounces. Exploration showed the sawn end of the upper fragment to be denuded a finger's breadth; but the upper end of the lower fragment could not be felt nor reached. On the 28th a collection of pus was detected, by examination with the finger, in a cavity at the inner side of the upper fragment, and at 8.30 P. M. of this day another hæmorrhage, uncontrollable by pressure on the femoral artery, to the amount of eight ounces took place. Stimulants and opiates were then given to procure sleep and time in order to enable the patient to recover, in part at least, from the effects of the hæmorrhage and undergo an operation, for which, with a view of having the further advantage of daylight, the following morning was determined upon. At 4 o'clock A. M. the next day there was another hæmorrhage, estimated at six ounces, and when the patient had pretty well recovered, amputation was performed by transfixion through the site of the wound, making antero-posterior flaps. The patient did not rally well. He died two hours after the operation. At the *post-mortem* examination, the thoracic and abdominal organs were found to be healthy. The hæmorrhages were discovered to have occurred from a large orifice plainly to be seen in the upper end of the lower portion of the severed sciatic artery, the ball having evidently found the vessel lying in its course and disrupted it. The blood not coming from any branch of the femoral explains the non-control of the flow by pressure thereon, as was believed at the time. The bleeding and stopping was probably due to the closing of the orifice by the end of the bone, and to its shifting, and perhaps to other causes. The two sawn ends of the bone were necrosed for the space of one-quarter inch to an inch, beyond which a good amount of callus was thrown out."

FIG. 168.—Upper half of right femur. *Spec.* 3854.

TABLE XXIII.

Summary of Sixty-five Fatal Cases after Primary Excision of the Shaft of the Femur for Shot Injury.

NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	INJURY, OPERATION, AND RESULT.
1	*Austin, M. G.*, Pt., D, 21st Virginia, age 24.	July 2, 3, '63.	Right; up. third; Sept. 26, bony union. with lateral curvature. Died Dec. 2, 1863, of wounds.
2	*Ball, C. H.*, Capt., K, 6th Va. Cav., age 29.	May 7, 9, '64.	Left. Died May 14, 1864.
3	Becht, J., Pt., B, 7th Maryland, age 38.	Mar. 31, 31, '65.	Right; mid. third, by Surg. R. K. Robinson, 7th Md.; April 12, amp. up. third. Died April 12, 1865, shock.
4	Beck, W. J., Pt., D, 2d Penn. Heavy Art'ry, age 18.	June 19, 19, '64.	Left; upper third; no attempt at union. Died July 8, 1864. Autopsy. *Spec.* 2816.
5	Bittle, M., Pt., K, 36th Wisconsin.	Je. 18,'64, Primary.	Right; mid. third, by Surg. S. H. Plumb. 59th N. Y. Died June 21, 1864.
6	*Boss, D. W.*, Pt., K, 64th Georgia, age 20.	Feb. 6, 7, '65.	Right; three inches upper third. Died February 9, 1865.
7	Brown, J. E., Corp'l, F, 86th New York.	July 2, 2, '63.	Middle third. Died July 11, 1863.
8	Brozier, N. P., Pt., I, 101st Ohio, age 27.	June 27, 27, '64.	Right; neck, by Surg. S. H. Kersey, 36th Ind. Died July 6, '64.
9	Burch, O., Pt., G, 111th New York, age 17.	April 2, 5, '65.	Left; three ins. mid. and upper thirds, by Act. Staff Surg. W. J. Burr, U. S. A.; sloughing. Died July 18, '65, exhaustion. Autop.
10	Burt, E. E., Pt., C, 8th New York Heavy Art.	June 17, 17, '64.	Right; four ins. lower third, by Surg. N. Hayward, 20th Mass. Died June 20, 1864.
11	Carroll, L., Serg't, H, 1st Delaware, age 22.	Oct. 22, 22, '64.	Right; mid. third; Nov. 11, hæm.; lig.; amp. hip. joint. Died Nov. 19,'64; pyæm. *Spec.* 1020. *Circ.* 6, '65, p. 50. *Circ.* 7, '67, pp. 38, 62. See CASE 298, p. 139, *ante*.
12	Clark, R., Pt., B, 55th Illinois.	May 17, 18, '62.	Left. Died May 20, 1862.
13	Conner, S. L., Pt., E, 82d Ohio.	July 1, 1, '63.	Right; middle third. Died July 16, 1863.
14	*Cox, R.*, Serg't, L, 1st S. Carolina Sharpshoot'rs.	June 30, J'y 3, '62.	——; up. third; bones of pelvis also fractured. Died July 11, '62.
15	Dawson, J., Pt., G, 48th New York, age 32.	Aug. 16, 16, '64.	August 18th, gangrene. Died August 19, 1864.
16	Daniel, R., Pt., F, 13th West Virginia, age 37.	Oct. 19, 19, '64.	Left; six inches upper and middle thirds. Died Nov. 7, '64; pyæm. Autopsy.
17	Delinger, C., Pt., D, 200th Pennsylvania.	Mar. 25, 25, '65.	Left; upper third. Died March 29, 1865.
18	Engle, J., Government employé, age 19.	Mar. 16, 18, '64.	Right; middle third, by Surg. B. Woodward, 22d Ill. Died Mar. 24, 1864.
19	Evans, J., Pt., I, 57th Indiana.	June 15, 15, '64.	Right; upper third, by Surg. E. B. Glick, 40th Ind. Died June 29, 1864.
20	Fearing, J., Pt., G, 21st Mass., age 23.	June 3, 4, '64.	Right; two and a half ins. upper third; June 31, spic. removed; nec. Died Aug. 3, '64. *Spec.* 2947.
21	Foster, F., Serg't, F, 1st New York Dragoons.	April 2, 2, '65.	Left; middle third. Died May 5, 1865.
22	*Gillis, G.*, Serg't, G, 61st Georgia, age 24.	June 2, 2, '64.	Upper and middle thirds. Died June 10, 1864
23	Harris, L. W., Pt., I, 84th Indiana.	Aug. 8, 8, '64.	Middle third, by Ass't Surg. W. H. Matchett, 40th Ohio. Died Sept. 5, 1864.
24	*Hill, J. M.*, Pt., C, 11th Alabama, age 21.	May 24, 24, '64.	Right; three ins. middle third. Died June 9, 1864.
25	Holmes, J., Lieutenant, E, 40th Indiana.	June 17, 17, '64.	Right; upper third, by Surg. E. B. Glick, 40th Ind. Died June 25, 1864.
26	*Hood, S.*, Pt., D, 6th South Carolina.	Dec. 10, 10, '64.	Eight ins. from lesser trochanter down. Died Dec. 11, 1864.
27	Hyatt, J., Pt., F, 57th Indiana.	May 27, 27, '64.	Left; middle third, by Surg. E. B. Glick, 40th Ind. Died June 24, 1864.
28	Lambert, J. S., Pt., I, 30th Wisconsin, age 36.	Sept 14, 14, '64.	Left; entire middle third, by A. A. Surg. A. Kelly. Died Sept. 14, 1864, shock.
29	*Ledwell, J.*, Pt., B, 52d North Carolina.	July 14, —, '63.	Right; three inches up. third, including troc. maj., by Surg. R. W. Pease, U. S. V. Died on the eighth day. *Spec.* 1476.
30	Lewis, W. H., Pt., F, 11th New Jersey.	June 18, 18, '64.	Left; middle third, by Surg. N. Hayward, 20th Mass. Died June 24, 1864.
31	[1]Libby, J. C., Serg't, I, 17th Maine.	Dec. 13, 13, '62.	Left; middle third. Died Jan. 2, 1863.
32	Matthews, J. S., Pt., B, 3d Iowa Cavalry.	May 25, 25, '63.	Right; upper third. Died May 30, 1863.
33	Mayer, J. B., Pt., C, 9th Indiana.	Sept. 3, 3, '64.	Middle third, by Ass't Surg. W. H. Matchett, 40th Ohio. Died Sept. 3, 1864, of wounds.
34	McIlhany, P., Pt., C, 88th New York.	May 5, 5, '64.	Left; three inches mid. third, by Surg. W. O'Meagher, 69th N. York. Died May 5, 1864.
35	Meeks, W. A., Pt., F, 125th Ohio.	Sept. 19, 19, '63.	Right; upper third, by Surg. H. McHenry, 125th Ohio. Died Nov. 3, 1863, exhaustion.
36	Mehwaldt, H., Pt., B, 8th New York Heavy Artillery.	June 18, 18, '64.	Right; six inches mid. third, by Surg. N. Hayward, 20th Mass. Died June 21, 1864.
37	Messenger, I., Pt., F, 112th Illinois, age 25.	Aug. 6, 6, '64.	Right; three inches upper third, by Surg. C. S. Frink, U. S. V. Died, Sept 2, 1864, of wounds.
38	Milkie, W., Pt., D, 26th Wisconsin.	July 20, 20, '64.	Left. Died August 7, 1864.
39	Mock, A., Pt., K, 55th Pennsylvania.	Mar. 30, 30, '65.	Left; four inches mid. third, by Surg. C. M. Clark, 39th Illinois. Died March 31, 1865.
40	*Moore, H.*, Pt., H, 36th Alabama.	Nov. 27, 28, '63.	Left; lower third, by Surg. J. C. Morgan, 29th Mo. (gang. of foot, amp. foot). Died Dec. 6, 1863.
41	Personius, S. W., Pt., G, 109th N. Y., age 21.	May 6, 6, '64.	Left; upper third. Died May 20, 1864.
42	Peterson, C. M., Pt., I, 6th Iowa.	June 27, 27, '64.	Right; four ins. lower third, by Surgs. W. Graham, 40th Ill., and W. Lomax, 12th Ind. Died July 20, 1864.
43	Phinney, J. A., Corp'l, B, 31st Maine, age 22.	April 2, 2, '65.	Right; upper third, by Surg. J. A. Hayes, 11th New Hampshire. Died April 16, 1865.
44	Potter, R. E., Serg't, H, 1st N. York Dragoons, age 26.	May 12, 12, '64.	Right; two ins. middle third, by Surg. B. T. Kneeland, 1st N. Y. Drag's. Died June 18, '64; pyæm.
45	Pugh, J. M., Corp'l, F, 38th Ohio.	Sept. 1, 1, '64.	Upper third. Died Sept. 14, 1864.
46	Ramage, E., Pt., I, 15th Ohio.	June 25, 25, '63.	Left; three inches. Died June 28, 1863. *Spec.* 1752.
47	Ruckel, D., Pt., I, 14th Ohio.	June 16, 16, '64	Right; upper third, by Surg. C. N. Fowler, 105th Ohio. Died June 27, 1864.
48	Shaw, A. A., Pt., C, 9th Missouri S. M. Cav.	April 1, 1, '63.	Left; lower third, by Surg. H. Culbertson, U. S. V. Died April 2, 1863. Autopsy.
49	Small, E., Pt., E, 69th New York.	Sept. 17, 17, '62.	Left. Died October 2, 1862.
50	Smith, C., Serg't, K, 3d Ohio Cavalry.	May 21, 21, '63.	Right; middle third. Died May 25, 1863.
51	Soule, J. W., Corp'l, D, 6th Mich. Cav., age 27.	July 8, 8, '63.	Right; upper third; hæms.; 29th, amputat'n up. third. Died July 29, 1863, of hæm. *Spec.* 3854.
52	Sullivan, J., Pt., F, 57th Indiana.	May 27, 27, '64.	Left; middle third. Died June 17, 1864, of wounds.
53	Thomas, R. M., Serg't, E, 129th Ind., age 28.	Mar. 10, 10, '65.	Left; four inches, by Surg. G. W. Carr, 129th Ind. Died March 20, 1865, exhaustion.
54	[2]—— ——, Lieut., 118th or 115th Penn., age 30.	Sept. 17, 17, '62.	Four inches middle third, by Surg. H. W. Rivers, 4th Rhode Island. Died Sept. 19, 1862.
55	Vining, M. R., Lieut., A, 7th Maine.	May 12, 12, '64.	Right; four inches upper third, by Surg. F. M. Eveleth, 7th Maine. Died May 19, 1864.
56	*Wallace, J.*, Pt., C, 21st Georgia, age 37.	Mar. 25, 25, '65.	Left; mid. third, by Surg. G. R. Sullivan, 39th N. J.; Aug. 26th and Sept. 11, rem. frags. Died Sept. 23, 1865; pyæmia. *Spec.* 1354. *Photo. Series*, No. 92.
57	Washburne, E. A. B., Pt., D, 10th New York Cavalry, age 23.	April 6, 6, '65.	Right; upper third. Died April 19, 1865, exhaustion from hæm.
58	White, J., Lieut., G, 1st Penn. Reserves, age 30.	May 12, 12, '64.	Right; troch. minor, and frag. upper third, by Surg. L. W. Reed, U. S. V. Died May 18, 1864; pyæmia.
59	Williams, P. I., Lieut., E, 76th Illinois.	June 21, 21, '63.	Upper third, by Surgs. C. Carle, 41st Ill., and B. F. Stephenson, 14th Ill. Died in three-quarters of an hour.
60	Williams, B., Pt., C, 76th Colored Troops.	April 9, 9, '65.	Left. Died April 12, 1865.
61	Wishmire, C. E., Pt., A, 27th Indiana, age 33.	July 3, 5, '63.	Left; by Surg. W. H. Twiford, 27th Ind.; 12th, hæm. Died July 15, 1863.
62	Wolf, M. B., Serg't, E, 11th Ohio.	Nov. 24, 25, '64.	Right; three inches. Died Dec. 9, 1863.
63	Wool. C., Pt., M, 9th New York Cavalry.	June 11, 11, '64.	Right; upper third. Died June 13, 1864.
64	*Wright, H. A.*, Lieut., G, 6th Virginia, age 23.	July 30, Au. 1, '64.	Right; upper and middle thirds. Died Aug. 5, 1864.
65	*Yancey, T. H.*, Serg't. B, 48th Alabama, age 33.	Oct. 7, 7, '64.	Left; four inches upper third. Died Oct. 25, 1864.

[1] O'MEAGHER (W.), *Casualties of the Battle of Fredericksburg*, in *Am. Med. Times*, 1863, Vol. VI, p. 179.

[2] Supposed to be Lieutenant R. M. Johnston, Adjutant 125th Pennsylvania.

In ten of the sixty-five fatal cases of primary excision[1] in the shaft of the femur the point of resection was not indicated; in twenty-five instances the excision was in the upper third; in five, in the upper and middle thirds; in twenty-one, in the middle third, and in four, in the lower third.

Undetermined Cases of Primary Excision in the Shaft of the Femur.—There are six cases of this group; the data are very meagre, and in five of the six cases not even the names of the patients are recorded:

TABLE XXIV.

Summary of Six Cases of Primary Excision in the Shaft of the Femur with Unknown Results.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.	No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1	*Gosa, J. A.*, Pt., K, 36th Alabama.	Nov. 27, 28, '63.	Right; lower third. Surg. J. C. Morgan, 29th Mo.	4	Unknown.	July 3, 3, '63.	Left; middle third; nine inches. *Spec.* 1552.
2	Unknown.	May 6, 6, '64.	Left; five and a half inches excised. *Spec.* 2671.	5	Unknown.	May —, —, '64.	Left; six and a half inches lower third. *Spec.* 2410.
3	Unknown.	May 6, 6, '64.	Left; eight and a half inches. *Spec.* 2644.	6	Unknown.	May 3, 3, '63.	L't; seven and a half ins. Surg. J. Y. Cantwell, 82d Ohio, and A. A. Surg. A. D. Kibbee. *Spec.* 1374.

Intermediary Excisions in the Shaft of the Femur.—This category comprises forty-eight cases, with nine recoveries and thirty-nine deaths, a fatality of 81.2 per cent.

Recoveries after Intermediary Excision in the Femur.—Two examples are detailed:

CASE 419.—Private J. B. Kendall, Co. K, 5th Wisconsin, aged 34 years, was wounded in the right thigh during the assault on the heights of Fredericksburg, May 3, 1863, and entered Campbell Hospital, Washington, five days afterwards. Surgeon A. F. Sheldon, U. S. V., reported his discharge from service May 3, 1864, by reason of "shot fracture of right femur," and at an examination on July 2, 1866, Surgeon J. H. Baxter, U. S. V., described the man as "suffering from the effects of an excision of nearly five inches of the femur." On November 6, 1867, the pensioner, who then held the appointment of clerk in the Quartermaster General's Office, visited the Army Medical Museum, when the photograph, represented in the annexed cut (FIG. 169), was taken. The following information in regard to his case was elicited from his statements: "He was wounded by a musket ball, which split upon the shaft of the femur, a portion of the missile lodging in the cylinder of the bone and a portion traversing the thigh and making its exit posteriorly. He was conveyed on a stretcher to a house in Fredericksburg, and on the following morning to the Sixth Corps Hospital on Falmouth Heights. On May 10th, he was sent on the cars to Aquia Creek, and thence on a hospital transport to Washington. The injured limb was suspended by Smith's anterior splint. There was intense irritative fever, with copious suppuration. On May 21st, Acting Assistant Surgeon F. W. Kelly made a long incision on the posterior aspect of the thigh, removed a fragment of ball and numerous detached pieces of bone, and turned out and sawed off the sharp extremities of the fractured shaft. The limb was then supported in a wooden trough by cushions. The surgical fever and suppuration gradually abated, and ultimately firm union took place and the wound healed. Abscesses formed several times after his discharge from hospital, and bits of necrosed bone were eliminated. The sinuses did not close definitely until August, 1866." At the time of his visit to the Museum the cicatrices were in a sound condition, and the fracture appeared firmly consolidated, having resulted in two and a half inches shortening of the limb and false anchylosis of the knee. His general health was excellent, and, notwithstanding the stiffness of his knee, he walked briskly with only a slight limp. Owing to the permanent character of the results of the injury this pensioner has been exempted from examinations. The pensioner was paid December 4, 1878.

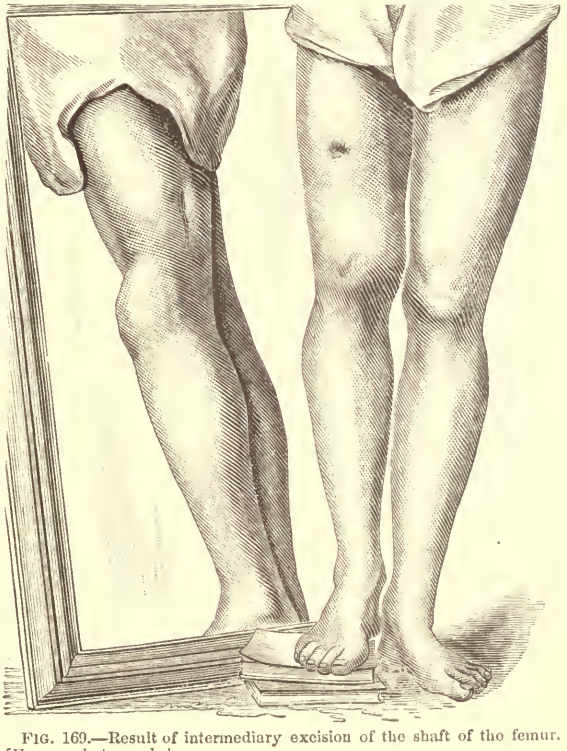


FIG. 169.—Result of intermediary excision of the shaft of the femur. [From a photograph.]

[1] The portion of bone excised amounted to eight inches in one instance (CASE No. 26 of TABLE XXIII); to six inches in two (CASES 16 and 36 of TABLE XXIII); to four inches in eight; to three inches in eight; to two and one-half and to two inches in one each; and in forty-four cases the length of bone excised was not precisely stated. The fractures were caused, in 62 instances, by small projectiles, twice by shell fragments, and once by a grapeshot.

CASE 420.—Private L. M. Baker, Co. B, 2d Wisconsin, aged 29 years, was wounded at Gettysburg, June 1, 1863, and admitted to the field hospital of the 1st division, First Corps. Surgeon G. M. Ramsey, 95th New York, recorded: "Gunshot fracture of right thigh. July 6th, resection." On September 5th, the patient was transferred to Camp Letterman, and subsequently to the General Hospital at York. A photograph, represented in the annexed cut (FIG. 170), was received from Surgeon H. Palmer, U. S. V., with the following description of the case: "A conical leaden ball entered the anterior aspect of the right thigh six inches below the middle of Poupart's ligament, thence passing backward and slightly upward, making its exit at the posterior aspect, an inch above the point of entrance, fracturing the femur. Two hours after the reception of the injury he was taken to a field hospital, and, he states, on the 3d of July he was placed under the influence of chloroform and fragments of bone to the extent of two inches of shaft were removed by cutting down upon them at the seat of the fracture. Water dressings were used for the first two weeks, when Smith's anterior splint was applied—the limb suppurating profusely, and the man's vital power being a good deal depressed. There was a constant tendency to sloughing in the posterior wound, rendering the frequent application of caustic necessary. The splint was removed on the 15th of November, partial bony union having taken place, suppuration still continuing and spiculæ of bone being discharged from time to time; patient, who was upon tonics and nutritious diet, gradually improving. On the 13th of January the posterior wound assumed a sloughing condition, which spread with rapidity, and was attended with considerable constitutional disturbance. It was checked by the free use of bromine, the patient being at the same time upon iron and quinia. Since that time the patient has continued slowly but steadily to improve. April 14th, the wounds have closed; the man is in excellent health and able to walk about on crutches, amount of shortening being two and a half inches. On June 30, 1864, he was discharged from service, although still using crutches, able to bear considerable weight upon the injured limb." Examiner C. D. Cameron, of LaCrosse, Wisconsin, reported, December 23, 1865: "Shot wound of right thigh, shattering the bone. Some four inches of the femur were removed. Limb much crooked and greatly atrophied; is five inches shorter than the other. Wound not yet healed." Examiner W. D. Flinn, of Redwood Falls, Minnesota, September 26, 1873, certified to "resection of about three inches of bone," and stated "the wound has been open and running during the last two and a half years." The pensioner was paid June 4, 1879.

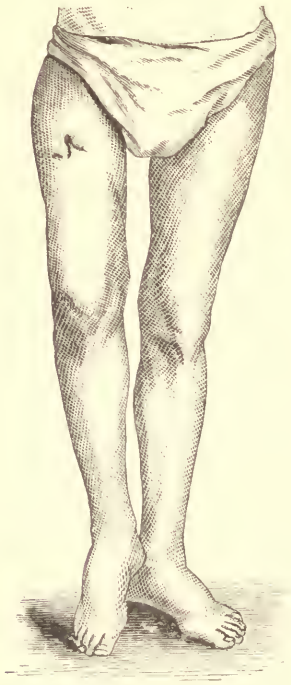


FIG. 170.—Result of intermediary excision in the shaft of the femur. [From a photograph.]

One of the nine survivors after intermediary excision in the shaft of the femur was a Confederate soldier, and eight were Union soldiers. Of the latter, one died nearly a year after the operation, six are pensioners in 1879, and one has not been heard from since 1870. The point of excision was in the upper third of the femur in one instance; in the middle third in five; in the middle and lower in one; and in the lower third in two cases.

TABLE XXV.

Summary of Nine Cases of Recovery after Intermediary Excision of the Shaft of the Femur for Shot Injury.

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	INJURY, OPERATION, AND RESULT.	No	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	INJURY, OPERATION, AND RESULT.
1	Anderson, L. C., Pt., A, 7th Kansas Cavalry, age 19.	Nov. 11, 20, '61.	Left; three ins. upper third, by A. A. Surg. J. Thorne; erysipelas. Disch'd March 1, 1864; pens'd; four ins. shortening; anchylosis knee joint.	6	*McFarland, R.*, Pt., K, 22d N. Carolina, age 19.	July 3, 23, '63.	Right; two and a half ins middle third, by A. A. Surg. J. L. Whitaker. Sept. 23, leg paralyzed and two ins. shorten'g. Exch'd April 25, 1864.
2	Baker, L. M., Pt., B, 2d Wisconsin, age 29.	July 1, 6, '63.	Right; two inches middle third; two and a half ins. short'g; Oct. 14, partial union. Disch'd June 30, 1864; pens'd; Sept., '73, w'd has been open two years. *Surg. Phot. Series*, Vol. 4, 1865.	7	Morrison, H. A., Pt., A, 1st Maine Heavy Art., age 20.	May 19, 23, '64.	Right; two and a half ins., and fragm'ts amount'g to three ins. more, middle third, by Surg. N. R. Mosely, U. S. V. Mustered out June 6, 1865; pens'd; not heard from since March, 1870. *Spec.* 2333.
3	Hall, S. C., Pt., F, 3d Indiana Cav., age 18.	Nov. 8, 15, '63.	Right; three and a half ins. up. third, by Surg. T. R. Crosby, U. S. V. April 13, 1864, amp. upper third. Disch'd July 8, 1864; pensioned; stump healed.	8	Whitesell, J., Pt., E, 61st Ohio, age 25.	Aug. 29, Sept. 8, 1862.	Left: four and a half ins. low. and middle thirds, by Surg. B. B. Breed, U. S. V. Disch'd Jan. 17, 1863; pens'd. Died Aug. 12, '63. *Spec.* 199.
4	Hazelrigg, W. G., Pt., A, 19th Inf'ry, age 31.	April 6, —, '62.	Left; lower third. Disch'd Jan. 14, 1863; pens'd; three and a half ins. short'g; pieces of bone dis'd; anch. knee joint.	9	Wilson, J. E., Pt., F, 13th N. Jersey, age 37.	May 3, 17, '63.	Right; fragments, four ins. mid. third, by Surg. W. H. Twiford, 27th Ind. Disch'd April 8, '64; pens'd; four and a half inches short'g; anchy. of knee joint. *Spec.* 1277.
5	Kendall, J. B., Serg't, K, 5th Wisconsin, age 34.	May 3, 21, '63.	Right; three ins. low third, by A. A. Surg. F. W. Kelly. Firmly united. Disch'd May 3, 1864; pens'd; '67, slight limp; two and a half ins. short'g; false anchy. of knee joint. *Surg. Phot.* 187.				

The injuries were inflicted by a grape shot in one case, by a slug in one, and by small missiles in seven instances. The length of the excised portion of the femur varied from two to five and one-half inches.

Fatal Cases of Intermediary Excision in the Shaft of the Femur.—A few illustrations, showing the nature and extent of the intermediary excisions practised, will precede the tabular statement of the thirty-nine fatal cases:

CASE 421.—Private T. Fitzgerald, Co. C, 38th New York, aged 27 years, was wounded at Chancellorsville, May 2, 1863, and treated at a field hospital until June 15th, when he was conveyed to Washington. Assistant Surgeon G. A. Mursick, U. S. V., reported: "The patient was admitted to Stanton Hospital with compound fracture of the lower third of the right femur. Resection of a portion of the bone was performed on May 19th, before admission to this hospital. The wound suppurated profusely, and his condition was unfavorable. Water dressings were used, and Hodgen's splint was applied to the limb. Six ounces of whiskey were administered daily. There was no attempt at union of the bone and no abatement of the discharge. By July 2d the patient had become pale, anæmic, and emaciated, when muriated tincture of iron was prescribed in doses of twenty drops three times a day. The patient was also troubled with anorexia, and on July 5th diarrhœa came on, for which astringents, consisting of opium and tannin, and subsequently tincture of catechu and opium, were administered. Death occurred on July 10, 1863." A section of the injured femur was contributed by Surgeon J. A. Lidell, U. S. V., and is shown in the wood-cut (FIG. 171). The specimen exhibits considerable deposit of callus, imprisoning the necrosed fragments but not uniting the extremities.

FIG. 171.—Section of right femur fractured in lowest third. *Spec.* 1522.

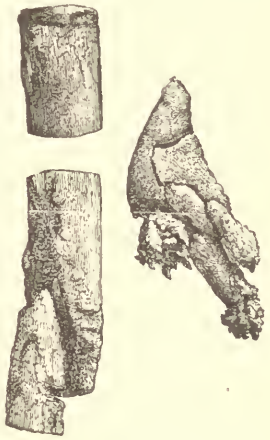


FIG. 172.—Two sections and an irregular portion of shaft of femur. *Spec.* 394.

CASE 422.—Corporal J. White, Co. F, 12th Infantry, aged 16 years, was wounded in the thigh at Gaines's Mills, June 27, 1862. Assistant Surgeon H. S. Schell, U. S. A., reported that the femur was fractured and that the wounded man was captured by the enemy. After remaining a prisoner for three weeks he was exchanged and conveyed to Baltimore. Acting Assistant Surgeon E. G. Waters reported the following history: "The patient was admitted to Camden Street Hospital, July 21st, with the left femur badly shattered at the upper third. No apparatus had been applied. On July 26th, he was placed under the influence of chloroform, and an incision over the seat of injury, six inches in extent and exposing the bone, was made and the broken and unattached fragments removed, after which the ends of the upper and lower extremities were sawn off, leaving a hiatus of some four inches. The wound was then closed by stitches and adhesive strips, and the patient was put upon a supporting treatment. There was considerable loss of blood during the operation, which was performed by Assistant Surgeon R. Bartholow, U. S. A. On August 5th, the limb was placed in the anterior splint. At this time the discharge had improved in appearance and diminished in quantity, and the external wound looked healthy and was closing rapidly; the patient also maintained his strength and cheerfulness, and but for a troublesome bedsore over the sacrum he was almost free from pain. On August 8th, typhoid symptoms came on, the pulse being quick and irritable; the tongue dry, cracked, and covered with brown epithelium; appetite good but thirst insatiable. Wine, quinine, iron, and concentrated nourishment were now administered liberally. The wound was nearly closed and presented a healthy appearance as well as the discharge. On August 14th, colliquative diarrhœa came on, from which the patient sank and died, having survived the operation nineteen days. At the *post-mortem* examination both extremities of the resected portion of the femur were found denuded of periosteum and extensively necrosed. There had been no attempt at union, nor was any callus found in the surrounding tissues. The soft parts were gangrenous and intolerably offensive." The specimen, shown in the wood-cut (FIG. 172), was contributed by the operator, and consists of a portion of the shaft of the injured femur, embracing two sections an inch and a half and three inches long respectively, and an irregular portion two inches by three in its greater lengths. The latter is composed of fragments united by new bone. The larger section is obliquely fractured at one end, with thickened periosteum, and the smaller shows a ring of necrosis at one extremity.

FIG. 173.–Excised five inches of shaft of left femur. Posterior view. *Spec.* 1539.

FIG. 174.–Anterior view of the same specimen.

CASE 423.—Sergeant M. Smith, Co. I, 73d Pennsylvania, was wounded in the left thigh at Chancellorsville, May, 3, 1863. The injury involved a fracture of the femur at the trochanter major. The wounded man reached the Eleventh Corps hospital at Brook's Station on May 15th, and on the following day five inches of the bone, commencing just below the neck, was resected by Surgeon R. Thomain, 29th New York. The patient died June 8, 1863. The excised bone is represented in the wood-cuts (FIGS. 173, 174), and was contributed, with the history, by the operator.

The excision was practised in the upper third in fifteen instances; at the junction of middle and upper thirds in two; in the middle third in fourteen; in the lower third in five instances. In three cases the point of excision was not indicated.

TABLE XXVI.

Summary of Thirty-nine Fatal Cases of Intermediary Excision of the Shaft of the Femur for Shot Injury.

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	INJURY, OPERATION, AND RESULT.
1	Atkinson, H. L., Pt., H, 2d Maryland, age 32.	Sept. 30, Oct. 30, 1864.	Right; great trochanter and one inch of shaft. Died Oct. 25, '65; traumatic erysipelas.
2	Baker, J. F., Pt., D, 147th Penn., age 29.	May 3, 18, '63.	Right; two ins., and loose spiculæ. June 10, diarrhœa. Died Aug. 10, 1863.
3	Biddle, A., Pt., E, 6th New Jersey.	May 5, 14, '62.	Left; mid. third, by Surg. R. B. Bontecou, U. S. V. Died May 25, 1862, of pyæmia.
4	Brewer, J., Pt., K, 130th Indiana, age 18.	Aug. 6, Sept. 1, 1864.	Right; three ins. upper third, by Surg. F. Meacham, U. S. V. Died Nov. 18, 1864.
5	Brown, E. W., Lieut., C, 37th New York.	May 5, 16, '62.	Right; three ins. upper third, by Surg. R. B. Bontecou, U. S. V. Died May 23, 1862; pyæmia.
6	*Burden, H.*, Pt., 6th S. Carolina, age 18.	May 5, 17, '62.	Left; by Surg. R. B. Bontecou, U. S. V. Died May 20, '62; pyæm.
7	Burroughs, J., Serg't, B, 3d Kentucky.	Sept. 19, 28, '63.	Right; four ins. low. third; amp. mid. third. Died Oct. 10, 1863.
8	Collar, C., Pt., F, 45th Illinois, age 20.	Feb. 14, Mar. 12, 1864.	Right; mid. third, by Surg. G. S. Kemble, U. S. V. May 1, amp. thigh, upper third. Died May 9, '64. shock.
9	Connover, J. C., Corp'l, E, 27th Illinois, age 21.	May 25, June 18, 1864.	Left; four ins. up. third, by Ass't Surg. G. W. Burke, 46th Penn. Died June 21, 1864; pneumonia.
10	Cramer, J., Pt., E, 55th New York.	May 5, 14, '62.	Five ins. mid. third, by Surg. R. B. Bontecou, U. S. V. Died May 17, 1862.
11	Dickenson, C., Corporal, G, 88th Indiana.	Sept. 20, —, '63.	Right; four inches middle third, by Surg. I. Moses, U.S.V. Died Oct. 5, 1863. *Spec.* 2145.
12	Dillon, W., Pt., A, 10th New York, age 23.	June 3, 13, '64.	Right; six ins. up. third, by Surg. A. F. Sheldon, U. S. V. Died June 13, 1864, shock.
13	Eisele, R., Pt., E, 6th New Jersey.	May 5, 17, '62.	Left; four ins. middle third, by Surg. R. B. Bontecou, U. S. V. Died May 20, 1862; pyæmia.
14	Fitzgerald, P., Pt., I, 38th New York, age 27.	May 2, 19, '63.	Right; low. third. July 5, diarrh. Died July 10, 1863, suppuration and diarrhœa. *Spec.* 1522.
15	*Friend, J.*, Pt., H, 7th Missouri, age 27.	July 4, 13, '63.	Right; mid. third, by A. A. Surg. A. Sterling. Died July 17, 1863; hæmorrhage. *Spec.* 2091.
16	*Goddard, W.*, ——, B, Caswell's Georgia S. S.	June 24, J'y 1, '63.	Middle third; erysipelas. Died August 24, 1863.
17	Hall, J. W., Pt., I, 92d New York.	Dec. 14, 29, '62.	Left; three and a half ins. up. t'd, by Surg. C. A. Cowgill, U. S. V. Died Jan. 22, 1863. Autopsy. *Spec.* 1328.
18	Hall, S. M., Pt., E, 7th New York, age 29.	June 3, 13, '64.	Left; five ins. up. third, by Surg. A. F. Sheldon, U. S. V. Died June 17, 1864, exhaustion.
19	Hamlin, J. L., Corp'l, G, 7th Minnesota, age 21.	Dec. 16, 23, '64.	Left; two and a half ins. upper third, by A. A. Surg. S. Blackwood. Died Dec. 24, '64; shock of operation.
20	Harper, C. D., Pt., F, 5th Michigan.	May 5, 14, '62.	Left; four ins. mid. th'd, by Surg. R. B. Bontecou, U. S. V. Died May 17, 1862; pyæmic hæmor. from wounded veins of thigh.
21	Heller, J. P., Pt., F, 147th Pennsylvania.	May 3, 19, '63.	Right; three ins. Died May 25, 1863, tetanus. *Spec.* 1272.
22	Horrigan, D., Pt., K, 28th Mass., age 32.	May 5, 30, '64.	Left; four ins. up. third, by Surg. A. F. Sheldon, U. S. V. Died Sept. 2, 1864, of wounds.
23	Huntley, H. S., Pt., I, 37th New York.	May 5, 17, '62.	Left; lower third, by Surg. R. B. Bontecou, U. S. V. Died May 22, 1862; pyæmia.
24	Lemberger, F., Pt., I, 33d Iowa, age 23.	July 4, 17, '63.	Right; nineteen fragm. and sharp ends, four ins. in all, lower third, by Surg. I. Moses, U.S.V. Died July 26, 1863, of inflammatory fever. *Spec.* 2084.
25	Martin, F., Serg't, F, 155th Penn., age 22.	May 8, June 1, 1864.	Left; middle third, by Surg. A. F. Sheldon, U. S. V.; gangrene. Died June 7, 1864; exhaustion.
26	May, A. S., Pt., E, 8th Iowa, age 26.	April 9, May 5, 1864.	Right; three ins. up. third. Died May 6, 1864.
27	McCormick, R., Serg't, C, 2d Missouri, age 24.	Sept. 20, Oct. 18, 1863.	Left; frag. and ends, three and a half ins., mid. third, by Surg. I. Moses, U. S. V. Nov. 3, arterial hæm. Died Nov. 11, 1863, of pyæmia. Autopsy. *Spec.* 2131.
28	P——, ...	Intermediary, 1862.	Right; low. third, by Surg. B. A. Vanderkieft, 102d N. Y. Died in three weeks; pyæmia. *Spec.* 11.
29	Parker, T., Pt., I, 5th New Jersey, age 20.	May 5, 15, '62.	Right; three ins. mid. third, by Surg. R. B. Bontecou, U. S. V. Large bed-sores. Died July 2, 1862; diarrhœa.
30	Paton, T., Pt., E, 72d New York.	May 7, 17, '62.	Left; up. port. protruding femur, by Surg. R. B. Bontecou, U.S.V. Died May 20, 1862, of pyæmia.
31	Polser, J. P., Pt., B, 15th Iowa.	Oct. 4, 25, '62.	Left; upper third. Died Oct. 27, 1862.
32	Redwood, W., Pt., A, 5th Michigan.	May 5, 16, '62.	Left; five ins. mid. third, by Surg. R. B. Bontecou. Died May 19, 1862.
33	Rose, S. L., Serg't, D, 113th Ohio.	Sept. 20, Oct. 17, 1863.	Right; ends and frag., two and a half ins. in all, middle third, by Surg. I. Moses, U. S. V. Died Oct 20, 1863. *Spec.* 2130.
34	Sayre, A., Pt., E, 12th Ohio.	Dec. 11, 26, '63.	Left; troch. major. Died January 23, 1864; pyæmia.
35	Smith, I. M., Serg't, I, 73d Pennsylvania.	May 3, 16, '63.	Right; five ins. up. third, includ'g troc. major, by Surg. R. Thomaine, 29th New York. Died June 8, '63; anæmia. *Spec.* 1539.
36	Stevens, H., Pt., I, 59th Mass., age 16.	May 6, June 3, 1864.	Right; three ins. upper third, by Surg. R. B. Bontecou, U. S. V. Died June 5, '64; exhaustion. *Spec.* 3034.
37	Taylor, C. H., Pt., E, 3d Artillery, age 20.	Feb. 20, Mar. 6, 1864.	Right; mid. third, five ins., by Ass't Surgeon W. R. Ramsay, U. S. A., and others. Died April 2, 1864; exhaustion from continued hæmorrhage.
38	White, J., Corp'l, F, 12th Infantry.	June 27, July 26, 1862.	Left; three ins. up. third, by Ass't Surg. R. Bartholow, U. S. A. Died Aug. 14, 1862. Autopsy; gangrene. *Spec.* 394.
39	Young, W., Serg't, C, 5th Minnesota, age 28.	Dec. 16, 23, '64.	Left; three and a half ins. upper third, by A. A. Surg. S. Blackwood. Died Dec. 31, 1864.

Three of these thirty-nine soldiers belonged to the Confederate and thirty-six to the Union army. The right femur was injured in nineteen, the left in eighteen of the thirty-seven cases in which this point was recorded.

Secondary Excisions in the Shaft of the Femur.—Nineteen examples were reported in this category. Fifteen patients recovered, three died, and the result in one instance remains undetermined.

Recoveries after Secondary Excision in the Shaft of the Femur.—Two examples of the fifteen cases of this group will be given in detail:

CASE 424.—Private J. Reid, Co. G, 162d New York, aged 35 years, was wounded in the right thigh, at Springfield Landing, June, 1863. Assistant Surgeon J. Homans, jr., U. S. A., recorded his admission to St. James Hospital, New Orleans, July 3d, and described the injury as follows: "The patient had sustained a compound fracture of the right femur a few days previous to entering the hospital, having been wounded by a bullet, which entered the anterior face of the limb about four and a half inches below Poupart's ligament, and emerged about four inches below the great trochanter, having passed just outside

the femoral artery and shattered the bone in its passage. On admission the thigh was but slightly swollen; the shortening amounted to about an inch and a half. I determined to make an effort to save the limb, for experience had taught me how much conservative surgery can accomplish in gunshot fractures of the thigh. A Smith's anterior splint was applied, but, proving uncomfortable, it was removed and the limb was placed on a double-inclined plane. The orifice of entrance healed, and pus, which began to be discharged quite freely, flowed out through the lower opening. On July 29th the patient's condition was favorable for an operation, and I determined to remove all the necrosed bone possible, and, if necessary, to resect a portion of the shaft of the femur. The patient was placed under the influence of chloroform, and an incision two and a half inches long was made from either side of the orifice of exit in the direction of the long axis of the limb. Several pieces of necrosed bone were then removed, and the end of each fragment of the fractured femur was turned out and sawn off with a chain saw beyond the point where the bone was bare. The periosteum along the course of linea aspera was carefully preserved and peeled off from the bone, or rather the bone was gently torn away from the periosteum. About three inches of the femur were thus resected. No untoward symptom followed for more than two months, and, in October, the limb could be raised by the heel, union being quite firm. About this time he was attacked with erysipelas, which seemed to be caused by the whitewashing of the ward in which he lay; but the attack was slight and soon passed off. In November he could walk about on crutches and bend his knee slightly. I noticed that union took place first and mainly along the inner side of the bone; and as the periosteum here was preserved entire, there was not so much shortening as would otherwise have resulted, it being only three and a half inches. On December 12, 1863, the patient was discharged from service and left for New York. How useful a limb he will have cannot yet be determined, but amputation would have killed him." The New York City Examining Board, at different dates, certified to the injury, and to union with deformity, and from four and a half inches to five inches shortening as resulting therefrom, together with complete anchylosis of the knee joint. The pensioner is also reported as wearing an artificial appliance attached to his shoe. The pensioner was paid March 4, 1879.

CASE 425.—Private J. F. Williams, Co. H, 26th Pennsylvania, aged 25 years, was wounded in the right shoulder and right thigh, at Gettysburg, July 2, 1863. He entered a field hospital of the Third Corps, and was removed to Camp Letterman one month afterwards. Surgeon H. Janes, U. S. V., noted the injury as "a compound fracture of the right femur at the upper third, caused by a minié ball," and recorded the following result: "On September 8th, the upper extremity of the lower fragment was found to be protruding and to be denuded, and four days later the patient was placed upon the operating table and about two inches of the lower fragment were carefully excised by Acting Assistant Surgeon H. Leaman. The limb was then placed in an anterior splint. Small pieces of bone were discharged from time to time and steady improvement followed. By November 9th, partial union had taken place, and several days afterwards the patient was transferred to York Hospital." Surgeon H. Palmer, U. S. V., in charge of the latter, on February 15, 1864, made the following note of the condition of the limb: "At this time there is complete bony union of the fracture. There is, however, some dead bone at the upper fourth of the thigh, still causing rather free discharge of pus by three openings. The thigh is shortened about four and a half inches, its circumference increased four inches, and the limb bent outward. The patient's general health is excellent and his constitutional condition good." The patient was ultimately transferred to Mower Hospital, Philadelphia, July 25, 1865, and one month later he was discharged and pensioned. Examiner E. A. Smith, of Philadelphia, on August 28, 1865, certified to "total loss of use of right arm and right leg from wound of shoulder and thigh, to fracture of femur and eight inches shortening," and to "one hundred and twenty-nine pieces of bone having been removed," and added that the pensioner "has a cough and is a sad wreck." The pensioner was paid March 4, 1866, since when he has not been heard from.

The excision was practised in the upper third in nine instances, in the middle third in four, and in the lower third in two. In four cases portions of the trochanter major and of the shaft of the femur were excised; in the remaining eleven cases the excised portion of the femur varied in length from two to six inches.

Fatal Cases of Secondary Excision in the Shaft of the Femur.—The three operations of this group were practised on Union soldiers. In one instance the right femur, and in two the left femur had been fractured.

CASE 426.—Private J. McElroy, Co. E, 35th Iowa, aged 38 years, was wounded in the right thigh, at Lake Chicot, June 6, 1864, and underwent the operation of resection of the femur at Gayosa Hospital, Memphis. Surgeon F. N. Burke, U. S. V., who performed the operation, made the following report of the case: "The patient was admitted twelve days after the injury, which was caused by a minié ball striking the anterior surface of the middle third of the thigh, fracturing the femur, and lodging in the limb. The leg was placed in a double-inclined concave splint. The wound healed readily without suppuration, and in two months the patient was able to walk on crutches, the fragments—though not in a straight position—having united partly by cartilage and partly by ligament. His constitutional state was very good, he being fat and healthy. The patient was to have been sent to his home on furlough, but on October 25th, having been allowed to go out on the street, he became intoxicated, and, by a fall, refractured the femur at the place of union. On the following day he was placed under the influence of chloroform, and three inches of bone was excised through an incision five inches in length, an opening one inch long being made on the posterior surface of the thigh for drainage. Bilious diarrhœa set in five days after the operation and continued for two weeks. Death resulted from pyæmia, November 23, 1864, several violent chills having occurred five or six days before and much prostration during two weeks. Large quantities of stimulants, together with quinine and iron, and nourishing diet were administered, and solution of chlorinate of soda was applied to the wound. The *post-mortem* examination revealed a large abscess extending from the wound to the hip joint and containing laudable pus in considerable quantity. There was no sign of any reparative process in the ends of the bone, and no pus was found in the lungs, liver, or spleen."

TABLE XXVII.

Summary of Nineteen Cases of Secondary Excision in the Shaft of the Femur for Shot Injury.

[Recoveries, 1—15; Deaths, 16—18; Result undetermined, 19.]

No.	Name, Military Description, and Age.	Dates.	Injury, Operation, and Result.	No.	Name, Military Description, and Age.	Dates.	Injury, Operation, and Result.
1	Allen, J. W., Pt., B, 22d Indiana, age 28.	Oct. 8, Dec. 1, 1862.	Left; three ins. lower third, by Surg. J. G. Hatchitt, U. S. V. Anæmia. Disch'd Feb. 13, 1863; pens'd; six inches shortening.	11	O'Riley, P., Pt., H, 69th New York.	Sept. 17, Oct. 22, 1862.	Left: carious and necrosed trochanter major and shaft. Discharged Mar. 10, 1863; not pensioned.
2	Curtin, D., Pt., G, 47th New York, age 25.	Feb. 20, July 15, 1864.	Left; four in. mid. third. Disch'd June 5, 1865; pens'd; lig. union only; knee joint anchylosed; shortening over seven inches.	12	[1]Reid, J., Pt., G, 162d New York, age 35.	June 8, July 29, 1863.	Right; necrosis; three ins. upper third, by Ass't Surg. J. Homans, jr., U.S.A.; Oct., '63, union firm; erysip. Disch'd Dec. 12, 1863; pens'd; union with deformity; anchylosis knee joint.
3	Dennell, W. I., Serg't, E, 73d Penn., age 23.	July 20, Aug. 23, 1864.	Left; troch. maj. and two inches necrosed shaft, by A. A. Surg. M. L. Herr. Duty Jan. 10, 1865; not pensioned.	13	Thomas, W. C., Pt., F, 55th Ohio, age 17.	May 2, Sept. 11, 1863.	Right: July 11, rem. seq.; ex. of four ins. up. third. Disch'd June 27, 1864; pens'd; great deform. and short'g. *Spec.* 1686.
4	Duggan, T., Corp'l, M, 11th Illinois Cavalry, age 19.	Dec. 18, '62. Aug. 23, '63.	Right; lower third: gangrene. Disch'd April 7, '65; pensioned. July 5, 1866, amputation, junct. lower and middle thirds.	14	Watts, S., Serg't, K, 33d Ohio, age 21.	May 14, 1864.	Right; two ins low. thirds. Dis'd June 6, '65; pens'd; shortening six ins., leg useless.
5	Frazee, H. W., Pt., L, 2d New York Heavy Artillery, age 29.	Apl 7, '65, April —, 1866.	Left; two ins. upper thirds, by Dr. Hutchinson; ends wired. Dis'd Jan. 10, '66, befo. operat'n; pens'd; no union, limb no use.	15	Williams, J. F., Pt., H, 26th Penn., age 25.	——— July 2. Sept. 12, 1863.	Right; two inches upper third, by A. A. Surgeon H. Leaman. Nov., '63, partial union. Must. out Aug. 26, '65; pens'd; eight inches shortening.
6	*Grayson, C.*, Pt., F, 16th Mississippi.	Sept. 17, Dec. 22, 1862.	R't; necro.: portion of troch. maj. and shaft, by A. A. Surg. A. V. Cherbonnier. Duty April 27, '63.	16	Chase, J. A., Pt., B, 12th Mass., age 36.	Dec. 13, 1862, Jan. 13, 1863.	Left; fragm'ts and sharp points, two ins. in all, by A. A. Surg. R. Reyburn. Jan. 18, 19, hæmorrhage from external circumflex artery. Died Jan. 19, 1863. *Spec.* 1021.
7	Haggerty, D., Pt., L, 1st New Jersey Cav., age 23.	Oct. 12. 1863, ———	Left: necrosis troch.; exc. disens'd portion, by A. A. Surg. J. H. Thompson. Must. out Sept. 22, 1864; applied for pension Dec., 1864, not heard from since.	17	[2]McElroy, J., Pt., E, 35th Iowa, age 38.	June 6, Oct. 26, 1864.	Right; bone united; refract. by fall; three ins. mid. third. Surg. F. N. Burke, U.S.V. Died Nov. 23, 1864, pyæmia. Autopsy.
8	*Hosay, J.*, Pt., B, 9th Missouri.	July 4, '63, Mar. 8, '64.	Left; three ins. mid. third, by A. A. Surg. A. Sterling. Prison, Nov. 4, 1864.	18	[3]Unknown, Pt., — New Jersey, age 22.	June 27, Aug. 10, 1862.	Left; five and a quarter inches mid. third, 28 pieces, by Dr. — Merritt. Died Aug. 10, 1862.
9	Houghton, D. F., Corp'l, E, 16th Maine, age 21.	Dec. 13, '62, Aug. 6, '63.	Left; caries; six ins. up. third, by Surg. C. Alexander, 16th Maine. Disch'd May 15, 1863, pens'd; shorten'g six ins., stiff, open.	19	Unknown.....	———, 1862.	——. Excis'n of frag't, and small portion of shaft partly necrosed. Result unknown. *Spec.* 396.
10	Millhouse, J., Serg't, K, 73d Illinois, age 31.	Sept. 20, Dec. —, 1863.	Left; two and a half ins. middle third. Disch'd April 30, 1865; pens'd; bone carious, very lame.				

Excisions in the Shaft of the Femur at an Unknown Period after Shot Injury.—The seventeen cases of this group are enumerated in the following table:

TABLE XXVIII.

Seventeen Cases of Excision in the Shaft of the Femur after Shot Injury; time of Operation not known.

[Recoveries, 1—7; Deaths, 8—16; Result unknown, 17.]

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.	No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1	Grauaz, F., Pt., D, 1st Penn. Rifles, age 38.	Dec. 13, '62, ——.	Left; two ins. mid. third. Dis'd Aug. 20, 1863; subsequently enlisted in V. R. C. Dis'd June 4, '65, and pens'd; union complete. Not heard from since Mar. 4, '68.	8	*Baker, R.*, Lieut., A, 9th Mississippi, age —.	Nov. 25, '63, ——.	Left; three ins. and small fragments middle third; diarrhœa. Died Jan. 2, '64; pyæm. Autop.
2	Hiatt, H. H., Pt., B, 19th Indiana, age 19.	Aug. 31, '62, ——.	Right; three ins. Disch'd Oct. 20, '63; pens'd. Atrophy; three ins. short'g; anchy. of knee and hip joints. Died Mar. 21, '71; general debility and prostration.	9	Bartholomew, G., Pt., E, 8th Missouri, age —.	May 8, '62, ——.	Right; fractured parts mid. third, by Surg. D. W. Hartshorne, U. S. V. Died May 20, 1862.
3	Holbrook, S., Pt., 1st N. H. Battery, age 22.	Dec. 13, '62, ——.	Right; up. third. Disch'd Dec. 17, '63; pens'd: bone discharging; can do light work.	10	Bowman, W. H., Pt., I, 78th Illinois, age —.	Nov. 24, '63, ——.	Left; lower third, ends sawn off; pyæmia. Died Dec. 22, 1863.
4	Murphy, E. A., Serg't, C, 2d New York Mt'd Rifles, age 23.	Mar. 31, '65, ——.	Left; two ins. middle third; ball extracted. Disch'd Oct. 11, '65; pens'd; short'g three and a half ins.; anchy. knee joint; necrosis.	11	Furgerson, N., Pt., G, 6th Indiana, age —.	Nov. 23, '63, ——.	Right; low. third, ends sawn off. Died Jan. 18, 1864; exhaustion. Autopsy.
5	Nelson, J., Pt., H, 51st Ohio, age 21.	Sept. 3, '64, ——.	Right; two ins. one side of upper third; gang., car., necro. Dis'h July 29, '65; pens'd; bone diseased; one and a half ins. short'g; anchy. of knee joint.	12	*McHarper, P.*, Pt., H, 12th Miss., age —.	———	Left. Died June 6, 1864.
6	*Shannon, A. J.*, Pt., F, 35th N. C., age 33.	April 20, '64, ——.	Left. Retired February 9, 1865; limb entirely useless.	13	[4]Maines, R., Pt., F, 70th New York, age 30.	May 5, '62, ——.	Left. Died May 31, 1862.
7	*Woolton, A.*, Pt., A, 15th Alabama, age 26.	Aug. 28, '62, ——.	Right; lower third. Retired Jan. 4, 1865; shortening 2½ inches.	14	*Thompson, J. S.*, Pt., H, 11th Tenn., age —.	Nov. 24, '63, ——.	Right; middle third, rough ends sawn off. Jan. 14, 1864, hæm. from profunda art'y. Died Jan. 19, 1874. Autopsy.
				15	Woolf, T., Pt., A, 125th Pennsylvania, age —.	Sept. 17, '62, ——.	Left. Died Jan. 25, 1863.
				16	Vocum, J. P., Pt., A, 89th Illinois, age —.	Nov. 24, '63, ——.	Left; upper third, ends sawn off. Dec. 19, pyæmia. Died Dec. 20, 1863. Autopsy.
				17	*Debuck, J.*, Pt., C, 29th Tennessee, age —.	——— Je. 1, '64.	Right; three ins., including trochanter major. Result unknown.

[1] HOMANS (J., jr.), *Resection of Three Inches of the Upper Third of Femur*, in *Am. Med. Times*, 1864, Vol. VIII, p. 65.

[2] DORRAN (W. M.), *Two Cases of Gunshot Fract. of Upper Third of Femur, Treated Conservatively*, in *Med. Record*, 1866-67, Vol. I. Case II. p. 467.

[3] MERRITT (—), *Compound Comminuted Fracture of Femur—Exsection*, in *Am. Med. Times*, 1863, Vol. VI, p. 247.

[4] PRAY (G. M.), *Reports of Hospitals*, in *Am. Med. Times*, 1862, Vol. V, Case III, p. 76.

The seventeen cases in which the time between the reception of the injury and the operation could not be ascertained comprise eleven Union and six Confederate soldiers. In eleven instances the length of the excised portion of the femur was not indicated; in three instances two inches, and in three, three inches of bone were removed.

Summing up the one hundred and seventy-five cases of excision in the shaft of the femur, it will be seen that the operations were performed in the upper third in seventy-six instances, including nine cases in which the operation extended into the middle third of the femur. Of these seventy-six cases twenty-five recovered, forty-nine proved fatal, and in two the result remained undetermined, a mortality of 66.2 per cent. Of the fifty-nine excisions in the middle third of the femur, the final issue could not be ascertained in one case; eighteen were followed by recovery, and forty by death, a death rate of 68.9 per cent. The seventeen operations in the lower third include five recoveries, eleven deaths, and one undetermined result, a fatality of 68.7 per cent. The twenty-three operations with undefined seat of fracture include sixteen deaths, three recoveries, and four undetermined cases, a mortality of 84.2 per cent. In six of the one hundred and seventy-five cases of excision in the shaft of the femur recourse was had to subsequent amputation of the thigh, and in one, to exarticulation at the hip.[1] Further observations on excisions in the shaft of the femur will be reserved for the concluding remarks of this section.

AMPUTATIONS IN THE SHAFT OF THE FEMUR.—On page 169, *ante*, the total number of cases of amputations of the thigh to be considered in this section was stated as 6,238. Of these, 9 were performed for shot contusions of the femur, 2,900 on account of shot fractures of the shaft of the femur, and 3,329 for immediate or remote results of shot fractures of the knee joint, leg, ankle joint, or foot. The nine operations for complications following shot contusions of the shaft of the femur have been detailed at page 173, and there remain to be noticed 6,229 cases as indicated in the following table:[2]

TABLE XXIX.

Numerical Statement of Sixty-two Hundred and Twenty-nine Amputations of the Thigh for Shot Injury.

OPERATIONS.	TOTAL.					UPPER THIRD.				MIDDLE THIRD.				LOWER THIRD.				SEAT UNRECORDED.			
	Cases.	Recovered.	Died.	Undetermined.	Ratio of Mortality.	Recovered.	Died.	Undetermined.	Ratio of Mortality.	Recovered.	Died.	Undetermined.	Ratio of Mortality.	Recovered.	Died.	Undetermined.	Ratio of Mortality.	Recovered.	Died.	Undetermined.	Ratio of Mortality.
Primary	3,949	1,958	1,943	48	49.8	260	268	5	50.7	686	463	8	40.3	973	927	14	48.7	39	285	21	87.9
Intermediary	1,320	479	841	....	63.7	50	97	....	66.0	205	266	....	56.4	217	459	....	67.9	7	19	....	73.0
Secondary	442	239	203	....	45.9	30	25	....	45.4	102	66	....	39.2	107	100	....	48.3	....	12	....	100.0
Time between injury and operation not stated	518	163	323	32	66.4	12	21	....	63.6	34	29	7	46.0	37	61	6	62.2	80	212	19	72.6
Aggregates	6,229	2,839	3,310	80	53.8	352	411	5	53.8	1,027	824	15	44.5	1,334	1,547	20	53.6	126	528	40	80.7

[1] The cases of excision in the shaft of the femur followed by amputation of the thigh are: Private J. Becht, B, 7th Maryland, fatal (CASE 3, TABLE XXIII, p. 206); Corporal J. W. Soule, D, 6th Michigan Cavalry, fatal (CASE 418, p. 205, and CASE 51, TABLE XXIII, p. 206); Private S. C. Hall, F, 3d Indiana Cavalry, recovery (CASE 3, TABLE XXV, p. 208); Sergeant J. Burroughs, B, 3d Kentucky, fatal (CASE 7, TABLE XXVI, p. 210); Private C. Collar, F, 45th Illinois, fatal (CASE 8, TABLE XXVI, p. 210); and Corp'l T. Duggan, M, 11th Illinois Cavalry, recovery (CASE 4, TABLE XXVII, p. 212). In the case of L. Carroll, H, 1st Delaware (CASE 298, p. 139, and CASE 11, in TABLE XXIII, p. 206), the excision in the shaft of the femur was followed by an unsuccessful exarticulation at the hip.

[2] Adding to the 6,229 cases recorded in this Table the 9 cases of amputation in the thigh following shot contusions of the femur, the 2 operations cited at page 8, *ante*, for complications following deep incised wounds, and the 131 amputations tabulated at page 54, *ante*, following shot flesh wounds of the lower extremity, we have a total of 6,371 recorded cases of amputation of the thigh performed for injuries inflicted by weapons of war in the American civil war.

As indicated in the Table, the result as to fatality remained undetermined in only eighty of the six thousand two hundred and twenty-nine cases; twenty-eight hundred and thirty-nine were followed by recovery, and three thousand three hundred and ten by death, a mortality of 53.8 per cent. This exceeds the fatality in cases of shot fractures of the femur treated by conservation (49.9 per cent., see page 176, *ante*) by 3.9 per cent., while it is 15.6 per cent. less than the ratio of deaths after excisions in the shaft of the femur (69.4 per cent., see page 200, *ante*). It will also be observed that of the amputations in which the time between the injury and the operation could be definitely ascertained, the primary are by far the most numerous. The sixty-two hundred and twenty-nine amputations were performed on sixty-two hundred and nine patients, twenty being double operations. In three cases both thighs were removed at the middle thirds; ten ablations of both thighs were performed in the lower thirds; in one case the point of amputation in the right thigh was not stated, while the left thigh was amputated in the lower third, and in six instances of amputation of both thighs the thirds were not indicated.[1] In fourteen of the twenty double thigh amputations both operations were primary; in two, both intermediary; in one, the operation in the right thigh was a primary, and in the left thigh an intermediary; in one, the amputation in the right thigh was a primary, and in the left thigh a secondary; and in two instances the periods of the operations were not recorded. In twelve cases the ablation in the thigh was accompanied by an amputation of the opposite limb, viz: in three, by amputations at the knee joint; in eight, by amputations in the leg; and in one, by an amputation at the ankle joint.[2]

PRIMARY AMPUTATIONS IN THE SHAFT OF THE FEMUR FOR SHOT INJURY.—According to the plan indicated on p. 697 of the *Second Surgical Volume*, the cases in which the operation was practised within forty-eight hours subsequent to the reception of the injury have been classified as primary amputations. Three thousand nine hundred and forty-nine of the six thousand two hundred and twenty-nine amputations in the shaft of the femur belong to this group. In forty-eight instances the results were not ascertained; nineteen hundred and fifty-eight were successful, and nineteen hundred and forty-three were fatal, a mortality of 49.8 per cent.

Primary Amputations in the Upper Third of the Femur.—Five hundred and thirty-three of the thirty-nine hundred and forty-nine primary amputations in the shaft of the

[1] The three instances in which both thighs were removed in the middle thirds are: Sergeant T. Doud, 2d Michigan, primary operations, fatal; Corporal J. W. Woodworth, H, 11th Michigan, primary operations, fatal; Private S. Bagley, B, 5th New Hampshire, right, primary, left, secondary operation, fatal (*Spec.* 4232, A. M. M.). The ten instances of ablations of both thighs in the lower thirds are: Corporal M. Dunn, H, 46th Pennsylvania, primary operations, recovery (*Spec.* 3193, A. M. M.); Private *E. G. Rush*, 21st Georgia, primary operations, recovery (see *Surg. Phot. Series*, Nos. 132, 133, and *Cont'd Photo's*, Vol. 3, p. 36, and *Spec.* 3998, A. M. M.); Private S. Allen, G, 59th Massachusetts, primary operations, fatal; Private R. S. Michael, A, 105th Pennsylvania, primary operations, fatal; Private D. Nicholson, H, 22d Massachusetts, primary operations, fatal (*Spec.* 2966, A. M. M.); Sergeant E. C. Rabbit, B, 10th Missouri, primary operations, fatal; Private J. Stewart, D, 77th New York, primary operations, fatal; Lieutenant J. Whelpley, D, 1st Maine, primary operations, fatal; Private D. Wallace, I, 5th Artillery, intermediary operations, fatal (*Specs.* 1383, 1384, A. M. M.); Pt. J. Moore, E, 46th Pennsylvania, intermediary operations, fatal. In the fatal case of Private W. F. Mills, E, 8th New York Heavy Artillery, the point of the primary amputation in the right thigh was not recorded, the operation in the lower third of the left thigh was an intermediary. The six instances in which the points of ablation were not stated are: Pt. S. Goodwell, G, 29th Illinois, primary operations, fatal; Pt. *H. Kenner*, 4th Virginia, primary operations, fatal; Pt. C. Myer, F, 30th Missouri, primary operations, fatal; Pt. H. Tieman, C, 119th New York, primary operations, fatal; Pt. *J. A. Parker*, L, Cobb's Legion Cavalry, time of operations not stated, recovery; Pt. *G. Nunenger*, A, 58th Virginia, time of operations not stated, fatal.

[2] The three cases of amputation of the thigh and of exarticulation at the knee of the opposite limb are: Corporal C. N. Lapham, K, 1st Vermont Cavalry, amputation of right thigh in middle third and of left leg at the knee joint, primary operations, recovery (see *Surg. Photo's Series*, Nos. 154, 155); Private J. Barker, I, 58th Massachusetts, amputation of right thigh in lower third and of left leg at knee joint, primary operations, fatal; Private H. Smith, I, 14th New Jersey, amputation of right thigh in lower third and of left leg at the knee joint, primary operations, fatal. The eight cases of amputations in the thigh and ablations of the opposite leg are: Private S. Banks, C, 43d Colored Troops, primary amputations in middle third of right thigh and lower third of left leg, fatal; Private L. Johnson, B, 1st Tennessee, primary amputations of left thigh in lower, and right leg in upper third, fatal; Private L. O. Lamphere, G, 21st Connecticut, Sergeant P. Bradley, C, 16th Michigan, and Private *J. R. Lewis*, H, 53d Georgia, primary amputations in left thighs in lower thirds and of right legs in lower thirds, fatal; Sergeant J. Foss, C, 59th New York, primary amputations of thigh and leg, thirds unknown; H. Housley, F, 32d Wisconsin, amputation of right thigh in lower third and of left leg in upper third, intermediary operations, recovery; Private H. Brown, K, 22d Colored Troops, primary amputation of right leg in upper third, and secondary amputation of left thigh in lower third, recovery; Lieut. A. Birmingham, A, 69th New York, primary amputation of right thigh in lower third and of left foot at ankle joint, fatal.

femur were practised in the upper third of the thigh. The result was determined in all but five cases. Two hundred and sixty patients recovered after the operation, and two hundred and sixty-eight, or 50.7 per cent., died. The right thigh was amputated in two hundred and forty-nine, and the left in two hundred and thirty of the four hundred and seventy-nine instances in which this point was recorded. A few successful and fatal examples will be detailed, and all cases of primary amputation in the upper third of the thigh will be enumerated in TABLE XXX.

Successful Cases of Primary Amputations in the Upper Third of the Thigh.—The two hundred and sixty operations of this category were performed on two hundred Union and on sixty Confederate soldiers. It was impracticable to ascertain the subsequent histories of the Confederate soldiers. Of the Union soldiers, one officer was retired and one hundred and ninety-nine men were pensioned, and it appears from the records of the Pension Office that one hundred and ninety-three of the survivors after primary amputation in the upper third of the femur were living in September, 1879. One had died from chronic diarrhœa, two from consumption, the result of the injury and the operation, and in four cases the cause of death was not reported:

CASE 427.—Lieutenant-Colonel R. Avery, 102d New York, aged 24 years, received a shot fracture of the upper third of the right thigh, at Lookout Mountain, November 24, 1863. He entered the field hospital of the 2d division, Twelfth Corps, where the injured limb was amputated by Surgeon C. H. Lord, 102d New York, who reported as follows: "This case of amputation at the upper third of the thigh is of interest from the fact that the patient had recently returned to duty from hospital, where he had been since receiving a severe wound of the face and neck at Chancellorsville, May 3, 1863. His general health was poor, yet he underwent the operation well, and at the date of this report, December 2d, he is getting along finely. The flap has closed completely for nearly two inches anteriorly, and every indication points to a speedy recovery. Dry dressings have been used entirely." The patient was subsequently transferred to hospital at Bridgeport, and afterwards to Nashville, whence he proceeded to his home on leave of absence. Lastly he entered the Annapolis Hospital, and on June 27, 1864, he was discharged from service. In the following year he was re-appointed as an officer of the Veteran Reserve Corps, and on December 31, 1870, he was retired from active service. In a communication from Dr. H. E. Goodman, late surgeon U. S. V., the amputation was described as having been performed "at the great trochanter." During January, 1866, Colonel Avery, who was then serving on duty at the office of the Commissary General of Prisoners, visited the Army Medical Museum, being quite well and in good health, and the stump, though affected with neuralgia, having been healed for more than a year previous. This officer's name appears on the retired list in 1879.

CASE 428.—Private T. E. Gay, Co. H, 9th Ohio Cavalry, aged 19 years, was shot in the left thigh while on guard duty, at Cypress Creek, April 22, 1864. The nature of the injury was reported by Surgeon C. M. Finch, of the regiment, as follows: "The wound was the result of an accident, the missile, a carbine ball, entering the knee joint at the external condyle, passing upward and comminuting the femur to the upper third, at which point the limb was amputated. From present indications (eight days after the accident) the man will recover." One month after the reception of the injury the patient was transferred to hospital at Nashville, subsequently to Louisville, and lastly to Camp Dennison. Surgeon C. McDermont, U. S. V., in charge of the latter hospital, reported that "the patient was admitted June 21st in good general health, but in his transfer he sustained a severe contusion of the stump by a fall. On the following day the stump presented a gangrenous appearance, which was checked by the application of a solution of bromine. Subsequently dressing of basilicon ointment was applied, under which it rapidly improved and threw out healthy granulations." The patient was furnished with an artificial limb, seven months after the reception of the injury, by the firm of Douglas Bly, and on November 17, 1864, he was discharged from service and pensioned. In his application for commutation, in 1870, the pensioner mentions that Assistant Surgeon John C. Thorpe, 9th Ohio Cavalry, performed the amputation. Examiner J. W. Long, of Bryan, Ohio, May 7, 1873, certified to "amputation of left leg four inches below the upper point of the trochanter major; muscles very much atrophied, the bone being covered by nothing but the skin and fascia up to the trochanter. He has no power in the stump, etc." The pensioner was paid September 4, 1879.

CASE 429.—Private J. H. Judd, Co. C, 86th New York, aged 18 years, was wounded in the right thigh, before Petersburg, September 11, 1864. He was admitted to the field hospital of the 3d division, Second Corps, whence Surgeon J. S. Jameson, 86th New York, described the injury as "a compound fracture of the femur at the middle third, caused by a musket ball," and reported that he "amputated the limb at the upper third." The patient was subsequently transferred to City Point, and three weeks after the date of the operation he was moved to hospital at Alexandria, whence Surgeon E. Bentley, U. S. V., described the amputation as an "antero-posterior flap operation." The patient was ultimately transferred to Judiciary Square Hospital, Washington, and discharged from service January 13, 1865, and pensioned. Previous to leaving the hospital he was supplied with an artificial limb by the Jewett Patent Leg Company, of Washington, D. C. In his application for commutation, dated 1870, the pensioner represented the stump as being in a sound condition, but reported the artificial leg as having been unsatisfactory. Examiner F. R. Wagner, of Addison, N. Y., April 15, 1874, certified to "amputation about two inches below the trochanter minor, leaving the stump so short that an artificial limb cannot be worn." The pensioner was paid June 4, 1879. The specimen, No. 410, Army Medical Museum, consists of the middle third of the shaft of the injured femur. It was contributed by the operator.

CASE 430.—Private A. Tarcott, Co. H, 94th New York, aged 18 years, was wounded at Fredericksburg, December 13, 1862, and admitted to the field hospital of the 2d division, First Corps. Surgeon C. J. Nordquist, 83d New York, noted: "Gunshot wound; right leg amputated above knee." Two weeks after the injury the wounded man was conveyed to Washington, where he entered Trinity Church and subsequently Judiciary Square Hospital. On June 11, 1863, he was transferred to Central Park Hospital, New York City, whence Acting Assistant Surgeon G. F. Shrady contributed to the Army Medical Museum a cast of the stump (*Spec.* 1373), taken nine months after the amputation, with the following history: "According to the patient's account the lower portion of his right thigh was almost completely carried away by a grapeshot, and a great deal of hæmorrhage followed the injury. Amputation at the upper third by the long posterior flap was performed, on the day following the injury, by Surgeon G. W. Avery, 94th New York. There was an attack of gangrene of the stump in the latter part of April, and the patient has suffered from necrosis of the femur. When admitted to this hospital the stump was entirely healed." Two months later the patient was furnished with an artificial limb by E. D. Hudson, of New York City, and on November 15, 1863, he was discharged from service and pensioned. Examiner C. M. Johnson, of Watertown, New York, certified, May 7, 1873: "The stump is only three inches in length, tender and painful; the extremity of the femur being covered only by integument. He uses an artificial limb occasionally only." The pensioner was paid September 4, 1879.

FIG. 175.—Stump of right thigh, nine months after amputation. *Spec.* 1373.

Fatal Cases of Primary Amputation in the Upper Third of the Thigh.—There were two hundred and sixty-eight cases of this group. Two hundred and thirty patients were Union and thirty-eight were Confederate soldiers. Gangrene supervened in eight, pyæmia in thirty, and tetanus in four instances. In the following case the femur was fractured in its upper third:

CASE 431.—Private W. H. Croyle, Co. H, 55th Pennsylvania, aged 21 years, was wounded at Petersburg, June 16, 1864, and was admitted to hospital at Fort Monroe four days afterwards. Assistant Surgeon E. McClellan, U. S. A., reported: "Gunshot fracture of right femur, upper third. Amputation was performed in the field on the day of the injury, chloroform being used." On August 27th, the patient was transferred to DeCamp Hospital, David's Island, New York Harbor, whence Assistant Surgeon W. Webster, U. S. A., reported that the stump was still unhealed, and that the patient was a sufferer from chronic diarrhœa, from the effects of which he died September 7, 1864.

In the next two cases primary amputation in the upper third of the femur was performed for fractures in the middle third:

CASE 432.—Private M. H. Bartlett, Co. D, 4th Vermont, aged 19 years, was wounded at Funkstown, July 10, 1863, and entered the General Hospital at Frederick two days afterwards. Acting Assistant Surgeon C. M. Martin reported the injury and its result as follows: "A minié ball entered the outer side of the left thigh about the middle third and passed directly through, breaking the bone. Amputation in the upper third was performed on the field by the circular method. When admitted to this hospital there was partial union of the flaps, and granulation was progressing. Cold-water dressings were used. The patient was in good spirits and seemed to be doing finely until July 29th, when I saw a change for the worse, his pulse being low and quick. I then ordered pills of iron and quinine to be given three times a day, also full diet. Two days afterwards he had a slight chill and appeared rather weaker, the stump not looking healthy and the granulations very pale and flabby. Ten drops of nitric acid diluted in an ounce of water was then ordered to be applied once a day, and the pills were continued, with one ounce of whiskey every three hours. On the next day the patient was gradually sinking, and on August 2d, he had a severe chill in the morning. Death supervened at 9.30 A. M. on August 3, 1863. At the *post-mortem* examination, three hours after, the lungs, heart, spleen, and kidneys were found to be healthy, but the liver was highly congested. On removing the remaining portion of the femur considerable callus was discovered to have been thrown out, and in dissecting the muscles I found two circumscribed abscesses, each containing about half an ounce of pus." The upper portion of the femur was contributed to the Museum by Dr. Martin, and is numbered 3887 of the Surgical Section.

CASE 433.—Private F. Ward, Co. G, 45th Colored Infantry, was accidentally shot in the left thigh, near Fort Harrison, February 7, 1865. The nature of the injury and its result were recorded by Dr. N. Folsom, Regimental Surgeon, as follows: "A conical musket ball, fired at a distance of about three hundred yards, entered the outer aspect of the limb about the middle, fractured the femur, and, splitting in two, passed out on the inner aspect lower down. There were two orifices of exit, and two more pieces of the ball were found in the wound. The man was admitted to hospital within six hours after the injury. The loss of blood was estimated at a pint and a half, and the bone was found extensively comminuted, there being twenty-six fragments. Amputation by the circular method, at the junction of the upper and middle thirds of the bone, was performed under ether, three ligatures being applied and six sutures. Stimulants were freely exhibited, with beef tea, through the night. The case progressed well until forty-eight hours after the operation, when the patient was suddenly attacked with violent pain in the stump, and, the dressing being removed, adhesion was found to be quite extensive. The sutures were then removed and a finger gently introduced at the middle of the wound for one and a half inches, and relief was afforded by giving one-fourth of a grain of morphia. Wet lint covered with oiled silk was now applied, and the adhesions gradually gave way during the week following. Granulations appeared over about one-third of the surface, but were pale and inactive. The patient took tincture of chloride of iron, fifteen drops three times a day, and good diet and stimulants. Poultices were applied after the fourth day, but suppuration was at no time profuse. Considerable pain and tenderness of the other leg was also complained of. The pulse gradually rose from 100 to 130, and fell in strength. After the seventh day the patient's tongue became dry and brownish. He died on the twelfth day, February 19, 1865."

TABLE XXX.

Condensed Summary of Five Hundred and Thirty-three Cases of Primary Amputations in the Upper Third of the Femur for Shot Fractures.

[Recovery, 1–260; Death, 261–528; Result unknown, 529–533.]

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1	Abey, J., Corporal, B, 67th Penn , age 20.	Oct. 19, 20, '64.	Left; circular; Surg. R. Barr, 67th Penn. Disch'd May 8, 1865.
2	Allen, W. G., Capt., F, 25th Iowa, age 38.	Mar. 20, 20, '65.	Right; Surg. A. Sabine, 76th Ohio. Mustered out June 6, 1865.
3	*Amos, P. M.*, Pt., D, 45th North Carolina, age 27.	July 7, 7, '64.	Left. Prison, December 4, 1864.
4	Atchinson, J. N., Pt., F, 2d New Jersey, age 28.	Aug. 27, 27, '62.	Right; circular; Aug. 31st, hæm., lig. femoral. Disch'd June 3, '63.
5	Atwater, T. J., Pt., C, 112th Illinois.	Nov. 18, 19, '63.	Left; flap; Confederate surgeon. Disch'd Feb. 17, 1864.
6	Avery, R., Lt.-Col., 102d New York.	Nov. 24, 25, '63.	Right; flap; Surg. C. H. Lord, 102d N. Y. Disch'd June 27, '64.
7	Babcock, J. P., Pt., D, 18th Ohio, age 24.	May 14, 14, '64.	Right; circular. Disch'd May 20, 1865.
8	Barker, D., Serg't, K, 10th Illinois Cavalry.	April 18, 18, '63.	Left; flap. Disch'd June 29, 1863.
9	Barnes, S., Pt., B, 12th Illinois.	Oct. 3, 5, '62.	Right. Disch'd April 6, 1863.
10	Barrett, G. W., Serg't, I, 7th Ohio.	Aug. 9, 11, '62.	Right; circular. Disch'd Oct. 27, 1862.
11	Barton, G., Lieut., D, 81st Pennsylvania.	Dec. 13, 13, '62.	Right; circular. Disch'd April 16, 1863.
12	Bassett, W., Pt., A, 111th Pennsylvania.	Sept. 17, 17, '62.	Left; flap. Disch'd Dec. 1, 1862.
13	Bauer, A., Serg't, A, 102d New York, age 21.	June 27, 27, '64.	Left; circ.; Surg. A. K. Fifield, 29th Ohio. Disch'd Nov. 22, '64. *Spec.* 2338.
14	Bedell, H. E., Lieut., D, 11th Vermont.	Sept. 13, 13, '64.	Left; Surg. C. B. Park, 11th Vermont. Disch'd Feb. 20, 1865.
15	Beaver, J. A., Colonel, 148th Pennsylvania.	Aug. 25, 26, '64.	Right; circ.; Surg. J. W. Wishart, 140th Penn. Disch'd Dec. 22, '64.
16	Bell, J., Serg't, D, 150th New York, age 28.	Mar. 19, 19, '65.	Right; flap; Skey's operation; Surg. C. M. Campbell, 150th N. York. Disch'd Oct. 13, 1865.
17	*Benedrum, C. W.*, Pt., G, 17th Virginia Cavalry.	July 1, 1, '63.	Left. Recovered.
18	Benninghoff, F., Corp'l, B, 1st Mich. Artillery, age 28.	Nov. 22, 22, '64.	Right; flap; Surg. A. Sabine, 76th Ohio. Disch'd June 18, 1865.
19	*Bine, J.*, Pt., I, Stuart Horse Art'y. age 43.	May 2, 2, '63.	Right; Surg. Randolph, C. S. A. Furloughed June 11, 1863.
20	Birt, W. T., Corp'l, D, 47th Illinois.	May 22, 22, '63.	Left; circular; Surg. H. Z. Gill, U. S. V. Disch'd Sept. 23, 1863. Died October, 1863; diarrhœa.
21	Boden, E. G., Pt., A, 1st Vermont, age 19.	May 5, 5, '64.	Right; circular. Disch'd August 30, 1865.
22	Brannagan, W., Pt., H, 70th New York, age 21.	July 2, 4, '63.	Left; flap. Veteran Res. Corps Dec. 31, 1863.
23	Brown, A. P., Serg't, K, 74th Illinois, age 26.	June 18, 18, '64.	Right; flap; Surgs. W. P. Pierce, 88th Ill., and H. E. Hasse, 24th Wis. Disch'd Oct. 28, 1864.
24	Brown, C. E., Lt. Col., 63d Ohio, age 30.	July 22, 23, '64.	Left; flap; Surg. A. B. Monohan, 63d Ohio. Disch'd July 8, 18 5.
25	Bruck, T., Capt., F, 8th New York.	June 8, 10, '62.	Left; Drs. Allen, Davis, and Herald, C. S. A. M. O. Apr. 23, '63.
26	Bryant, E. A., Musician, C, 4th N. Hamp., age 24.	July 30, 30, '64.	Right; circular. Disch'd Oct. 18, 1864.
27	*Butler, G.*, Pt., 31st Mississippi, age 20.	July 20, 20, '64.	Right; circular. To Provost Marshal Dec. 1, 1864.
28	Bull, H., Pt., K, 7th Indiana, age 24.	Nov. 28, 28, '63.	Right; circ.; Surg. G. W. New, 7th Ind. Disch'd April 1, 1864.
29	Campbell, J., Pt., L, 2d Penn. Art'y, age 24.	Sept. 29, 30, '64.	Right; flap. Disch'd July 10, '65.
30	Capstran, A., Pt., H, 98th New York, age 18.	May 13, 13, '64.	Left; circular. Disch'd October 18, 1864.
31	Carroll, J., Pt., H, 25th New York, age 19.	June 1, 2, '62.	Right. Disch'd June 23, 1863. *Spec.* 2400.
32	Carpenter, I., Pt., H, 102d New York, age 19.	Dec. 18, 18, '64.	Right; circular. Disch'd Oct. 5, 1865.
33	*Carter, W. W.*, Pt., I, 2d Tenn. Cav., age 26.	April 2, 2, '65.	Right; circular. To Provost Marshal May 6, 1865.
34	*Carter, A. L.*, Pt., A, 56th Virginia.	June 27, 27, '62.	Amp. by Surg. Evans, C. S. A. Recovery.
35	*Cashine, J. H.*, Pt., K, 5th N. Carolina, age 30.	April 3, 4, '65.	Left. Released July 10, 1865.
36	Cassell, R., Pt., E, 29th Col'd Troops, age 38.	April 2, 2, '65.	Right; circular. Disch'd July 11, 1865.
37	Clarke, H. G., Corp'l, A, 111th N. York, age 22.	July 2, 3, '63.	Right; circ.; Surg. O. Munson, 108th N. Y. Disch'd Oct. 15, '63.
38	Cook, D., Pt., F, 118th Ohio, age 21.	Dec. 29, 29, '63.	Right; circ. Disch'd June 23, 1865.
39	Cookson, R. B., Pt., B, 14th Maine, age 18.	Aug. 5, 5, '62.	Left; flap; Surg. E. Adams, 14th Maine. Disch'd Sept. 26, 1862.
40	Cowger, G. M., Serg't, E, 17th Iowa.	May 14, 15, '63.	Left; circular. Disch'd Nov. 23, 1863.
41	Cozad, H. J., Pt., A, 6th Missouri.	June 2, 2, '61.	Right; Surgs. G. S. Walker and W. F. McChesney, 6th Missouri. Disch'd June 16, 1862.
42	Congdon, J., Pt., H, 30th Ohio, age 21.	June 21, 24, '64.	Left; circular; Surg. A. K. Fifield, 29th Ohio. Disch'd July 19, '65.
43	Crawford, G. W., Lieut., F, 6th Michigan Cav.	July 14, 14, '63.	Flap. Discharged Feb. 17, 1864.
44	*Cribb, D. W. P.*, Pt., F, 25th Georgia.	May 12, 13, '64.	Left; Surg. Gelks, 26th Georgia. Recovery.
45	Criss, S. G., Pt., A, 7th West Virginia, age 19.	May 24, 24, '64.	Right; flap; Surg. D. W. Maull, 1st Del. Disch'd May 27, 1865.
46	Crowley, D., Pt., F, 25th New York, age 35.	Sept. 17, 17, '62.	Right. Discharged.
47	Cue, E., Pt., F, 97th New York.	Sept. 17, 18, '62.	Right; flap. Disch'd May 15, '63.
48	Curtis, E. D., Serg't, I, 1st Penn. Res., age 25.	July 2, 3, '63.	Right; flap. Disch'd February 3, 1864.
49	Dart, E. S., Pt., G, 8th Michigan.	June 16, 17, '62.	Left. Discharged Oct. 18, 1862.
50	*Davis, S. M.*, Pt., A, 24th Georgia.	July 1, 1, '64.	Left; Surg. Mitchell, C. S. A. Recovered.
51	Dailey, P., Pt., G, 140th New York, age 29.	May 5, 6, '64.	Right; flap; Confederate surgeon. Disch'd June 11, 1865.
52	Dana, D. Z., Pt., B, 60th New York, age 35.	June 15, 15, '64.	Right; circ.; Surg. H. B. Whiton, 60th N. Y. Disch'd Mar. 7, '65.
53	*Dean, H. H.*, Pt., Provost Guard.	July 18, 20, '63.	Surgeon Gleeves, C. S. A. Recovered.
54	Dell, F., Pt., F, 70th New York, age 21.	May 1, 2, '62.	Right; Ass't Surg. J. Ash, 70th N. York. Disch'd Oct. 13, '62.
55	Delcher, P., Pt., K, 3d N. Y. Cavalry, age 42.	May 16, 16, '64.	Left; flap; Confederate surgeon. Disch'd March 8, 1865
56	Dermock, T., Pt., B, 7th Conn., age 27.	Oct. 8, 8, '63.	Left; flap; Surg. G. C. Jarvis, 7th Conn. Disch'd Dec. 24, 1863.
57	Donohue, J. S., Capt., A, 8th Michigan, age 27.	May 6, 7, '64.	Left; circ.; Surg. W. B. Fox, 8th Mich. Disch'd Sept. 28, 1864.
58	Downs, T., Pt., F, 88th New York, age 38.	Sept. 17, 17, '62.	Right; Surg. F. Reynolds, 88th N. Y. Sept. 29th, hæm., fem. tied. Disch'd March 13, 1863.
59	[1] *Duncan, M. I.*, Serg't, G, 21st Virginia.	Oct. 26, 27, '63.	Right; circ.; Surgs. Coleman and Fleming, C. S. A. Fur. Jan. 11, '64.
60	Dunlap, I. N., Pt., I, 17th Illinois.	Feb. 15, 15, '62.	Left; flap; Surg. C. Goodbrake, 20th Ill. Disch'd Mar. 28, 1862.
61	Dunham, C. R., Pt., H, 1st Maryland, age 30.	June 3, 3, '64.	Right; circ.; Surg. A. A. White, 8th Md. Disch'd Mar. 30, 1865.
62	*Emmitt, J.*, Serg't, C, 56th North Carolina.	July 30, 30, '64.	Left; Surg. C. H. Ladd, C. S. A. Recovery.
63	Eveland, J., Pt., E, 7th Illinois.	Oct. 4, 4, '62.	Right. Jan. 15, 1863, loose skin cut off. Discharged.
64	*Ferguson, S.*, Pt., D, 14th N. Carolina, age 28.	Sept. 17, 18, '62.	Left; Surg. Tracy, C. S. A. Retired March 16, 1865.
65	Finn, T. Lieut., D, 7th West Virginia, age 21.	June 3, 3, '64.	Left; circ.; Surg. D. W. Maull, 1st Del. Disch'd Dec. 19, 1864.
66	Fisher, H. J., Pt., K, 102d Illinois, age 24.	Mar. 16, 16, '65.	Left; flap; Surg. W. Hamilton, 102d Ill. Disch'd June 14, 1865.
67	*Fisher, J. A.*, Serg't, E, 52d Virginia.	Aug. 9, 10, '62.	Right; Surg. Waddell, C. S. A. Disch'd Oct. 7, 1862.
68	[2] Fischer, F., Lieut., K, 47th Ohio, age 26.	May 19, 20, '63.	Right; circular. Disch'd Dec. 15, 1863.
69	Fisher, J., Lieut., K, 17th Indiana, age 24.	Oct. 28, 28, '64.	Left; Surg. Fountain, 2d Ala. Cav. Disch'd May 15, 1865.
70	Fitzgerald, P., Pt., A, 7th Wisconsin, age 18.	June 18, 18, '64.	Left; circular. Disch'd May 25, 1865.
71	*Fitzhugh, H.*, Lieut., Purcell's Battery.	.....	Antero-internal large and small post. flap at neck of fem.; Surgs. G. R. C. Todd and Taney, C. S. A. Recov'd. Died two years later.
72	*Flemming, D.*, Pt., D, 5th C. S., age 27.	Nov. 30, 30, '64.	Right; ant. post. flap. To Provost Marshal March 7, 1865.
73	Foote, F. W., Lieut., I, 121st N. York, age 22.	May 10, 11, '64.	Left; flap; Surg. McGuire, C. S. A. Disch'd Sept. 27, 1864.
74	Foster, R., Corporal, B, 16th Penn., age 24.	April 5, 5, '65.	Left; circular. Disch'd August 21, 1865.
75	Fox, J., Pt., K, 1st Cavalry, age 20.	Aug. 10, 10, '64.	Right; ant. post. flap; Confed. surgeon. Disch'd July 6, 1865. *Spec.* 3224.
76	French, S. S., Pt., I, 9th N. Hampshire, age 18.	June 17, 17, '64.	Right; flap. Disch'd July 26, '65.
77	Fry, W., Serg't, K, 123d Ohio, age 26.	April 2, 2, '65.	Left; circ.; Surg. H. C. Levensaeler, 8th Mc. Recovery.
78	Gay, T. E., Pt., H, 9th Ohio Cavalry, age 19.	April 22, 22, '64.	Left; flap; Ass't Surg. J. C. Thorpe, 9th Ohio. Disch'd Nov. 18, '64.
79	*Gilbert, R. T.*, Serg't, D, 18th Georgia, age 31.	July 2, 2, '63.	Right; circ.; Asst. Surg. Ramseur, C. S. A. Exch'd Nov. 12, 1863.
80	Golden, J., Pt., B, 2d U. S. Cavalry.	July 21, 21, '63.	Left; Asst. Surg. C. J. Wilson, U. S. A. Disch'd Mar, 16, 1864.

[1] DAVIS (W. A.), *Case of Tetanus—Recovery*, in *Confed. States Med. and Surg. Journal*, 1864, Vol. I, No. I, p. 8.

[2] BRYAN (J.), *Cases of Amputations from the Armies of the Southwest*, in *Am. Med. Times*, 1863, Vol. 7, p. 288.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
81	Goodman, J. E., Serg't, D, 147th Penn., age 21.	Nov. 27, 27, '63.	Left; circ.; Surg. H. E. Goodman, 28th Penn. Disch'd Sept. 19, '64.
82	Goodwin, W. H., Pt., B, 9th Missouri S. M. Cav.	Aug. 6, 6, '62.	Left; flap. Disch'd February 19, 1863.
83	Grim, F. M., Pt., F, 140th Pennsylvania, age 18.	June 18, 19, '64.	Left; Surg. J. W. Wishart, 140th Penn. Disch'd May 16, 1865.
84	*Grims, W.*, Pt., I, 49th Virginia, age 17.	May 31, Je. 1, '64.	Right; circ. To prison Oct. 1, 1864.
85	Hall, J. D., Pt., K, 1st Delaware, age 18.	Oct. 27, 28, '64.	Left; flap. Disch'd June 22, '65.
86	Hall, J. W., Serg't, H, 6th Kentucky, age 24.	July 9, 9, '64.	Right; circular. Disch'd June 7, 1865.
87	Hall, A., Serg't, B, 153d New York, age 26.	Aug. 14, 15, '64.	Left; flap; Confederate surgeon. Disch'd June 23, 1865.
88	Haines, E., Pt., I, 8th Penn. Reserves, age 23.	May 6, 6, '64.	Right; circ.; Surg. C. Bowers, 6th Penn. Res. Disch'd Jan 18, '65.
89	Hamlink, D. F., Major, 4th N. Y. H. A., age 22.	Mar. 31, 31, '65.	Right; flap. Mustered out Sept. 26, 1865.
90	*Hamlet, S. B.*, Pt., K, 1st Mississippi, age 31.	Nov. 30, Dec. 1, 1864.	Right; ant. post. flap; Asst. Surg. W. E. Whitehead, U. S. A. Provost Marshal, May 6, 1865.
91	Hankins, D. W., Corp'l, E, 14th New Jersey, age 24.	June 1, 2, '64.	Right; double flap; Surg. J. S. Martin, 14th N. Jersey. Disch'd Jan. 23, 1865.
92	Harrison, S., Pt., A, 149th New York, age 25.	May 25, 26, '64.	Left; circ.; Surg. J. V. Kendall, 149th N. York. Reamputation. Disch'd July 15, 1865.
93	Harrington, H., Pt., B, 123d New York, age 26.	June 19, 20, '64.	Right; flap; Surg. J. Chapman 123d N. York. Disch'd Oct. 4, 1865. *Spec.* 586.
94	Hartford, W. H., Serg't, A, 5th N. York, age 28.	June 2, 3, '64.	Right; circ.; Confed. surgeon. Disch'd Aug. 7, 1865.
95	Harvey, E. H., Pt., A, 7th Mich. Cav., age 19.	May 28, 28, '64.	Right; ant. post. flap; Surg. S. R. Wooster, 1st Michigan Cav. Disch'd Dec. 25, 1864.
96	Hassler, J. A., Pt., H, 16th Penn. Cav., age 23.	Feb. 6, 7, '65.	Right; circ.; Surg. F. H. LeMoyne, 16th Penn. Cav. Dis. Aug. 6, '65.
97	Hayes, J. E., Lt. Col., 12th Kansas.	April 30, 30, '64.	Left. Mustered out June 30, '65.
98	*Hays, B. F.*, Pt., F, 3d Virginia.	Sept. 17, 17, '62.	Left; Surg. Mayo, C. S. A. Furloughed Oct. 30, 1863.
99	*Heflen, W. J.*, Pt., C, 9th Louisiana.	June 14, 15, '63.	Right; Surg. Love, C. S. A. Retired Oct. 22, 1864.
100	Henry, J., Pt., A, 57th New York.	May 5, 6, '64.	Right; circ.; Surg. D. Kelsey, 64th N. Y. Disch'd Jan. 18, 1865.
101	Henry, P., Pt., G, 2d Missouri.	Oct. 8, 8, '62.	Right; flap; Surg. C. Spinzig, 2d Missouri. Disch'd Jan. 3, 1863.
102	Hill, R. S., Capt., B, 2d Indiana Cavalry.	April 16, 16, '65.	Right. Mustered out July 22, '65.
103	Hill, A. F., Serg't, D, 8th Pennsylvania.	Sept. 17, 17, '62.	Left; flap. Disch'd June 21, '63.
104	Himes, A., Pt., D, 7th New York Heavy Art., age 25.	June 3, 5, '64.	Right; ant. post. flap; Surgs. Peel and Snelly, C. S. A. Discharged Jan. 20, 1865.
105	*Hogan, F.*, Sergeant, B, Huger's Battery.	June 1, 1, 64.	Left; circ; Surg. C. B. Gibson, C. S. A. Recovery.
106	Holbert, J., Pt., E, 20th Indiana, age 43.	Mar. 25, 25, '65.	Left; flap. Disch'd Aug. 2, 1865.
107	Holman, H., Pt., A, 25th Mass., age 35.	June 25, 26, '64.	Left; flap. Disch'd June 20, '65.
108	[1]*Hood, J. B.*, Lt. Gen'l, C. S. A.	Sept. 19, 19, '63.	Professor J. G. Richardson, of New Orleans. Recovery.
109	*Howard, N. J.*, Pt., H, 48th Alabama, age 33.	June 3, 4, '64.	Circular. Furloughed.
110	Hoyer, B., Pt., G, 107th Penn., age 18.	Sept. 17, 19, '62.	Right; flap; Surg. J. F. Hutchinson, 107th Penn. Disch'd July 13, 1863.
111	*Huder, A. L.*, Pt., H, 11th Georgia, age 20.	July 2, 3, '63.	Left. Exchanged Sept. 25, 1863.
112	*Hughes, G. W.*, Pt., B, 6th Georgia.	Mar. 20, 20, '64.	Right; Surg. Swann, C. S. A. Recovery.
113	Huston, W. G., Pt., K, 8th Indiana.	May 23, 23, '63.	Right; periosteum flap; Surg. J. K. Bigelow, 8th Ind. Disch'd October 8, 1863.
114	*Hutchinson, R. B.*, Pt., D, 7th South Carolina.	Sept. 17, 18, '62.	Right; Surg. T. H. Squire, 89th N. Y. Nov. 24th, bone removed, femoral opened, lig. Provost Marshal, April 27, 1863.
115	*Hyatt, R. F.*, Pt., C, 3d Arkansas, age 18.	Sept. 17, 19, '62.	Left; sloughing; gangrene. Discharged Nov. 24, 1862.
116	Ireland, A., Pt., B, 9th Maine, age 18.	Oct. 27, 27, '64.	Right; Surg. C. M. Clark, 39th Ill. Disch'd June 12, 1865.
117	*Irwin, I. M.*, Pt., G, 45th North Carolina, age 21.	Oct. 19, 19, '64.	Right. To Prov. Marshal April 1, 1865.
118	*Irving, D.*, Pt., H, 8th Louisiana, age 26.	Nov. 27, 27, '63.	Right; circular. Exchanged and retired February, 1865.
119	Jackson, J., Serg't, A 66th Illinois, age 30	May 9, 10, '64.	Left; circular. Disch'd June 7, 1865.
120	Jarrett, I., Serg't, A, 1st New Jersey Cavalry, age 18.	Mar. 31, Ap. 1, '65.	Left; circular; Surg. W. W. L. Phillips, 1st New Jersey Cav. Disch'd July 5, 1865.
121	Jessup, J., Lieut., B, 187th Pennsylvania.	June 18, 18, '64.	Right. Mustered out Aug. 7, '64.
122	Jones, D. M., Corp'l, I, 199th Penn., age 25.	April 2, 2, '65.	Right; flap; Surg. J. S. Taylor, 23d Ill. Must. out June 24, '65.
123	Jones, O., Pt., C, 27th Mass., age 19.	May 15, 15, '64.	Left; flap; Surg. W. H. Rice, 81st N. Y. Disch'd July 16, 1865.
124	Jones, S. P., Serg't, D, 121st Pennsylvania.	Dec. 13, 15, '62.	Right; flap; Confed. surgeon. Disch'd Dec. 3, 1863.
125	Judd, J. H., Pt., C, 86th New York, age 18.	Sept. 11, 11, '64.	Right; ant. post. flap; Surg. J. S. Jamison, 86th N. York. Disch'd Jan. 13, 1865. *Spec.* 4110.
126	*Kelly, T. A.*, Pt., E, 57th Alabama, age 19.	July 20, 22, '64.	Left; ant. post. flap; gang. To prison Aug. 21, 1865.
127	Kessler, M., Pt., A, 87th Penn., age 46.	Oct. 17, 19, '64.	Left; flap. Disch'd July 1, 1865.
128	*Key, J. J.*, Pt., E, 8th South Carolina, age 23.	July 1, 3, '63.	Right. Retired Feb. 7, 1865.
129	Kilbourn, G. L., Serg't, C, 137th N. Y., age 25.	July 2, 3, '63.	Left; Surg. H. B. Whiton, 6?th N. Y. Disch'd July 19, 1864.
130	Kilner, T. A., Corp'l, E, 16th Indiana, age 35.	Aug. 30, 30, '62.	Left; flap; Asst. Surg. J. D. Gatch, 16th Ind. Disch'd Oct. 24, '62.
131	Kiser, G., Serg't, G, 95th Ohio.	Aug. 30, 31, '62.	Right; circ.; Surg. H. Z. Gill, 95th Ohio. Disch'd Aug. 20, '63.
132	Klein, D., Pt., C, 64th Illinois, age 26.	July 22, 22, '64.	Left; ant. post. flap; Asst. Surg. H. A. Mix, 64th Ill. Hæm.; lig. Disch'd Feb. 6, 1866.
133	Knapp, L., Pt., B, 111th New York, age 21.	May 18, 18, '64.	Left; flap; Surg. W. S. Cooper, 125th N. Y. Disch'd Oct. 5, '65.
134	Knapp, D. E., Pt., K, 65th Illinois, age 21.	July 19, 19, '64.	Left; circ.; Surg. C. S. Frink, U. S. V. Mustered out July 12, '65.
135	*Langston, G. M.*, Serg't, I, 3d S. Carolina, age 37.	July 2, 3, '63.	Right; flap. Exchanged March 17, 1864.
136	Lawrence, J., Pt., B, 37th Wisconsin.	July 30, 30, '64	Right; flap. Disch'd April 24, '65.
137	*Leich, J.*, Serg't, A, 27th North Carolina.	Sept. 27, 28, '63.	Right; Surg. Walker, C. S. A. Recovered.
138	Lewis, W. W., Pt., K, 95th Ohio.	June 10, 11, '64.	Right; flap; Confederate surgeon. Discharged.
139	Lindsley, D., Pt., C, 29th Ohio, age 22.	May 8, 8, '64.	Right; Surg. A. K. Fifield, 29th Ohio. Disch'd Jan. 9, 1865.
140	*Lock, J.*, Serg't, I, 2d North Carolina.	Sept. —, —, '62.	Right. Furloughed April 13, '64.
141	Loftis, W. J., Pt., K, 5th Tenn., age 22.	May 27, 27, '64.	Left; ant. post. flap; Surgeon J. Sympson, 24th Ky. Disch'd May 6, 1865.
142	Lowe, W., Pt., F, 9th Maryland, age 17.	Oct. 18, 18, '63.	Right; circ.; Surg. R. R. Clarke. 34th Mass. M. O. Feb. 2. '64.
143	Lumphrey, O., Serg't Major, 1st N. Y. Cav.	April 6, 6, '65.	Left; Surg. T. S. Gardner, 17th Penn. Cav. Disch'd July 24, '65.
144	Maass, L., Pt., F, 1st Indiana Battery.	July 13, 13, '63.	Right; flap; Surg. G. P. Rex, 33d Illinois. Disch'd Dec. 16, 1863.
145	Mahoney, J., Pt., A, 11th New York Cav., age 21.	June 14, 15, '64.	Left; ant. post. flap; Surg. C. Gray, 11th N. Y. Cav. Disch'd March 30, 1865.
146	*Manning, G. M.*, Lieut., C, Phillips's Legion.	Nov. 29, 29, '63.	——; Surg. Shine, C. S. A. Furloughed Oct. 15, 1864.
147	Martin, C. A., Serg't, F, 28th Penn., age 27.	July 20, 21, '64.	Right; ant. post. flap. Disch'd July 2, 1865.
148	*Matlock, J. M.*, Pt., A, 1st Arkansas Battery.	Aug 27, 27, '63.	——; Surgs. Mitchell and Ford, C. S. A. Recovered.
149	*McCabe, J. P.*, Serg't, F, 2d Virg'a Cav., age 26.	Oct. 11, 11, '63.	Right; Surg. Shackleford, C. S. A. Retired Feb. 28, 1865.
150	McClain, J. S., Pt., K, 79th Indiana.	Dec. 31, 31, '62.	Left; flap; Surg. L. Manker, 79th Ind. Disch'd March 6, 1863.
151	*McConkey, S. L.*, Pt., G, 37th Tennessee.	Sept. 20, 21, '63.	——; Surg. Hall. Recovered.
152	McCord, C. P., Corp'l, K, 23d Iowa.	May 17, 17, '63.	Left; Surg. W. H. White, 23d Iowa. Disch'd Aug. 20, 1863.
153	McCurley, J., Pt., B, 1st Pennsylvania Art'y.	Aug. 29, 29, '62.	Right. Disch'd Oct. 29, 1862.
154	McDaniels, S., Pt., D, 75th Ohio.	April 11, 13, '62.	Left; flap; Surg. C. L. Wilson, 75th Ohio. Disch'd June 2, '62.
155	McFarland, R. W., Corporal, C, 3d Wis., age 23.	May 25, 26, '64.	Left; circular. Disch'd May 26, 1865.
156	McKee, S. T., Pt., E, 4th Penn. Cav., age 21.	Mar. 31, Ap. 1, '65.	Left; circular. Disch'd June 14, 1865.
157	McLaughlin, M., Pt., A, 24th Conn., age 34.	Mar. 16, 16, '65.	Left; circular. Disch'd Oct. 3, 1865.
158	McMahon, D., Capt., D, 89th New York.	July 1, 3, '63.	Left; flap. Disch'd June 23, '64.
159	McNulty, C., Pt., A, 23th Massachusetts.	Sept. 17, 18, '62.	Right; flap; Surg. B. A. Vanderkeift, U. S. V. Disch'd Mar. 23, '63.
160	*Milling, R. R.*, Pt., G, 3d S. Carolina Battery.	Sept. 20, 21, '63.	Right; Surgeon Walker, C. S. A. Recovered.
161	Moore, J. H., Corp'l, K, 2d New York Heavy Artillery, age 26.	Aug. 25, 26, '64.	Right; circular; Surgeon J. W. Wishart, 140th Penn. Disch'd March 22, 1865.
162	Moore, P., Pt., E, 26th Mass., age 32.	Sept. 19, 19, '64.	Left; ant. post. flap; Surg. J. G. Bradt, 26th Mass. Disch'd Oct. 30, '65. Died Dec. 5, 1869.
163	Mosher, D. H., Pt., B, 8th Mich., age 24	May 6, 8, '64.	Right; Surg. W. B. Fox, 8th Michigan. Disch'd Jan. 24, '65.
164	Murphy, E., Lieut., A, 5th Cavalry, age 26.	Sept. 19, 20, '64.	Left; skin flap; Asst. Surg. J. W. Williams, U. S. A. Retired April 25, 1865.
165	Myers, S., Pt., C, 183d Pennsylvania, age 18.	May 2, 2, '64.	Left; circular; Surg. D. H. Houston, 2d Del. Disch'd June 8, '65.
166	*Neatis, J. P.*, Serg't, E, 23d Virginia Cavalry.	July 3, 5, '63.	Left. Recovered.

[1] SMITH (STEPHEN), *Analyses of 439 amp. in the contiguity of the lower extremity*, in *Memoirs of the U. S. San. Com.*, 1871, Surg. II, p. 64.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
167	Nelson, J., Lieut., K, 18th Penn'a Cavalry, age 42.	Feb. 26, 26, '63.	Right; ant. post. flap; Surg. J. J. Marks, 18th Penn. Cavalry. Discharged.
168	Nuthmann, A., Pt., D, 39th New York, age 40.	May 6, 8, '64.	Left; circ.; Surg. G. L. Potter, 145th Penn. Disch'd Dec. 9, '64.
169	O'Brien, E., Pt., A, 63d New York, age 24.	May 18, 18, '64.	Right; circ.; Surg. P. E. Hubon, 28th Mass. Disch'd April 9, '66.
170	O'Connell, T., Pt., H, 124th N. York, age 24.	July 2, 4, '63.	Left; circular. Disch'd June 15, 1865. Died June 9, 1872.
171	*Olive, J. W. A.*, Corp'l, H, 3d Arkansas.	May 6, 6, '64.	Right; Surgeon Brown, C. S. A. Recovered.
172	Park, W. B., Corp'l, E, 2d Michigan, age 20.	July 11, 11, '63.	Left (injuring popliteal artery); circ.; Surgeon E. J. Bonine, 2d Mich. Disch'd April 9, 1864.
173	Payne, I. A., Pt., K, 1st Colored Troops, age 18.	Oct. 27, 28, '64.	Left; lateral flap; Confederate surgeon. Disch'd July 12, 1865.
174	Peach, G. S., Serg't, B, 24th Mass., age 29.	April 11, 11, '63.	Right; circ.; Surg. S. A. Green, 24th Mass. Disch'd May 10, 1864.
175	*Perkins, L. A.*, Corp'l, D, 15th Virginia, age 19.	Sept. 19, 19, '64.	Right; circ.; Surg. Buvard, C.S.A. Provost Marshal, April, 1, 1865.
176	Peterson, W., Pt., K, 3d Vermont, age 30.	June 3, 3, '64.	Right; double flap; Surg. D. M. Goodwin, 3d Vt. Dis. June 6, '65.
177	Phillips, W. D., Serg't, I, 10th N. York Heavy Artillery, age 28.	April 2, 2, '65.	Left; ant. post. oval flap; Confed. surgeon. Necr. bone removed. Disch'd Oct. 17, 1865.
178	Pinkney, J. H., Pt., C, 4th Cl'd Troops, age 33.	Sept. 29, 29, '64.	Right; flap. Disch'd Dec. 20, '65.
179	Pluss, W., Pt., E, 23d Michigan, age 39.	May 14, 14, '64.	Left; circ.; Surg. D. L. Heath, 23d Mich. Disch'd July 18, 1865.
180	*Powell, F.*, Pt., A, 10th Louisiana.	Aug. 29, 30, '62.	Left; Surg. Tanney, C.S.A. Retired Oct. 22, 1864.
181	Purcell, J., Pt., A, 20th Connecticut, age 23.	Mar. 16, 16, '65.	Left; ant. post. skin flap; Surg. J. W. Terry, 20th Conn. M. O. June 13, 1865.
182	*Pullien, R.*, Pt., E, 47th North Carolina.	July 3, 3, '63.	Right. Exch'd Oct. 26, 1863.
183	Pyle, A. J., Corp'l, F, 51st Indiana, age 25.	April 30, 1863.	Right. Disch'd Sept. 23, 1863. Died Jan. 11, 1867.
184	Quinn, P., Serg't, E, 1st Louisiana Cavalry.	April 7, 7, '64.	Right; circular. Disch'd June 10, 1864.
185	Redmond, M., Serg't, F, 63d New York.	Sept. 17, 18, '62.	Right; circ.; Surg. G. B. Cogswell, 29th Mass. Disch'd May 20, 1863.
186	Rennells, A. L., Corp'l, K, 149th Pennsylvania.	May 12, 12, '64.	Right; flap; Surg. W. D. Humphrey, 149th Penn. Disch'd July 18, 1865.
187	*Richmond, J. L.*, Pt., G, 6th South Carolina.	June 27, 1864.	Right. Retired from service Sept. 6, 1864.
188	Riley, J. H., Corp'l, K, 78th Illinois, age 21.	Sept. 1, 1, '64.	Left; lat. flap; Surg. W. M. Gray, 60th Ills. Gang. Dis. Feb. 8, '65.
189	Rohne, A. W., Pt., K, 123d Ohio.	June 13, 13, '63.	Right; flap. Disch'd Oct. 26, '63.
190	Rogers, E., Pt., C, 103d Pennsylvania.	Oct. 3, 3, '62.	Right. Disch'd March 12, 1863.
191	*Royal, J. B.*, Pt., F, 59th Georgia.	July 3, 3, '63.	——; Surg. Harris, C. S. A. Paroled Oct. 22, 1863.
192	Sandford, G. P., Comis'y Serg't, F, 2d West Virginia Cav., age 24.	April 6, 6, '65.	Right; ant. post. flap. Recovery. Mustered out June 30, 1865.
193	Schenkelberger, J., Lt., I, 1st New York Art'y.	Aug. 29, 29, '62.	Left; circ. inside, flap externally; A. A. Surg. J. B. Greene. Discharged Dec. 17, 1862.
194	Schleier, M., Pt., B, 3d Iowa, age 29.	Aug. 14, 14, '64.	Right; circular. Disch'd Aug. 15, 1865.
195	Schneider, E., Pt., H, 5th Artillery.	Sept. 19, 21, '63.	Left; flap. Disch'd Feb. 24, '64.
196	Schwartz, P., Pt., F, 46th New York, age 20.	July 30, 30, '64.	Right; double flap; Surg. W. B. Fox, 8th Mich. Dis. Apr. 3, '65.
197	Shea, A., Pt., C, Purnell's Legion, age 20.	June 18, 18, '64.	Right; circ.; Surg. J. S. O'Donnell, Purnell Legion. Disch'd Oct. 28, 1864.
198	Sheldon, D. D., Serg't, B, 14th Missouri.	May 23, 23, '62.	Left; circular. Disch'd Nov. 11, 1862.
199	Shomers, P., Pt., A, 140th N. York, age 41.	June 2, 2, '64.	Right; flap; Confed. surgeon. Disch'd Aug. 11, 1865.
200	[1] Simpson, W., Courier, Iowa, age 24.	Sept. —.	Left; ant. post. flap; Surg. E. Batwell, 14th Mich. Disch'd. Not a pensioner.
201	*Sluder, A. L.*, Pt., H, 11th Georgia, age 20.	July 2, 3, '63.	Left. Exchanged Sept. 25, 1864.
202	Small, G. W., Pt., K, 21st Penn. Cav., age 19.	June 3, 3, '64.	Right; circular. Disch'd August 2, 1865.
203	*Smith, B. S.*, Pt., A, 48th Mississippi, age 49.	June 30, July 1, '62.	Right; cir. Escaped August 18, 1863.
204	Smith, J., Pt., B, 2d Massachusetts, age 29.	Mar. 16, 16, '65.	Right; ant. post. flap. Disch'd Sept. 12, 1865.
205	Smith, S. D., Pt., C, 7th N. Hampshire, age 30.	July 18, 20, '63.	Left; circ.; Con. surg. Disch'd April 13, 1864. *Spec.* 1856.
206	Snyder, W. E., Pt., F, 7th Kentucky.	May 22, 22, '63	Left. Disch'd Sept. 4, 1863.
207	Space, J. D., Pt., I, 15th New Jersey, age 21.	Aug. 17, 18, '64.	Right; circ.; Surg. J. W. Miller, C. S. A. Disch'd June 24, '65.
208	Springer, J. M., Corp'l, B, 40th Illinois.	April 6, 8, '62.	Right; flap. Disch'd July 10, 1862.
209	Stackhouse, P. J., Pt., C, 2d Penn. Res., age 34.	July 2, 4, '63.	Left; ant. post. flap. Disch'd May 3, 1864.
210	Steinberger, W., Pt., A, 23d Indiana.	May 1, 1, '63.	Left; flap. Recovered; disch'd.
211	Stiensberger, M., Pt., H, 11th Penn., age 30.	Mar. 31, 31, '65.	Left; flap. Disch'd June 9, 1865.
212	Stoddard, A., Pt., G, 4th N. Hampshire, age 33.	Sept. 1, 1, '63.	Left; flap; Surg. S. A. Green, 24th Mass. Disch'd June 16, '64. *Spec.* 4306.
213	Stoughton, W. L., Col., 11th Michigan.	July 4, 4, '64.	Right; Surg. W. N. Elliott, 11th Mich. Disch'd Sept. 30, 1864.
214	Stocks, G. W., Pt., I, 3d Iowa.	July 12, 12, '63.	Left; flap. Disch'd Oct. 1, 1863.
215	Streeter, H. R., Pt., A, 85th Illinois, age 28.	Aug. 9, 9, '64.	Right; flap; Surg. H. R. Payne, 10th Ills. Disch'd Nov. 7, 1865
216	Strickland, N., Pt., C, 203d Penn., age 20.	Jan. 15, 15, '65.	Right; circ.; Surg. J. W. Mitchell, 4th C. T. Mar. 8th, reamp.
217	Stuckey, J. S., Capt., D, 138th Penn., age 30.	Sept. 19, 20, '64.	Right. Surg. C. E. Cady, 138th Penn. Disch'd Feb. 8, '65.
218	Sweet, L., Corp'l, C, 88th Indiana, age 33.	Mar. 19, 20, '65.	Left; flap; Confederate surgeon. Disch'd Oct. 4, 1865.
219	Taggart, J. N., Pt., G, 1st West Virginia L.A., age 23.	Aug. 26, 26, '63.	Left; ant. post. flap; Surg. W. B. Wynne, 14th Penn. Cavalry. Disch'd June 14, 1864.
220	Tanner, J., Pt., C, 38th New York.	Sept. 1, 1, '62.	Left; circular. Disch'd June 3, 1863.
221	Tarcott, A., Pt., A, 94th New York, age 18.	Dec. 13, 14, '62.	Right; long post. flap; Surg. G. W. Avery, 94th N. Y. Disch'd Nov. 12, 1863. *Spec.* 1373.
222	*Taylor, M. C.*, Pt., G, 4th North Carolina Cav.	June 19, 20, '63.	Right. Furloughed Nov. 3, 1863.
223	Terry, J., Pt., B, 72d Ohio, age 23.	July 3, 4, '63.	Left; flap. Disch'd Nov. 20, '64.
224	Thompson, W., Signal Quartermaster, U.S.N.	Nov. 7, 7, '61.	Right; flap; Surg. J. T. Kitchen, U. S. N. Disch'd July 22, '62. Died Sept. 12, 1872.
225	Thresher, A., Pt., I, 66th Illinois.	June 28, 28, '64.	Left; flap; Surg. E. Guilick, 9th Ills. Disch'd Aug. 1, 1865.
226	*Tucker, R.*, Pt., K, 19th Arkansas, age 21.	July 22, 22, '64.	Left; flap. Recovery.
227	[2] *Tucker, J.*, Serg't, G, 4th Tenn. Cav., age 40.	May 9, 9, '64.	Right; flap. May 14th, reamp. Furloughed.
228	Uhl, G., Serg't, K, 20th Indiana, age 22.	Mar. 25, 25, '65.	Left; flap. Disch'd July 6, 1865.
229	Vangorden, J. S., Pt., C, 14th Infantry.	June 6, 7, '62.	Left. Disch'd Sept. 4, 1862.
230	Vaughan, J. F., Lieut., K, 7th Indiana, age 32.	June 1, 1, '64.	Left; Surg. G. W. New, 7th Ind. Disch'd Sept. 20, 1864.
231	Vebber, H. H., Serg't, D, 10th N. Y. Art., age 33.	April 2, 4, '65.	Right; circ.; Surg. O. S. Copeland, 10th New York Artillery. Disch'd Oct. 5, 1865.
232	Vechan, C., Pt., D, 12th New Jersey, age 24.	May 10, 11, '64.	Right; circ.; Surg. A. Satterthwaite, 12th N. Jersey. Disch'd July 18, 1865.
233	*Vinzant, J.*, Serg't, A, 1st Florida, age 26.	Dec. 4, 6, '64.	Right; ant. post. flap. Paroled July 15, 1865.
234	Wait, A., Corp'l, D, 127th Illinois, age 21.	July 28, 28, '64.	Left; flap; Surg. A. C. Messenger, 57th Ohio. Disch'd Mar. 23, '65.
235	*Walker, G.*, Serg't, K, 40th Virginia.	June 26, 27, '62.	Right; Surgeon Spence, C. S. A. Recovered.
236	Wallace, S. F., Pt., D, 178th N. York, age 18.	April 9, 9, '64.	Left; flap. Disch'd June 25, '65. 4325, stump tender.
237	Wakefield, S., Pt., K, 95th Illinois.	May 18, 19, '63.	Left; flap; Surg. J. W. Green, 95th Ill. Disch'd Aug. 11, '63.
238	Warren, G. W., Pt., B, 20th Indiana.	June 25, 26, '62.	Left; flap; Surg. M. Gunn, 5th Mich. Disch'd Aug. 21, '62.
239	Waters, P., Pt., C, 4th Col'd Troops, age 45.	Sept. 29, 30, '64.	Left. Disch'd April 10, 1865.
240	*Watkins, J. D.*, Serg't, I, 52d North Carolina.	Dec. 17, 17, '62.	Left; Surg. Warren, C. S. A. Recovered.
241	Watkins, L. D., Pt., E, 55th Penn., age 21.	June 18, 20, '64.	Left. Disch'd Dec. 20, '64. *Spec.* 4325.
242	Webb, J. M., Lieut., D, 17th Maine, age 29.	April 6, 6, '65.	Left; flap; Surg. N. A. Hersom, 17th Maine. M. out June 4, '65.
243	Wedeking, J. H., Pt., A, 114th Illinois, age 20.	July 16, 16, '63.	Right; ant. post. flap; Surg. H. Z. Gill, U. S. V. Disch'd May 20, 1864.
244	[3] Weeks, J. D., Pt., G, 3d Col'd Troops, age 20.	Nov. 14, 14, '63.	Left; oblique flap; Surg. S. W. Gross, U. S. V. Also amp. arm. Dis. July 26, '65, and pensioned.
245	Welch, W., Pt., D, 33d New Jersey, age 19.	May 8, 9, '64.	Left; circ.; Confederate surgeon. Disch'd Aug. 20, 1865.
246	Welsh, J., Pt., A, 4th Penn. Cav., age 27.	Aug. 16, 16, '64.	Right. Disch'd Feb. 9, 1865.
247	*Westmoreland, M.*, Pt., B, Nelson's Battery.	July 22, 22, '64.	——; Surg. J. Semple, C. S. A. Recovered.

[1] BATWELL (E.), *Successful Amputation at the Hip Joint*, in *Med. and Surg. Reporter*, 1865, Vol. XIII. p. 188.

[2] O'KEEFE (D. C.), *Surgical Cases of Interest treated at Institute Hospital, Atlanta, Ga., May and June*, 1864, in *Confederate States Med. and Surg. Jour.*, 1865, Vol. II, p. 25.

[3] GROSS (S. W.), *Synchronous Amputation of the Left Thigh at its Upper Third and of the Left Arm*, in *Am. Med. Times*, 1864, Vol. VIII. p. 122.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
248	Wiatt, T., Pt., A, 24th Kentucky, age 32.	June 1, 1, '64.	Right; flap. Disch'd March 22, 1865.
249	Wiggins, W. W., Corp'l, E, 5th Wis., age 34.	May 12, 12, '64.	Right; flap; Surg. C. R. Crane, 5th Wis. Mustered out 1864.
250	Wilbur, D., Serg't, K, 1st Maine H.A., age 37.	Oct. 27, 29, '64.	Right; ant. post. flap; Confed. surgeon. Mustered out 1865.
251	Willey, R., Pt., E, 40th Illinois.	April 6, 8, '62.	Left; circ. Disch'd Aug. 4, 1862.
252	*Wilkinson, H. T.*, Lieut., C, 22d Virginia, age 25.	Nov. 27, 28, '63.	Right; circular. Trans. Dec. 3, 1863.
253	Winn, J. J., Quartermaster U. S. S. Oneida, age 33.	April 22, 22, '62.	Left; Surg. J. Y. Taylor, U. S. N. Also amp. left arm. Disch'd Nov. 17, 1862.
254	*Wise, G. C.*, Pt., B, 14th South Carolina, age 20.	May 6, 6, '64.	Left. Surg. Huger, C. S. A. Retired from service Feb. 11, 1865.
255	Wolf, A., Pt., I, 38th Wisconsin.	April 2, 2, '65.	Left; flap; also amp. finger right hand. Disch'd Sept. 6, 1865.
256	Wormwood, C., Pt., B, 97th New York, age 19.	June 4, 4, '64.	Right. Disch'd. *Spec.* 1464.
257	*Worthy, C. W.*, Pt., H, 15th S. Carolina, age 21.	June 22, 22, '64.	Right; circ. Furloughed August 16, 1864.
258	Yeagle, J., Pt., C, 111th Penn., age 25.	May 25, 25, '64.	Left; flap; Surg. G. P. Oliver, 111th Penn. Disch'd Feb. 8, '65.
259	*Yerwood, T. L.*, Pt., H, 19th Georgia.	Aug. 9, 10, '62.	——; Surg. Beckie. Recovered.
260	York, D. P., Pt, B, 19th Maine, age 30.	Sept. 19, 20, '64.	Left; circ.; Surg. H. Fearn, 175th N. York. Disch'd Dec. 30, '64.
261	*Able, P.*, Pt., A, 49th Virginia.	May 30, 31, '64.	Left; ant. post. flap. Died July 1, 1864; pyæmia.
262	Aikens, R. N. G., Serg't, B, 109th N. Y., age 21.	June 10, 10, '64.	Right; Asst. Surg. J. S. French. 109th N. York. Irritative fever. Died Sept. 17, '64; exhaustion.
263	Albert, H. C., Corp'l, A, 1st Cavalry, age 21.	July 27, 27, '64.	Right; flap. Died Aug. 19, 1864; exhaustion.
264	Allison, J. J., Serg't, B, 39th Mass., age 40.	June 19, 19, '64.	Right. Died July 30, 1864.
265	Anderson, R., Lieut., I, 31st Iowa.	May 21, 21, '63.	Flap; Surg. J. C. Morgan, 29th Missouri. Died May 22, 1863.
266	Anderson, S. P., Pt., D, 118th Pennsylvania.	Sept. 20, 20, '62.	Right. Died Sept. 29, 1862.
267	Angle, T., Pt., D, 100th Colored Troops, age 21.	Dec. 16, 17, '64.	Left; circ.; Surg. J. R. Ludlow, U.S.V. Died Dec. 30, '64; exh'n.
268	Arms, A. I., Pt., H, 71st New York.	July 2, 2, '63.	Also amp. arm. Died July 3, '63.
269	Armstrong, J., Pt., B, 14th New York H. Art.	July 18, 18, '64.	Left; circ.; Surg. T. F. Oakes, 56th Mass. Died July 21, 1864.
270	Armstrong, J., Pt., A, 2d Rhode Island.	June 25, 25, '62.	Right. Died July 6, 1862.
271	Armstrong, S. H., Pt., A, 13th C. T., age 24.	Dec. 16, 17, '64.	Right. Died January 1, 1865.
272	Asherwood, J., Pt., G, 7th N. Y. H. Art'y, age 30.	June 16, 16, '64.	Left; ant. post. flap. Died June 28, 1864; exhaustion.
273	Aylesworth, E. G., Pt., G, 147th New York.	July 2, 3, '63.	Right. Died July 10, 1863.
274	Babcock, W., Lt. Col., 75th New York.	Sept. 19, 19, '64.	Left; ant. post. flap. Died Oct. 5, 1864; pyæmia.
275	*Bailey, W.*, Pt., D, 31st N. Carolina, age 23.	May 16, 16, '64.	Left; flap. Died June 14, 1864.
276	*Bailey, J.*, Pt., E, 35th Alabama, age 29.	Nov. 30, Dc. 1, '64.	Left; ant. post. flap. Died Jan. 28, 1865; exhaustion.
277	Ball, C. A., Corp'l, D, 14th N. Hamp., age 45.	Sept. 19, 19, '64.	Right; ant. post. flap; pyæmic. Died Oct. 25, 1864.
278	Barr, S., Serg't, B, 3d Iowa Cavalry, age 23.	Oct. 22, 22, '64.	Left; oval flap. Died Nov. 28, 1864; irritative fever.
279	*Barnes, R. G.*, Sergeant Major, 52d N. Carolina.	July 3, 3, '63.	Right. Died July, 1863.
280	Bartlett, M. H., Pt., D, 4th Vermont, age 19.	July 10, 10, '63.	Left; circ. Died August 3, '63; exhaustion. *Spec.* 3887.
281	Barrett, A., Pt., H, 4th Indiana Cavalry.	Oct. 4, 5, '63.	Left; double flap; Asst. Surg. J. E. Link, 21st Ill. Died Oct. 7, '63.
282	*Beatty, C. L.*, Capt., A, Palmetto S. S.	Aug. 14, 14, '64.	Died August 15, 1864.
283	*Bell, J. C.*, Pt., A, 13th South Carolina.	July 28, 28, '64.	Circ.; Ast. Surg. W. F. Richardson, C.S.A. Died July 30, '64; exh'n.
284	Bennett, L., Pt., D, 141st Pennsylvania.	July 3, 3, '63.	Died July 10, 1863.
285	*Bennett, J. W.*, Major, 10th Missouri Cavalry.	Sept. 27, 27, '64.	Left. Died November 15, 1864.
286	Berguist, G., Pt., C, 95th New York, age 33.	June 17, 17, '64.	Left; ant. post. flap. Died Aug. 4, 1864; pyæmia.
287	Biltz, G. C., Serg't, E, 108th Ohio.	May 14, 14, '64.	Right. Died May 24, 1864.
288	Bishop, M. G., Serg't, E, 5th Connecticut.	July 20, 20, '64.	Right. Died July 28, 1864.
289	Bollonbaugh, J., Pt., E, 93d Ohio.	June 28, 28, '64.	Right. Died July 28, 1864.
290	Bowers, J. C., Capt., D, 184th Penn., age 20.	June 2, 2, '64.	Right; Surg. J. L. Brinton, 8th Ohio. Died July 18, '64; exh'n.
291	*Boyce, S.*, Serg't, K, 30th North Carolina.	Nov. 8, 8, '63.	Left; Surg. H. F. Lyster, 5th Mich. Cav. Died Nov. 11, '63.
292	Boyd, J., Color Serg't, 2d Delaware.	July 2, 2, '63.	Left. Died.
293	Bragg, J., Pt., I, 42d New York.	Sept. 17, 17, '62.	Left. Died October 3, 1862.
294	Brandt, C., Pt., A, 1st Minnesota.	July 3, 3, '63.	Right. Died July 21, 1863.
295	Brennan, P., Pt., E, 169th New York, age 23.	Jan. 16, 16, '65.	Right; ant. post. flap; Surg. L. Barney, 6th Col'd Troops. Died Feb. 2, 1865; exhaustion.
296	Briggs, J., Pt., C, 79th Ohio.	May 25, 25, '64.	Right. Died June 11, 1864.
297	Brine, J. M., Pt., F, 27th Michigan.	July 30, 30, '64.	Right; Surg. W. B. Fox, 8th Michigan. Died July 30, 1864.
298	*Brooks, M.*, Serg't, H, 16th North Carolina.	July 3, 3, '63.	Right. Died July 18, 1863.
299	Browney, W., Pt., G, 73d New York.	July 3, 3, '63.	Left. Died July 13, 1863.
300	Brown, I., Pt., I, 142d Pennsylvania.	May 5, 5, '64.	Left. Died May 7, 1864.
301	Brown, J., Pt., K, 102d New York, age 27.	May 27, 27, '64.	Right; flap; Surg. C. H. Lord, 102d N. Y. Died Feb. 18, 1865.
302	*Brown, J. F.*, Pt., A, 15th South Carolina.	June 1, 1, '64.	Left; double flap. Died June 9, 1864.
303	Brown, J. W., Pt., F, 152d New York.	May 18, 18, '64.	Right; Surg. M. Rizer, 72d Penn. Died May 18, 1864.
304	*Brown, M. A.*, Pt., H, 25th S. Carolina, age 18.	May 16, 16, '64.	Flap. Died May 22, 1864.
305	Buch, J., Pt., H, 27th Iowa.	June 21, 21, '63.	Left; Surg. N. Gay, U. S. V. Died June 22, 1863.
306	*Burks, J. H.*, Pt., F, 9th Alabama.	June 24, 24, '64.	Died June 26, 1864.
307	Buras, A., Pt., F, 66th New York.	Sept. 17, 17, '62.	Surg. C. S. Wood, 66th N. York. Died Sept. 25, 1862.
308	Butler, A. K., Corp'l, F, 1st Michigan Cavalry.	Mar. 19, 20, '62.	Right; circular. Died March 27, 1862; pyæmia.
309	Cæsar, H., Captain, A, 52d New York.	May 1, 1, '63.	Right; Surg. C. S. Wood, 66th N. York. Died May 10, 1863.
310	Cairns, J. W., Pt., G, 5th Penn. Reserves.	May 9, 9, '64.	Surg. C. Bowers, 6th Penn. Died May 10, 1864.
311	Callahan, J., Pt, I, 1st New York Dragoons.	Aug. 10, 10, '64.	Died August, 1864.
312	Carue, W. W., Serg't, H, 20th Massachusetts.	Sept. 19, 20, '64.	Left; flap; Surg. J. G. Bradt, 26th Mass. Died Nov. 30, '64. *Sp.* 3796.
313	Camp, E. L., Serg't, G, 84th Illinois.	June —, —, '64.	Left; Surg. J. T. Woods, 99th Ohio. Died June 21, 1864.
314	Campbell, M., Pt., C, 11th Penn. Reserves.	July 2, 2, '63.	Left. Died August 1, 1863.
315	Campbell, J., Pt., K, 6th Vermont.	May 15, 15, '64.	Right. Died May 18, 1864.
316	Carpenter, C., Pt., L, 1st New York Artillery.	April 30, 30, '63.	Right; Surg. E. Shippen, U.S.V. Died May 2, 1863.
317	Carson, T. D., Pt., C, 4th Ohio.	May 3, 3, '63.	Surg. C. S. Wood, 66th N.Y. Died May 3, 1863.
318	Chambers, W., Pt., I, 4th New Jersey.	May 5, 5, '64.	Right. Died May 7, 1864.
319	Chisler, J., Pt., I, 8th Penn., age 19.	May 6, 6, '64.	Left; Surg. C. Bowers, 6th Penn. Reserves. Died May 13, 1864.
320	Churchill, A. W., Corp'l, G, 7th Mich. Cavalry, age 33.	Oct. 19, 19, '64.	Right; flap. Died Nov. 8, 1864; exhaustion; anemia.
321	Clapp, S. C. B., Lieut., H, 125th N. Y., age 22.	May 12, 12, '64.	Right; Surg. J. W. Wishart, 140th Penn. Died June 5, 1864.
322	Clarke, A., Pt., A, 69th Indiana.	Primary.	Right. Died November 7, 1862.
323	Coffing, J. C., Lieut., K, 10th Connecticut.	Dec. 14, 14, '62.	Right; Surg. F. G. Snelling, U. S. V. Died Dec. 25, '62; exh'n.
324	Collier, P., Pt., K, 3d Missouri Cavalry.	May 1, 1, '63.	Right. Died May 3, 1863.
325	*Combs, A. J.*, Pt., H, 39th Georgia, age 27.	Dec. 4, 4, '64.	Flap; A. A. Surg. W. Appley. Died Dec. 5, '64; hæmorrhage.
326	Condon, S., Pt., I, 87th New York, age 18.	June 25, 27, '62.	Right; July 7th. Died Sept. 2, 1862; pyæmia.
327	Conlin, W., Pt., H, 140th Pennsylvania.	July 3, 3. '63.	Left. Died July 15, 1863.
328	Connor, S. A., Pt., G, 62d Ohio, age 21.	Oct. 13, 13, '64	Right. Died Nov. 7, '64; tetanus.
329	Connor, P., Pt., D, 53d Pennsylvania.	June 1, 1, '62.	Right; June 26th, reamp. Died July 8, 1862; exhaustion.
330	Constine, L., Pt., C, 143d Pennsylvania.	May 11, 13, '63.	Circ.; Surg. W. T. Humphrey, 149th Penn. Died May 18, '63.
331	Coqtillet, I., Pt., G, 8th Ill. Cavalry, age 21.	Dec. 1, 2, '63.	Right; circ.; A. Surg. T. W. Stull, 8th Ill. Cav. Died Jan. 17, 1864. *Spec.* 1893.
332	Cowman, J., Pt., C, 81st Ohio.	Sept. 3, 3, '64.	Left; Surg. J. Pogue, 66th Ill Died Sept. 10, 1864; pyæmia.
333	*Coxe, L. I.*, Serg't, D, 25th South Carolina.	Sept. 29, 29, '64.	Left. Died October 23, 1864.
334	Crane, J., Pt., K, 100th New York.	Sept. 4, 4, '64.	Right; Surg. M. S. Kittinger, 100th New York. Died Sept. 5, 1864.
335	Crawton, W., Pt., H, 63d New York.	Sept. 17, 17, '62.	Died September 22, 1862.
336	Croyle, W. H., Pt., H, 55th Penn., age 21.	June 16, 16, '64.	Right. Died Sept. 6, '64; chronic diarrhœa.
337	Danner, S., Pt., I, 111th Illinois.	May 14, 14, '64.	Right; Surg. A. C. Messenger, 57th Ohio. Died June 7, 1864.
338	Davill, J., Pt., H, 10th Missouri.	May 14, 14, '63.	Left. Died May 18, 1863.
339	Davis, E., Pt., C, 18th Ohio, age 35.	Dec. 15, 16, '64.	Left; ant. post. flap; A. A. Surg. M. L. Herr. Died Dec. 27, '64; pyæmia.
340	Delaney, J., Pt., C, 101st Illinois, age 25.	May 25, 26, '64.	Right; ex. and int. lateral flaps. Died June 20, 1864; pyæmia.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
341	Diefenbaugh, J., Pt., H, 93d Ohio.	May 8, 8, '64.	Right. Died July 2, 1864; gangrene.
342	Dingman, A., Pt., F, 27th Michigan.	June 3, 3, '64.	Left; Surg. W. B. Fox, 8th Mich. Died June 3, 1864.
343	*Dixon, J.*, Pt., F, 32d Alabama.	May 15, 15, '64.	Right. Died May 25, 1864.
344	Doiz, J. C., Pt., B, 19th Infantry.	July 22, 22, '64.	Right. Died August 4, 1864.
345	Donaldson, S., Pt., C, 139th Pennsylvania.	June 7, 7, '64.	Right. Died June 9, 1864.
346	Douglass, A. J., Pt., B, 14th W. Va., age 23.	Aug. 25, 27, '64.	Left; do. flap; A. Surg. C. W. Stinson, 23d Ill. Died Aug. 27, '64.
347	Doyle, T., Corp'l, I, 4th Maine.	July 2, 3, '63.	Right. Died July 6, 1863.
348	Dudley, J., Pt., C, 34th Massachusetts.	Mar. 31, 31, '65.	Left; flap; Surg. T. H. Squire, 89th New York. Died.
349	Dudley, W., Pt., E, 64th New York.	July 2, 2, '63.	Left; hæmorrhage. Died July 23, 1863.
350	Dunham, W. H., Pt., F, 114th New York.	Oct. 19, 19, '64.	Right; circ. Died Oct. 28, 1864; pyæmia.
351	Dunn, O., Corp'l, F, 66th New York, age 26.	Sept. 17, 17, '62.	Surg. C. S. Wood, 66th N. York. Died October 25, 1862.
352	Durnan, L., Corp'l, G, 121st Ohio, age 21.	Mar. 19, 20, 65.	Left. Died April 14, 1865.
353	Eddy, J. C., Pt., F, 22d Connecticut.	Dec. 13, 13, '62.	Died December 20, 1862.
354	Edward, W., Pt., I, 49th Ohio.	June 26, 26, '64.	Left. Died June 26, 1864.
355	Edwards, C., Pt., K, 149th New York.	May 25, 25, '64.	Left. Died June 2, 1864.
356	[1]Elder, W. B., Serg't, B, 91st Penn.	Dec. 14, 14, '62.	Right; circ. Died Jan. 8, 1863; tetanus.
357	Erwin, W. B., Pt., C, 5th Tennessee.	May 14, 14, '64.	Left. Died May 16, 1864.
358	Evans, E. S., Pt., I, 87th Indiana.	June 15, 15, '64.	Left. Died June 26, 1864.
359	Evans, H., Serg't, E, 12th Massachusetts.	May 5, 5, '64.	Right. Died May 6, 1864.
360	Fortna, H. A., Pt., D, 16th Illinois, age 20.	Mar. 19, 19, '65.	Left. Died May 4, 1865; exhaustion.
361	French, J., Pt., C, 53d Ohio.	June 27, 27, '64.	Right; Surg. A. C. Messenger, 57th Ohio. Died July 1, 1864.
362	French, D., Pt., F, 81st Ohio.	May 16, 16, '64.	Left. Died June 8, 1864.
363	Gaston, T., Pt., E, 89th Illinois.	June 1, 1, '64.	Died June 3, 1864.
364	Geary, C. M., Corp'l, M, 1st Maine Cav., age 23.	April 7, 7, '65.	Right. Died April 15, 1865.
365	Gillsen, A., Pt., F, 7th Infantry.	Feb. 21, 22, '62.	Asst. Surg. B. Norris, U. S. A. Died Feb. 22, 1862.
366	*Gilbert, W.*, Pt., D, 23d South Carolina.	July —, —, '63.	Left. Died August 15, 1863.
367	*Girvior, W.*, Pt., K, Dawson's Artillery.	April 2, 2, '65.	Died April, 1865.
368	*Glover, W.*, Pt., A, 16th or 25th La., age 21.	De.31,'62, Jan. 1,'63.	Right. Died January 7, 1863.
369	Good, F., Pt., B, 11th New Hamp., age 19.	May 12, 12, '64.	Right. Died June 19, 1864.
370	*Grice, S. M.*, Pt., A, 27th South Carolina.	June 15, 17, '64.	Right; ant. post. flap; Asst. Surg. W. F. Richardson, C.S.A. Died June 18, 1864; exhaustion.
371	Griffin, T., Pt., B, 6th Kansas Cavalry.	July 27, 27, '64.	Right; circ.; Surg. C. E. Swezey, U.S.V. Died July 29, '64; shock.
372	Groat, P., Pt., H, 14th Iowa, age 25.	May 18, 18, '64.	Right; flap. Died June 14, '64; typho-malarial fever.
373	Gusler, W., Pt., F, 60th Illinois.	Sept. 1, 1, '64.	Left. Died September 3, 1864.
374	Guilford, H., Corp'l, F, 16th Maine.	Dec. 13, 13, '62.	Left. Died December 15, 1862.
375	Haddike, L., Serg't, I, 66th New York.	Aug. 13, 13, '64.	Left; Surg. A. Van Devere, 66th N. Y. Died August, 1864.
376	Hall, J. C., Pt., A, 20th Maine, age 37.	Sept. 30, Oct. 1,'64.	Right. Oct. 11th, diarrhœa. Died Oct. 21, 1864.
377	Harman, J. H., Serg't, K, 9th Maine, age 21.	May 18, 18, '64.	Left. Died June 6, 1864; irritative fever.
378	Hartland, A., Corp'l, A, 99th New York.	June —, —, '63.	Left; circ.; Surg. J. Wilson, 99th N. Y. Died June 24, 1863.
379	Hemphill, D., Pt., E, 72d Penn., age 26.	July 2, 4, '63.	Right; July 20th, gang. Died Aug. 20, 1863; pyæmia.
380	Hensey, J. H., Pt., H, 55th Illinois.	Aug. 31, 31, '64.	Left; Surg. A. C. Messenger, 57th Ohio. Died Sept. 6, 1864.
381	Hewitt, L. T., Pt., M, 6th Penn. Cavalry.	May 14, 14, '64.	Left. Died May 22, 1864; exhaustion.
382	Hills, W., Pt., D, 2d Michigan.	Nov. 24, 24, '63.	Left; Surg. G. B. Cogswell, 29th Mass. Died Dec. 22, 1863.
383	Hoffman, A., Pt., I, 57th Ohio.	Jan. 11, 11, '63.	Right; Surg. M. F. Carey, 48th Ohio. Died Jan. 13, 1863.
384	Holmes, J., Pt., H, 9th Massachusetts	May 5, 5, '64.	Right. Died May 8, 1864.
385	Howard, G. J., Serg't, G, 5th Vermont.	Mar 25, 25, '65.	Left. Died April 2, 1865.
386	*Howard, W.*, Pt., K, 55th North Carolina.	July 3, 3, '63.	Left. Died July 22, 1863.
387	*Hughes, N.*, Serg't, Miller's Mississippi Cav.	July 22, 24, '64.	Left; gang.; circular. Died July 24, 1864.
388	*Hyde, W. J.*, Pt., C, 19th Louisiana, age 24.	Dec. 17, 18, '64.	Left; flap; gangrene. Died Nov. 20, 1865; typh. fever.
389	Hydrick, L., Serg't, I, 66th New York.	Aug. 14, 14, '64.	Left. Died August 16, 1864.
390	Jackson, J., Corp'l, K, 11th Conn., age 36.	June 18, 18, '64.	Left. Died July 23, 1864; exhaustion.
391	[2]James, J. L., Corp'l, C, 18th Indiana.	May 1, 1, '63.	Right; double flap. Died May 27, 1863.
392	Jennings, J., Pt., I, 14th Conn., age 17	Aug. 25, 27, '64.	Left; ant. post. doub. flap; Surg Hunt, C.S.A. Died Sept. 26, '64.
393	Jessop, N., Corp'l, K, 97th N. York, age 30.	Aug. 18, 19, '64.	Right; circ. Aug. 31st, pyæmia. Died Sept. 5, 1864; pyæmia.
394	Johnson, J. W. C., Pt., B, 187th Penn.	June 18, 18, '64.	Died July 1, 1864.
395	*Jones, D. C.*, Pt., H, 43d Alabama, age 25.	May 16, 16, '64.	Flap. Died May 19, 1864.
396	Jones, H., Pt., F, 36th Col'd Troops, age 33.	June 15, 15, '64.	Left; flap. Died August 20, '64; hæmorrhage.
397	Jones, J. W., Pt., A, 122d Pennsylvania.	Dec. 13, 13, '62.	Died December 20, 1862.
398	Jones, O. H., Serg't, D, 146th New York.	June 2, 3, '64.	Left; flap. Died June —, 1864; absorption.
399	Kelty, T., Pt., K, 100th Pennsylvania.	July 30, 30, '64.	Left; flap; Surg. T. F. Oakes, 56th Mass. Died July 31, 1864.
400	Kenison, A., Pt., E, 12th Maine.	Sept. 19, 19, '64.	Right; circ.; pyæmic sym. Died October 16, 1864.
401	Kennedy, C., Pt., F, 71st Penn., age 27.	May 18, 18, '64.	Right; Surg. G. L. Potter, 145th Penn. Died June 4, '64; pyæmia.
402	Kensler, P., Pt., G, 47th Ohio, age 36.	July 28, 29, '64.	Left; flap; Act. Staff Surg. C. B. Richards, U.S.A. Died July 31, 1864.
403	Kerr, S. M., Pt., C, 6th Tenn. Cav., age 20.	Dec. 16, 16, '64.	Right; ant. post. flap. Died Jan. 10, '65; typhoid pneumonia.
404	Kief, J., Pt., B, 66th New York.	Dec. 16, 16, '62.	Left; Surg C. S. Wood, 66th N. York. Died Dec. 19, 1862.
405	*King, T. H.*, Corp'l, C, 12th N. C., age 19.	Oct. 19, 19, '64.	Circular. Died; tetanus.
406	Kirkpatrick, E., Pt., A, 18th Ohio, age 31.	Dec. 16, 16, '64.	Left; ant. post. flap; Surg B. B. Breed, U. S. V. Died Dec. 17, 1864; exhaustion.
407	Knox, S., Pt., C, 28th Pennsylvania.	July 20, 20, '64.	Left. Died August 22, 1864.
408	Lackey, J., Pt., C, 21st Mass., age 39.	May 5, 6, '64.	Right; Surg. P. E. Hubon, 28th Massachusetts. Died June 1, 1864; pyæmia.
409	Lake, C., Pt., A, 102d New York.	Sept. 17, 17, '62.	Right. Died September 29, 1862.
410	Lamson, W. H., Pt., C, 6th Maine, age 23.	May 9, 9, '64.	Right; skin flap; circular. Died June 6, 1864.
411	Langelle, L., Pt., H, 7th Missouri.	June 17, 17, '63.	Circular; pyæmia. Died July 7, 1863.
412	Laughner, A., Pt., F, 18th Penn. Cavalry.	Nov. 12, 12, '64.	Right; oval flap; Surg. J. W. Smith, 2d Ohio Cavalry. Died Dec. 22, 1864; pyæmia.
413	Leary, T., Pt., I, 5th Infantry.	Feb. 21, 22, '62.	Asst. Surg. B. Norris, U. S. A. Died Feb. 22, 1862.
414	Leech, J., Pt., A, 82d Penn., age 42.	Sept. 21, 21, '64.	Right. Died Oct. 8, '64; shock.
415	Leonard, S. H., Pt., A, 3d Massachusetts.	Sept. 19, 19, '64.	Right. Died September 24, 1864.
416	Linerman, H., Pt., G, 37th Ohio, age 33.	July 28, 28, '64.	Left; circ.; Act. Staff Surg. C. B. Richards. Died Aug. 4, 1864.
417	Long, F. M., Major, 45th Illinois.	July 12, 12, '63.	Right. Died July 12, 1863.
418	*Long, R.*, Serg't, H, 24th N. Carolina, age 23.	June 16, 16, '64.	Left; circ. Died July 23, 1864. *Spec.* 1685.
419	Lothian, J., Capt., C, 24th Mich., age 27.	June 16, 16, '64.	Left; lat. flap; Surg. J. W. Wishart, 140th Penn. Died July 12, 1864.
420	Luderking, R., Corp'l, A, 2d Michigan.	Nov. 29, 29, '63.	Right; Surg. G. B. Cogswell, 29th Mass. Died Dec. 3, 1863.
421	Lynch, W. M., Serg't, A, 69th New York.	June 3, 3, '64.	Right; Surg. J. A. Spencer, 69th New York. Died June 8, 1864.
422	Mace, W. H., Corp'l, D, 32d Maine.	July 22, 22, '64.	Left. Died July 23, 1864.
423	Maders, W. C., Pt., G, 83d New York, age 30.	May 8, 9, '64.	Right. Died June 3, 1864; pyæmia.
424	Mahan, M., Pt., A, 12th Massachusetts.	Dec. 13, 13, '62.	Left; flap. Died Dec. —, 1862.
425	Marsh, J., 2d Lieut., I, 29th Ohio.	July 1, 1, '63.	Right. Died July 4, 1863.
426	Martin, A. B., Capt., H, 6th Maryland.	May 5, 5, '64.	Left. Died May 5, 1864.
427	Mason, A. J., Capt., H, 145th Penn., age 30.	Dec. 13, 13, '62.	Left. Died Jan. 12, '64; pyæmia.
428	Mathias, L., Pt., C, 107th New York, age 38.	Mar. 16, 16, '65.	Left; flap. Died May 6, 1865.
429	May, J., Corp'l, H, 6th Wisconsin.	May 14, 14, '64.	Died May 14, 1864.
430	*Mayo, J.*, Pt., C, 44th North Carolina.	Oct. 2, 2, '64.	Right; Surg. A. A. White, 8th Md. Died Oct. 4, 1864.

[1] Butler (W. H.), *Remarks on tetanus, with histories of nine cases*, in *Am. Med. Times*, 1863, Vol. 7, p. 158

[2] Bryan (J.), *Sixteen cases of Amputation treated in hospital at Grand Gulf, Miss.*, in *Am. Med. Times*, 1863, Vol. 7, p. 5.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
431	McDonald, P., Pt., K, 8th Kansas, age 30.	Sept. 19, 20, '63.	Right; circular. Died October 12, 1863; hæmorrhage.
432	McDonald, H., Corp'l, B, 98th Ohio, age 39.	Sept. 1, 1, '64.	Right; ant. post. flap. Died Nov. 24, 1864; exhaustion.
433	McFarland, G., Pt., B, 13th Indiana.	Dec. 12, 12, '62.	Died December 12, 1862; shock and hæmorrhage.
434	McGarry, J. E., Pt., B, 105th Penn., age 21.	June 16, 16, '64.	Right; ant. post. flap; Surg. D. S. Hays, 110th Penn. Died July 17, 1864.
435	McMorris, M., Pt.; B, 124th N. Y., age 18.	May 5, 5, '64.	Left. Died May 30, '64; pyæmia.
436	Mead, J. P., Pt., I, 11th Massachusetts.	July 21, 23, '61.	Died July 23, 1861; under operation.
437	Miller, W., Corp'l, B, 85th Indiana.	June 27, 27, '64.	Right. Died July 6, 1864.
438	Montgomery, J. P., Pt., B, 10th Infa'ry, age 18.	Aug. 21, 21, '64.	Left; ant. post. flap; Surg. J. W. Anawalt, 11th Penn. Died Sept. 10, 1864; pyæmia.
439	Moore, J. N., Pt., F, 5th Tennessee, age 40.	May 14, 14, '64.	Left. Died May 17, 1864.
440	Morgan, G. C., Serg't, D, 48th Illinois.	July —, —, '63.	Asst. Surg. R. L. Von Harlingen, 53d Ohio. Died July 18, 1863.
441	Mulligan, T. H., Pt., A, 14th Infantry, age 30.	July 2, 4, '63.	Left. Died July 14, '64; tetanus.
442	Murray, M., Pt., I, 149th New York.	July 20, 20, '64.	Left; circ.; Surg. C. H. Lord, 102d New York. Died July 21, 1864; hæmorrhage.
443	Myers, S. C., Corp'l, F, 70th N. Y., age 24.	July 2, 3, '63.	Left. Died July 28, 1863; hæmorrhage.
444	*Nelms, W. F.*, Pt., B, 5th Texas.	July 3, 3, '63.	Right. Died July 9, 1863.
445	Noonan, C., —, F, 18th New York.	Sept. 14, 15, '62.	Amp.; sloughing. Died August 8, 1863.
446	Nye, G. W., Serg't, H, 3d Maine.	Aug. 30, 30, '62.	Right. Died September 5, 1862.
447	O'Hagan, M. P., Serg't, C, 16th N. York Heavy Artillery, age 22.	Aug. 12, 12, '65.	Left; Surg. E. Bentley, U. S. V. Died August 23, 1865; hæmorrhage.
448	Ormsby, R., Pt., G, 64th New York.	July 2, 2, '63.	Right. Died July 16, 1863.
449	Osborn, L., Pt., G, 3d New York Cav., age 27.	May 17, 18, '64.	Right; circ. May 22d, hæmorrhage. Died May 27, 1864.
450	Page, J. L., Corp'l, H, 66th N. York, age 33.	Sept. 17, 17, '62.	Right; Surg. C. S. Wood, 66th N. Y. Died October 10, 1862.
451	*Partridge, P. S.*, Pt., D, 26th Mississippi.	June 3, 5, '64.	Circ.; Surg. Taley. Died June 10, 1864.
452	Parker, W. S., Pt., C, 1st U. S. Sharpshooters.	May 3, 3, '63.	Right. Died May 3, 1863.
453	Parker, M., Pt., A, 5th Vermont.	Oct. 19, 20, '64.	Right. Died October 21, 1864.
454	Paul, W., —, C, 7th Wisconsin.	July 1, 1, '63.	Circ. Died July 6, 1863.
455	Perkins, J. W., Pt., F, 6th West Virginia.	June 5, 5, '63.	Left; Asst. Surg. J. T. Wharton, 6th W. Virginia Cav., and others. Died June 5, 1863.
456	Perrin, W., Pt., I, 158th New York, age 26.	April 2, 2, '65.	Right; Asst. Surg. C. G. Allen, 34th Mass. Died April 13, '65; pyæmia.
457	Pettigrew, A. J., Pt., C, 11th Penn. Reserves.	July 2, 3, '63.	Right. Died July 13, 1863.
458	Potter, W., Pt., B, 29th Ohio, age 22.	May 8, 8, '64.	Left; circ.; Surg. A. K. Fifield, 29th Ohio. Died July 6, 1864; diarrhœa.
459	Poust, W., Pt., K, 51st Penn., age 29.	Aug. 19, 19, '64.	Right; circ. Died Sept. 10, '64; erysipelas.
460	Pratt, E. C., Lieut., G, 6th Cl'd Troops, age 24.	Sept. 29, 29, '64.	Right. Died Dec. 15, '64; pyæmia.
461	*Preston, Y. P.*, Pt., C, 42d Alabama.	May 15. 15, '64.	Died June 8, 1864.
462	Preston, J. W., Pt., F, 147th Penn., age 29.	June 18, 19, '64.	Right; circ.; Surg. J. W. Brock, 66th Ohio. Died Aug. 29, 1864; diarrhœa.
463	Prescott, C., Pt., G, 51st Pennsylvania.	June 2. 2, '64.	Left. Died June 4, 1864.
464	Purdy, H., Pt., C, 2d Penn. Battery, age 33.	July 1, 1, '63.	Right. Died September 11, 1863; pyæmia.
465	*Ranner, W.*, Pt., F, 3d Florida.	Mar. 19, 19, '65.	Right. Died March 25, 1865.
466	*Rathbone L.*, Pt., C, 25th N. C., age 20.	Dec. 1, 1, '64.	Left; circ. Died Dec. 2, 1864.
467	Reaghton, W., Pt., G, 67th Pennsylvania.	Mar. 25, 25, '65.	Right. Died March 25, 1865.
468	Reed, J. M., Serg't, B, 24th Michigan.	May 12, 12, '64.	Left. Died May 12, 1864.
469	Reynolds, J., Pt., C, 1st Rhode Island Artil'ry.	April 5. 5, '62.	Left. Died April 5, 1862; shock.
470	Rice, A., Pt., G, 111th New York, age 21.	June 19, 19, '64.	Left; circ.; Surg. J. W. Wishart, 140th Penn. Died June 29, '64; exhaustion.
471	Rice, J. C., Brig. Gen'l U. S. V., 5th A. C.	May 10, 10, '64.	Died May 10, 1864.
472	Richardson, A. C., Serg't, A, 59th Mass.	July 30, 30, '64.	Right; flap; Surg. T. F. Oakes, 56th Mass. Died July 30, 1864.
473	Richardson, T., Pt., H, 11th West Virginia.	Mar. 16, 16, '64.	Right; circ.; Surg. C. M. Clark, 39th Ill. Died March 18, 1864; shock and exh'n. *Spec.* 5656.
474	Rider, J., Pt., A, 8th Kansas, age 37.	Sept. 19, 20, '63.	Left; circ. Died October 22, '63; pyæmia.
475	Riley, J., Pt., B, 11th New Jersey.	Mar. 29, 29, '65.	Left. Died April 1, 1865.
476	Riley, O., Pt., M, 2d New York.	Sept. 13, 13, '63.	Right. Died September 13, 1863.
477	Rinker, G. W., Pt., B, 6th Kansas Cavalry.	July 27, 28, '64.	Right; circ.; Surg. C. E. Swezey, U. S. V. Died July 29, '64; shock.
478	Rupert, J. F., Corp'l, K, 24th Michigan.	May 12, 12, '64.	Died May 13, 1864.
479	Ryan, T., Pt., E, 127th Illinois, age 23.	June 27, 27, '64.	Right; Surg. A. C. Messenger, 57th Ohio. Died Aug. 9, 1864.
480	Salmond, E., Pt., G, 74th Ohio.	July 22, 22, '64.	Left. Died July 30, 1864.
481	Sanderson, J. K., Pt., F, 37th Massachusetts.	May 5, 5, '64.	Right; Surg. G. T. Stevens, 77th N. Y. Died May 12, '65; gang.
482	Schmidt, F., Pt., D, 118th Pennsylvania.	Sept. 20, —, '62.	Left. Died September, 1862.
483	Schrafenberger, P., Pt., A, 9th Ohio.	Sept. 19, 19, '63.	Right. Died October 13, 1863.
484	Seaman, H. J., Pt., E, 13th Illinois.	Nov. 27, 27, '63.	Left; Surg. S. C. Plummer, 13th Ill. Died Nov. 27, 1863.
485	Seevers, R. D., Pt., K, 36th Ohio, age 43.	July 25, 25, '64.	Right; lat. flap. Died October 20, 1864; exhaustion.
486	Sharp, D., Pt., A, 7th Penn. Reserves.	Sept. 14, 15, '62.	Died September 15, 1862.
487	Shepard, H. B., Pt., F, 95th New York, age 21.	May 5, 6, '64.	Right; circ. Died June 12, 1864; pyæmia.
488	*Sherman, E.*, Corporal, Young's Bat'ry, age 43.	July 28, 28, '64.	Right; flap. Died July 29, 1864.
489	Sherman, M., Pt., G, 28th Pennsylvania.	Sept. 17, 17, '62.	Left. Died October 5, 1862.
490	Shields, T., Pt., H, 99th Pennsylvania.	July 3, 3, '63.	Right. Died July 5, 1863.
491	Shriner, J. T., Pt., G, 83d Pennsylvania.	May 27, 27, '62.	Died June 10, 1862.
492	Slaine, P. S., Pt., H, 10th Connecticut.	Feb. 8, 8, '62.	Died February 10, 1862.
493	Smith, J., Serg't, K, 7th Connecticut, age 29.	June 2, 2, '64.	Left. Died August 22, 1864; exhaustion.
494	*Smith, J. W.*, Serg't, H, 48th N. C., age 22.	April 6, 7, '65.	Right. Died May 2, '65; pyæmia.
495	Smith, N., Pt., A, 39th Illinois.	April 2, 2, '65.	Right; circ.; Surg. C. M. Clark, 39th Ill. Died April 4, 1865.
496	Smith, T., Pt., 34th Cl'd Troops.	Dec. 9, 9, '64.	Left. Died December 23, 1864.
497	Soper, J., Pt., C, 16th Maine.	Dec. 13, 13, '62.	Left. Died December 26, 1862.
498	Spencer, G. E., Pt., A, 7th Ohio.	Nov. 27, 27, '63.	Left. Died December 21, 1863.
499	Stiene, S. P., Pt., K, 100th Penn., age 22.	May 12, 12, '64.	Right; Surg. T. F. Oakes, 56th Mass. Died May 30, 1864.
500	Stood, M., Pt., C, 14th Michigan.	Mar. 19, 21, '65.	Left. Died March 21, 1865.
501	Strong, L., Serg't, A, 9th N. York Cav., age 23.	Sept. 13, 13, '63.	Right. Died September 16, '64; pyæmia.
502	Stuart, S., Pt., F, 31st Colored Troops.	July 30, 30, '64.	Right; circ.; Surg. F. M. Weld, 27th C. T. Died Aug. —, 1864.
503	Sulfrise, C. A., Pt., 6th Penn., age 20.	Aug. 6, 6, '64.	Left; Surg. A. M. Wilder, U. S. V. Died Sept. 3, 1864.
504	Sullivan, D., Pt., B, 63d New York.	Dec. 13, 13, '62.	Left. Died January 3, 1863.
505	Summer, G., Corp'l, K, 20th Michigan.	May 12, 12, '64.	Left. Died May 14, 1864.
506	Thomas, A., Pt., C, 2d Tennessee C. T.	Feb. 5, 6, '64.	Left; circ.; Surg. J. G. F. Holston, U. S. V. Died Feb. 29, 1864.
507	Van Buren, M., Pt., H, 59th Ohio.	June 28, 28, '64.	Left. Died July 6, 1864.
508	Waffle, W., Pt., F, 14th New York H'vy Art., age 30.	July 11, 11, '64.	Right; flap; Surg. T. F. Oakes, 56th Mass. Died Sept. 26, 1864; pyæmia.
509	Ward, F., Pt., G, 45th Colored Troops.	Feb. 7, 7, '65.	Left; circ.; Surg. N. Valsom, 45th Cl'd Troops. Died Feb. 19, '65.
510	*Walters, J. R.*, Pt., I, 52d North Carolina.	July 3, 3, '63.	Left. Died.
511	*Warren, J. H.*, Pt., D, 42d Georgia.	May 15, 15, '64.	Died May, 1864.
512	Watson, G. M., Pt., D, 63d Indiana.	May 14, 14, '64.	Right; gangrene. Died May 22, 1864.
513	Weiler, J., Corp'l, K, 40th New York, age 30.	May 24, 24, '64.	Right. Died May 31, 1864; hæmorrhage.
514	Wheeler, A. R., Corp'l, I, 9th N. Hamp., age 21.	June 16, 16, '64.	Left. Died July 20, 1864.
515	Whipple, R. G., Corp'l, K, 24th Mich., age 41.	Aug. 19, 20, '64.	Left; flap. Died August 25, '64; hæmorrhage.
516	White, P., Pt., A, 35th Indiana, age 27.	June 10, 10, '64.	Left; Surg. H. G. Averdick, 35th Ind. Died July 12, 1864.
517	White, W., Pt., I, 3d Wisconsin.	Mar. 16, 16, '65.	Left; Asst. Surg. G. W. Burke, 46th Penn. Died March 17, '65.
518	Whitehead, F., Pt., I, 97th New York.	May 12, 12, '64.	Died May, 1864.
519	Whitney, G. P., Pt., H, 6th Vermont.	May 5, 5, '64.	Left; Surg. D. W. Maull, 1st Delaware. Died.
520	Wicks, A., Pt., G, 14th Indiana.	May 10, 10, '64.	Right; Surg. G. W. McCune, 14th Ind. Died May 12, 1864.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
521	Wiley, J., Corp'l, K, 40th New York.	May 24, 25, '64.	Right; Surg. H. F. Lyster, 5th Mich. Died May 31, 1864.
522	Willey, H., Pt., E, 46th New York, age 28.	June 17, 17, '64.	Left; circ.; Surg. W. C. Shurlock, 61st Penn. Died July 12, 1864; pyæmia.
523	Williams, E., Pt., E, 80th Illinois.	Oct. 8, 8, '62.	Died October 10, 1862.
524	Williams, J. B., Pt., A, 14th N. Y. H. Art'y.	Aug. 5, 5, '64.	Right; flap; Surg. T. F. Oakes, 56th Mass. Died Aug. 6, 1864.
525	*Williams, W. H.*, Serg't, D, 13th Mississippi.	July 3, 3, '63.	Right. Died.
526	*Wilson, J.*, Pt., B, 5th Texas, age 32.	July 2, 4, '63.	Right; flap. July 15th, hæm., lig. fem. Died July 23, 1863.
527	Winsket, A., Pt., G, 123d Indiana.	June 16, 16, '64.	Right; Surg. A. M. Wilder, U. S. V. Died June 23, 1864; shock.
528	*Wright, J. H.*, Lieut., D, 5th Virginia.	Mar. 25, 25, '65.	Left. Died March 27, 1865.
529	*Craig, J. C.*, Pt., E, 44th Mississippi, age 28.	July 28, 28, '64.	Right; ant. post. flap.
530	*Frayer, T. J.*, Pt., I, 49th Virginia.	June 2, 2, '64.	.....
531	*Hawkins, G. W.*, Lieut., H, 30th Mississippi.	Aug. 31, —, '64.	Left: also wound right; Surg. A. Sabine, 76th Ohio.
532	*Hennesy, W.*, Citizen, Confederate.	July —, —, '63.	Surg. C. B. Richards, 30th Ohio.
533	*Whitney, E.*, Pt., A, 44th Georgia.	May 19, —, '64.	.....

In two hundred and five of the five hundred and thirty-three cases enumerated in the foregoing table the precise seat of fracture in the femur was not indicated. In the remaining three hundred and twenty-eight cases the fracture was in the upper third of the femur in sixty-six, in the middle third in one hundred and seventy, in the lower third in fifty, at the knee joint in thirty-seven, and in the leg in five instances.

Primary Amputations in the Middle Third of the Femur.—There were eleven hundred and fifty-seven of these operations. The results were ascertained in eleven hundred and forty-nine cases; six hundred and eighty-six were successful, and four hundred and sixty-three proved fatal, a mortality of 40.3 per cent. The operations were on the right side in five hundred and forty-four, and on the left in five hundred and thirty-four instances; in seventy-nine cases the side was not specified.

Recoveries after Primary Amputation in the Middle Third of the Femur.—The six hundred and eighty-six operations of this group were performed on one hundred and forty-five Confederate and five hundred and forty-one Union soldiers. Of the latter, two have become insane, one was retired, and five hundred and thirty-seven were pensioned; in one instance no application for pension seems to have been made.

Case 434.—Private J. Kells, Co. I, 113th Ohio, aged 44 years, was wounded at Jonesboro', September 1, 1864. He was admitted to the field hospital of the 2d division, Fourteenth Corps, whence Surgeon W. C. Daniels, U. S. V., reported: "Shot fracture of right thigh at middle third by a minié ball; limb amputated." From the field hospital the patient passed to Chattanooga, thence to Cumberland, Nashville, and afterwards to Brown, Louisville, from which hospitals his case was described as an "antero-posterior flap amputation of the thigh at the middle third." He was discharged from service at Camp Dennison March 21, 1865, and supplied with a Palmer artificial leg four months afterwards. He became a pensioner, and has been paid as such June 4, 1879. In his application for commutation he represented the stump as "healed and sound," and stated that Surgeon T. B. Williams, 121st Ohio, performed the amputation.

In the following instance a large sequestrum was removed from the stump of the femur three months after the amputation:

Case 435.—Private J. McMahon, Co. I, 6th New York Cavalry, aged 23 years, was wounded in the left leg, at Todd's Tavern, May 7, 1864. He was admitted to a field hospital of the Cavalry Corps, where amputation was performed but not recorded, and five days afterwards he was transferred to Washington. Assistant Surgeon W. Thomson, U. S. A., made the following report of the case: "The wound was caused by a musket ball, which caused a fracture of the femur extending into knee joint, for which amputation was performed at the middle third, by the circular method, within an hour, chloroform being used. He was admitted to Douglas Hospital May 12th, at which time a large slough existed on the anterior flap, which soon separated, exposing the end of the bone. There was no vigorous effort at repair, the granulations being pale and flabby. The patient's general condition was unfavorable; he was much depressed and very pallid, and had a severe diarrhœa. On June 20th, the cellular tissue of the stump again began to slough, and, on the 22d, it was found requisite to apply pure bromine. On the 23d most of the sloughs separated, and, by the next day, the stump was clean and the granulations more florid and healthy. One inch and a half of the end of the femur was in a state of necrosis and protruding. On August 11th, a sequestrum, nine inches in length, was removed by extraction, leaving a deep cavity in the stump, which was bounded externally by a large and firm cylinder of new bone. The patient's improvement was then rapid, and, by November 1st, he was considered convalescent. This man had remained for weeks as pale as death and so feeble as to be unable to lift his head from his pillow. He seemed daily on the verge of the chill of pyæmia, and his case was recognized and pointed out as one of osteomyelitis of the femur, from which—if death did not result—a long exfoliation would be removed." On May 18, 1865, the patient was discharged from

service, and several weeks after he was furnished with an artificial limb by the firm of A. A. Marks, of New York City. In his application for commutation, dated 1870, the pensioner stated that the amputation was performed by Assistant Surgeon S. C. Sanger, 6th New York Cavalry, also that the stump was in a healthy condition. The pensioner was paid June 4, 1879. The sequestrum (*Spec.* 4281) was contributed to the Museum by Dr. Thomson, and is shown, reduced in size one-third, in FIG. 4 of PLATE LXIX, opposite.

Amputation of the right thigh in the middle third and of the left leg at the knee joint was successfully performed in the following instance:

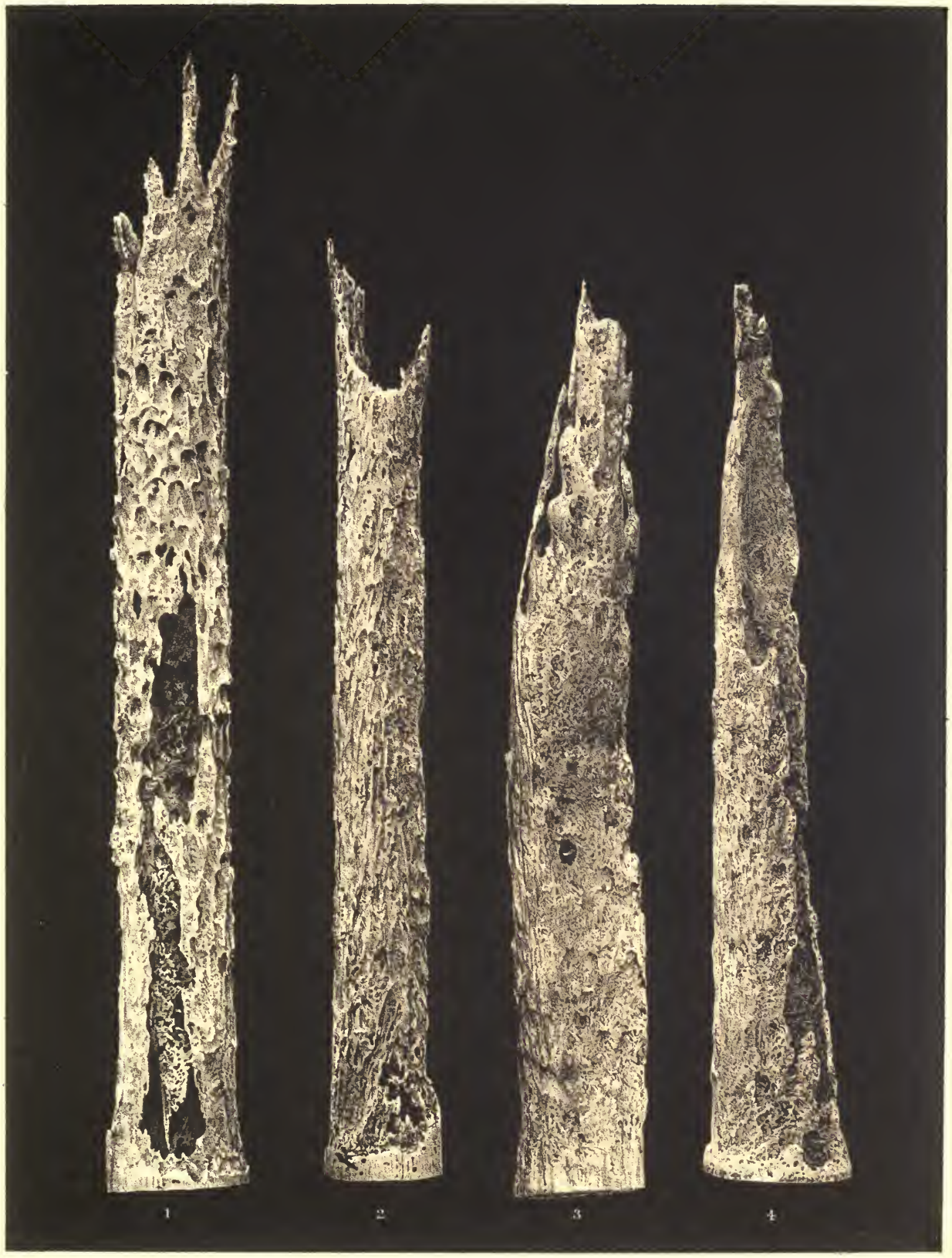
CASE 436.—Corporal C. N. Lapham, Co. K, 1st Vermont Cavalry, aged 23 years, was wounded during the engagement near Boonsboro', July 8, 1863, by a cannon ball, which carried away both legs. He was conveyed to the field hospital at Boonsboro', where both limbs were amputated two days after the receipt of the injury. Four months after the operation the patient was deemed well enough to be allowed to go to his home, where he remained until the following year. On May 31, 1864, he was furnished with artificial limbs by Dr. E. D. Hudson, of New York City, who contributed the photographs represented in the annexed cuts (FIGS. 176, 177) and the following description of the operation: "The right thigh was amputated at the middle third, by the antero-posterior flap method, on account of great comminution of the leg involving the knee joint; the stump is healed and in a favorable condition. The left leg was disarticulated at the knee joint. This operation was also performed by antero-posterior flaps, and the stump is healed and in good condition, though the supporting cicatrix at the base is not good. The condyles of the femur, as a base, form the most useful, reliable, and comfortable support, and constitute his chief dependence, and the benefits of disarticulation, when compared with amputations of the thigh, are shown to be incalculable." The patient was discharged from Baxter Hospital, at Burlington, Vermont, Aug. 25, 1864, and pensioned. Five months later, when a student at the Collegiate Institute in Poughkeepsie, N. Y., he wrote to Dr. Hudson that "he could walk with ease on level ground, get up and down stairs readily, and was getting along much better than he anticipated in so short a time." Some time afterwards he obtained an appointment as clerk in the U. S. Treasury Department at Washington, in which occupation he is still employed. His pension was paid September 4, 1879. In his application for commutation he reported that Surgeon L. P. Woods, 5th New York Cavalry, was the operator who amputated his limbs.

FIG. 176.—Amputation of right thigh at middle third and of left leg at knee joint. [From a photograph.]

FIG 177.—Appearance of patient with artificial legs. [From a photograph.]

In thirteen instances re-amputation of the thigh became necessary, and in fourteen cases the protruding ends of the femur were removed. In the following, four inches of the extremity of the bone were exsected nearly seven months after the amputation.

CASE 437.—Private J. Wearing, Co. L, 2d Pennsylvania Heavy Artillery, aged 20 years, was wounded at Petersburg, June 17, 1864, and admitted to the field hospital of the 1st division, Ninth Corps, where Surgeon M. K. Hogan, U. S. V., recorded: "Wound of left knee joint; amputation at junction of middle and lower third of thigh." One week after the reception of the injury the man was transferred to Finley Hospital, Washington, and in October following he entered Broad and Cherry Streets Hospital, Philadelphia, whence Acting Assistant Surgeon T. C. Brainerd made the following report: "At the date of admission the femur protruded about one-fourth of an inch, and the stump was healed to within one inch of the bone. The patient being anæmic, iron and quinine were administered. Simple dressings were applied to the stump. By November 15th his general health had improved and the line of separation was forming around the protruding portion of the bone. On December 1st, the ulcer upon the stump presented a sloughing tendency, but again cleaned up. On January 6, 1865, about four inches of the extremity of the femur was exsected by cutting down upon it from the outer anterior surface of the stump and sawing through the bone with a chain saw. The bone removed was necrosed and surrounded by a large amount of reparative material. A small artery spouted from the medullary canal of the bone, the hæmorrhage from which was promptly controlled by pressing a piece of soft wax into the canal. Three ligatures were applied and ether was used. The operation was performed by Acting Assistant Surgeon H. M. Bellows. The patient reacted promptly. Simple dressings were continued to the stump. Two days



Ward phot. T. Sinclair & Son lith

PLATE LXIX.—TUBULAR SEQUESTRA FROM AMPUTATIONS OF THE FEMUR.

1 Spec. 1853.—2 Spec. 144.—3 Spec. 3100.—4 Spec. 4281.

Surgical Section, Army Medical Museum.

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later an attack of erysipelas supervened, extending as far up as the groin, but yielding to treatment, and by January 15th it had entirely disappeared and the general condition had much improved. One month later cicatrization was almost complete, and the patient was walking about with the aid of crutches." In April he was transferred to South Street Hospital, and subsequently to Chester, where he was discharged from service July 26, 1865, and pensioned. Some weeks afterwards the man was supplied with an artificial leg, manufactured by R. Clements. In his application for commutation, dated 1870, he represented the stump as being in a sound and healthy condition. The pensioner was paid June 4, 1879. The sequestrum (*Spec.* 4196) removed from the stump was contributed to the Museum by the operator, and is represented in FIG. 3 of PLATE LXX, opposite p. 242.

Thirteen of the pensioners have died since the date of their discharge from the service; one from lung disease, three of debility, and nine of causes not stated:

FIG. 178.—Comminuted lower half of right femur. *Spec.* 4120.

CASE 438.—Corporal J. Bidlingmaier, Co. H, 73d New York, aged 46 years, was wounded before Petersburg, September 11, 1864. Surgeon O. Everts, 20th Indiana, noted his admission to the field hospital of the 3d division, Second Corps, with "shot fracture of thigh, followed by amputation." From the field the wounded man was transferred to the depot hospital at City Point, and thence, on October 8th, to Washington. Assistant Surgeon J. C. McKee, U. S. A., reported his entrance into Lincoln Hospital, with "antero-posterior flap amputation of the right thigh at the middle third," also that he was furloughed December 9th. The patient subsequently entered Judiciary Square Hospital, and on May 6, 1865, he was discharged from service, having been previously supplied with an artificial limb by the Jewett Patent Leg Co., of Washington, D. C. He was a pensioner until June 16, 1871, when he died of marasmus, his attending physician certifying that "it was evident that some portion of the splintered bone remained in the stump, as abscesses frequently formed thereon and copious discharges ensued;" also that the disease, as a consequence, first became apparent about the first of April, 1871. The amputated portion of the femur, represented in the wood-cut (FIG. 178), was contributed by Surgeon D. S. Hays, 110th Pennsylvania, who performed the operation. The specimen shows that the shaft was badly comminuted by a conoidal ball, which flattened, in a mushroom shape, against the anterior surface in the lowest third.

Fatal Cases of Primary Amputation in the Middle Third of the Thigh.—The four hundred and sixty-three operations of this group were performed on four hundred and sixty-one patients; in two instances both thighs having been primarily removed at the middle third. Sixty-seven were Confederate and three hundred and ninety-four were Union soldiers:

CASE 439.—Private *G. Cox*, Co. K, 1st North Carolina Cavalry, aged 27 years, was wounded at Brandy Station, June 9, 1863. He was admitted to a field hospital of the Fifth Corps, whence Assistant Surgeon B. Howard, U. S. A., reported the following history: "The patient was a man of usual good health but had the bloated appearance of a habitual drinker. He was shot in the right thigh, and was brought to Kelly's Ford, a distance of about three miles, in an ambulance. On examination I found a wound of entrance on the outer side of the thigh, a little above its middle, but there was no wound of exit. The wound of entrance was very small, as if made by a pistol ball. The femur was badly shattered. The patient complained of having lost a good deal of blood on his way to Kelly's Ford. I immediately proceeded to amputate near the upper third by the circular mode. The patient suffered considerably from shock, but rallied comfortably, and was transported eight miles the next morning in an ambulance, and thence by cars to Alexandria. On examination of the amputated leg the femur was found to be shattered more than six and a half inches, but not comminuted as finely as often happens in fractures by a minié rifle ball, this fracture being more vitreous in appearance and furnishing but one small fragment, all the others being large ones. The ball had entered the outer side of the thigh, passed behind and partially around the femur, entering at its inner aspect, and lodging in the medullary canal. The interesting point in the case is the relation of the extensiveness of the fracture to the weight and the diminished velocity of the ball; that the bone should have been so extensively shattered by a pistol ball, which, when subsequently weighed, did not exceed five scruples and six grains, and that the mischief was all done, too, after the ball had been so much deflected from its original course." Surgeon T. R. Spencer, U. S. V., reported the patient's admission to Prince Street Hospital, and the result of the case as follows: "On June 19th and 23d, hæmorrhage occurred from the external circumflex artery, for which compression and cold applications were made. The loss of blood amounted to six ounces. The patient looked anæmic, and there was considerable sloughing of the stump. Death followed on June 24, 1863." The amputated portion of the femur was contributed to the Museum by the operator, and is numbered 1233, *Surg. Section* (FIG. 179).

FIG. 179.—Comminution of middle third of right femur. *Spec.* 1233.

CASE 440.—Sergeant John Sproul, Co. C, 40th New York, aged 24 years, received at Kelly's Ford, November 7, 1863, a conoidal musket ball wound, causing a compound fracture of the left femur just above the knee. He was taken to the field hospital of the 1st division, Third Corps, Surgeon J. W. Lyman, U. S. V., in charge, and amputation of the thigh in the middle third, anterior and posterior flap method, was performed by Surgeon A. Campbell, 40th New York, on the day of injury. He was conveyed to Washington, and admitted into the Douglas Hospital on November 9th. His attending medical officer, Assistant Surgeon W. F. Norris, U. S. A., reports, November 16th: It was found impossible to support the heavy posterior muscular flap; the sutures sloughed out, and there was a great gaping surface discharging profusely, but normal in appearance. The patient was very pallid. The stump was

thoroughly supported by adhesive straps, and the best nutrients, with stimulants, were administered. 24th, there was slight tenderness along the femoral artery and slight enlargement of the inguinal glands. There was no vigorous effort at repair in the stump, which remained pale and flabby, and his general condition became worse daily. December 4th, there were well-marked chills with fever in the evening, pulse 120 and feeble, respiration hurried, sweating, and nausea. These symptoms became hourly worse: his pulse became countless, his respiration sighing and very rapid, his face pinched and anxious; occasional vomits of a green bilous matter: he finally died, on December 7th, at 4 o'clock P. M., of pyæmia. Autopsy sixteen hours after death. Assistant Surgeon W. Thomson, U. S. A., records: "The most careful examination failed to find a trace of inflammation or coagulation in the blood-vessels. The soft tissues of the stump were perfectly normal. There were found in the thoracic cavity the usual traces of pyæmia. The lungs anteriorly were pale, posteriorly they were both coated over the lower lobes with recent yellow and soft ill-looking lymph. There was no considerable effusion or adhesions; no traces of a frank pleuritis, but of a local asthenic inflammation were found. Both lungs were congested, hardened, and dark in color posteriorly, and in the left there were several small yellowish-white spaces, apparently abscesses. * * The other organs, except the cerebro-spinal, were examined and found normal except the spleen, which was slightly hardened and congested. No trace of embolia was found in the lungs, nor was death caused by the secondary changes there produced. The destruction of pulmonary tissue had not progressed sufficiently. There must have been the absorption, by the veins most probably, from this medullary and cancellated portion of the femur, of a material soluble in the fluids of the blood, and produced, in the cadaveric changes that took place in the organic matter—dead, but confined in this cancellated bone. This caused the fatal toxicæmia which overpowers the nervous system, and may have also caused those local changes found in the posterior portions of both lungs. It seems strongly probable that it is due to blood poisoning, introduced by the veins, since all cases of pyæmia exhibit pathological changes in the lungs, where the venous blood becomes distributed to thin delicate structures before being depurated by exposure to the atmosphere. The case was about to be relinquished as incomprehensible, when it was proposed by Dr. Norris to saw the femur from its head to its extremity longitudinally, and thus expose its medullary canal. A small quantity of apparently healthy pus had been found between the periosteum and the shaft two inches from the sawn end, and there were a few osteophytes clinging to the bone at that point. When, however, the bone had been separated in its long diameter, its medullary canal presented the traces of pathological action. This canal and the cancellated structure extending past the trochanters to a point half way through the head were found filled with a yellowish-green substance, intolerably fetid, and resembling, more than anything else, the debris of hospital gangrene." The bone was sent at once to the Museum and portrayed in colors. No pus was found in this bone, and, under the microscope, nothing but debris. The connective tissue seemed to have perished *en masse*. In PLATE XXXII, opposite, the diseased stump of the femur is represented, and PLATE XXXI, opp. p. 228, exhibits the gangrenous condition of the medullary canal.

CASE 441.—Private William Crawford, Co. B, 2d Pennsylvania Cavalry, aged 40 years, had his right leg shattered near the knee by a fragment of shell, at the battle of Spottsylvania, May 12, 1864. The soft parts were much torn, and the popliteal artery was divided. Amputation was immediately performed near the middle of the thigh by Surgeon Charles Bower, 6th Pennsylvania Reserves. The patient was sent to Washington, and admitted, on July 16th, to Lincoln Hospital. He was in an exhausted condition and had no appetite. He utterly refused to take bark or stimulants of any description. The tongue and fauces were covered with aphthæ. There was diarrhœa, from which, in a chronic form, the patient had long suffered. He died on July 27, 1864. There was extreme emaciation. At the autopsy but slight lesions were found in the viscera, except the great intestine, which was studded with ulcers. The necrosed extremity of the femur slightly protruded from the wound. This was the end of a very large, loose sequestrum, invested by a fragile involucrum. The specimen in the Army Medical Museum, No. 2890, *Surgical Section*, consists of the stump of the right femur, with a very large sequestrum in process of separation and a partial involucrum formed.

The histories of the two cases of primary amputations of both thighs in the middle third are very brief. The patients died on the day following the operations:

CASE 442.—Sergeant Theodore Doud, Co. C, 2d Michigan, received, at Petersburg, July 30, 1864, a shell wound of both thighs. He was carried to the field hospital of the 3d division, Ninth Corps, where, on the same day, Surgeon W. B. Fox, 8th Michigan, amputated both thighs at the middle third. Death resulted July 31, 1864. The case is recorded by Surgeon P. A. O'Connell, U. S. V.

CASE 443.—Corporal John W. Woodworth, Co. H, 11th Infantry, was wounded at Rappahannock Station, November 7, 1863, a shell fracturing both femurs at the middle third. He was taken to the field hospital of the Fifth Corps, and both thighs were amputated in the middle third. He died the next day, November 8, 1863. The case is reported by Assistant Surgeon E. DeW. Breneman, U. S. A.

Pyæmia was observed in seventy-six, gangrene in eighteen, tetanus in seven of the four hundred and sixty-three fatal primary amputations in the middle third of the thigh, and in forty-four instances hæmorrhages occurred subsequent to the operations. In three cases the amputation in the thigh was accompanied by operations in the upper extremities, and in one instance the opposite limb was amputated in the leg.[1]

[1] In the case of Private W. J. Rand, K, 45th Massachusetts (TABLE XXXI, p. 239, No. 1,018, and *Second Surgical Volume*, TABLE XLIV, p. 634, No. 87), the left arm was removed at the shoulder-joint; the left arm was amputated in the lower third in the case of Private H. Jackson, E, 4th Colored Troops (TABLE XXXI, p. 237, No. 904, and *Second Surgical Volume*, TABLE LXXIII, p. 747, No. 40); three inches of the right radius were excised in the case of Sergeant J. Robinson, H, 48th Illinois (TABLE XXXI, p. 239, No. 1,033, and *Second Surgical Volume*, TABLE CXXVII, p. 952, No. 51). The left leg was amputated in the lower third in the case of Private S. Banks, C, 43d Colored Troops (TABLE XXXI, p. 235, No. 706).

DISEASED STUMP OF FEMUR

TABLE XXXI.

Condensed Summary of Eleven Hundred and Fifty-seven Cases of Primary Amputations in the Middle Third of the Femur for Shot Fracture.

[Recoveries, 1—685; Deaths, 687—1,149; Results unknown, 1,150—1,157.]

NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	Adams, C. B., Pt., G, 116th N. York, age 37.	Sept. 19, 20, '64.	Right; circ. A. Surg. J. Homans, jr., U.S.A. Dis. Aug. 25, '65.
2	Adams, J., Pt., H, 27th Ohio.	Mar. 13, 13, '62.	Right; flap. Disch'd Aug. 2, '62.
3	Alexander, J., Pt., A, 129th Penn., age 25.	May 4, 4, '63.	Right. Surg. W. G. Nugent, 126th Penn. Disch'd Mar. 16, 1864.
4	Alexander, J., Pt., D, 22d C. T., age 34.	Sept. 20, 21, '64.	Left; flap. Mar. 15, '65, removed necro'd bone. Dis. Mar. 20, '65.
5	Allaback, E. W., Pt., A, 52d Pennsylvania.	May 24, 24, '62.	Left; flap. Surg. W. S. Woods, 52d Penn. Disch'd Aug. 1, 1862.
6	Allen, F. A., Pt., I, 8th N. Y. Cavalry, age 29.	June 3, 3, '64.	Left; flap. Subseq. operations. Disch'd July 13, 1865.
7	Allen, G. W., Serg't, A, 3d Mass. Cav., age 27.	Oct. 19, 20, '64.	Right; circ. Surg. D. F. Leavitt, 3d Mass. Cav. Dis. May 31, '65.
8	*Allen, S.*, Pt., H, 23d N. Carolina, age 25.	July 1, 3, '63.	Left; circular. Exchanged Nov. 12, 1863.
9	Allroth, W., Pt., K, 46th New York, age 30.	July 30, 30, '64.	Left; flap. Surg. A. F. Whelan, 1st Mich. S. S. Dis. Sept. 11, '65.
10	Altenberger, J., Pt., F, 37th Ohio.	May 19, 19, '63.	Left. Surg. S. P. Bonner, 47th Ohio. Subsequent operation. Disch'd Sept. 8, 1863.
11	Ammerman, R. W., Pt., B, 148th Penn., age 22.	May 12, 13, '64.	Right; circ. June 24th, removed three ins. femur. Disch'd May 30, 1865. *Spec.* 2698.
12	Andrews, D., Pt., I, 62d Penn., age 18.	May 6, 6, '64.	Left; ant. post. flap. Discharged July 26, 1865.
13	*Andrews, W. A.*, Pt., E, 3d C. S. Inf., age 27.	Nov. 30, Dec. 1, '64.	Right; lateral flap. Exchanged March 7, 1865.
14	Arts, J., Capt., K, 2d New York.	June 25, 25, '62.	Left. Discharged Nov. 10, 1862.
15	Aschman, R., Capt., A, 1st Sharpshooters.	Aug. 15, 15, '64.	Right. Surg. H. F. Lyster, 5th Mich. Disch'd Aug. 19, 1864.
16	Austin, W. F., Capt., K, 9th Kentucky.	April 7, 8, '62.	Right. Dr. W. W. Goldsmith, Louisville. Disch'd Apr. 19, '62.
17	Azdell, J., Pt., C, 104th Ohio, age 29.	May 27, 27, '64.	Left; circ. Surg. F. H. Rodgers, 104th Ohio. Dis. June 13, 1865.
18	Bachman, C., Pt., D, 198th Penn., age 28.	Mar. 29, 29, '65.	Left; flap. Discharged June 27, 1865.
19	*Bagley, T. R.*, Pt., H, 24th South Carolina.	May 14, 14, '63.	——. Recovered.
20	Bailey, J. C., Pt., D, 4th Ohio.	Dec. 13, 14, '62.	Left; flap. Disch'd April 22, '63.
21	Ball, L., Serg't, F, 3d Kentucky, age 24.	Sept. 19, 21, '63.	Right; flap. One inch fem. rem'd. Disch'd March 22, 1864.
22	Barnett, R., Pt., D, 1st N. Y. Dragoons, age 25.	Oct. 14, 15, '64.	Left; ant. post. flap. Surg. A. P. Clark, 6th N. Y. Cav. Disch'd Oct. 30, 1865.
23	Barnes, J. W., Pt., C, 11th Tennessee Cav.	Jan. 28, 28, '64.	Left; flap. Surg. T. H. Kearney, 45th Ohio. Disch'd Mar. 28, '65.
24	Barnes, W., Serg't, I, 13th Mass., age 38.	Aug. 30, 31, '62.	Left. Disch'd April 23, 1863.
25	Barnhart, T. P., Pt., F, 3d Wisconsin, age 19.	Mar. 16, 16, '65.	Right; circular. Disch'd Aug. 22, 1865.
26	*Barraham, J. H.*, Pt., H, 2d North Carolina.	Aug. 16, 16, '64.	Right; circular. Retired March 17, 1865.
27	Barrett, S., Pt., K, 69th Ohio, age 17.	Mar. 19, 20, '65.	Left; flap. Confederate surgeon. Disch'd Oct. 14, 1865.
28	Bartlett, W. F., Capt., I, 20th Mass., age 21.	April 25, 25, '62.	Left; circ. Surg. N. Hayward, 20th Mass. Disch'd July, 1866.
29	Bartling, H., Pt., L, 9th Mich. Cavalry, age 22.	June 12, 12, '64.	Left; lat. flap. Surg. A. Nash, 9th Mich. Cav. Disch. May 12, 1865.
30	Barton, M., Pt., E, 72d Indiana.	May 9, 10, '63.	Right. Surg. D. B. Rice, 102d Ill. Disch'd Sept. 15, 1863.
31	Batch, P., Pt., K, 99th Ohio, age 21.	June 20, 20, '64.	Right; ant. post. flap. Surg. J. T. Woods, 99th Ohio. Disch'd Nov. 22, 1865.
32	Becht, A., Pt., E, 52d New York.	June 1, 3, '62.	Left. Disch'd Dec. 25, 1862.
33	Beck, G. H., Corp'l, I, 11th Penn., age 18.	May 5, 6, '64.	Left; circ. Ass't Surg. W. P. Osborn, 11th Penn. Disch'd June 1, 1865.
34	Becker, C., Corp'l, B, 12th Missouri.	Mar. 8, 8, '62.	Right; circ. Surg. C. Cook, 12th Missouri. Discharged.
35	Beckwith, D. G., Pt., K, 23d New York.	Dec. 13, 13, '62.	Left. Surg. J. Ebersole, 19th Ind. Disch'd April 10, 1863.
36	Beckwith, W. G. Serg't, B, 5th Michigan Cav., age 31.	April 8, 8, '65.	Right; circ. Surg. A. K. St. Clair, 5th Mich. June 26th, nec. bone rem. Dis. Sept. 1, '65. *Sp.* 4239.
37	Bell, I., Serg't, B, 81st Penn., age 20.	July 2, 3, '63.	Right; flap. Disch'd March 10, 1864.
38	Bellis, R., Serg't, D, 1st Maryland P. H. B.	July 2, 4, '63.	Right; circ. Ass't Surg. J. A. Frecman, 13th N. Jersey. Disc. Jan. 31, 1864.
39	Bentley, A. C., Pt., D, 93d New York, age 27.	May 23, 23, '64.	Left; flap. Disch'd June 30, '64.
40	*Bentley, G.*, Pt., B, 8th Louisiana.	June 27, 28, '62.	——. Recovered.
41	Bentley, W. G., Major, 9th N. Y. Cav., age 28.	June 21, 21, '64.	Left; circ. Surg. W. H. Rulison. 9th N. Y. Cav. Disc. Oct. 5, '65
42	Berran, B., Serg't, K, 160th New York.	May 27, 27, '63.	Left; circ. Discharged Oct. 26, 1863.
43	Best, W. J., Ord'y Seaman, U. S. S. Pawnee.	June 27, 28, '61.	Left; Surg. N. Pinkney, U. S. N. Discharged.
44	Biebel, A., Pt., L, 9th N. York Cav., age 23.	Nov. 26, 27, '64.	Left; ant. post. flap. Surg. C. H. Andrus, 176th N. York. Disch'd Oct. 21, 1865.
45	Bidlingmayer, J., Corp'l, H, 73d N. York, age 46.	Sept. 11, 11, '64.	Right; ant. post. flap. Surg. D. S. Hays, 110th Penn. Disch'd May 6, 1865. *Spec.* 4120.
46	Bishop, F., Pt., H, 65th Indiana, age 21.	Dec. 13, 14, '63.	Right; flap. Disch'd Oct. 21, '64.
47	Bishop, I, Pt., K, 111th Ohio, age 24.	May 14, 14, '64.	Left; flap; one and one-half inch bone remo'd. Dis'd Aug. 29, '65.
48	Bissell, J. B., Sergeant-Major, 26th Iowa.	Sept. 4, 4, '64.	Right; ant. post. flap. Surg. A. T. Hudson, 26th Iowa. Disch'd Jan. 6, 1865.
49	Bivens, T. E., Pt., C, Bissell's Engin'r Reg't.	May 28, 28, '62.	Right; flap. Reg'l Surg. C. S. Shelton. Disch'd July 29, 1865.
50	Blair, J., Serg't, A, 105th Penn., age 26.	Oct. 2, 2, '64.	Left; circ. Surg. D. S. Hays, 110th Penn. Disch'd Jan. 11, 1866. Died Nov. 8, 1869. *Spec.* 4125.
51	*Blake, W.*, Pt., K, 18th Mississippi, age 18.	July 3, 3, '63.	Left. Sept. 4th, exfol. removed. Exchanged Nov. 12, 1863.
52	*Boatwright, R. S.*, Pt., I, 21st South Carolina.	Jy 11, '63. Primary.	Left; circ. July 17th, end of bone removed. Exch'd July 23, 1863.
53	Brake, G., Pt., D, 15th West Virginia, age 41.	June 18, 18, '64.	Left; double flap. Ass't Surg. J. J. Johnson, 15th W. Virginia. Disch'd Oct. 19, 1864.
54	*Brandon, S. S.*, Pt., C, 27th S. Carolina, age 19.	June 2, 2, '64.	——; circular. Furloughed Oct. 18, 1864.
55	Brannon, L., Pt., D, 10th Ohio.	Oct. 8, 10, '62.	Left; flap. Surg. C. S. Muscroft, 10th Ohio. Disch'd Feb. 15, '63.
56	Breen, M., Pt., E, 9th Mass., age 40.	June 3, 5, '64.	Right; double skin flap. Disch'd Oct. 18, 1864.
57	[1]*Brett, C.*, Pt., B, 11th Alabama.	June 27, 28, '62.	——; circular. Transferred July 15, 1862.
58	Brickham, I., Pt., K, 14th Wisconsin, age 46.	April 3, 3, '65.	R't; ant. post. flap. Surg. E. Powell, 72d Ill. Disch'd Oct. 20, '65.
59	Briggs, W. D., Pt., A, 147th N. York, age 29.	Sept. 29, 29, '64.	Left; circ. Surg. D. McFall, 142d N. Y. Disch'd Sept. 11, 1865.
60	Brobst, J., Serg't, A, 107th Ohio, age 22.	April 9, 10, '65.	Left; ant. post. flap. Surg. J. Knauss, 107th Ohio. Disch'd Sept. 6, 1865.
61	*Brock, M. V.*, Pt., C, 48th Mississippi.	July 2, 3, '63.	Right. Surgeon Craft, C. S. A. Recovered.
62	Brown, C., Pt., F, 8th Indiana, age 23.	July 28, 28, '64.	Right; flap. Surg. J. K. Bigelow, 8th Ind. Disch'd Nov. 29, 1864.
63	Brown, D. W., Pt., A, 25th Indiana.	Feb. 13, 13, '62.	Left. Disch'd July 31, 1862.
64	Brown, G. M., Pt., A, 31st Illinois, age 22.	June 15, 15, '64.	Left; circ. Surg. J. S. Reeves, 78th Ohio. Disch'd Feb. 2, '65.
65	*Bruce, W. D.*, Pt., C, 13th Virginia.	Aug. 28, 29, '62.	Right. Surg. W. Grimes, C. S. A. Recovered.
66	Bruce, V. W., Pt., A, 17th Mich., age 20.	Nov. 16, 17, '63.	Right; circ. Confed. surgeon. Disch'd April 4, 1864.
67	*Bryant, W. W.*, Pt., G, 1st Tennessee.	May 31, Je. 1, '62.	Left. Surgeon Wright, C. S. A. Recovered.
68	Buckles, A. J., Lieut., E, 20th Ind., age 18.	Mar. 25, 25, '65.	Right; flaps. Surg. D. S. Hays, 110th Penn. Disch'd May 16, '65.
69	Bullent, A. C., Pt., F, 18th New York.	Sept. 14, 15, '62.	Left. Disch'd Nov. 19, 1862.
70	Bullock, W. S., Pt., G, 89th New York.	Oct. 27, 28, '64.	Right; circ. Surg. T. H. Squire, 89th N.Y. Disch'd April 20, '65. July, '65, necro. bone remo'd.
71	Burbank, J. H., Pt., F, 10th Massachusetts.	May 3, 3, '63.	Right; flap. Disch'd Feb. 25, 1864.
72	*Burchett, J. W.*, Pt., K, 8th Virginia, age 21.	July 3, 3, '63.	Left. Exchanged Nov. 12, 1863.
73	*Burk, H. F.*, Serg't, K, 48th North Carolina.	Sept. 17, 18, '62.	——. Surg. Lindsay, C. S. A.
74	*Burkett, F. H.*, Pt., D, 2d S. Carolina, age 24.	July 2, 4, '63.	Right. Surgeon Pierce, C. S. A. Furloughed Dec. 4, 1863.
75	[2]*Burnett, J. B.*, Pt., 1st S. Carolina, age 31.	Sept. 17, 18, '62.	Left; circular. Recovered.
76	Burton, J. O., Pt., B, 48th Illinois.	Feb. 13, 13, '62.	Right; flap. Disch'd June 17, 1862.

[1] SMITH (E. H.), *Cases of Fracture of Femur*, in *Confed. States Med. and Surg. Jour.*, 1864, Vol. I. p. 24.

[2] FISHER (G. J.), *Cases of Amp. after the Battle of Antietam, Sept.* 17, 1862, in *Am. Jour. of Med. Sci.*, 1863, Vol. XLV, p. 47.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
77	Butler, A.C., Pt., D, 11th Maine, age 20.	Aug. 14, 14, '64.	Right; circ. Ass't Surg. W. W. Royal, 11th Maine. Disch'd Sept. 20, 1865.
78	Butler, W. H., Serg't, C, 6th C. Troops, age 24.	Sept. 29, 29, '64.	Right; circ. Ass't Surg. J. W. Mitchell, 4th Colored Troops. Disch'd May 29, 1865.
79	Buzzell, S. P., Corp'l, B, 38th Wisconsin, age 24.	Aug. 13, 13, '64.	Right; circ. Surg. W. B. Fox, 8th Mich. Disch'd Feb. 25, '65.
80	*Caddell, G. R.*, Pt., K, 43d N. Carolina, age 20.	Sept. 19, 19, '64.	Left. Surg. Hill, 3d N. Carolina. Exchanged April 3, 1865.
81	Cammett, W. B., Pt., A, 26th Maine.	June 14, 14, '63.	Right; circ. Surg. C. Abbott, 26th Maine. Disch'd Aug. 29, 1863.
82	Cannon, J., Pt., D, 7th Maryland, age 24.	July 18, 18, '64.	Left; flap. Surg. R. H. Robinson, 7th Md. Disch'd June 5, 1865.
83	Cappers, A., Pt., A, 4th Wisconsin.	May 27, 27, '63.	Right; circ. Disch'd Feb. 19, '64.
84	Capper, H. M., Serg't, G, 10th Connecticut.	Mar. 14, 14, '62.	Right; flap. Disch'd July 1, '62.
85	[1] *Carlisle, M.*, Lieut., G, 19th South Carolina.	Sept. 19, 19, '63.	Right. Recovered.
86	Carpenter, H. H., Pt., D, 136th N. Y., age 27.	May 15, 16, '64.	Left. Ass't Surg. B. L. Hovey, 146th N. Y. Disch'd June 13, '65.
87	*Carpenter, J. M.*, Pt., Carpenter's Bat'y, age 17.	Sept. 19, 19, '64.	Left; circ. Surg. W. S. Love and H. McGuire, C. S. A. Exch'd April 1, 1865.
88	Carr, F., Pt., F, 73d Penn., age 18.	June 27, 27, '64.	Left; circular. Discharged Aug. 2, 1865.
89	Carroll, J., Pt., B, 1st N. Jersey Cavalry.	June 2, 2, '62.	Right. Surg. W. W. L. Phillips, 1st N. J. Cav. Dis. Sept. 27, '62.
90	*Carroll, S. F.*, Pt., D, 1st N. Carolina Cav.	Sept. 23, 23, '63.	Right; flap. Trans. to prison December 7, 1863.
91	Carrow, J. T., Corp'l, F, 4th Delaware, age 33.	June 16, 16, '64.	Left; ant. post. flap. Surg. D. S. Hopkins, 4th Delaware. Disc'd May 31, 1865.
92	Carson, A., Pt., H, 42d Pennsylvania.	Dec. 13, 15, '62.	Left. Confed. surgeon. Disch'd March 4, 1863.
93	Carter, C. C., Pt., H, 9th Kentucky, age 35.	July 19, 19, '64.	Right; ant. post. flap. Surg. T. R. W. Jeffray, 19th Ky. Mustered out Dec. 7, 1864.
94	*Cartner, C.*, Pt., A, 30th Virginia, age 22.	Sept. 19, 19, '64.	Right; circ. Released June 28, 1865.
95	Carver, J., Pt., E, 18th Kentucky.	July 17, 17, '62.	Left; flap. Dr. Pendleton, C. S. A. Recovered.
96	Casey, J., Pt., C, 100th New York, age 19.	April 2, 2, '65.	Right; circ. Surg. N. M. Carter, 100th N. Y. Disch'd Nov. 20, '65.
97	Casey, P., Pt., H, 1st Cavalry, age 21.	July 10, 10, '63.	Right; flaps of skin; circ. of mus. Hæm. July 26th, femoral ligat. Disch'd Dec. 9, 1863.
98	Casselberry, G., Serg't, K, 51st Penn., age 23.	Oct. 27, 27, '64.	Left; bilateral flap. Disch'd July 27, 1865. Sub. operation.
99	*Cheany, W. W.*, Lieut., B, 33th Arkansas.	July 4, 4, '63.	Right; hæm.; femoral lig. Furloughed Oct. 15, 1864.
100	Cheesebro, J., Pt., I, 135th N. York, age 20.	May 15, 15, '64.	Right; circ. Surg. C. J. Bellows, 7th Ohio. Disch'd June 19, '65.
101	Clark, E. W., Pt., F, 5th Michigan, age 31.	June 16, 17, '64.	Left; flap. Disch'd Feb. 7, 1865.
102	Clark, G. W., Pt., E, 12th N. Hampshire, age 25.	May 9, 9, '64.	Right; flap. Surg. A. C. Benedict, U. S. V. (also amp. right forearm.) Disch'd June 2, 1865.
103	Clark, J., Pt., H, 8th N. Hampshire.	June 14, 14, '63.	Left. Discharged Aug. 24, 1863.
104	*Clark, R. F.*, Pt., B, 49th North Carolina.	March, 1865.	To Provost Marshal May 10, '65.
105	*Clineo, N.*, Pt., H, 28th North Carolina.	Aug. 16, 16, '64.	Left; circ. Surg. 28th North Carolina. Recovered.
106	Clowes, J., Seaman U. S. Navy.	Jan. 15, 15, '65.	Left. Surg. J. McClellan, U.S.N.; nec. bone rem. Dis'd Feb. 7, '65.
107	*Clyburn, B. R.*, Major, 2d S. Carolina, age 22.	Oct. 19, 19, '64.	Left; circ. Surg. Gilmore, C.S.A. Sent to prison Jan. 10, 1865.
108	Cockburn, W., Serg't, H, 2d N. Jersey Cavalry, age 38.	Dec. 28, 29, '64.	Left; flap. Jan. 7th, femoral lig.; religated 18th and 23d. May 11, 1865, recovered.
109	*Coffett, J. B.*, Pt., B, 7th Virginia Cav., age 20.	May 23, 23, '62.	Left. Surg. West. Retired Mar. 8, 1865.
110	Coleman, M. J., Pt., D, 145th Penn., age 32.	Oct. 14, 14, '63.	Left; circular. Disch'd May 9, 1865.
111	Collins, W. T., Corp'l, A, 2d Sharpshooters.	Aug. 23, 23, '62.	Left. Surg. J. P. Prince, 36th Mass. Disch'd Feb. 23, 1863.
112	Coombs, F. M., Pt., B, 6th Missouri, age 23.	Aug. 25, 25, '64.	Right; circ. Surg. A. C. Messenger, 57th O. Disch'd July 5, '65.
113	Connell, Q., Pt., 4th Me. Battery, age 30.	Sept. 29, Oct. 1, '64.	Left; ant. post. flap. Disch'd Jan. 20, 1865.
114	Connor, H., Capt., H, 118th Penn., age 28.	Mar, 31, 31, '65.	Right; circ. Surg. J. Thomas, 118th Penn. Disch'd Oct. 28, '65.
115	*Coogan, T.*, Pt., F, 5th Texas.	Sept. 20, 21, '63.	——. A. Surg. Roberts, 5th Texas. Disch'd Oct. 16, 1863.
116	Coolidge, N., Pt., K, 46th Illinois, age 21.	July 7, 7, '64.	Right; flap. Surg. Allen, C.S.A. Disch'd Oct. 5, 1864.
117	*Cook, J. F.*, Pt., H, 4th Virginia Cav., age 34.	Oct. 11, 13, '63.	Right; flap. Transferred to hospital April 10, 1864.
118	Cook, J., Corp'l, F, 6th New York.	May 7, 8, '62.	Left. Surg. F. H. Hamilton, U.S. V. Disch'd July 1, 1862.
119	Cooper, H. J., Pt., F, 71st Penn., age 23.	May 12, 12, '64.	Right. Surg. J. M. Rizer, 72d Penn. Disch'd July 27, 1865.
120	*Cosby, A. W.*, Corp'l, E, 4th Georgia.	May 5. 5, '64.	Left. Surg. Young. Recovered.
121	Costa, D., Pt., K, 6th C. Troops, age 19.	Sept. 29, 29, '64.	Right; ant. post. flap. Disch'd June 20, 1865.
122	Cotter, W., Pt., E, 9th N. Hampshire, age 27.	July 30, 30, '64.	Right; long post. flap; rem. dead bone. Oct. 15, 1871, amp. hip j't. *Specs.* 252, 4954, 5946. Died Jan. 21, 1874.
123	Covey, W. G., Pt., B, 27th Missouri, age 24.	Feb. 14, 14, '65.	Right; ant. post. skin flap. Surg. B. N. Bond, 27th Mo. Disch'd July 15, 1865.
124	Coyne, P., Pt., B, 69th New York.	Sept. 17, 17, '62.	Right; ant. post. flap. Surg. J. H. Taylor, U. S. V. Disch'd May 15, 1863.
125	*Cox, J. W. M.*, Corp'l, A, 61st Tennessee.	May 17, 18, '63.	Right. Surg. Wilson, 4th Miss. Recovered.
126	Cram, W. H., Pt., K, 9th New Hampshire.	May 12, 12, '64.	By Surg. J. S. Ross, 11th New Hampshire.
127	Cramer, A., Serg't, B, 55th Ohio, age 37.	Mar. 16, 16, '65.	Left; circular. Disch'd Aug. 23, 1865.
128	Creager, W. H., Pt., B, 121st Ohio, age 17.	June 27, 28, '64.	Left; circ. Surg. T. B. Williams, 121st Ohio. Dis. June 21, 1865.
129	*Crist, W. M.*, Pt., 2d Rockbridge (Va.) Bat., age 19.	April 2, 3, '65.	Left; lat. flap. Released June 29, 1865.
130	Crommett, C., Pt., K, 112th Illinois.	Nov. 18, 19, '63.	Left; flap. Confed. Surg. Disch'd Feb. 16, 1864.
131	*Crow, W. T.*, Serg't, I, 35th Mississippi, age 25.	Nov. 30, 30, '64.	Right; circ. Provost Marshal March 7, 1865.
132	Crowl, J., Pt., F, 100th Penn., age 18.	July 30, 30, '64.	Left; circ. Surg. W. V. White, 57th Mass. Disch'd Feb. 25, '65.
133	Crye, J. D., Pt., D, 34th Indiana, age 22.	May 16, 16, '63.	Left; flap. Disch'd Sept. 21, '64.
134	Curran, J. W., Pt., G, 5th Wisconsin, age 24.	April 6, 8, '65.	Left; ant. post. flap. Ass't Surg. W. W. Allen, 5th Wis. July 13th, prot. exfol. rem. Disch'd Nov. 30, 1865. *Spec.* 547.
135	Curtis, R. D., Pt., K, 18th Conn., age 40.	June 5, 5, '64.	Right; lat. flap. Surg. L. Holbrook, 18th Conn. Disch'd June 27, 1865.
136	Dalton, J., Serg't, G, 151st N. York, age 33.	Oct. 19, 20, '64.	Left; ant. post. flap. Surg. J. R. Cotes, 151st N. Y. Disch'd Jan. 23, 1865.
137	Dangler, J. H., Pt., B, 1st N. Y. Cav., age 26.	Sept. 22, 22, '64.	Right; oval skin flap. Ass't Surg. P. Gardner, 1st Vermont Cav. Disch'd March 16, 1865.
138	Danner, J., Pt., A, 39th New York, age 33.	May 6, 8, '64.	Left; ant. post. flap. Confed. Surg. Disch'd June 26, 1865.
139	*Davis, E. J.*, Serg't, G, Cobb's Georgia Leg'n, age 25.	Aug. 25, 25, '64.	Right; circ. Furloughed Nov. 24, 1864.
140	*Davis, H.*, Pt., I, 17th Mississippi, age 30.	Oct. 19, 19, '64.	Left; doub. lat. flap. Surg. Patterson, C. S. A. To prison Mar. 9, 1865. Nov., '65, seq. remov'd.
141	Davis, J., Pt., B, 88th N. York.	Sept. 17, 18, '62.	Right; flap. Surg. F. Reynolds, 88th N. Y. Disch'd Nov. 18, '62.
142	Day, R. M., Pt., B, 54th Mass. C. T., age 22.	July 16, 16, '64.	Right; circ. A. Surg. L. D. Radzinsky, 54th Mass. Aug. 6, reamputat'n. Disch'd March 29, '65.
143	Debaugh, A., Pt., A, 123d Ohio, age 28.	April 6, 7, '65.	Right; flap. Surg. T. H. Squire, 89th N. Y. Discharged.
144	Deloe, W. W., Corp'l, H, 15th West Va., age 23.	Mar. 31, 31, '65.	Right; circ. Surg. C. M. Clark, 39th Ill. Disch'd April 16, 1866.
145	Demers, E., Corp'l, D, 125th N. York, age 21.	July 3, 4, '63.	Left; lat. flap. Surg. W. S. Cooper, 125th N. Y. Disch'd June 7, '64.
146	Dennison, J. M., Corp'l, K, 126th Ohio, age 27.	Sept. 19, 19, '64.	Right; ant. post. flap. Disch'd Jan. 17, 1865.
147	Dercourt, A., Pt., F, 32d New York.	May 8, 8, '62.	Right. Disch'd Oct. 25, 1862.
148	Detweiler, C., Pt., B, 100th Penn., age 37.	May 12, 12, '64.	Right; ant. post. flap. Surg. T. F. Oakes, 56th Mass. Discharged Jan. 13, 1865.
149	Devlin, J., Pt., I, 91st N. York, age 22.	Mar. 31, 31, '65.	Left; Teale's method; also amp. thumb and mid. finger. Disch'd Sept. 30, '65. *Phot. Ser.*, Vol. 8, No. 45. *Card Pt.*, Vol. 1, p. 25.
150	[2] *Dew, J. H.*, Pt., A, 24th Alabama.	Sept. 19, 21, '63.	——. Sent to hospital Oct. 31, 1863.
151	DeWolf, H., Pt., D, 7th Michigan, age 17.	May 31, Je 1, '62.	Right. Surg. G. Chaddock, 7th Mich. Rem. of sequest. Disch'd.
152	Dilks, J., Pt., D, 25th N. Jersey.	Dec. 13, 13, '62.	Left; flap. Surg. J. Riley, 25th New Jersey. Recovered.
153	Dillon, J. J., Pt., B, 16th Illinois.	Mar. 20, 20, '65.	Right; flap. Surgeon C. S. A. Mustered out July 8, 1865.
154	Dixon, L., Pt., H, 17th Connecticut, age 19.	July 1, 2, '63.	Right; circ. Confed. surg. Aug. 28th and Sept. 3d, spiculæ rem. Disch'd Oct. 10, 1864.
155	Dollar, G., Col'd Teamster.	March, 1865.	Right. Doing well.
156	Dormyer, J., Pt., G, 93d Pennsylvania, age 29.	Oct. 19, 20, '64.	Left; ant. post. skin flaps; circ. sect. of mus. Disch. April 1, '65.
157	Douglas, A. C., Serg't, G, 97th N. York, age 20.	May 10, 10, '64.	Left; flap. Surg. W. B Chambers, 97th N. Y. Disch'd Dec. 13, '64.
158	*Downs, D.*, Serg't, B, 35th Alabama, age 24.	Nov. 29, De. 1, '64.	Left; circ. Provost Marshal May 20, 1865.

[1] TERRY (C.), *Report of wounded, Army of Tennessee, after the battle of Chickamauga*, in *Confed. States Med. and Surg. Jour.*, 1864, Vol. I, p. 76.

[2] TERRY (C.), *op. cit.*, p. 76.

GANGRENE OF THE MEDULLA.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
159	*Downs, T. J.*, Pt., B, 21st Mississippi.	May 3, 3, '63.	Left; circ. Surg. N. Hayward, 20th Mass. Rem. three ins. fem. Exchanged April 11, 1864.
160	Doyle, J., Pt., B, 1st Wisconsin Cavalry.	Aug. 3, 3, '62.	Left; flap. Veteran Res. Corps.
161	Drain, W. L., Pt., I, 5th New York, age 19.	June 2, 2, '64.	Left; flap. Surg. C. S. A. Feb. 16, 1865, sequest. rem. Disch'd June 9, 1865. *Spec.* 113.
162	Drach, W. S., Pt., F, 7th Maryland, age 22.	May 8, 9, '64.	Right; double flap. Dr. Dungan, C. S. A. Disch'd July 21, 1865.
163	*Draughn, J. B.*, Corp'l, B, 30th Tenn., age 20.	Nov. 30, De. 1, '64.	———. Transferred to Provost Marshal May 4, 1865.
164	Duchenes, J., Pt., C, 71st New York, age 26.	July 2, 3, '63.	Left; flap. Surg. J. M. Merrow, 2d N. H. Disch'd June 14, 1864.
165	Duff, L. B., Lieut.-Col., 105th Pennsylvania.	June 18, 18, '64.	Right. Discharged Oct. 25, 1864.
166	Duffany, A. D., Pt., C, 6th Vermont, age 44.	April 16, 18, '62.	Right; flap. Surg. C. M. Chandler, 6th Vt. Disch'd July 1, '62.
167	Dugal, L., Sergeant, F, 146th N. Y., age 26.	May 5, 6, '64.	Left; ant.post.doub.flap. Confed. surg. Disch'd March 22, 1865.
168	Dugan, P., Pt., G, 169th New York, age 25.	Sept. 29, 29, '64.	L't; circ. Surg. J. Knowlson, 169th N.Y. Dis. Nov. 3, '65. Nov. 25, '65, reamp., Surg. Thorn, Troy, N.Y.
169	*Duncan, L. S.*, Serg't, I, 4th Tenn. Cav., age 26.	Aug. 14, 14, '64.	Left; circ. Provost Marshal Nov. 16, 1864.
170	Dunlap, L. L., Pt., F, 119th Penn., age 22.	April 2, 2, '65.	Left; circ. Surg. P. Leidy, 119th Penn. Disch'd June 17, 1865.
171	Dunn, J., Pt., I, 2d New York H. A., age 30.	Aug. 14, 15, '64.	Right; circ. Disch'd June 9, '65.
172	Duren, L. M., Pt., C, 7th Arkansas, age 21.	Oct. 8, 8, '62.	Left; circ. Furloughed June 16, 1863.
173	Eaton, G. L., Pt., F, 16th Conn., age 28.	April 24, 24, '63.	Left; circ. Ass't Surg. J. B. Whitcomb, 16th Conn. Disch'd.
174	*Eck, H.*, Serg't, F, 14th Louisiana.	Dec. 13, 13, '62.	Left. Surg. White. Furloughed Jan. 26, 1864.
175	Englebrecht, H., Pt., E, 2d Kentucky.	April 7, 8, '62.	Left. Disch'd August 4, 1862.
176	Erenburg, A., Lieut., 1st Ky. Light Artillery.	Sept. 17, 17, '62.	Left. Surg. H. E. Smith, 27th Mich. Dis. May 15, '65. Subs. rem. bone.
177	Evans, E. M., Corp'l, D, 28th Iowa, age 19.	Oct. 19, 20, '64.	Right; circ. A. Surg. J. M. Cowen, 77th Ill. Disch'd June 21, 1865.
178	Everson, F., Pt., E, 1st Wisconsin, age 40.	Aug. 24, 24, '64.	Right; circ. Insanity. Washington, Oct. 20, 1864.
179	Ewald, H., Pt., F, 43d N. York, age 18.	May 3, 5, '63.	Right; flap. Surg. M. Case, 43d N. Y. Disch'd Sept. 16, 1863.
180	Fairgrieves, G., Pt., H, 15th N. Jersey, age 23.	June 1, 2, '64.	Right; circ. Surg. J. S. Martin, 14th N. J. Disch'd June 30, '65.
181	Farmer, M., Pt., K, 10th N. Hampshire, age 24.	June 3, 3, '64.	Left; circ. Surg. H. N. Small, 10th N. H. Disch'd June 14, '65.
182	Faulkner, I., Pt., B, 6th Missouri Cav., age 25.	Aug. 25, 27, '64.	Right; circ. A. A. Surg. J. F. Musgrove. Disch'd Mar. 16, '65.
183	Feerer, D. A., Pt., A, 79th Ohio, age 22.	May 27, 27, '64.	Left; flap. Disch'd Dec. 28, '64.
184	Fickel, S. W., Pt., B, 78th Ohio, age 17.	Aug. 26, 26, '64.	Right; circ. Surg. J. S. Reeves, 78th Ohio. Dec. 4th, re-amp. by Surg. G. Grant, U. S. V. Discharged July 24, 1865.
185	Fitzgerald, C., Pt., G, 106th Illinois, age 25.	Jan. 7, 7, '65.	Left. Ass't Surg. F. J. Foster, 13th Ill. Cav. Dis. Aug. 31, '65.
186	Finn, J., Pt., B, 11th Infantry, age 28.	Oct. 1, 1, '64.	Right. Surg. T. M. Flandrau, 146th N. Y. Duty Mar. 17, '65.
187	Fisher, H., Pt., E, 14th N. York H. A., age 36.	July 5, 5, '64.	Right; long. ant. flap. Insanity. Insane asylum Mar 3, 1865.
188	Fisher, L., Corporal, F, 184th Penn., age 18.	June 3, 3, '64.	Right, circ. Discharged May 30, 1865.
189	Fisher, T., Corp'l, B, 4th Colored Troops, age 18.	June 14, 15, '64.	Right; flap. Discharged May 20, 1865.
190	Fordice, J. R., Pt., B, 39th Illinois.	Sept. 11, 11, '63.	Left; circ. A. A. Surg. W. H. Finn. Disch'd June 20, 1864.
191	Folger, I. H., Lieut., H, 58th Mass., age 21.	June 3, 3, '64.	Right. Surg. 32d Me. Subseq. operat'n. Disch'd Dec. 17, '64. Dead bone removed.
192	*Follard, J.*, Pt., A, 21st Tennessee, age 18.	Nov. 30, De. 1, '64.	Left; circular. Provost Marshal March 18, 1865.
193	Forney, R., Pt., H, 48th Penn., age 24.	Sept. 17, 18, '64.	Right; flap. Discharged Jan. 13, 1864.
194	Forrest, J. J., Pt., K, 21st Ohio, age 24.	Sept. 1, 1, '64.	Right; flap. Surg. D. S. Young, 21st Ohio. Disch'd June 24, '65.
195	[1]Forrester, P., Pt., G, 99th Pennsylvania.	Dec. 13, 13, '62.	Left; ant. post. flap. Surg. W. O'Meagher, 69th N. Y. Sub. rem. of bone. Dis. Nov. 26, '63.
196	Fountain, N., Pt., B, 18th Wisconsin, age 17.	Oct. 5, 5, '64.	Right; circ. Surg. E. J. Buck, 18th Wis. Disch'd May 18, '65.
197	Fouts, S., Pt., G, 2d Iowa, age 23.	Feb. 15, 16, '62.	Left; flap. Discharged.
198	Fralick, W. A., Pt. M, 10th N.Y. H.A., age 19.	April 2, 2, '65.	Left; circ. Confederate surgeon. Disch'd Sept. 22, 1865.
199	Frazer, P., Lieut., C, 4th Colored Troops, age 40.	July 30, 30, '64.	Right; flap; hæm. Disch'd April 22, 1865.
200	French, S., Pt., D, 16th Penn. Cav., age 23.	Aug. 16, 16, '64.	Left; circ.; bone removed. Discharged July 18, 1865
201	French, W., Corp'l, D, 17th Penn. Cav., age 17.	Aug. 16, 16, '64.	Left; lateral flap. Discharged Jan. 17, 1866.
202	*Fristoe, R. H.*, Captain, 8th Kentucky Cavalry.	July 14, 14, '64.	———. Recovered.
203	Fultz, H., Pt., K, 23d Kentucky, age 34.	Nov. 25, 26, '63	Left; flap. A.A. Surg. R. Wirth. Discharged June 22, 1864.
204	Fuller, J., Pt. G., 3d Missouri, age 28.	May 14, 14, '64.	Right; flap. Surg. A. Sabine, 76th Ohio. Disch'd Mar. 8, '65.
205	Gable, J., Pt., B, 155th Pennsylvania, age 19.	June 18, 20, '64.	Right; ant. post. flap. Surg. A. E. Reed, 155th Penn. Disch'd Aug. 7, 1865.
206	Gahl, jr., W., Pt., K, 57th Illinois.	Oct. 4, 4, '62.	Right; flap. Recovered.
207	*Gallagher, T.*, Serg't, F, 7th Louisiana, age 30.	June 14, 15, '63.	Left. Surgeon Davis. Retired February 13, 1865.
208	[2]Gardner, H., Capt., I, 100th Illinois, age 23.	Nov. 24, 25, '63.	Right; flap. Surg. A. W. Heise, 100th Ill. Hæm.; lig. of fem'l art'ry. Disch'd Aug. 18, 1864.
209	Gardner, C. H., Pt., C, 16th Mass., age 34.	June 18, 18, '62.	Left; circ. Confed. surg. Dis. July 11, 1863. *Spec.* 288.
210	*Garrett, W.*, Pt., I, 15th Mississippi, age 18.	July 18, 19, '64.	Right; flap; slough.; gangrene. Recovery.
211	Gathers, L., Pt., H, 155th Penn., age 30.	Feb. 6, 6, '65.	Left; flap. Disch'd May 29, '65.
212	Gay, I. D., Serg't, F, 91st Indiana, age 28.	Aug. 6, 7, '64.	Left; circ. Surg. E. Batwell, 14th Mich. Disch'd June 20, '65.
213	Gear, N. H., Pt., D, 2d Connecticut.	June 1, 2, '64.	Left; doub. flap. Surg. H. Plumb, 2d Conn. Disch'd June 3, '64. July 7th, re-amputation.
214	Geissler, J., Pt., B, 49th New York, age 49.	July 12, 12, '64.	Right; ant. post. flap. Surg. G. T. Stevens, 77th N. Y. Disch'd June 23, 1865. *Card Phot.*
215	Gelsleichter, C., Corp'l, C, 13th Ohio Cavalry, age 32.	July 30, 30, '64.	Left; double flap. Surg. A. F. Whelan, 1st Mich. S. S. Sept. 7, bone rem. Disch'd June 9, '65.
216	Gibson, G., Pt., C. 63d Pennsylvania.	June 1, 1, '62.	Right. Disch'd July 21, 1862.
217	Giese, E. F., Pt., D, 82d Illinois, age 20.	July 1, 1, '63.	Left; flap. Surg. W. C. Steinmetz 58th N. Y. Sub. oper. Disch'd March 14, 1864.
218	*Gibson, H. B.*, Pt., D, 2d S. Carolina, age 23.	July 3, 4, 1863.	Left; circ. Transferred for exchange Sept. 10, 1863.
219	Gildersleeve, A., Landsman, U. S. Steamer Montgomery.	Jan. 15, 16, '65.	Left; also amp. r't thumb and index finger. Re-amp. Disch'd July 6, 1867.
220	Gill, J. W., Serg't, A, 6th Maryland, age 27.	April 2, 2, '65.	Left; flap. Surg. E. K. Foreman, 6th Md. Disch'd July 21, '65.
221	Godley, L. M., Serg't, E, 22d Iowa.	May 22, 23, '63.	Left; flap. Discharged Sept. 4, 1863.
222	*Gooch, J. D.*, Pt., B, 15th Virginia.	May 5, 5, '64.	Left; circ. Surg. Slater, 15th Va. Furloughed May 25, 1864.
223	Good, P., Pt., B, 33d Indiana, age 19.	June 22, 23, '64.	Left; flap. Disch'd April 14, 1865.
224	*Gould, T. M.*, Serg't, E, 29th Alabama, age 29.	July 20, 21, '64.	Right; circ.; gang.; bone exc. Recovery.
225	Goulding, J. F., Serg't, C, 20th Massachusetts, age 29.	July 2, 3, '63.	Right; flap. Surg. N. Hayward, 20th Mass. Aug. 30, spicu. ext. Sept. 23, nec. bone ext. Disch'd Jan. 28, 1864.
226	[3]Gowans, J., Pt., A, 38th New York.	Dec. 13, 15, '62.	Left; lat. flap. Ass't Surg. R. A. Everett, 5th Mich. Discharged April 27, 1863.
227	Grant, P., Pt., E, 48th Pennsylvania, age 17.	June 27, 27, '64.	Left; circ. Surg. W. R. D. Blackwood, 48th Pa. Dis. Jan. 13, '65.
228	Grant, H., Pt., F, 165th New York, age 21.	July 23, 25, '64.	Left; circ. Discharged Feb. 10, 1865.
229	[4]*Gray, W. A.*, Pt., K, 24th Alabama.	Sept. 19, 19, '63.	Right. Discharged Oct. 9, 1863.
230	*Gray, W. H.*, Pt., F, 33d North Carolina.	May 23, 24, '64.	Left. Ass't Surg. J. A. Vigal, 33d N. Carolina. Recovered.
231	Green, D., Serg't, G, 4th Delaware, age 26.	June 19, 19, '64.	Left; ant. post. flap: remo. nec. bone. Disch'd June 23, 1865.
232	Green, J. D., Pt., E, 7th Maryland, age 22.	May 5, 6, '64.	Left; flap. Surg. Straith, C. S. A. Disch'd Aug. 18, 1865.
233	Green, T. G., Pt., G, 36th New York.	July 1, 2, '62.	Left; flap; nec. bone removed. Disch'd July 15, '63. *Spec.* 115.
234	*Green, W. H.*, Pt., K, 2d S. Carolina, age 32.	Sept. 4, 4, '64.	Right. Released April 1, 1865.
235	Griffin, H. M., Pt., D, 14th Michigan, age 20.	July 6, 6, '64.	Left; circ. Surg. E. Batwell, 14th Mich. Discharged July 18, '65.
236	Grogan, A., Lieut., G, 6th Conn., age 21.	June 29, 29, '64.	Left; ant. post. flap. Surg. F. L. Dibble, 6th Conn. Discharged Nov. 26, 1864.
237	*Groover, P. H.*, Pt., I, 48th Alabama.	Oct. 20, 20, '63.	Right. Surgeon Burton. Recovered.
238	Gross, J., Corp'l, E, 82d Illinois, age 24.	May 25, 26, '64.	Right; circular. Disch'd Feb. 12, 1865.

[1] O'Meagher (W.), *Casualties at the Battle of Fredericksburg*, in *Am. Med. Times*, 1863, Vol. VI, p. 179.

[2] Lidell (J. A.), *On the Surgical Treatment of Traumatic Hæmorrhage, etc.*, in *Surg. Mem. of the War of the Rebellion, collected and published by the U. S. Sanitary Commission*, 1870, Vol. I, p. 225.

[3] O'Meagher (W.), *Casualties, etc., op. cit.*, p. 179, and *Surg. Mem. of the War of the Rebellion, Coll. and pub. by the U. S. San. Comm.*, 1871, Vol. II, p. 20. [4] Terry (C.), *loc. cit.*, p. 76.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
239	*Groves, J. R.*, Pt., K, 13th North Carolina.	July 1, 2, '63.	Left. Recovered.
240	Guy, R. W., Pt., F, 14th N. York S. M., age 30.	July 1, 2, '63.	Right; ant. post. flap. Surg. G. M. Ramsey, 95th N.Y. Disch'd March 30, 1864. *Spec.* 4368.
241	Guyer, F., Capt. D, 83d New York, age 36.	May 6, 7, '64.	Right; circ. Confed. surgeon. Mustered out.
242	Hall, A. A., Pt., E, 9th N. York Cav., age 26.	Oct. 11, 11, '63.	Right; circ. Surg. B. G. Streeter, 4th N. Y. Cav. Disch'd Aug. 23, 1864. *Spec.* 4367.
243	*Hallowell, W. G.*, Pt., A, 27th North Carolina.	Oct. 14, 15, '63.	Left. Furloughed Dec. 18, 1863.
244	*Hamilton, J. R.*, Lieut., E, 10th Florida.	Sept. 10, 10, '64.	———. Surgeon Bacon, C. S. A. Recovered.
245	Hammell, D. F., Serg't, E, 122d N. Y., age 34	Oct. 19, 19, '64.	Right; flap. Surg. G. T. Stevens, 77th N. Y. Disch'd May 30, '65.
246	Hammers, G., Capt., D, 27th Kentucky, age 34.	July 21, 21, '64.	Left; circ. Surg. J. W. Lawton, U. S. V. M. o. March 29, 1865.
247	Hanna, O., Pt., B, 47th Ohio, age 26.	Mar. 21, 21, '65.	Right; circ. Surg. J. H. Hutchinson, 15th Mich. Disch'd June 17, 1865.
248	Hannah, A., Pt., I, 1st Mich. Art'y, age 18.	Aug. 12, 12, '64.	Right; flap. Surg. H. H. Langdon, 79th Ohio. Disch'd Oct. 3, 1865.
249	Hauerwas, L., Pt., C, 18th Connecticut.	May 15, 16, '64.	Left; circ. Confederate surgeon. Disch'd May 12, 1865.
250	Harford, T. J., Pt., D, 161st N. York, age 21.	April 8, 9, '64.	Right; circ. Ass't Surg. W. F. Sigler, 130th Ill. Sub. opera'n. Disch'd March 8, 1865.
251	Harvey, H. G., Capt., E, 145th Pennsylvania.	June 12, 12, '64.	Right; circ. Surg. G. L. Potter, 145th Penn. Disch. Dec, 19, '64.
252	*Haskins, D.*, Pt., 1st Virginia Artillery.	Sept. 29, 29, '64.	Left; double flap. Ass't Surg. W. F. Richardson, C. S. A. Furloughed Nov. 10, 1864.
253	Held, P., Pt., G, 40th New York, age 21.	May 23, 23, '64.	Right; ant. post. flaps. Nov. 18th, bone rem. Disch'd Mar. 8, 1865.
254	Henne, R., Lieut., H, 15th Missouri, age 40.	Mar. 8, 8, '62.	Left. Surg. C. Cook, 12th Mo. Disch'd Jan. 27, 1863; re-amps.
255	Herald, J., Pt., I, 1st Michigan.	Aug. 29, 29, '62.	Right. Surg. J. W. Tunnicliffe, 1st Mich. Disch'd Feb. 20, '63.
256	Hill, J., Pt., B, 79th N. York, age 36.	Oct. 10, 11, '63.	Left; circ. Surg. G. B. Coggswell, 29th Mass. Discharged June 4, 1864. *Spec.* 4377.
257	*Hill, I. M.*, Pt., I, 14th South Carolina.	July 3, 4, '63.	Left. Surg. L. Y. Hurt, C. S. A. Paroled Sept. 23, 1863.
258	*Hiller, S. J.*, Pt., E, 3d South Carolina, age 23.	Oct. 19, 19, '64.	Right; circ. Surg. Evans, C. S. A. Pro. Marshal April 1, 1865.
259	Hodges, S., Pt., F, 82d Ohio, age 20.	May 25, 26, '64.	Left; flap; gangrene; re-amp. June 10th. Disch'd June 5, '65.
260	Holbrook, C., Pt., H, 109th N. York, age 21.	May 12, 14, '64.	Left; double flap. Confed. surg. Disch'd Nov. 25, 1865.
261	*Holloway, J. A.*, Pt., F, 15th South Carolina.	June 1, 1, '64.	———. circ. Transferred June 7, 1864.
262	Holloway, F., Corp'l, F, 30th Wisconsin, age 20.	June 1, 1, '64.	Right; doub. flap. Confed. surg. Disch'd May 27, 1865.
263	Holmes, P., Pt., D, 8th Maine, age 20.	June 3, 3, '64.	Right; circ. Ass't Surg. W. R. Benson, 8th Maine. Discharged May 3, 1865.
264	[1]*Holmes, W. F.*, Pt., G, 4th Tenn. Cav., age 24.	May 9, 9, '64.	Left; flap; three-fourths of an inch of bone remo. Recovered.
265	Hopwood, A. S., Corp'l, B, 7th Ky. Cav., age 27.	June 28, 28, '63.	Left; Surg. R. R. Taylor, U.S.V. Disch'd June 8, 1864.
266	*Horton, W. H.*, Pt., B, 8th Alabama age 19.	July 2, 2, '63.	Right; removal of protruding bone. Exchanged.
267	Houghton, C. H., Capt., L, 14th New York H. Artillery, age 23.	Mar. 25, 25, '65.	Right; circ. Surg. W. Ingalls, 59th Mass. Disch'd Aug. 26, 1865. *Spec.* 4001.
268	House, M., Serg't, F, 9th Iowa, age 21.	Feb. 1, 1, '65.	Left; flap. Surg. A. Sabine, 76th Ohio. Disch'd June 6, 1865.
269	Howard, R. C., Pt., F, 5th Penn. Cav., age 22.	Sept. 27, 27, '64.	Right; circ. Confed. surgeon. Disch'd July 18, 1865.
270	Howard, W. H., Pt., K, 14th New York H. A., age 18.	Aug. 19, 20, '64.	Right; circ. Disch'd Nov. 25, '65. Died Nov. 27, '68. *Spec.* 391.
271	Howe, F. M., Pt., C, 20th Michigan, age 23.	Aug. 18, 18, '64.	Left; circ. Surg. W. B. Fox, 8th Mich. Disch'd July 26, '65.
272	*Howlett, H. M.*, Pt., A, 7th Louisiana.	May 6, 7, '62.	Left. Surgs. Hancock and Triplett. Disch'd July 14, 1862.
273	Hoyner, J., Pt., A, 153d New York, age 30.	Oct. 19, 20, '64.	Left; circ. Surg. N. L. Snow, 153d N. Y. Disch'd Jan. 9, '65.
274	*Hubbard, W. M.*, Pt., A, 1st Louisiana, age 26.	July 2, 2, '63.	Left. Surgeon White, C. S. A. Exchanged March 3, 1864.
275	Huck, J., Pt., A, 72d New York, age 34.	Aug. 27, 27, '62.	Left. Disch'd April 7, '63. Died Sept. 8, 1865.
276	*Hudson, G. H.*, Pt., L, 5th Virginia, age 38.	Sept. 23, 23, '64.	Left; circ. Surg. W. S. Love, C. S. A. Released June 28, '65.
277	Huffman, A., Corp'l, C, 2d Ohio.	Dec. 31, '62, Jan. 1, '63.	Left; flap. Surg. B. F. Miller, 2d Ohio. Disch'd April 9, '63.
278	Hughes, P. F., Serg't, C, 125th New York, age 22.	May 18, 18, '64.	Left; circ. Surg. W. S. Cooper. 125th N. Y. Nec. bone rem. Disch'd Aug. 29, '65. *Spec.* 3276.
279	Hunt, J., Pt., K, 151st New York.	June 1, 2, '64.	Right; double flap. Discharged Dec. 26, 1864.
280	Hunt, M., Serg't, D, 3d Vermont, age 25.	June 3, 3, '64.	Left; double flap. Surg. D. M. Goodwin, 3d Vermont. Disch'd May 17, 1865.
281	Hyndman, J. A., Pt., G, 5th Ohio Cavalry.	Feb. 23, 23, '63.	Left; circ. Surg. D. V. Ramels and Ass't Surg. G. Sprague, 5th Ohio Cav. Disch'd June 3, '64.
282	Iburg, F., Pt., E, 2d Missouri.	Oct. 8, 8, '62.	Lett; flap. Disch'd Oct. 3, 1863.
283	Imhoff, F., Pt., D, 2d N. Jersey, age 32.	July 3, 4, '63.	Left; flap. Disch'd March 15, 1864.
284	Inman, W., Pt., D, 4th New Jersey.	May 5, 5, '64.	Left; flap. Surg. J. D. Osborne, 4th N. J. Disch'd Nov. 21, '64.
285	Inman, P., Pt., A, 95th Illinois, age 20.	June 27, 27, '64.	Left; flap. Surg. G. W. Eastman, 16th Wis. Sub. amputations. Disch'd June 17, 1865.
286	Irvine, T., Pt., I, 1st Pennsylvania, age 27.	May 31, J'ne 1, '64.	Left; circ. Confederate surgeon. Disch'd May 12, 1865.
287	Jackson, A., Pt., E, 75th Ohio, age 18.	Aug. 19, 19, '63.	Right; circ. (also w'd left knee). Surg. C. L. Wilson, 75th Ohio. Disch'd Jan. 20, 1865.
288	James, J., Pt., H, 19th Maine, age 29.	July 2, 3, '63.	Right; flap. Disch'd Nov. 12, 1864.
289	James, S. E., Pt., G, 30th Iowa.	Oct. 21, 21, '63.	Right; flap. Surg. A. T. Hudson, 26th Ia. Disc. Feb. 27, '64.
290	Jarrell, A., Corp'l, I, 1st Delaware, age 23.	April 7, 8, '65.	Left; circ. A. Surg. E. P. Roche, 35th Mass. Disch'd Oct. 18, '65.
291	Jarvis, I., Pt., K, 10th N. Jersey, age 30.	May 31, 31, '64.	Left; circ. Surg. O. R. Freeman, 10th N. J. Disch'd Dec. 15, '64.
292	Jay, L., Pt., 14th Indiana Battery, age 28.	June 10, 11, '64.	Right; ant. post. flap. Confed. surgeon. Disch'd July 8, 1865.
293	*Jean R. M.*, Pt., G, 3d Arkansas.	July 8, 8, '64.	Left. Surgeon Brown. Recovered.
294	*Jennings, J. W.*, Serg't, B, Hampton's Legion.	Jan. 17, 18, '64.	Left. Surgeon Bozeman. Recovered.
295	Jerger, S., Capt., K, 27th Indiana, age 40.	May 3, 3, '63.	Right; circ. Discharged Aug. 19, 1863.
296	Jess, T., Pt., F, 125th Illinois, age 25.	Aug. 5, 5, '64.	Left flap. Surg. M. W. Hooton, 86th Ill. Disch'd Feb. 22, '65.
297	Johnson, C. W., Serg't, C, 3d Indiana Cavalry.	June 21, 21, '63.	Right. Surg. A. Hard, 8th Ill. Cavalry. Disch'd Feb. 11, '64.
298	Johnson, W. W., Corp'l, E, 143d Penn., age 31.	July 1, 2, '63.	Right; ant. post. flap. Disch'd Jan. 20, 1864.
299	*Johnston, J. L.*, Corp'l, G, 19th Ala., age 20.	July 22, 22, '64.	Right; circ. Sept. 5th, gang., slough. Trans'd Sept. 22, '64.
300	*Johnston, G. S.*, Pt., H, 27th North Carolina.	May 22, 22, '63.	Left. Surgeon Hunt, C. S. A. Recovered.
301	Johnston, R., Pt., D, 70th Indiana.	July 20, 20, '64.	Right. Disch'd June 7, '65. Died March 15, 1869; pyæmia.
302	Jones, J., seaman, U. S. Navy.	Jan. 15, 16, '65.	Left. Disch'd August 4, 1865.
303	Jones, E. E., Corp'l, F, 117th N. York, age 26.	Jan. 15, 15, '65.	Left; circ. Ass't Surgeon F. B. Kimball, 3d New Hampshire. Disch'd Oct. 14, 1865.
304	Jordan, A., Pt., C, 12th Maine, age 21.	Oct. 19, 19, '64.	Left; circ. Discharged June 12, 1865.
305	Joyce, E., Pt., A, 1st Artillery, age 27.	May 27, 27, '63.	Left; ant post. flap. Surg. M. Benedict, 75th N. Y. Disch'd March 30, '64. *Spec.* 2670.
306	Karn, W., Pt., G, 118th Ohio, age 24.	July 20, 20, '64.	Left; ant. post. flap. Surg. C. D. Moore, 13th Ky. Disch'd April 14, 1865.
307	Karstens, H., Corp'l, K, 16th Iowa.	Sept. 19, 19, '62.	Right; flap. Surg. J. G. F. Holston, U.S.V. Disch'd Ap'l 8, '63.
308	Kearney, J., Serg't, I, 76th New York, age 30.	July 2, 2, '63.	Right; circ. Surg. G. W. Metcalf, 76th N.Y. Also amp. r't thumb. Disch'd July 6, 1864. *Spec.* 4366.
309	Keeler, D. N., Pt., C, 8th Illinois.	Feb. 15, 16, '62.	Right; circ. Disch'd Oct. 11, 1862.
310	Keller, G. W., Pt., I, 19th Indiana.	Aug. 28, 29, '62.	Left; flap. Surg. J. McNulty, U. S. V. Disch'd Dec. 23, '62.
311	Kells, J., Pt., I, 113th Ohio, age 44.	Sept. 1, 1, '64.	Right; ant. post. flap. Surg. T. B. Williams, 121st Ohio. Disch'd March 21, 1865.
312	Kelly, J., Pt., G, 2d Artillery, age 21.	May 31, 31, '64.	Left; flap. A. A. Surgeon J. H. Thompson. July 31, seq. rem. Disch'd Mar. 10, '65. *Spec.* 2926.
313	Kelly, M., Pt., A, 1st Vermont Battery.	Aug. 16, 16, '63.	Left; bilateral flap. Discharged Dec. 10, 1863.
314	Kelsey, E. E., Pt., B, 64th New York.	Dec. 13, 14, '62.	Left. Disch'd March 13, 1864.
315	Kennedy, J., Serg't, A, 95th Illinois, age 28.	Dec. 15, 15, '64.	Left; circ. Surg. J. W. Green, 95th Ill. Disch'd June 8, 1865.
316	*Kennedy, P. R.*, Pt., C, 27th N. C., age 21.	Oct. 14, 15, '63.	Left; circular. Furloug'd February 13, 1864.
317	Killen, A., Pt., K, 14th Ohio, age 31.	Sept. 19, 21, '63.	Left; ant. post. flap. Disch'd July, 17, 1865.
318	Killian, M., Pt., I, 79th Penn., age 20.	July 20, 21, '64.	Right; lat. flap. Disch'd July 13, 1865.
319	King, A., Pt., H, 7th Michigan Cavalry.	Aug. 24, 25, '64.	Right; flap. Ass't Surg. G. R. Richards, 7th Mich. Cav. Disch.
320	[2]*Kirby, W. T.*, Pt, —, 59th Alabama.	Sept. 19, 19, '63.	——. Bone protruded; reamputation.
321	Kirby, W. H., Pt., A, 7th N. Jersey, age 24.	July 1, 2, '63.	Left; flap. Disch'd May 6, 1864.

[1] O'KEEFE (D. C.), *Surgical Cases of Interest, treated at Institute Hospital, Atlanta, Ga., May and June*, 1864, in *Confederate States Med. and Surg. Jour.*, 1865, Vol. II, p. 25.

[2] TERRY (C.), *loc. cit.*, p. 76.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
322	Kline, R., Pt., E, 51st Penn., age 19.	June 3, 3, '64.	Right; flap; necrosis. Mustered out Jan. 25, 1866.
323	*Knifflin, C. H.*, Serg't, K, 8th Ark., age 22.	Dec. 16, 17, '64.	Right; circ. Provost Marshal June 24, 1865.
324	Kottinger, J. F., Pt., B, 16th Infantry, age 26.	Dec. 31, '62, Jan. 1, '63.	Left; flap. Ass't Surgeon J. F. Weeds, U. S. A. Disch'd July 15, 1863.
325	Konkleman, F., Pt., C, 149th Penn., age 19.	Oct. 8, 8, '64.	Right; flap. Disch'd July 19, 1864.
326	Kohlman, H., Pt., F, 47th Ohio, age 37.	Dec. 13, 14, '64.	R't; circ.; also amp. three fingers r't hand. Surg. I. N. Barnes, 116th Ill. Disch'd Sept. 20, '65.
327	Kountz, J., musician, G, 37th Ohio, age 20.	Nov. 25, 25, '63.	Left; ant. post. flap. Surg C. P. Brent, 54th Ohio. Discharged April 29, 1864.
328	Kramer, C., Pt., E, 191st Penn., age 20.	Mar. 31, 31, '65.	Left; oval skin flap; circ. sect. of musc. Disch'd June 16, '65.
329	Kranz, C., Corp'l, B, 15th N. Y. H. A., age 27.	Aug. 18, 19, '64.	Left; circ. Disch'd Sept. 12, 1865.
330	Kreig, P., Pt, C, 46th New York, age 28.	Aug. 21, 21, '64.	Left; amp. left arm. Surg. W. B. Fox, 8th Michigan. Disch'd April 27, 1865.
331	Landolt, W. H., Serg't, A, 5th Wis., age 29.	April 6, 6, '65.	Left; circ. Disch'd July 13, '65.
332	Langshold, A., Pt., B, 8th Illinois.	May 12, 12, '63.	Left; flap. Disch'd Aug. 8, '63.
333	Lane, J. M., Serg't, E, 16th Penn. Cav., age 41.	Oct. 27, 28, '64.	Right; flap. Disch'd July 26, 1865.
334	Langan, J., Pt., B, 2d Michigan, age 22.	June 18, 18, '64.	Right; ant. post. flap. Surg. S. S. French, 20th Mich. Gang. Disch'd Sept. 11, 1865.
335	Lanning, A., Serg't, F, 93d Indiana, age 27.	Dec. 15, 15, '64.	Left; circ.; gang.; neer. Disch'd Nov. 16, 1865.
336	Lapham, C. N., Corp'l, K, 1st Vermont Cav., age 23.	July 8, 10, '63.	Right; ant. post. flap. (Left; knee joint.) Surg. A. Wood, 1st Mass. Cav. Disc'd Aug. 25, '64.
337	*Langstone, B. F.*, Pt., C, 5th Arkansas, age 19.	Nov. 30, Dec. 1, '64.	Left; bilateral flap. Prov. Marshal March 27, 1865.
338	Larkin, A. B., Pt., D, 30th Iowa, age 24.	Oct. 21, 21, '63.	Right; lat. flap. Surgeon G. L. Carhart, 31st Iowa. Disch'd Feb. 4, 1864.
339	Lawrence, J. K., Pt., D, 93d New York, age 33.	May 12, 13, '64.	Left; circ. Disch'd June 16, '65.
340	Laurie, C., Pt., F, 2d Vermont.	June 4, 4, '64.	——; double flap; gang. Furloughed.
341	Learey, J., Pt., M, 10th N. York Cav., age 22.	Mar. 31, Ap. 1, '65.	Left; ant. post. flap. Disch'd July 20, 1865.
342	Leach, E. B., Corp'l, K, 25th Mass., age 33.	Sept. 19, 20, '64.	Right; ant. post. flap. Surg. J. G. Bradt, 25th Mass. Disch'd Oct. 29, 1864.
343	*Lee, T. J.*, Pt., I, 38th Virginia, age 32.	Aug. 25, 26, '64.	Right. Surgeon Wilbur, C. S. A. Retired March 13, 1865.
344	*Lee, Z. P.*, Pt., C, 23d Tennessee.	Sept. 20, 20, '63.	Right. Surgeon Plummer. Recovered.
345	Le Flure, R., Serg't, G, 2d Kansas Col'd.	July 17, 17, '63.	Right; circ. Disch'd Aug. 29, 1864.
346	Leggett, W. F., Pt., F, 1st Ala. Cav., age 25.	July 29, 30, '63.	Left; flap. Surg. A. B. Stewart, 1st Ala. Cav. Disc. July 5, '64.
347	Lelar, W. D., Corp'l, H, 99th Pennsylvania.	Dec. 13, 14, '62.	Right. Disch'd May 4, 1863.
348	Lemmon, J., Corp'l, D, 33d Illinois.	May 17, 17, '63.	Right; flap. Surg. G. P. Rex, 33d Ill. Gang. Disch'd Nov. 4, 1863.
349	Lennon, W., Pt., A, 8th Michigan Cav., age 17.	Oct. 25, 25, '63.	Left; circ. Disch'd May 26, '64.
350	Leonard, O. H., Pt., B, 21st Indiana, age 22.	July 4, 4, '64.	Right; ant. post. flap. Surg. C. J. Walton, 21st Ky. Disch'd June 20, 1865.
351	Levitt, J., Serg't, C, 35th Illinois, age 31.	June 18, 19, '64.	Left; circ. Surg. S. P. Hawley, 35th Ill. Disch'd Feb. 24, '65.
352	Lewis, M., Pt., K, 7th Mich. Cav., age 18.	July 3, 4, '63.	Right. Disch'd June 3, 1864.
353	Liesy, J., Pt., B, 17th Ohio, age 26.	May 14, 15, '64.	Right; circ. Disch'd Feb. 18, 1865.
354	Lilley, S. O., Pt., L, 1st Maine H. A., age 20.	May 19, 21, '64.	Right; flap. Disch'd April 26, 1865.
355	Lincoln, E., Serg't, I, 12th Illinois.	April 6, 7, '62.	Left; flap. Surg. H. Wardner, U. S. V. Disch'd May 29, 1862.
356	*Lindsay, W.*, Pt., I, 18th North Carolina.	May 2, 3, '63.	Right; circ. Surg. Lane. Gang. Furloughed July 28, 1863.
357	Listman, J., Capt., H, 185th New York.	Feb. 6, 6, '65.	Right; circ. Surg J. Thomas, 118th Penn. Disch'd May 29, '65.
358	*Little, J.*, Pt., B, 27th Virginia	Aug. 28, 28, '62.	Left. Surg. Gibson. Recovered.
359	*Lofton, B. F.*, Pt., D, 32d Tennessee.	Sept. 20, 21, '63.	Left. Surg. Grant. Recovered.
360	Logan, W. A., Corp'l, D, 110th Ill., age 30.	Sept. 1, 1, '64.	Right; flap. Surg. N. G. Sherman, 9th Ind. Disc'd Feb. 1, '65.
361	*Lott, G. W.*, Serg't, H, 7th South Carolina.	July 3, 3, '63.	Right. Surgeon Pierce, C. S. A. Recovered.
362	Lovely, C., Pt., F, 11th Vermont, age 38.	June 1, 1, '64.	Right; double flap; also amp. left arm. Disch'd Feb. 6, 1865.
363	Loveridge, C., Pt., B, 1st U. S. S. S.	May 27, 27, '62.	Left; flap; gang. Disch'd Jan. 29, 1863.
364	Lowenstein, M., Lieut., D, 15th N. Y. H. A., age 21.	Mar. 31, 31, '65.	Right; circ. Surg. A. A. White, 8th Md. Disch'd Oct. 20, 1865.
365	Lucas, W. V., Serg't, I, 8th Indiana.	May 1, 1, '63.	Right; flap. Disch'd Aug. 27, 1863.
366	Lusty, R., Pt., E, 15th Massachusetts, age 18.	July 2, 2, '63.	Left. Surg. S. H. Plumb, 85d N. Y. Disch'd Jan. 12, 1864.
367	Luttmann, J., Pt., K, 203d Penn., age 34.	Jan. 15, 15, '65.	Right; circ. Disch'd May 7, '65.
368	*Lyons, W.*, Pt., Wheat's Battery.	July 21, 21, '61.	Left. Surg. Love. Recovered.
369	*Maybe, W.*, Pt., C, 63d Tennessee, age 51.	May 16, 16, '64.	——. Recovered.
370	Madden, T., Corp'l, A, 173d New York.	May 27, 29, '63.	Left; circ. Surg. N. W. Leighton, 173d N. Y. Disch'd Sept. 12, 1863.
371	Maguire, D., Serg't, B, 2d Penn., age 24.	June 26, 28, '62.	Left; circ. Dr. Swinburne. Discharged Mar. 3, '64. *Spec.* 170.
372	Magill, D. B., Capt., A, 117th N. York, age 26.	Jan. 15, 15, '65.	Left. Surg. J. W. Mitchell, 4th C. T. Disch'd June 8, 1865.
373	Maher, P., Lieut., F, 63d New York, age 42.	June 22, 22, '64.	Left. Discharged June 12, 1865. Not pensioned.
374	Main, F. F., Pt., F, 100th New York, age 19.	July 18, 19, '63.	Left; circ. Confed. Surg. Sloughing; neer. Disch'd July 30, '64. *Spec.* 4298.
375	Mansfield, C., Pt., E, 145th Penn., age 30.	May 12, 13, '64.	Right; flap. Disch'd March 24, 1865.
376	Manson, S. B., Pt., F, 33d Maine, age 24.	July 24, 24, '64.	Right; flap. Surg. C. L. Trafton, 32d Maine. Disch'd May 6, 1865.
377	Mapes, W. E., Capt., H, 124th N. York, age 21.	Aug. 14, 14, '64.	Right; flap. Disch'd Dec. 19, '64.
378	Marine, S. A., Pt, G, 13th Iowa, age 21.	July 21, 21, '64.	Right; flap. Surg. M. W. Thomas, 13th Iowa. Dis. April 5, '65.
379	Marr, A. C., Serg't, E, 14th N. Jersey, age 25.	Sept. 19, 19, '64.	Right; flap. Surg. T. A. Helwig, 87th Penn. Disch'd July 8, '65.
380	Marsh, A., Serg't, B, 64th N. York, age 32.	May 12, 12, '64.	Right; flap. Surg. J. W. Wishart, 140th Penn. Feb., 1865, necrosed bone pulled away. Disch'd Feb. 24, 1865.
381	*Marsh, T. J.*, Pt., I, 2d Missouri, age 19.	June 18, 19, '64.	Right; ant. post. flap. Provost Marshal Oct. 21, 1864.
382	Martin, D. D., Pt., C, 12th Maine, age 45.	Sept. 15, 15, '62.	Right; flap. Discharged 1863.
383	Martin, J., Corp'l, F, 123d N. York, age 25.	June 22, 22, '64.	Right; flap. Surg. J. Chapman, 123d N. Y. Disch'd July 19, '65.
384	Martin, J., Pt., D, 106th New York, age 20.	Sept. 19, 19, '64.	Left; flap. Surg. T. A. Helwig, 87th Penn. Disch'd Mar. 31, '65.
385	Martin, S., Pt., H, 64th Illinois, age 22.	July 22, 22, '64.	Left; flap. Disch'd Feb. 28, '65.
386	Martin, W. J., Corp'l, I, 14th W. Va., age 33.	July 20, 21, '64.	Right; ant. post. flap. Surg. J. H. Manown, 14th W. Va. July 27, '65, necrosed bone removed. Disch'd April 16, 1866.
387	*Mason, G.*, Pt., K, 13th Virginia Cav., age 24.	Sept. 30, Oct. 1, '64.	Right; circ. Prison Jan. 27, '65.
388	McAnany, P., Pt., Bat'y A, 1st Art'ry, age 28.	April 12, 12, '63.	Right; ant. flap. Disch'd from hospital Jan. 20, 1864.
389	McCann, F., Pt., B, 10th New Jersey, age 22.	Aug. 17, 18, '64.	Right; circ. Confed. Surgeon. Disch'd March 17, 1865.
390	McCarthy, F., Corp'l, G, 1st Wis. Cav., age 27.	April 30, 30, '63.	Right. Disch'd Aug. 14, 1863. Died Feb. 10, 1864.
391	McClaskey, J. R., Serg't, A, 13th Iowa, age 33.	July 6, 7, '64.	Left; ant. post. flap. Surg. M. W. Thomas, 13th Iowa. Disch'd Aug. 23, 1865.
392	McClintock, J. H., Pt., A, 87th Penn., age 18.	Oct. 19, 19, '64.	Left; ant. post. flap. Surg. F. A. Helwig, 87th Penn. Discharged April 10, 1865.
393	McCord, D., Pt, G, 149th New York, age 24.	July 3, 3, '63.	Left; circ. Surg. J. V. Kendall, 149th N. Y. May 26th, rem. of bone. Disch'd March 3, 1865. *Spec.* 2756.
394	McDonald, H., Corp'l, F, 61st C. Troops, age 24.	Oct. 16, 17, '61.	Left; ant. post. flap. Confederate Surg. Disch'd July 29, 1865.
395	McFarling, J., Pt., D, 154th N. Y., age 20.	June 22, 22, '64.	Left; flap. Disch'd May 31, '65.
396	McGary, W., Pt., D, 1st New Jersey, age 29.	July 12, 13, '63.	Left; circ. Surg. Clark. Discharged Oct. 5, 1863.
397	McGuire, P., Corp'l, E, 20th Mass., age 32.	July 3, 5, '63.	Right; circ. Surg. N. Hayward, 20th Mass. Disch'd May 14, '64.
398	McGill, L., Pt., B, 97th Penn., age 16.	Aug. 16, 16, '64.	Right; circ. Surg. J. R. Everhart, 97th Penn. Disch'd Jan. 17, 1866. *Spec.* 2399.
399	McGaulley, W., Pt., D, 2d W. Va., age 27.	Aug. 23, 23, '62.	R't; doub flap. Surg. R. W. Hazlett, 2d W. Va. Dis. April 27, '63.
400	McGindley, B., Pt., C, 22d Kentucky.	May 16, 17, '63.	Right; flap. Surg. B. F. Stevenson, 22d Ky. Dis. Sept. 10, '63.
401	McGonagle, C., Corp'l, C, 37th Ohio, age 21.	Oct. 19, 20, '64.	Right; circ; femoral religated. Disch'd March 31, 1865.
402	McGrew, N. B., Pt., F, 34th Ohio.	Sept. 13, 13, '62.	Left; flap. Disch'd June 17, '63. Died Oct. 27, 1864; shock.
403	McKay, R., Pt., F, 28th Mass., age 18.	May 18, 18, '64.	Left; circ. Disch'd April 26, '65.
404	McKinney, J., Serg't, A, 15th Ohio.	June 24, 24, '63.	Right; circ. Disch'd March 9, 1864.
405	McMahon, J., Pt., I, 6th New York Cav., age 23.	May 7, 7, '64.	Left; circ. A. Surg. S. C. Sanger, 6th N. Y. Cav. Aug. 18th, remo 8 ins. seq. Disch'd May 18, 1865. *Spec.* 4281.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
406	McMann, S., Corp'l, C, 1st Penn. Rifles, age 35.	May 11, 11, '64.	Right; flap. Surg. J. J. Comfort, 1st Penn. Rifles. Disch'd Aug. 7, 1865. *Spec.* 221.
407	McMillan, J., Serg't, G, 24th Michigan, age 22.	July 2, 4, '63.	Right; circ. Surg J. H. Beach, 24th Mich. Disch'd Nov. 30, '63.
408	*McMillan, W. W.*, Corp'l, G, 12th Ala., age 29.	July 3, 3, '63.	Left; flap. Exchanged.
409	McMullan, A., Pt., B, 36th New York, age 23.	July 1, 2, '62.	Right; circ.: July 17th, flap amp. up. third. Disch'd July 3, 1863. *Spec.* 1392.
410	McNair, G., Corp'l, C, 6th N. Y. H. A., age 19.	Oct. 19, 19, '64.	Left; flap. Disch'd Oct. 5, 1865.
411	[1]*McNeal, J.*, Lieut., C, 10th Georgia, age 34.	Sept. 17, 17, '62.	Right; circ. Surg. G. G. Crawford, C. S. A. Retired Nov. 11, '64.
412	McNey, J., Pt., B, 15th New Jersey.	May 10, 10, '64.	Right; flap. Disch'd Sept. 2, '65.
413	McNulty, P., Pt., 7th Mass. Bat'ry, age 24.	Mar. 27, 27, '65.	Right; ant. post. flap. Disch'd June 5, 1865.
414	McOmber, M. J., Pt., H, 6th Penn. Res. Corps, age 18.	July 2, 4, '63.	Right; flap. Surg. C. Bowers, 6th Penn. Res. Disch'd May 30, '64.
415	McVean, D. C., Capt., E, 1st Wisconsin.	Sept. 19, 20, '63.	Left. Surg. L. I. Dixon, 1st Wis., Capt., V. R. C. Res. May 9, '64.
416	*Means, P. B.*, Pt., E, 48th Alabama, age 18.	July 3, 3, '63.	Left. Exchanged Nov. 12, '63.
417	Melton, J., Pt., G, 55th Illinois.	June 27, 27, '64.	Right. Ass't Surg. J. J. Smith. Disch'd March 1, 1865.
418	Mellinger, M., Pt., B, 55th Penn., age 28.	June 18, 19, '64.	Left. Disch'd April 4, 1865.
419	Mercer, J. Q., Capt., E, 147th Penn., age 25.	June 16, 16, '64.	Right; flap. Surg. H. E. Goodman, U. S. V. Two sub. oper. Disch'd Feb. 2, 1865.
420	Mess, F., Pt., B, 11th New Jersey, age 47.	April 1, 1, '65.	Left; bilateral flap. Disch'd July 21, 1865.
421	Messmer, A., Pt., B, 7th N. York H. A., age 33.	Aug. 15, 15, '64.	Right; cir. Surg. J. W. Wishart, 140th Penn. Disch'd Dec. 16, '64.
422	*Miller, D. C.*, Pt., F, 63d Tennessee.	Sept. 20, 21, '63.	Left. Surg. McDonough. Recovered.
423	Miller, G., Pt., E, 15th Infantry, age 19.	Aug. 7, 8, '64.	Lett; ant. post. flap. V. R. C. June 1, 1865.
424	Miller, J. R., Pt., D, 1st Conn. H. Art., age 32.	May 18, 18, '64.	Left; ant. post. flap. Surg. S. W. Skinner, 1st Conn. H. A. Discharged May 6, 1865.
425	Miller, J. P., Pt., I, 12th New Jersey, age 24.	May 6, 7, '64.	Lett; oval flap. Surg. Gaskill, C. S. A. Disch'd April 28, '65.
426	Miner, R. F., Pt., F, 30th Wisconsin, age 29.	Aug. 27, 28, '64.	Right; flap. Surg. O. Hoyt, 30th Wis. Exfol. removed. Disch'd April 5, 1865.
427	Moody, D. M., Pt., C, 3d Maine, age 36.	July 1, 3, '63.	Left; flap. Confederate Surgeon. Disch'd Nov. 28, 1863.
428	*Moore, S. E.*, Serg't, L, 1st S. C. Rifles.	Aug. 28, 28, '62.	Left. Surg. T. A. Evans, P. A. C. S. Disch'd Oct. 25, 1862.
429	*Moran, I K.*, Pt., D, 14th Virginia.	May 16, 16, '64.	Left. Surg. Doughty. Furl'd June 25, 1864.
430	Morgan, H. O., Captain, 12th Infantry.	May 5, 6, '64.	Left; circ. Surg. L. W. Oakley, 2d N. J. Retired Feb. 17, 1868.
431	Morgan, J., Pt., K, 145th New York.	Oct. 12, 12, '63.	Left; doub. ant. post. flap. Surg. R. K. Tuthill, 145th N. Y. Dis. Feb. 23, '64. *Spec.* 4317.
432	*Morgan, J. M.*, Pt., Orr's S. C. Rifles.	July 28, 28, '64.	Left; double flap. Reg't Surg. Transf'd Sept 16, 1864.
433	Morse, J. W., Pt., F, 14th N. Hampshire, age 20.	Sept. 19, 21, '64.	Left; ant. post. flap; one inch of femur rem. Dis. June 15, '65.
434	Moses, M. J., Corp'l, E, 81st New York, age 28.	May 9, 9, '64.	Left; ant. post. flap. Surg. W. H. Rice, 81st N. Y. Disch'd Sept. 14, 1864.
435	Mowatt, D., Pt., C, 100th New York, age 26.	Aug. 16, 17, '64.	Left; flap; spic. remo'd. Disch'd Jan. 18, 1865.
436	Mulrenen, P., Pt., H, 30th Mass., age 43.	July 13, 14, '63.	Right. Disch'd Dec. 26, 1863. Died Sept. 5, 1868; debility.
437	Murphy, D., Pt., A, 17th Mass., age 28.	May 13, 13, '63.	Lett; circ. Surg. J. F. Galloupe, 17th Mass. Disch'd Mar. 5, 1864.
438	*Murphy, E. H.*, Serg't Major, 48th Georgia.	Aug. 16, 16, '64.	Right. Surgeon Pope. Recovered.
439	*Murphy, H. A.*, Pt., E, 14th Louisiana.	July 2, 2, '63.	Right. Surg. Taney, C. S. A. Gangrene. Exch'd Mar. 3, '64.
440	Myers, A. A., Pt., B, 51st Indiana, age 31.	Dec. 15, 15, '61.	Left; circ. Disch'd July 6, '65.
441	*Myrick, N. W.*, Pt., A, 27th Georgia, age 27.	Aug. 18, 19, '64.	Right; circ. Surg. T. F. Oakes, 56th Mass. Prison Mar. 23, '65.
442	Nelson, E. H., Pt., E, 8th Vermont.	Sept. 4, 5, '62.	Left; flap. A. Surg. G. W. Avery, 9th Conn. Disch'd Feb. 20, 1863.
443	Newland, I. I., Serg't, B, 34th Ohio, age 28.	Sept. 19, 20, '64.	Left; ant. post. flap. Surg. W. S. Newton, 91st Ohio. Disch'd April 6, 1865.
444	*Newton, J. A.*, Pt., F, 34th North Carolina, age 19.	July 1, 2, '63.	Left. Surg. A. F. Miller, C. S. A. Necro. bone removed. Exch'd March 4, 1864.
445	Nicholson, J., Pt., C, 4th West Virginia, age 25.	May 19, 20, '63.	Left; flap. Disch'd August 14, 1863.
446	Nixon, J., Pt., F, 18th Ohio.	Dec. 30, 30, '62.	Right; flap. Surg. G. D. Beebe, U. S. V. Disch'd April 23, 63.
447	*Norris, H.*, Pt., F, 7th S. Carolina Bat'ry, age 44.	Aug. 21, —, '64.	Left. To prison Feb. 10, 1865.
448	Nugent, T., Lieut., H, 27th Indiana, age 26.	July 3, 3, '63.	Left; flap. Surg. W. H. Twiford, 27th, Ind. Disch'd May 25, 1864.
449	Nurse, H. H., Pt., H, 86th Illinois, age 21.	Mar. 16, 17, '65.	Left; ant. post. flap. Surg. A. Wilson, 113th O. Dis. June 25, '65.
450	O'Brien, J. D., Capt., A, 24th New York.	Sept. 17, 17, '62.	Right; circ. Surg. J. M. Farley, 84th N. Y. Disch'd Dec. 22, '62.
451	O'Connor, C., Pt., G, 8th Connecticut.	May 7, 7, '64.	Right; circ. Surg. M. Storrs, 8th Conn. Disch'd Oct. 4, 1864.
452	Ohlinger, F., Pt., D, 13th West Virginia, age 18.	June 18, 18, '64.	Left; flap. Disch'd June 10, '65.
453	O'Kane, D., Corp'l, A, 29th Penn., age 22.	May 15, 15, '64.	Right; circ. Surg. J. A. Wolf, 29th Penn. Disch'd July 4, '65.
454	Oliver, C. E. M., Pt., F, 123d Ohio, age 20.	Mar. 31, 31, '65.	Right; circ. Surg. C. H. Levansaler, 8th Me. Dise. Aug. 30, '65.
455	Oliver, G. W., Pt., H, 7th Ohio, age 36.	June 19, 19, '64.	Right; circ. Surg. J. W. Brock, 65th Ohio. Gangrene. Disch'd May 12, 1865.
456	O'Neal, R. H., Pt., K, 29th Penn., age 21.	July 3, 3, '63.	Right; circ. Disch'd March 14, 1864.
457	Orbeton, J. H., Pt., K, 9th Maine, age 33.	May 20, 20, '64.	Right; double skin flap. Disch'd Jan. 6, 1865.
458	Osborn, V. B., Pt., A, 2d Kansas Cav., age 26.	Jan. 17, 19, '65.	Right; flap. Surg. J. P. Root, 2d Kan. Cav. Disch. May 8, '65.
459	Owens, J. M., Lieut., H, 8th Penn. Reserves.	Dec. 13, 15, '62.	Right; circ. Surg. T. Jones, 8th Penn. Res. Disch'd April 4, '63.
460	Oxley, J. H., Pt., K, 86th Indiana.	Jan. 1, 2, '63.	Right; flap. Disch'd Mar. 7, 1865.
461	Page, J. C., Pt., E, 112th New York, age 25.	Jan. 15, 16, '65.	Left; ant. post. flap. A. Surg. F. B. Kimball, 3d N. H. Disch'd June 27, 1865.
462	Palmer, W. H., Lieut., G, 53d Illinois.	Mar. 21, 21, '65.	Right; circ. Surg. F. M. Rose, 43d Ohio. Disch'd June 22, '65.
463	Parks, G. W., Pt., I, 7th Missouri Cavalry.	Aug. 16, 17, '62.	Right; flap. Surg. Raydon, C. S. A. Bone remov. subs. Disch'd Nov. 8, 1862.
464	Paul, J. S., Corp'l, H, 71st Pennsylvania.	Oct. 21, 22, '61.	Right. Surg. A. B. Crosby, U. S. V. Disch'd, 1862.
465	Parr, J., Pt., D, 100th Penn., age 24.	Mar. 25, 25, '65.	Right; circ. Disch'd July 16, '65.
466	Parry, D. D., Pt., F, 3d Ohio.	Oct. 8, 9, '62.	Left; lateral flap. Surg. G. D. Beebe. Disch'd March 21, '63.
467	Parsell, L. D., Corp'l, A, 5th New York, age 30.	Aug. 18, 19, '64.	Right; flap. Confed. Surgeon. Disch'd March 8, 1865.
468	*Patterson, S. N.*, Corp'l, A, 52d Virginia.	Aug. 28, 29, '62.	——. Surgeon Grimes, C. S. A. Recovered.
469	Paxon, G. H., Pt. E, 4th Penn. Cav., age 22.	June 11, 11, '64.	Right; flap. Disch'd July 4, '65.
470	*Peeden, J. M.*, Pt., H, 16th Georgia, age 23.	Oct. 22, 22, '64.	Right; circ. Confed. Surgeon. Prison Feb. 18, 1865.
471	Perkins, H. C., Pt., B, 14th Kentucky.	Aug. 6, 6, '62.	Right; flap. Surg. A. C. Miller, 14th Ky. Disch'd Dec. 31, '63.
472	Perkins, G. R., Pt., C, 1st Maine Cav., age 18.	Mar. 31, 31, '65.	Right; circ. Act. Staff Surg. G. W. Colby. Disch'd Aug. 24, '65.
473	Perry, J., Pt., C, 74th New York, age 20.	July 2, 3, '63.	Right; flap. A. Surg. J. T. Calhoun, U. S. A. Dis. July 19, '64.
474	*Phelps, R. S.*, Pt., B, 1st Georgia Cavalry.	May 14, 16, '64.	Left. Recovered.
475	*Phillips, Z. D.*, Pt., H, 49th Va., age 21.	May 5, 5, '64.	Right. Surg. Moffat, C. S. A. Retired Feb. 11, 1865.
476	Pickering, A. H., Pt., F, 1st Mass. Art., age 29.	June 16, 17, '61.	Right; flap. Disch'd Jan. 2, '65.
477	*Pitchford, R. T.*, Richard's Miss. Bat'n, age 29.	April 2, 2, '65.	Right. Camp Parole June 17, 1865.
478	*Plemons, Z. T.*, ——, E, 60th Georgia.	Nov. 27, 28, '63.	Left. Surg. J. Dwinelle, 106th Penn. Prison April 11, 1864. *Spec.* 1886.
479	Pollard, A., Serg't, C, 38th Tennessee.	July 20, 20, '64.	Right; circular. Recovery.
480	*Porter, B. C.*, Pt., A, 9th Virginia, age 31.	May 10, 10, '64.	Left; circular. Confed. Surgeon. Retired Nov. 4, 1864.
481	Porter, J. A., Serg't, B, 76th Penn., age 27.	Oct. 28, 29, '64.	Left; circ. Surg. N. Y. Leet, 76th Penn. Disch'd Aug. 12, 1865.
482	Powell, R. H., Pt., E, 7th Wisconsin, age 33.	Mar. 31, 31, '65.	Right; flap; sequ. rem'd. Disch'd Nov. 28, '65. *Spec.* 3015.
483	Powell, J., Pt., K, 143d New York, age 20.	Mar. 19, 19, '65.	Left; skin flap. Surg. H. Z. Gill, U. S. V. Disch'd Oct. 21, '65.
484	Powell, W., Pt., K, 66th Ohio.	Sept. 17, 17, '62.	Left; circ. Disch'd Dec. 4, 1862.
485	Powers, P., Pt., B, 25th Missouri.	Sept. 12, 13, '61.	Right; flap. Surg. Buchanan, C. S. A. Discharged.
486	Price, T., Pt., G, 5th Artillery, age 26.	May 27, 27, '64.	Right; ant. post. flap (wound left knee). Disch'd Sept. 21, 1864.
487	Prosser, G., Pt., G, 27th Indiana, age 18.	July 30, 30, '64.	Right; flap. Disch'd May 29, 1865.
488	Quance, A., Pt., B, 1st Michigan, age 16.	July 15, 15, '64.	Left; flap. Subs. oper. Disch'd Jan. 20, 1865.
489	*Rae, A. M.*, Pt., H, 2d Miss., age 26.	Aug. 18, 19, '64.	Left. To prison Feb. 10, 1865.
490	Ralph, W. R., Pt., I, 8th New Jersey, age 35.	July 2, 2, '63.	Left; flap. Disch'd May 30, '64.
491	Reed, C., Pt., F, 4th W. Virginia.	May 19, 20, '63.	Left; circ. Surgs. J. R. Philson, 4th W. Va., and S. P. Bonner, 47th Ohio. Disch'd Sept. 1, '63.
492	Rieder, C., Pt., C, 41st Ohio, age 19.	Nov. 23, 24, '63.	Right. Surg. Wood. Disch'd April 25, 1864.

[1] Fisher (G. J.), *loc. cit.*, p. 47.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
493	Reifsnyder, R. L., Pt., G, 198th Penn., age 30.	Mar. 29, 29, '65.	Left; flap; gangrene. Disch'd July 20, 1865.
494	Reinhart, J., Serg't, 13th New York Battery.	Aug. 29, 29, '62.	Right. Disch'd March 14, 1863.
495	Repperger, J., Corp'l, C, 15th N. Y. Art., age 38.	June 9, 9, '63.	Right. Surg. E. Bentley, U.S.V. Disch'd April, 1864.
496	Reynolds, J., Pt., C, 33d Mass., age 18.	May 14, 14, '64.	R't; ant. post. flap. Surg. J. Bennett, 19th Mich. Dis. Feb. 27, '65.
497	Reynolds, J., Pt., B, 13th New Jersey.	May 3, 5, '63	R't; ant. post. flap. Surg. J. J. H. Lord, 13th N. J. Dis. Oct. 19, '63.
498	Rexford, S., Pt., I, 45th Penn., age 20.	June 2, 2, '64.	Left; flap. Disch'd July 12, '65.
499	Rhodes, C., Pt., 11th Ohio Battery.	Sept. 19, 21, '62.	Left; flap. Surg. L. J. Ham, 48th Ind. Disch'd Mar. 20, 1863.
500	Rice, D., Pt., C, 79th Penn., age 23.	Mar. 19, 20, '65.	Left; bilat. flaps. Surgeon J. F. Reeve, 21st Wis. Disch'd June 15, 1865.
501	Rice, G. W., Pt., I, 4th Vermont, age 17.	May 5, 6, '64.	Left; ant. post. flap. Surg. G. T. Stevens, 77th N. Y. Disch'd Feb. 23, 1865.
502	Rice, J., Pt., G, 207th Penn., age 23.	Mar. 25, 25, '65.	Right; ant. post. flap. Surg. W. G. Hunter, 211th Penn. Disch'd Sept. 23, 1865. *Spec.* 4008.
503	Richard, L. P., Serg't, H, 7th N. Y., age 45.	April 2, 2, '65.	Left; circ. Disch'd Sept. 3, '65.
504	*Richards, W. T.*, Pt., I, 12th Ala., age 28.	Mar. 25, 25, '65.	Right; ant. post. flap. Surg. T. F. Oakes, 56th Mass. Recov'd Nov. 2, 1865. *Spec.* 4000.
505	Richmond, J., Pt., 7th Mass. Bat'ry, age 24.	Sept. 14, 14, '64.	Right; ant. post. flap. Disch'd Feb. 25, 1865.
506	Rider, G., Pt., H, 11th Mass., age 29.	Oct. 9, 10, '64.	Left; ant. post. flap. Surg. H. F. Lyster, 5th Mich. Disch'd Sept. 29, '65. Died May 3, 1871.
507	Riley, G. W., Pt., D, 66th Illinois.	May 31, 31, '64.	Left; flap Surg. J. Pogue, 66th Ill. Disch'd June 5, 1865.
508	Riley, P., Pt., M, 3d R. I. Art., age 29.	Sept. 11, 11, '63.	Right; flap. Surg. S. W. Gross, U. S. V. Necr'd bone removed. Disch'd June 24, '63. *Spec.* 4320.
509	Roach, P., Pt., C, 2d Cavalry, age 23.	June 11, 11, '64.	Left; flap. Ass't Surg. J. W. Williams, U. S. A. Recov'd.
510	*Roberts, E. G.*, Pt., C, 1st Georgia, age 21.	Nov. 30, De. 1, '64.	Left; circular. Provost Marshal Feb. 24, 1865.
511	Roberts, C. W., Adj't, 17th Maine.	July 2, 3, '63.	Left; flap. Disch'd Dec. 16, '63.
512	*Roberts, J.*, Pt., F, 61st Georgia.	Dec. 13, 15, '62.	Left. Surg. Sly. Furloughed Oct. 31, 1864.
513	Robinson, D., Corp'l, A, 25th Indiana, age 21.	Mar. 20, 20, '65.	Right; double flap. Surg. A. B. Monahan, 63d Ohio. Disch'd Oct. 17, 1865.
514	Robinson, R., Pt., C, 29th Penn., age 39.	Nov. 26, 27, '63.	Left; circ. Prot. bone rem. Feb. 7, '64. Disch'd July 5, 1864.
515	Rodgers, E., Pt., C, 103d Pennsylvania.	Sept. 3, 3, '62.	Right. Disch'd March 14, 1863.
516	*Rodgers, E. J.*, Pt., F, 12th Alabama, age 48.	July 1, 1, '63.	Left. Confed. Surgeon. Exch'd Sept. 25, 1863.
517	Rogers, A., Pt., B, 1st New York, age 17.	July 2, 2, '63.	Left. Disch'd Nov. 14, 1864.
518	Rollins, J. W., Pt., H, 31st Indiana, age 19.	Sept. 1, 1, '64.	Right; circular. Disch'd May 18, 1865.
519	Roney, H., Serg't, E, 30th Ohio, age 30.	Dec. 13, 13, '64.	Left; circ. Act. Staff Surg. C. B. Richards, U. S. V. Disch'd July 6, 1865.
520	Rose, H., Pt., F, 13th Mich., age 35	Mar. 19, 19, '65.	Left; ant. post. flap. Confed. Surgeon. Disch'd June 30, '65.
521	Roth, J. H., Pt., H, 205th Penn., age 22.	April 2, 2, '65.	Left; flap. Disch'd July 6, '65.
522	Rouse, G. A., Serg't, F, 8th Conn., age 22.	Sept. 30, 30, '64.	Left; flap. Disch'd Sept. 13, '65.
523	Rowe, P., Pt., B, 4th Artillery.	July 1, 1, '63.	Left. Disch'd Nov. 9, 1863.
524	[1]*Rudd, T.*, Pt., E, 32d Virginia, age 28.	Sept. 17, 18, '62.	Right; circ. Furloughed Nov. 2, 1864.
525	*Rutherford, J.*, Pt., E, 50th Virginia.	Jan. 30, 30, '63.	——. Surg. White. Recovered.
526	Runyon, J. M., Pt., H, 59th New York, age 16.	Sept. 17, 17, '62.	Right; circ. Surg. J. P. Colgan, 59th N. Y. Sequestr. extract. Disch'd May 4, '63. *Spec.* 1041.
527	*Samples, J. B.*, Pt., E, 19th Georgia.	Feb. 20, 20, '64.	——. Recovered.
528	Sandford, W. H., Pt., H, 19th Mich., age 20.	Mar. 16, 16, '65.	Left; circ. Ass't Surg. G. M. Trowbridge, 19th Mich. Discharged June 30, 1865.
529	Sauer, G., Serg't, G, 169th N. Y., age 37.	June 1, 1, '64.	Right; ant. post. flap; gangrene. Disch'd March 20, 1865.
530	Sausser, P., Corp'l, A, 208th Penn., age 24.	Mar. 25, 25, '65.	Left; ant. post. flap. Surg. W. O. McDonald, U. S. V. Disch'd July 10, '65. *Spec.* 4133.
531	Savage, W. B., Pt., F, 91st Ohio, age 33.	July 20, 21, '64.	Left; ant post. flap. Surg. J. B. Warwick, 91st Ohio. Disch'd Nov. 7, 1865.
532	Sawyer, T. J., Pt., E, 7th New Hampshire.	June 20, 21, '63.	Left; circ. Surg. C. M. Clark, 39th Ill. Disch'd Oct. 30, '63.
533	Sax, J., Pt., D, 3d New York, age 23.	May 16, 17, '64.	Right; ant post. flap. Disch'd Dec. 10, 1864.
534	Schad, C. H., Pt., M, 1st New York Art., age 19.	May 1, 1, '63.	Right; circ. Ass't Surg. J. S. Billings, U. S. A. Discharged April 15, 1864. *Spec.* 2361.
535	Scharf, A., Pt., I, 1st N. Jersey Cav., age 30.	April 8, 8, '64.	Left. Surg. W. W. L. Phillips, 1st N. J. Cav. Dis. July 20, 1865.
536	Scheifely, J., Pt., D, 3d Pennsylvania.	Dec. 13, 15, '62.	Right. Confed. Surgeon. Discharged June 22, 1863.
537	Scofield, E. D., Pt., F, 40th N. York, age 26.	Sept. 28, 28, '64.	Right; ant. post. flap. Surg. H. F. Lyster, 5th Mich. Disch'd May 18, 1865.
538	Schroeder, F., Pt., B, 7th New York, age 21.	May 5, 5, '62.	Left; double flap. Disch'd July 8, 1863. *Spec.* 3708, A. M. M.
539	Schweighauser, S., Pt., 1st Bat'ry Mc. Art'ry.	March 8, 8, '62.	Right. Disch'd August 28, 1862.
540	*Scott, E.*, Pt., E, 4th Virginia, age 28.	Oct. 9, 10, '64.	Left; circ. Surg. Thomas. To Prison Feb. 16, 1865.
541	*Scott, P. H.*, Pt., A, 13th Virginia, age 25.	Sept. 19, 19, '64.	Right; circ. Surg. W. S. Grimes, C. S. A. To Prison Jan. 5, 1865.
542	Secor, J., Serg't, E. 142d New York, age 23.	May 1, 1 '63.	Right; circ. A. Surg. J. S. Billings, U.S.A. Dis. Sept. 9, 1863.
543	Seiferman, B., Pt., B, 26th Illinois.	May 28, 28, '62	Right. Surg. M. K. Taylor, 26th Ill. Disch'd Oct. 16, 1862.
544	*Selbe, S.*, Pt., D, 18th Virginia.	June 27, 29, '62.	——. Recovered.
545	Shaffer, F. H., Pt, F, 2d Infantry, age 38.	May 1, 1, '63.	Right; flap. Ass't Surg. B. Howard, U. S. A. Jan. 2d, reamp.; gang Disch'd Sept. 6, 1864. Died Feb. 1, '73.
546	Shafer, S. J., Pt., E, 66th Ohio.	June 9, 11, '62.	Left; circ. Surg. Tener, C. S. A. Disch'd Dec. 22, 1862.
547	Shanley, M., Pt, B, 164th New York, age 27.	May 18, 18, '64.	Left. Disch'd August 29, 1865.
548	Shari, G., Pt., L, 2d Mich. Cavalry, age 22.	Nov. 5, 6, '64.	Left; ant. post. flap. A. Surg. W. F. Green, 2d Mich. Cavalry. Disch'd Sept. 18, 1865.
549	*Shaw, J. S.*, Serg't, B, 5th Alabama, age 30.	July 1, 2, '63.	Right; circ. Nec. bone rem. Sept. 14th. Exch'd Dec. 1, 1863.
550	Shaw, W. K., Pt., A, 5th Connecticut.	May 3, 4, '63.	Right; ant. post. flap. Surg. W. C. Bennett, 5th Conn. Disch'd Nov. 16, 1863. *Spec.* 1838.
551	Shawgo, G., Pt., A, 121st Penn., age 21.	April 1, 1, '65.	Right; circ. Surg. T. A. Ramsey, 121st Penn. Hæm. April 7th, lig. prof. Disch'd June 17, '65.
552	Shay, L., Pt., K, 21st Michigan, age 20.	Dec. 17, 17, '64.	R't; circ. flap. Surg. J. T. Reeve, 21st Wis. Disch'd June 8, '65.
553	*Shearm, M.*, Lieut., I, 12th N. C., age 25.	April 6, 7, '65.	Right; flap. Released June 9, 1865.
554	Shelley, A., Pt., H, 52d New York, age 21.	May 12, 12, '64.	Right; double flap. Discharged Dec. 26, 1864.
555	*Shelley, J. M.*, Pt., H, 48th Virginia.	Aug. 9, 9, '62.	Right. Recovered.
556	Sheppard, G., Seaman, Gunboat Prairie.	April, '63. Primary.	Left. Discharged.
557	Sheppard, J. M., Capt., K, 21st Conn., age 23.	May 16, 16, '64.	Left; circ. Surg. J. H. Lee, 21st Conn. Disch'd Sept. 14, 1864.
558	Sherman, E. M., Serg't, C, 11th Vt., age 18.	Sept. 19, 19, '64.	Right; double flap. Surg. C. B. Park, 11th Vt. Dis. June 28, '65.
559	*Sherrill, M. O.*, Serg't, A, 12th N. C., age 22.	May 9, 10, '64.	Right; circ. Surg. Streng. To Prison Oct. 26, 1864.
560	Shiffler, J., Pt., G, 55th Penn., age 19.	Sept. 29, 29, '64.	Right; flap. Disch'd June 1, '65.
561	Shindler, G. F., Pt., E, 107th Penn.	Sept. 17, 19, '62.	Right. Surg. J. F. Hutchinson, 107th Penn. Dis. Nov. 25, '62.
562	Shultz, J. L., Pt., H, 5th Penn, age 27.	Mar. 25, 25, '65.	Right; flap. Disch'd July 25, 1865.
563	*Simms, W.*, Pt., A, 1st Virginia Battery.	May 8, 10, '62.	Right. Surg. Coleman. Recovered.
564	*Singleton, G. W.*, Pt., Palmetto S. S., age 22.	Oct. 7, 7, '64.	Left. To prison April 13, 1865.
565	Sippey, W., Pt., C, 1st Colored Troops.	Feb. 20, 20, '65.	Right; flap. Surg. H. C. Merryweather, 5th C. T. Disch'd July 14, 1865.
566	Sisco, F. A., Pt., I, 23d Michigan, age 18.	Nov. 25, 26, '64.	Right; circ.; gangrene. Disch'd June 21, 1865.
567	Slater, I., Pt., D, 75th Illinois.	Oct. 9, 9, '62.	Left; flap. Surg. G. W. Phillips, 75th Ill. Disch'd Dec. 5, '62.
568	[2]*Slaughter, W. B.*, Pt., D, 18th Penn., age 20.	Sept. 19, 19, '63.	——. Removal of six inches of necrosed bone. Recovered.
569	Smith, C. S., Pt., K, 119th Penn., age 20.	May 10, 11, '64.	Left; circ. Confed. Surgeon. Disch'd June 16, 1865.
570	Smith, G., Pt., C, 28th Penn., age 27.	May 8, 8, '64.	R't; circ. Surg. H. E Goodman, 28th Penn. Discharged June 16, 1865.
571	Smith, H. G., Serg't, A, 39th Illinois, age 24.	Oct. 9, 9, '63.	Right; flap. Surg. C. M. Clark, 39th Ill. Disch'd June 22, '64.
572	Smith, J., Pt., D, 6th Penn. Res., age 29.	June 18, 18, '64.	Left; ant. post. flap. Disch'd June 19, 1865.
573	Smith, J. J., Corp'l, H, 5th Pennsylvania.	April 11, 11, '63.	Left; flap. Surg. J. H. Thompson, 139th N. Y. Disch'd May 30, '63.
574	Smith, S. D., Serg't, D, 29th Penn., age 24.	July 20, 20, '64.	Left; flap. Surg. J. A. Wolf, 29th Penn. Gangrene. Disch'd July 10, 1865.
575	*Smith, W.*, Corp'l, B, 1st Georgia S. S., age 22.	——, '64, Primary.	Left. Retired Dec. 7, 1864.

[1] Fisher (G. J.), *loc. cit.*

[2] O'Keefe (D. C.), *loc. cit.*, p. 25.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
576	Smock, J. W., Corp'l, F, 19th Ind., age 23.	June 18, 18. '64.	Left; lat. flap. Surg. J. Ebersole, 19th Ind. Sequest. and frag. remov'd. Dis. Nov. 9, '65.
577	Sneden, R. C., Pt., I, 1st Michigan.	June 22, 22, '62.	Right; flap. Surg. J. W. Tunnecliffe, 1st Mich. Discharged.
578	Snyder, J., Pt., I, 3d Missouri Cavalry.	Jan. 11, 13, '63.	Left; flap. Surg. W. Dickinson, U. S. V. Disch'd July 19, '63.
579	Snyder, W. S., Pt., B, 28th Pennsylvania.	Sept. 17, 19, '62.	Right; circ. Disch'd Nov. 29, 1862.
580	Solon, R., Bugler, H, 1st Mich. Cav., age 19.	June 12, 12, '64.	Left; flap; gangrene. Disch'd Jan. 7, 1865.
581	*Spangler, H. D.*, Pt., A, 54th Virginia, age 33.	Dec., '64, Primary.	——. Paroled Jan. 16, 1865.
582	Spellman, J., Pt., E, 9th Massachusetts.	June 27, 28, '62.	Left. Disch'd July 13, 1863.
583	Spencer, W. H., Capt., G, 61st New York.	June 30, J'y 2, '62.	Right; flap. Disch'd December 21, 1862.
584	Spittler, W., Corp'l, A, 110th Penn., age 21.	July 27, 27, '64.	Left. Surg. D. S. Hayes, 110th Penn. Disch'd Jan. 28, 1865.
585	Stahlschmidt, E., Serg't, H, 15th New York H. A., age 32.	Mar. 31, 31, '65.	Left; circular. Disch'd July 20, 1865.
586	Starr, G. H., Pt., E, 11th Conn., age 40.	May 15. 15, '64.	Left; ant. post. flap. A. Surg. D. Satterlee, 11th Conn. Disch'd June 23, 1865.
587	Stebbins, B. F., Corp'l, C, 16th Pa. Cav., age 21.	Feb. 6, 6, '65.	Left; ant. post. flap. Surg. F. LeMoyne, 16th Penn. Cavalry. Disch'd May 31, 1865.
588	Stelzer, C., Pt., K, 37th Ohio.	May 19, 19, '63.	L't; circ. A. Surg. C. B. Richards, 30th Ohio. Disch'd Aug. 24, '63.
589	Stevens, C. D., Pt., H, 126th N. York, age 26.	May 18. 18, '64.	Right; flap. Surg. G. L. Potter, 145th Penn. Dis June 12, '65.
590	Stevens, J. C., Pt., A, 15th N. Jersey, age 29.	Mar. 16, 16, '65.	R't; flap. A. Surg. C. W. Burke, 46th Penn. Disch'd May 28, '65.
591	[1]*Stevenson, H. C.*, Pt., K, Palmetto S. S.	June 27, 27, '62.	——; circ. Surg. J. McC. Gaston, C. S. A. Furl'd Sept. 4, '62.
592	Stewart, T., Pt., I, 110th C. Troops, age 22.	May 25, 25, '65.	Left; flap. A. Surg. H. Bauer, 97th C. T. Disch'd June 28, '65.
593	Stierten, C., Pt., A, 7th New York.	Mar. 8, 8, '62.	Right; circ. A. Surg. B. F. Stuehly, 7th N. Y. Recovered.
594	Stiles, J., Pt., B, 1st N. Jersey Cav., age 19.	April 30, 30, '64.	Right; circ. Disch'd July 4, '65.
595	Stoll, J. E., Pt., K, 1st N. J. Cav, age 26.	Mar. 31. Ap. 1, '65.	Aug. 10, necrosed bone remo'd. Right. Disch'd July 12, 1865.
596	*Stroud, E.*, Pt., H, 8th Alabama, age 27.	July 2. 3, '63.	Right. Provost Marshal Sept. 1, 1863.
597	[2]*Stuart, A. J.*, Lieut. Hoskin's Miss. Bat'ry, age 25.	May 19, 19, '64.	Left. Recovered.
598	Sturgis, W. G., Pt., B, 75th New York.	June 2, 2, '63.	Right; flap. Surg. W. W. Root, 75th N. Y. Disch'd Sept. 2, '63.
599	*Sullivan, A. O. L.*, Corp'l, G, 4th Virginia.	May 5, 5, '64.	Left. Surg. S. R. Sayers, C. S. A. Recovered.
600	Sullivan, J., Lt., F, 22d Col'd Troops, age 21.	June 16, 18, '64.	Left; ant. post. flap. Disch'd Nov. 22, 1864.
601	Sullivan, W., Pt., 15th New York Independent Battery, age 22.	June 18, 19, '64.	Left; flap. Surg. G. W. Metcalf, 76th N. Y. Disch'd Jan. 31, '65.
602	Sutter, F., Pt., E, 12th Penn., age 35.	Aug. 29, 30, '62.	Left. Disch'd August 1, 1863.
603	Swan, G. B., Pt., B, 21st Conn., age 18.	June 25, 25, '64.	Right; ant. posterior (oval) flap. Disch'd June 11, 1865.
604	Swayer, H., Pt., B, 93d Penn., age 20.	May 6, 8, '64.	Right; flap. Disch'd Oct. 25, '64.
605	Sweeney, J., Pt., I, 24th Mass., age 22.	Aug. 14, 14, '64.	Right; circ. Disch'd May 11, 1865.
606	Sweetser, L. C., Lieut., B, 39th Illinois, age 26.	June 2, 2, '64.	Left. Surg. C. M. Clark, 39th Illinois. Disch'd Nov. 7, 1865.
607	Switzer, D. M., Pt., A, 16th Iowa, age 33.	April 6, 6, '62.	Right. Dr. A. Judkins. Disch'd July 16, 1862.
608	Tanner, L. H., Corp'l, B, 2d Michigan, age 23.	May 12, 13, '63.	Right; flap. Disch'd Dec. 29. 1864.
609	Talbot, A., Pt., A, 14th N. Y. H. A., age 22.	Mar. 2, 2, '65.	Left; ant. post. flap. Disch'd Nov. 27, 1865.
610	Talbott, G. B., Pt., D, 38th Indiana, age 24.	July 9, 9, '64.	Left; circ. Surg. L. Slusser, 63th Ohio. Duty Nov. 17, 1864.
611	*Terrell, J. M.*, Pt., B, 9th Virginia.	Aug. 16, 16, '64.	Left; circ. Surg. 9th Va. Cav. Trans. Aug. 30, 1864.
612	Terhune, N. D. F., Pt., G, 27th Ind., age 19.	July 3, 4, '63.	R't; circ. Surg. W. H. Twiford, 27th Ind. Disch'd May 30, '64.
613	Thacker, B. F., Sg't, K, 61st C. Troops, age 21.	Aug. 21, 23, '64.	Right; flap. Ass't Surg. J. M. Study, U. S. V. Discharged.
614	Theban, T. A., Serg't, H, 4th N. York Art'y, age 25.	June 18, 18, '64.	Left; circ. Surg. H. C. Tompkins, 4th N. Y. H. A. Disch'd May 31, 1865.
615	Thoma, J., Pt., I, 26th New York.	Dec. 13, 14, '62.	Left; flap. Disch'd Mar. 14, '63.
616	Thoma, P., Pt., D, 10th Missouri.	Sept. 19. 19, '62.	Left; flap. Disch'd April 8, '63.
617	Thomas, J., Pt., A, 14th N. Y. H. A., age 20.	Aug. 7, 7, '64.	Right; flap. Surg. G. W. Snow, 35th Mass. Disch'd Feb. 27, '65.
618	Thomas, J., Pt., I, 33d Ohio, age 47.	Mar. 19, 20, '65.	Left; flap. Disch'd June 24, '65. Died Sept. 1, 1866.
619	Thomas, W., Serg't, B, 99th Penn., age 24.	May 5. 6, '64.	Left; flap. Disch'd Jan. 17, '65.
620	*Thomson, H. H.*, Lieut., K, Palmetto S. S., age 22.	Sept. 16, 16, '62.	Left. Exchanged Nov. 21, '62.
621	Thorpe, R., Pt., B, 10th Missouri.	Sept. 19, 19, '62.	L't; flap. Surg. J. G. F. Holston, U. S. V. Disch'd April 4, 1863.
622	*Todd, J.*, Pt., M, 6th Alabama, age 35.	July 1, 2, '63.	Right. Surg. Hays, C. S. A. Paroled Sept. 25, 1863.
623	*Treadwell, D.*, Serg't, F, 33d Mississippi, age 29.	Dec. 15, 16, '64.	Right; ant. post. flap. A. A. Surgeon S. C. Ayers. Provost Marshal March 27, 1865.
624	Tracy, C. H., Serg't, A, 37th Mass., age 32.	April 2, 2, '65.	Right; flap. Surg. E. M. White, 37th Mass. Recovered.
625	*Troyden, S. W.*, Serg't, M, 22d N. Carolina.	July 1, 2, '63.	Right. Surg. McAden, C. S. A. Paroled Oct. 22, 1863.
626	True, R. M., Pt., B, 2d New Hampshire.	June 25, 25, '62.	Left. Disch'd April 1, 1863.
627	Tryon, M. M., Pt., I, 14th N. Y. H. A., age 26.	June 1, 2, '64.	Left; circ.; gangrene. Disch'd Oct. 12, 1865.
628	Tuck, W. H., Pt., E, 38th Mass., age 29.	Sept. 19, 20, '64.	Left; flap. Surg. W. A. Barry, 98th Penn. Disch'd July 26, '65.
629	Tunney, P., Pt., E, 24th Mich., age 23.	July 2, 3, '63.	Right; ant. post. flap. Disch'd Dec. 20, 1863.
630	Tupper, F. W., Adj't 1st Alabama Cav., age 25.	Dec. 9, 9, '64.	Right; circ. Surg. F. M. Rose, 43d Ohio. Duty Mar. 22, 1865.
631	*Turner, W. H.*, Pt., G, 26th N. C., age 35.	July 1, 2, '63.	Left. Exchanged Nov. 12, '63.
632	Updyke, C., Pt., B, 2d N. Y. H. A., age 39.	June 7, 7, '64.	Right; circ. Surg. J. C. Howe, 2d N. Y. H. A. Dis. Nov. 7, '65.
633	Vanalstine, G. P., Serg't, E, 7th N. Y. Art., age 34.	June 3, 4, '64.	Right; circ. Surg. G. L. Potter, 145th Penn. Dis. Mar. 4, 1865.
634	Van Blareom, L., Capt., C, 15th N. J., age 29.	May 8, 9, '64.	Left; flap. Confed. Surgeon. Disch'd Dec. 19, 1864.
635	Van Houten, S. C., Pt., E, 4th New York H. A., age 32.	Aug. 25, 27, '64.	Right; circ. Surg. Hunt, C. S. A. Rem. of seques. July 13, 1865. Disch'd Oct. 14, '65. *Spec.* 1429.
636	Viles, W. S., Pt., D, 74th New York.	July 23, 23, '63.	Left; flap. A. Surg. J. T. Calhoun, U. S. A. Dis'd Dec. 31, '63.
637	Wade, D. F., Corp'l, D, 66th Indiana.	Aug. 30, 31, '62.	Right; circ. Surg. D. W. Voyles, 66th Ind. Disch'd Nov. 18, '62.
638	Wadsworth, C. P., Corp'l, B, 16th Maine, age 25.	June 21, 21, '64.	Right; ant. post. flap. Surg. C. Alexander, 16th Me. Disch'd June 9, 1865.
639	Wadsworth, D. G., Pt., C, 198th Penn., age 23.	Mar. 29, 29, '65.	R't; ant. post. flap. Surg. T. M. Flandreau, 146th N. Y. Disch'd Feb. 21, 1866.
640	Wagner, C., Corp'l, G, 9th N. Y. Cav., age 20.	Mar. 31, Ap. 1, '65.	Right; ant. post. flap. Disch'd July 24, 1865.
641	*Walker, G. W.*, Pt., G, 8th La., age 36.	May 9, 10, '64.	Right; circ. To prison Oct. 5, 1864.
642	*Walker, J. A.*, Pt., C, 3d Arkansas.	July 2, 2, '63.	——. Surg. Brown. Recovered.
643	Walsh, J., Pt., H, 1st Mich. S. S., age 30.	June 17, 17, '64.	Right; flap. Surg. A. F. Whelan, 1st Mich. S. S. Disch'd Oct. 24, 1864.
644	*Waller, D. P.*, Pt., C, 33d N. C., age 19.	May 3, 4, '63.	Left; circ. A. Surg. J. A. Vigel, 33d N. C. Gangrene. Recov'd.
645	Warrell, W., Pt., H, 60th Illinois, age 17.	Sept. 1, 2, '64.	Left; flap. Surg. W. M. Gray, 60th Ill. Disch'd July 31, '65
646	*Waters, J. A.*, Serg't, C, 15th N. C., age 24.	April 2, 2, '65.	Right; ant. post. skin flap. Surg. H. Churchill, 8th N. Y. H. A. Released June 14, 1865.
647	*Weakly, R.*, Lieut., G, 42d Tennessee.	June 2, 2, '64.	——. Surg. McMillan, C. S. A. Recovered.
648	Wearing, J., Serg't, A, 2d Penn. H. A., age 20.	June 17, 19, '64.	Left; circ. Jan. 6, 1865, resec. of extr. of femur. Disch'd July 26, 1865. *Spec.* 4196.
649	*Weatherby, J. M.*, Pt., I, 13th Miss., age 20.	Dec. 11, 11, '62.	Right. Furloughed Feb. 17, '63.
650	*Weber, A.*, Corp'l, I, 7th Louisiana.	June 14, 15, '63.	Left. Surg. Davis. Recovered.
651	Weckwith, E., Pt., K, 3d Maryland, age 39.	Sept. 17, 19, '63.	Right; circ. Disch'd June 2, '65.
652	Weeks, N., Pt., B, 10th N. Y. Art'y, age 26.	April 2, 2, '65.	Died, lung disease, Jan. 5, 1875.
653	Weeman, W. H. H., Pt., 1st Me. Bat'ry, age 28.	Oct. 19, 19, '64.	Right; flap. Confed. Surgeon. Disch'd Oct. 21, '65. *Spec.* 574.
654	*Welch, T.*, Pt., B, 9th Alabama, age 24.	May 3, 3, '63.	Left; circ. Surg. C. H. Andrus, 176th N. Y. Disch'd Aug. 2, '65.
655	Wells, F., Pt., I, 99th Penn., age 32.	Oct. 27, 28, '64.	Left. Disch'd April 1, 1863.
656	Wenhoner, W., Pt., H, 15th N. Y. H. A., age 22.	Mar. 31, 31, '65.	Right; circ. Confed. Surgeon. Disch'd Sept. 9, 1865.
657	West, B. F., Pt., A, 59th Ohio.	Dec. 31, 31, '62.	Left; ant. post. flap. Disch'd July 27, 1865.
658	Whaley, E. A., Capt., C, 6th Wisconsin, age 28.	April 1, 1, '65.	Right; flap. Disch'd April 5, '63.
659	Whitcomb, J., Pt., K, 11th Maine, age 26.	May 31, Je. 2, '62.	Right. Mustered out August 4, 1865.
660	White, W. M., Pt., D, 111th N. Y., age 24.	July 2, 3, '63.	Left. Disch'd Sept. 12, 1862. June 15, '65, reamp. upper third by Dr. J. Benson.
661	*Whitehead, J. M.*, Pt., H, 15th Alabama.	July 25, 25, '62.	Left; ant. post. flap. Surg. A. Satterthwaite, 12th N. Jersey. Disch'd Nov. 3, '64. *Spec.* 1417.
662	*Weir, T. P.*, Pt., B, 5th Georgia.	Sept. 19, 19, '63.	Left. Surg. Boatwright. Recovered.

[1] Gen. (G. H.), *loc. cit.*, page 24.

[2] O'Keefe (D. C.), *loc. cit.*, p. 30.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
663	Wight, G. L., Pt., K, 24th Mich., age 21.	June 22, 22, '64.	Left; ant. post. flap. Surg. J. H. Beach, 24th Mich. Disch'd July 13, 1865.
664	Wilbur, J., Serg't, D, 17th Penn., age 40.	Aug. 29, 29, '64.	Left; flap. Disch'd June 9, '65. *Spec.* 1514.
665	Wiley, G. O., Pt., B, 34th Mass., age 20.	Sept. 19, 20, '64.	Right. Disch'd March 8, 1865.
666	Wilkinson, G. D., Pt., K, 147th N. Y., age 35.	June 18, 18, '64.	Left; double lat. flap. Surg. G. W. New, 7th Ind. Disch'd Sept. 14, 1864.
667	*Wilkinson, S. C.*, Pt., A, 9th Tennessee, age 21.	Nov. 30, Dec. 1, '64.	Right; circular. Provost Marshal March 5, 1865.
668	Williams, B. F., Serg't, K, 40th Ohio, age 23.	June 20, 20, '64.	Left; flap. Surg. J. N. Beach, 40th Ohio. Hæm.; fem. ligated. Disch'd May 29, 1865.
669	Williams, E., Coal Heaver, U. S. S. Tristam Shandy, age 33.	Jan. 15, 15, '65.	Right. Disch'd June 15, 1865.
670	Williams, R., Pt., H, 6th Col'd Troops, age 22.	Sept. 28, 28, '64.	Left; flap. Disch'd May 16, '65.
671	*Williams, R.*, Pt., A, 14th Georgia.	May 12, 12, '64.	——. Surgeon Henderson. Recovered.
672	Wills, H., Lieut., G, 173d New York.	June 14, 14, '63.	Right. Surg. A. H. Van Norstrand, 4th Wis. Resigned Aug. 17, '63.
673	Wills, J. M., Pt., I, 21st New Jersey, age 15.	May 3, 3, '63.	Left. Disch'd Aug. 20, 1863.
674	Wilson, A., Pt., G, 48th Col'd Troops, age 20.	April 1, 3, '65.	Left; ant. post. skin flap; circ. sect. of muse. Surg. A. P. Bartlett, 33d Mo. Dis. July 22, '65.
675	Wilson, A. L., Serg't, K, 84th Indiana, age 23.	Dec. 16, 16, '64.	Left; circ. Surg. C. J. Walton, 21st Ky. Disch'd June 10, '65.
676	Wilson, E. J., Pt., B, 21st N. Y. Cav., age 32.	July 6, 6, '64.	Right; circ. Surg. J. Boone, 1st Md. P. H. B. Dis. Dec. 6, '64.
677	Wilson, H. T., Pt., G, 10th West Va., age 40.	Sept. 19, 19, '64.	Left; lateral flap. Surg. 1st W. Va. Disch'd Jan. 17, 1865.
678	Wilson, L., Corp'l, E, 17th N. Y., age 26.	Sept. 1, 2, '64.	Right; circ. Disch'd June 9, '65.
679	Wine, J., Pt., C, 9th Indiana Cav., age 44.	Dec. 17, 17, '64.	Left; ant. post. flap. A. Surg. J. R. Culbertson, 10th Ind. Cav. Disch'd May 15, 1865.
680	Winkler, J., Pt., D, 77th New York, age 33.	Oct. 19, 19, '64.	Left; double flap. Surg. G. T. Stevens, 77th N. York. Disch'd Aug. 11, 1865. *Spec.* 3513.
681	Winston, D. S., Pt., F, 117th N. York, age 23.	Sept. 29, 29, '64.	Right; flap. Confed. Surg. Mar. 10, '65, seq. remov'd. Sept. 26th, reamp. A. Surg. J. H. Armsby, U. S. V. *Spec.* 3226.
682	Wion, J. W., Pt., F, 3d Wisconsin.	Aug. 9, 11, '62.	Right. Disch'd Dec. 26, 1862.
683	Wood, E. R., Pt., B, 18th Connecticut, age 30.	June 18, 18, '64.	Right. Surg. L. Holbrook, 18th Conn. July 29th, flap reamp.; up. third. Disch'd May 4, '65.
684	*Wood, J. E.*, Pt., C, Nelson's Battery, age 21.	Sept. 19, 19, '64.	Left. Surg. G. W. Simple, C. S. A. Provost Marshal April 1, 1865.
685	Wright, H. J., Pt., C, 2d Michigan, age 21.	June 17, 18, '64.	Right; flap. Surg. S. S. French, 20th Mich. Disch'd Oct. 19, '65.
686	Young, J., Pt., I, 120th New York, age 18.	May 5, 6, '64.	Left; ant. post. flap. Surg. E. L. Welling, 11th N. J. Feb. 7, '65, seq. rem. Dis. Sept. 5, '65.
687	Abbott, J., Serg't, A, 31st Iowa.	Aug. 31, 31, '64.	Left. Died September 14, 1864.
688	Adams, H. L., Pt., E, 18th Penn. Cavalry.	Oct. 19, 19, '64.	Right; oval; sloughing. Died Nov. 16, 1864; pyæmia.
689	Adams, J., Pt., I, 12th New Jersey.	May 12, 12, '64.	——; circ. Surg. J. W. Wishart, 140th Penn. Died Dec. 23, '64.
690	Aherns, D., Pt., B, 31st Maine, age 20.	April 2, 4, '65.	Right. Surg. W. O. McDonald, U. S. V. Died April 11, 1865; pyæmia. *Spec.* 4160.
691	Aikin, H. H., Capt., D, 93th Colored Troops.	July 30. Au. 1, '64.	Left; circ. Surg. D. Mackay, 29th C. T. Died August 2, 1864.
692	Akam, R. J., Pt., I, 145th Pennsylvania.	July 3, 3, '63.	Died July 24, 1863.
693	Alpen, R., Pt., F, 20th Massachusetts.	June 1, 1, '64.	Left. Died June 14, 1864; hæmorrhage.
694	Ambler, W. H., Pt., G, 2d Vermont, age 21.	May 18, 18, '64.	Right; anterior post. flap. Died June 9, 1864; exhaustion.
695	Amstend, G., Serg't, B, 73d Pennsylvania.	May 2, 2, '63.	Left. Died May 15, '63; anæmia.
696	*Anderson, S. W.*, Pt., K, 37th Mississippi.	July 20, 20, '64.	Left; circ. Died August 16, '64.
697	Ankany, L., Pt., D, 35th Ohio, age 23.	Oct. 19, 20, '64.	Right; circ. Died Nov. 27, '64; pyæmia.
698	Arnold, J., Pt., K, 3d Vermont, age 15.	June 3, 3, '64.	Right. Died June 23, 1864.
699	Askenette, P., Pt., H, 12th Wisconsin.	July 21, 21, '64.	Left. Surg. H. McKennan, 17th Wis. Died July 23, 1864.
700	*Ataway, S.*, Pt., G, 1st S. Carolina, age 16.	July 3, 3, '63.	Right; slough'g, bone protrud'g. Died Aug. 10, '63; diarrhœa.
701	Atwell, O. M., Pt., I, 26th New York, age 21.	Dec. 13, 14, '62.	Left; flap. Jan. 5, 1863, hæm. Died Jan. 9, 1863.
702	Barber, A. J., Lieut., 11th Infantry, age 30.	July 2, 4, '63.	Left. Died July 28, '63; pyæmia.
703	Baguley, S., Pt., B, 5th N. Hampshire, age 21.	April 7, 8, '65.	R't; circ. Surg. W. O'Meagher, 69th N. Y. June 3d, amp. left thigh. Died July 10, 1865; exhaustion. *Spec.* 4332.
704	Baker, E. S., Corp'l, G, 1st Maine Cav., age 26.	April 9, 9, '65.	Left; sloughing; femoral; hæm.; ant. post. skin flap; circ. sect. of muscles; up. third. Died July 18, 1865.
705	Ball, C. E., Pt., F, 53d Mass., age 20.	June 14, 14, '63.	Right; hæm.; ligation femoral. Died June 29, 1863.
706	Banks, S., Pt., C, 43d Colored Troops.	July 30, 30, '64.	Right; amp. left leg. Surg. D. Mackay, 29th C. T. Died July 31, 1864.
707	Barron, J., Pt., C, 6th Illinois Cav., age 42.	Mar. 31, Ap. 1, '64.	Right; lat. flap. A. A. Surg. S. S. Jessup. Died April 2, 1864; exhaustion.
708	Beils, W. H., Pt., D, 14th New Jersey.	June 1, 1, '64.	Left. Died June 6, 1864.
709	Berry, J. R., Corp'l, E, 41st Illinois.	July 12, 12, '63.	Right. Died November 12, '63.
710	Bentley, E., Lieut., 14th New York Artillery.	June 2. 2, '64.	Right. Died June 4, 1864.
711	Berry, J., Corp'l, F, 10th West Virginia, age 20.	Sept. 19, 20, '64.	Left; circ. Oct. 25, pyæm. chills. Died Nov. 14, '64; typh. fever.
712	Bidwell, D. M., Serg't, 20th Mich., age 21.	June 3, 3, '64.	Right. Died July 13, 1864.
713	Bigham, J., Pt., H, 17th Indiana.	June 25, 26, '63.	Right; flap. Died July 21, '63; pyæmia.
714	Billings, S., Serg't, C, 19th Maine.	July 1, 1, '63.	Left. Died July 1, 1863.
715	*Bills, W. J.*, Pt., G, 32d Tennessee, age 35.	May 13, 13, '64.	Right; circ. A. Surg. W. F. Smith, 28th Penn. Gang. Aug. 14th, lig. fem. Died Sept. 23, '64; acute diarrhœa.
716	*Binson, J.*, Pt., G, 26th North Carolina.	May 5, 5, '64.	Right; circ. Surg. J. W. Wishart, 140th Penn. Died.
717	Bixler, G. W., Pt., H, 82d Penn., age 33.	April 6, 7, '65.	Left; lateral flap; hæmorrhage. Died April 15, 1865.
718	Blystone, W., Pt., G, 63d Pennsylvania.	June 18, 18, '64.	Died June 25, 1864.
719	Bone, J., Pt., E, 147th New York.	June 18, 18, '64.	Died June 18, 1864.
720	Bonton, J. H., Pt., H, 4th Col'd Troops, age 25.	Sept. 29, 29, '64.	Left; flap. Oct. 3d, hæmorrhage. Died Oct. 3, 1864; shock.
721	Bowlby, P., Pt., H, 27th Ill., age 25.	Nov. 25, 26, '63.	Right. Dec. 5th, gangrene. Died December 25, 1863
722	Boyle, J. E., Corp'l, E, 81st New York, age 19.	June 2, 2, '64.	Left. Died June 19, '64; pyæmia.
723	Bradley, J., Pt., D, 164th New York, age 37.	June 3, 3, '64.	Left; circ. Diarrhœa. Died Aug. 20, 1864.
724	Brannon, T. D., Serg't, F, 115th Illinois.	May 14, 14, '64.	——. Surg. G. H. Bane, 115th Ill. Died May 21, 1864.
725	Brestler, J. W., Corp'l, A, 26th Ohio, age 24.	June 27. 27, '64.	Right. Died July 3, 1864.
726	*Brewer, W. L.*, Serg't, K, 51st Georgia.	July 1. 1, '63.	Right. Died August 10, 1863; exhaustion.
727	Brittaln, F. M., Pt., I, 66th Ohio, age 21.	June 15, 15, '64.	Left; ant. post. flap. Surg. W. R. Longshore, 117th Penn. Died Nov. 20, '64; chronic diarrhœa.
728	Brown, A., Pt., D, 60th New York, age 25.	June 27, 27, '64.	Left; circ. Surg. H. B. Whiton, 60th N. Y. Died Sept. 21, '64; diarrhœa.
729	*Brown, J. W.*, Capt., I, 47th N. C., age 36.	Aug. 25, 25, '64.	Right; circ. Died Oct. 5, 1864.
730	*Brough, J. R.*, Capt., F, 27th Mississippi.	Aug. 31, 31, '64.	Left. Surg. A. C. Messenger, 57th Ohio. Died Sept. 1, 1864.
731	Brown, W. C., Serg't, G, 51st N. Y., age 21.	May 11, 11, '64.	Right; flap. Ass't Surg. A. G. Sprague, 7th R. I. May 21st, hæm.; lig. Died July 11, 1864.
732	Brown, W., Pt., A, 14th New Jersey.	July 9, 11, '64.	Right; circ. A. A. Surg. G. M. Paullin. Died July 12, 1864; exhaustion. *Spec.* 3857.
733	Bruce, A., Pt., H, 91st Ohio, age 20.	July 20, 20, '64.	Left; ant. post. flap. Died Aug. 14, 1864; diarrhœa.
734	Buckingham, M., Color Serg't, C, 104th N. Y.	July 1, 1, '63.	Right. Died July 5, 1863.
735	Burneson, W., Pt., D, 147th Penn., age 21.	June 16, 17, '64.	Left; ant. post. flap. Died July 19, 1864; exhaustion.
736	Burns, M., Pt., C, 140th N. Y., age 20.	July 2, 4, '63.	Left. Died August 4, 1863.
737	Burson, J. J., Pt., D, 85th Indiana.	July 20, 20, '64.	Left. Died August 20, 1864.
738	*Burt, J. T.*, Pt., D, Symon's Ga. Res., age 18.	Dec. 13, 14, '64.	Right. Surgeon E. Hutchinson, 137th New York. Died March 2, 1865; pyæmia. Autopsy.
739	Butler, S., Pt., C, 3d New Jersey.	June 27. 28, '62.	Right; circ. Died July 26, 1862.
740	Butler, W., Pt., H, 98th Illinois.	June 20. 21, '64.	Died June 22, 1864.
741	Campbell, H., Camp follower, age 23.	Mar. —, —, '63.	Left. A. A. Surg. G. W. Avery, Osteo-myelitis; seq. removed. Oct. 22, '66, amputa. hip joint. Died Oct. 22, 1865.
742	Campburn, J., Pt., F, 51st Penn., age 23.	Oct. 27, 27, '64.	Right; bi-lateral flap; diarrhœa. Died Nov. 23, '64; exhaustion.
743	[1]*Cantrell, F. M.*, Pt., —, 1st S. Carolina, age 30.	Sept. 17, 18, '62.	Right; flap. Died Sept. 25, '62; pyæmia.
744	*Carabine, D. W.*, Pt., G, Myrick's Miss. Battalion, age 21.	Dec. 16, 16, '64.	Right; circ. A. A. Surg. A. Rolls. Died Dec. 22, '64; irrita. fever.

[1] Fisher (G. J.), *Cases of Amputations*, in *Am. Jour. Med. Sci.*, 1863, Vol. 45, p. 47.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
745	Cardeman, W., Pt., A, 203d Penn., age 24.	Jan. 15, 15, '65.	Left; circ. A. Surg. H. C. Merriwcather, 5th C. T. Died Jan. 29, 1865; pyæmia.
746	Carpenter, L. B., Pt., H, 90th N. York, age 25.	Oct. 19, 20, '64.	Right. Ass't Surg. J. Homans, jr., U. S. A. Hæm. from wound in arm; lig. Died Nov. 14, 1864.
747	Carver, E., Corp'l, H, 7th Wisconsin.	May 5, 6, '64.	Right; ant. post. flap. Died June 16, 1864; exhaustion.
748	Case, C. F., Adj't, 36th Illinois, age 27.	Nov. 30, Dec. 1, '64.	Right; circ. A. A. Surg. J. H. Green. Died Dec. 18, '64; pyæm.
749	*Casey, T. J.*, Lieut., E, 16th Mississippi, age 36.	Aug. 21, —, '64.	Left. Died October 16, 1864.
750	Chamberlain, G., Pt., D, 8th Michigan.	May 12, 12, '64.	Left. Surgs. A. F. Whelan, 1st Mich. S. S., and W. C. Shurlock, 51st Penn. Died May, 1864.
751	Chapman, W., Pt., G, 21st Ohio.	Sept. 1, 1, '64.	——; by Surg. G. W. Bench, 141st N. York. Died Sept. 11, 1864.
752	Chase, A., —, I, 4th N. Hampshire, age 35.	July 30, 30, '64.	Right; circ. Surg. G. P. Greeley, 4th N. H. Died Aug. 23, 1864; exhaustion.
753	Cherry, S., Pt., A, 34th Illinois.	Aug. 6, 6, '64.	Left. Died August 25, 1864.
754	Chestnut, J., Pt., A, 80th Indiana, age 22.	May 14, 14, '64'	Right. Died July 16, 1864.
755	Childs, G. W., Pt., D, 56th Mass., age 27.	May 24, 24, '64.	Right; diarrhœa. Died June 11, 1864; asthenia.
756	Clark, J., Pt., H, 7th N. York H. A., age 24.	June 16, 17, '64.	Right; circ. Surg. P. E. Hubon, 28th Mass. June 27, hæm.; lig. profunda. Died Oct. 9, '64; exhaustion.
757	Clapp, E., Pt., H, 7th Conn., age 47.	June 2, 2, '64.	Right. Died June 10, 1864.
758	Clapper, F., Serg't, I, 2d N. York Vet. Cav.	April 23, 23, '64.	Right. Died April 23, 1864.
759	Clough, J., Pt., B, 109th Illinois.	Oct. 20, 20, '62.	Left. Died November 10, 1862.
760	Collin, F., Pt., B, 19th Maine.	July 3, 3, '63.	Died July 9, 1863.
761	*Coggins, D. M.*, Pt., I, 13th South Carolina.	——, May 22, '64.	Right. Died May 22, 1864.
762	Colby, J. S., Corp'l, I, 27th Michigan.	May 19, 19, '64.	Right; ant. post. flap. Died June 21, 1864; exhaustion.
763	Cole, A. E., Pt., G, 142d New York, age 17.	Jan. 15 15, '65.	Right; circ. Surg. J. W. Mitchell, 4th C. T. Died Feb. 4, '65; exh'n.
764	Cole, S. R., Pt., K, 9th N. Y. H. A., age 48.	April 2, 2, '65.	Right. Died April 16, 1865.
765	Collier, H., Pt., I, 12th Penn. Cavalry, age 20.	Dec. 16, 17, '64.	Right; circ. A. Surg. J. A. Freeman, U. S. V. Died Dec. 27, '64; exh. and pneumonia. *Spec.* 375.
766	Conklin, C., Pt., I., 6th Wisconsin.	April 29, 30, '63.	Right. Surg. J. Ebersole, 19th Ind. Died May 9, '63. *Spec.* 1120.
767	Connell, J., Pt., F, 146th New York, age 21.	Mar. 31, 31, '65.	Left; ant. post. flap. Surg. T. M. Flandrau, 146th N. Y.; gang. Died May 27, '65; phleb. and exh.
768	Cook, C. C., Lieut., C, 77th Pennsylvania.	June —, —, '64.	Left. Died October 6, 1864.
769	*Cook, F. S.*, Serg't, I, 53d Virginia.	May 10, 12, '64.	——; ant. post. flap. Surg. C. B. Gibson, C.S.A. Died May 14, '64.
770	Coon, H., jr., Corp'l, H, 149th New York.	Nov. 24, 24, '63.	Died November 25, 1863.
771	Courtnay, J. C., Pt., H, 30th Illinois, age 18.	July 22, 22, '64.	Right. Surg. H. McKennan, 17th Wis. Died Aug. 12, 1864.
772	Courtney, C., Pt., F, 89th New York, age 20.	Sept. 17, 19, '62.	Left. Died Sept. 26, '62; tetanus.
773	*Cox, G.*, Pt., K, 1st N. Carolina, age 27.	June 9, 9, '64.	Right; circ. Ass't Surg. B. Howard, U. S. A. Died June 24, '64. *Spec.* 1233.
774	Cox, J., Pt., C, 9th New York Heavy Artillery.	Oct. 19, 19, '64.	Left. Died October, 1864.
775	Cox, W. F., Pt., D, 91st Indiana.	Aug. 6, 6, '64.	Right; Surg. C. D., Moore, 13th Ky. Died Sept. 2, 1864.
776	Coyle, J., Pt., D, 15th New York Cavalry.	Mar. 31, 31, '65.	Left. Died May 24, 1865.
777	Cramer, D., Pt., E, 149th Penn., age 25.	May 8, 8, '64.	Left. Died June 3, '64; pyæmia.
778	Crawford, W., Pt., B, 2d Penn. Reserves, age 40.	May 12, 12, '64.	Right. Surg. C. Bower, 6th Penn. Res. Died July 27, '64; chron. diarrhœa. Autopsy. *Photo. Ser.* 164. *Spec.* 2890.
779	Crawford, W. S., Pt., D, 18th Ohio, age 23.	Dec. 15, 16, '64.	Left; lat. flap. A. A. Surg. J. E. Link. Died Dec. 29, 1864.
780	Crosby, A., Serg't, C, 19th Maine.	July 1, 2, '63.	Left. Died July 12, 1863.
781	Cross, W. H., Pt., G, 61st New York.	July 2, 2, '63.	Right. Died July 13, 1863.
782	Crowthers, J., Serg't, E, 81st New York, age 26.	May 16, 18, '64.	Right; circ. Died June 8, 1864; pyæmia.
783	Crowley, J., Corp'l, A, 7th New York, age 25.	April 2, 2, '65.	Right; circ. Surg. J. C. How, 2d N. Y. Artillery. Died May 7, '65; pyæ. Autop. *Spec.* 1487.
784	Cruger, P. C., Serg't, A, 6th New York Heavy Artillery, age 20.	Oct. 19, 21, '64.	Left; lat. skin flap; circ. section muscles. Surg. C. H. Andrus, 176th N. Y. Died Oct. 27, '64; pyæmia.
785	Crumpton, F. A., Pt., I, 4th Indiana Cavalry.	Jan. 17, 18, '64.	Left; circ. Died Jan. 30, 1864.
786	Culliden, D., Pt., I, 83d Pennsylvania.	May 5, 6, '64.	Left; ant. post. flap; bed-sores. Died June 16, '64; exhaustion.
787	Culver, H., Pt., E, 2d U. S. S. S., age 30.	June 18, 19, '64.	Left; circ. Dec. 17, reamp. Died Jan. 10, '65; gangrene.
788	*Cumber, J. G.*, Pt., I, 38th Ala., age 30.	May 15, 15, '64.	Right; circ. Surg. H. E. Goodman, U. S. V. Died July 14, 1864; exhaustion.
789	Cummings, I. S., Pt., F, 100th Ohio, age 20.	Aug. 6, 6, '64.	Right. Surg. A. M. Wilder, U. S. V. Died Sept. 5, '64; typhoid fever.
790	Curry, J. H., Serg't, D, 116th Penn., age 23.	May 5, 5, '64.	Right. Surg. W. O. Meagher, 69th N. Y. Died May 30, 1864.
791	Curlin, F., Pt., A, 28th Mass., age 26.	June 3, 3, '64.	Left; circ. Surg. P. E. Hubon, 28th Mass. Diarrhœa; hæm. Died July 1, 1864.
792	Curtis, R., Lieut., D, 3d New Jersey.	May 6, 6, '64.	Died May 19, 1864.
793	*Dafrimont, L.*, Pt., G, 17th Alabama.	July 28, 29, '64.	Right. Died Aug. 31, 1864.
794	Dail, J. H., Pt., K, 79th Ohio.	Mar. 19, 19, '65.	Right. Died March 29, 1865.
795	Dangler, D. F., Pt., E, 55th Penn., age 20.	June 18, 18, '64.	Right. Died July 20, 1864; exhaustion.
796	Davis, G., Pt., B, 2d Artillery.	Oct. 6, 6, '64.	Died October 17, 1864; pyæmia.
797	*Davis, W. H.*, Pt., A, 38th N. C., age 21.	June 23, 23, '64.	Right; circ. Surg. J. W. Wishart, 140th Penn. Died August 16, 1864.
798	Davidson, R. C., Serg't, C, 35th Mass.	July 30, 30, '64.	Left; circ. Surg. G. W. Snow, 35th Mass. Died Aug. 19, 1864.
799	Dawson, G. S., Capt., F, 2d N. Y. H. A., age 26.	June 16, 17, '64.	Left. Dr. A. Garcelon. Necro. Died Dec. 6, '64. *Sp.* 1427, 2828.
800	Delaney, D., Pt., B, 1st Md. Cav., age 29.	Dec. 2, 4, '64.	Left; ant. post. flap; circ. sect. of muscles. Surg. J. B. Lewis, U. S. V. Died Jan. 5, '65; pyæmia. Autopsy.
801	Dermerhorn, G. B., S'gt, A, 119th Penn.	June 1, 1, '64.	Left. Died June 9, 1864.
802	Devon, J., Pt., F, 26th Pennsylvania.	July 2, 2, '63.	Left. Died July 10, 1863.
803	Dillon, N., Corp'l, K, 80th Ill., age 21.	Dec. 15, 15, '64.	Right; circ. A. Surg. R. J. Hill, 45th Ill. Died Dec. 17, '64; hæm.
804	Dinley, J., Pt., E, 73d Ohio.	Oct. 29, 29, '63.	Died November 14, 1863.
805	Dolan, J., Pt., I, 74th Ohio, age 26.	Sept. 1, 2, '64.	Right; circ.; nec. femur; prot. remov'd; gang. Died Nov. 21, 1864; exhaustion.
806 807	Doud, T., Serg't, C, 2d Michigan.	July 30, 30, '64.	Both. Surg. W. B. Fox, 8th Mich. Died July 31, 1864.
808	Dougal, F. L., Pt., H, 15th Connecticut.	April 24, 25, '63.	Right. Died April 25, '63; shock.
809	Downey, J., Corp'l, B, 2d Iowa Cav., age 21.	April 1, 1, '65.	Right ant. posterior flap. Died April 26, 1865; pyæmia.
810	Dwyer, W., Pt., E, 27th Mass., age 19.	April —, —, '63.	Left; congestive chill. Died April 27, 1863.
811	Eaton, G. W., Teamster, H, 17th Mass., age 36.	May 17, 17, '64.	R't; circ. A. Surg. J. M. Palmer, 86th N.Y. Died May 18, '64.
812	Eckhart, G. W., Corp'l, B, 49th Pennsylvania.	Sept. 19, 19, '64.	Right; circ. Surg. P. Leidy, 119th Penn. Died Oct. 6, 1864; peritonitis.
813	Eddy, G., Pt., E, 7th Wisconsin, age 24.	Aug. 30, 30, '62.	Right. Sept. 8, 13, hæm.; lig. of femoral. Died Sept. 13, 1862; exhaustion.
814	Elder, M., Lieut., 11th Infantry, age 28.	July 2, 4, '63.	Left. July 29, pyæmia dev. Died July 25, '63; pyæmia.
815	Enos, E., Pt., H, 10th Penn. Res., age 28.	May 10, 10, '64.	R't. Surg. B. Rohrer, 10th Penn. Res. Died May 19, '64. *Sp.* 2442.
816	Evarts, E., Serg't, C, 8th N. Y. H. A., age 26.	Oct. 27, 28, '64.	Right. Nov. 14, sym. of pyæmia. Died Nov. 18, 1864.
817	Fakee, N., Pt., C, 6th N. Y. H. A.	May 19, 19, '64.	Right; flap. Died Oct. 2, 1864; typhoid pneumonia.
818	Farrer, J. W., Pt., E, 8th Ill. Cav., age 27.	June 9, 9, '63.	Left. Surg. A. Hard, 8th Ill. Cav. Died June 18, '63. Auto. *Sp.* 1224.
819	Ferguson, C. F., Serg't, I, 1st Mass., age 25.	July 2, 2, '63.	Left. July 8, hæm. Died Sept. 11, 1863.
820	Ferguson, D., Pt., G, 125th Ohio.	June 23, 23, '64.	Left. Surg. T. L. Magee, 51st Ill. Died June 26, 1864.
821	Ferguson, J., Pt., K, 51st Pennsylvania.	Dec. 13, 13, '62.	Right. Died Dec. 14, 1862.
822	*Fillingim, A.*, Pt., E, 37th Miss., age 23.	Dec. 16, 16, '64.	Right; circ. Ass't Surg. W. B. Trull, U. S. V. Died Dec. 25, 1864; irritative fever.
823	Fisher, D., Pt., K, 102d New York.	July 20, 20, '64.	Right. Died August 30, 1864.
824	Fisher, S., Corp'l, C, 90th Penn., age 27.	May 9, 10, '64.	Right; circ. Died May 30, 1864; pyæmia.
825	Flamburg, M., Pt., G, 52d New York.	Oct. —, —, '64.	——. Surg. J. E. Pomfret, 7th N. Y. H. A. Died Oct. 17, 1864.
826	Flynn, J. F., Pt., E, 1st Maine Cav., age 26.	April 6, 6, '65.	Right; circ. Died June 2, 1865; exhaustion. Autopsy.
827	*Ford, W.*, Pt., B, 7th Louisiana, age 23.	July 1, 1, '63.	Left; slough'g; (also w'nd right thigh.) Died Aug. 2, '63; hæm.
828	Frank, E. H., Lieut., A, 26th Iowa.	Aug. 12, 12, '64.	Right. Surg. A. T. Hudson, 26th Iowa. Died Aug. 14, 1864.
829	*Franklin, G. W.*, Pt., K, 50th Georgia.	July —, —, '63.	Left. Died August 10, 1863.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
830	Free, A., Pt., K, 26th Pennsylvania.	May 15, 16, '64.	Left. Died May, 1864.
831	Frost, A., Pt., A, 187th Penn., age 19.	June 18, 20, '64.	Right. Died Sept. 12, 1864.
832	Funt, J., Pt., H, 75th Illinois.	June 24, 24, '64.	Right. Surg. C. J. Walton, 21st Ky. Died July 15, 1864.
833	Gaddie, S. W., Pt., K, 5th Kentucky.	May 15, 15, '64.	Left. Died May 21, 1864.
834	Gallagher, P., Pt., B, 157th Pennsylvania.	Oct. 3, 3, '64.	Right; circ. Died Oct. 4, 1864.
835	Gardner, J., Pt., D, 15th New York, age 28.	Oct. 19, 19, '64.	Left; slough'g; protruding bone excised. Died Feb. 4, 1865.
836	Gardner, J., Pt., K, 27th Indiana.	July 3, 3, '63.	Left. Ass't Surg. G. V. Woolen, 27th Ind. Died July 28, 1863.
837	Gay, J., Pt., A, 35th Massachusetts, age 36.	Aug. 18, 19, '64.	Left; cir.; sloughing. Died Sept. 29, 1864; pyæmia.
838	Geiser, B., Pt., G, 32d Indiana.	June 4, 4, '64.	——. Died June 13, 1864.
839	Getchell, G. O., Capt., E, 3d Maine, age 28.	May 5, 5, '64.	Right; muscular flap. Surg. T. Hildreth, 3d Maine. Died May 30, 1864; pyæmia. Autopsy.
840	Getchell, H. D., Pt., C, 15th Mass., age 19.	Sept. 17, 17, '62.	Left. Died October 14, 1862.
841	*Gersinger, J. H.*, Pt., H, 1st North Carolina.	July 3, 4, '63.	Right. Surg. G. P. Oliver, 111th Penn. Died July 28, 1863.
842	Gibbs, L., Pt., G, 5th Mich. Cav., age 33.	July 3, 4, '63.	Right; slough extending nearly to groin. Died Sept., 18, 1863; diarrhœa.
843	Gilbert, J. H., Serg't, K, 2d N. Y. Cav., age 34.	April 1, 1, '65.	Left; ant. post. flap. Died April 27, 1865; pyæmia.
844	Gilbert, P., Pt., D, 83d Pennsylvania.	June 18, 18, '64.	Left. Died June 28, 1864.
845	Gilmore, J. A., Maj., 48th Penn., age 30.	May 31, 31, '64.	Right; flap. Died June 9, 1864; exhaustion.
846	Gleason, C. A., Corp'l, L, 3d Mass. Cavalry.	Sept. 19, 19, '64.	Left; circ. Died Oct. 12, 1864; pyæmia.
847	Godfrey, W. M., Pt., F, 7th Iowa.	Nov. 7, 9, '61.	——. Surg. E. C. Franklin, U.S.V. Died Nov. 19, 1861; tetanus.
848	Goldthwaite, J., Capt., A, 1st Maine.	Mar. 25, 25, '65.	Right. Died April 17, 1865.
849	Goodsell, G. B., Serg't, D, 103d Ohio.	May 14, 14, '64.	Left. Died May 20, 1864.
850	Gordon, P., Pt., E, 7th Missouri.	June —, —, '63.	Left. Died June 7, 1863.
851	Gotwaltz, A., Pt., A, 138th Pennsylvania.	Sept. 19, 19, '64.	Left; flap. Died Oct. 11, 1864; exhaustion.
852	Gould, E. S., Corp'l, I, 22d Mass., age 19.	July 3, 3, '63.	Right. Died August 7, 1863.
853	Gowers, J. A., Pt., B, 14th N. Y. H. A., age 23.	May 12, 13, '64.	Right; circ.; seq. removed. Died Sept. 18, 1864; asthenia.
854	Graves, J., Pt., D, 111th Illinois.	July 28, 28, '64.	Right. Surg. H. C. Messenger, 56th Ohio. Died Aug. 1, 1864; wound.
855	Gray, T. W., Corp'l, F, 58th Indiana.	Sept. 19, 19, '63.	Left. Died Oct. 29. 1863; hæm. and pyæmia.
856	Green, J., Serg't, D, 88th New York.	Dec. 13, 13, '62.	Right; slough; rem. protr. bone. Died Feb. 23, 1863. *Spec.* 655.
857	Grissel, J., Pt., B, 8th Kansas, age 21.	Dec. 16, 17, '64.	Left; ant. post. flap. A. A. Surg. R. McMilley; shock. Died Dec. 18, 1864; exhaustion.
858	Grow, L., F., Lieut., K, 25th Wisconsin.	July 22, 24, '64.	Right. Died July 26, 1864.
859	Haines, J., Pt., I, 7th Indiana, age 29.	May 11, 11, '64.	Right; circ. Surg. J. Ebersole, 19th Ind. Died May 29, 1864. *Spec.* 2408.
860	Hance, W., Corp'l, D, 137th N. Y., age 18.	Oct. 29, 29, '63.	Left. Surg. J. V. Kendall, 149th N. Y. Died Oct. 29, 1863.
861	*Hancock, C.*, Pt., A, 21st Virginia.	Sept. 19, 19, '64.	Right; flap. Died Oct. 4, 1864; pyæmia.
862	Hancock, J., Pt., E, 179th New York.	June 18, 18, '64.	Left. Died June 19, 1864.
863	Hansard, W., Capt., K, 41st Ohio, age 22.	Dec. 16, 16, '64.	Right; ant. post. flap. Died Jan. 7, 1865.
864	Harck, M., Corp'l, C, 63d Indiana.	May 14, 14, '64.	Left. Died May, 1864.
865	Hardy, E., Pt., F, 36th C. T., age 23.	July 30, 30, '64.	Left; flap. Ass't Surg. Th. Wild. 36th C. T. Died Aug. 29, '64; pyæmia.
866	Hartman, E., Pt., A, 59th New York.	Oct. 19, 19, '64.	Left. Surg. S. H. Plumb, 82d N. Y. Died Oct. 19, 1864.
867	Harison, P., Pt., I, 60th New York, age 25.	June 16, 16, '64.	Right; flap. Surg. H. B. Whiton, 60th N. Y. Gangrene. Died Aug. 16, '64; chronic diarrhœa.
868	Hatch, W. B., Col., 4th New Jersey.	Dec. 13, 13, '62.	Left. Died December, 1862.
869	[1] Hawksworth, T., Maj., 68th Pennsylvania.	Dec. 14, 14, '62.	Left. Died Jan. 6, 1863; tetanus. *Spec.* 112.
870	Healey, T., Pt., E, 157th New York.	July 1, 1, '63.	Left. Died July 15, 1863.
871	Healy, J., Pt., E, 64th New York.	April 7, 8, '65.	Left. Died June 8, 1865.
872	Helston, J., Pt., H, 49th Pennsylvania.	Sept. 19, 19, '64.	Left; circ. Died Sept. 29, 1864; exhaustion and debility.
873	Hempleman, N., Pt., G, 70th Ohio.	July 22, 22, '64.	Left; circ. Surg. R. Morris, 103d Ill. Died Aug. 18, 1864.
874	Henderson, J., Pt., F, 2d New Hampshire.	July 2, 2, '63.	Right. Died July 8, '63; wound.
875	Hendricks, F. E., Major, 4th New York H. A.	Mar. 31, 31, '65.	Right. Surg. P. E. Hubon, 28th Mass. Died April 1, 1865.
876	*Hengen, H.*, Pt., A, 2d Louisiana.	Nov. 3, 3, '63.	Right. Died Nov. 14, 1863.
877	Henry, J., Pt., B, 103d Illinois.	Nov. 25, 25, '63.	——. Died December 20, 1863.
878	Henwright, T., Pt., E, 117th N. Y., age 28.	Sept. 30, —, '64.	——. Died Oct. 4, '64; exhaustion from suppuration.
879	*Herndon, T. B.*, Pt., C, 60th Georgia.	Nov. 27, 28, '63.	Left. Surg. J. Dwinelle, 106th Penn. Died December 3, 1863. *Spec.* 1885.
880	Hersha, C., Serg't, F, 25th Iowa, age 21.	Mar. 19, 20, '65.	Right; circ. Surg. G. F. French, U. S. V. April 14, hæm.; lig. Died April 15, 1865
881	Hess, A., Pt., H, 10th New Jersey.	June 1, 1, '64.	Left. Died June 18, 1864.
882	Hess, J., Pt., I, 83d N. York, age 19.	May 12, 12, '64.	Left; circ.; protrud. bone remo'd. Died May 24, '64; exhaustion.
883	Heacock, N., Serg't, E, 119th Penn.	Sept. 19, 19, '64.	Left. Died Oct. 4, 1864; exhaustion.
884	*Hickman, L.*, Pt., 1st Virginia Artillery.	Sept. 29, 29, '64.	Right; circ.; (also other wounds.) Ass't Surg. W. F. Richardson, C. S. A. Died Oct. 23, 1864.
885	Higgins, A. W., Pt., E, 111th N. York, age 27.	June 17, 18, '64.	Left; lat. flap. Surg. J. W. Wishart, 140th Penn. Died July 11, 1864; pyæmia.
886	Hinchcliff, S. H., Pt., E, 210th Penna., age 39.	Feb. 6, 6, '65.	Left; flap. Died Feb. 17, 1865; exhaustion.
887	Hitchcock, H., Corp'l, G, 39th New York.	May 5, 5, 64.	Right; circ. Surg. J. W. Wishart, 140th Penn. Died May 6, '64.
888	Hoffman, F., Private, Knapp's Penn. Bat'ry.	July 20, 20, '64.	Right; circ. Surg. J. V. Kendall, 149th N. Y. Died Aug. 11, '64.
889	*Hoffman J. W.*, Pt., B, 57th N. Carolina.	Oct. 19, 19, '64.	Left. Died Oct. 25, '64; tetanus.
890	Holley, C., Pt., H, 2d Michigan.	June 18, 18, '64.	Right. Surg. S. S. French, 20th Mich. Died June 18, 1864.
891	Howard, F. H., Pt., B, 6th Mass.	Jan. 30, 30, '63.	Right. Died Feb. 1, '63; asthenia.
892	Howard, J. S., Capt., G, 8th Penn. Cavalry.	Mar. 31, 31, '65.	Left. Died April 21, 1865.
893	*Howel, J. C.*, Lt., C, 55th Alabama.	July 20, 20, '64.	——. Died July 30, 1864.
894	*Hubbard, J. D.*, Corp'l, G, 8th Florida, age 32.	Dec. 15, 15, '62.	Left. Died Jan. 22, '63; pyæmia. Autopsy.
895	Hubbell, G. P., Corp'l, C, 24th Michigan.	May 14, 14, '64.	——. Died May 17, 1864.
896	Hudnot, M. B., Pt., D, 8th New York H. A.	June 16, 16, '64.	Left. Surg. S. H. Plumb, 82d N. Y. Died June 17, 1864.
897	Hugh, E., Pt., H, 59th New York, age 22.	June 16, 17, '64.	Right; circ. Surg. G. L. Potter, 145th Penn. Died June 30, '64.
898	Hulce, C., Corp'l, H, 2d Michigan.	June 18, 18, '64.	Right. Surg. S. S. French, 20th Mich. Died June 18, 1864.
899	Humel, H. J., Pt., G, 155th Penn., age 23.	May 5, 5, '64.	Left. Died June 5, '64; exhaustion.
900	Husted, W., Pt., I, 142d New York, age 18.	Oct. 27, 27, '64.	Right. Surg. A. M. Clark, U.S.V. Died Nov. 15, '64; pyæmia.
901	Hutchinson, W. W., Pt., F, 18th Infantry.	June —, —, '64.	Left. Died July 28, 1864.
902	Hutzel, G. F., Pt., E, 5th Wisconsin, age 33.	April 2, 2, '65.	Right; circ. Died May 4, 1865; pyæmia.
903	Jackson, E., Adj't, 82d New York.	June 1, 1, '64.	Left. Surg. S. H. Plumb, 82d New York. Died June 7, '64.
904	Jackson, H., Pt., E, 4th Colored Troops, age 23.	Sept. 20, 20, '64.	Left; (also amp. arm.) Died Oct. 11, '64; exhaustion.
905	Jackson, W., Serg't, C, 23d Kentucky, age 41.	May 26, 27, '64.	Left; circ. Died June 8, 1864; exhaustion.
906	*Jeffries, A. S.*, Pt., I, 17th S. Carolina, age 23.	April 7, 7, '65.	Left. Died July 9, 1865; exhaustion.
907	Johnson, F. B., Pt., C, 16th Maine, age 23.	Dec. 13, 14, '62.	Right. Dec. 25, lig. fem. Died Dec. 25, '62; exhaustion.
908	Johnson, I., Corp'l, K, 1st Ohio Art'ry, age 21.	July 1, 3, '63.	Left. Oct. 10, hæm. Died Oct. 19, '63; asthenia.
909	Jones, A., Corp'l, K, 15th Mass., age 21.	May 10, 10, '64.	——. Died June 17, '64; pyæmia.
910	Jones, W. H., Pt., H, 1st Maryland, age 36.	May 19, 19, '64.	Right. Died June 19, 1864; pyæmia. Autopsy.
911	Kane, D., Pt., H, 1st New Jersey, age 19.	June 3, 4, '64.	Left; circ.; slough'g. Died Sept. 10, 1864.
912	Keeling, L. T., Pt., D, 17th Kentucky.	May 27, 27, '64.	Died June 3, 1864; wounds.
913	Keller, H. H., Pt., B, 7th Mich. Cav., age 34.	May 5, 6, '64.	Right. May 20, hæm.; 28th, recurred; ligation. Died June 25, 1864; pyæmia.
914	Kennard, P., Pt., A, 16th Kentucky.	May 14, 14, '64.	——. Died May 14, 1864.
915	Kerner, C., Pt., D, 26th Wisconsin, age 17.	Mar. 19, 19, '65.	Right. Died April 21, 1865.
916	Kessler, J., Serg't, A, 44th Illinois, age 26	Nov. 25, 27, '63.	Left; gang.; sym. of ichoræmia. Died Dec. 31, 1863.
917	Kidd, W., Serg't, C, 14th N. Y. H. A., age 33.	June 16, 17, '64.	Right; anterior post. flap. Died July 7, 1864.
918	Kiddoo, A., Pt., K, 102d Illinois.	July 20, 20, '64.	Right. Died November 26, 1864.

[1] O MEAGHER (W.), *Casualties at the Battle of Fredericksburg*, in *American Medical Times*, 1863, Vol. VI, p. 179.

NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
919	Kilbourne, E. A., Pt., H, 45th Penn., age 19.	May 18, 18, '64.	Right; ant. post. flap. Surg. T. S. Christ, 45th Penn. Died June 15, 1864; exhaustion.
920	*Kincaid, J. M.*, Capt., G, 53d N. Carolina.	July 3, —, '63.	Left. Died Aug. 21, 1863.
921	Kirkpatrick, J., Pt., G, 4th N. Y. H. A., age 21.	June 18, 18, '64.	Left; circ. flap; gang. Died Sept. 20, 1864.
922	Kline, M., Pt., H, 23d Penn., age 20.	Jan. 15, 15, '65.	Right; circ. A. Surg. F. B. Kimball, 3d N. H. Died Feb. 9, 1865; exhaustion. Autopsy.
923	Knight, T., Pt., F, 7th Rhode Island.	Dec. 13, 13, '62.	Right. Died December 15, 1862.
924	Knight, W., Pt., G, 147th New York.	Aug. 18, 18, '64.	Left. Surg. A. S. Coe, 147th N. Y. Died Aug. 21, 1864.
925	Kraai, T., Pt., D, 8th Michigan, age 20.	July 20, 21, '64.	Left; flap. Surg. W. B. Fox, 8th Mich. Aug. 18, reamp. Died Sept. 1, '64; pyæmia. Autopsy.
926	Lackey, M., Pt., K, 6th Vermont, age 18.	July 10, 10, '63.	R't; circ. July 21, hæm.; lig. fem. Died Oct. 22, 1863; exhaustion. *Spec.* 3880.
927	Lamb, H., Pt., H, 31st Iowa.	May 26, 26, '64.	Left; flap. Surg. A. T. Hudson, 26th Iowa. Died June 6, 1864.
928	Lambert, X., Pt., H, 32d Mass., age 34.	Feb. 6, 6, 65.	Right. Died March 4, 1865; pyæmia. Autopsy.
929	Lamphere, C., Pt., G, 8th Connecticut.	Sept. 29, 29, '64.	Left; circ. Surg. T. H. Squire, 89th N. Y. Died Sept. 30, 1864.
930	Lampman, A., Pt., B, 5th N. Y. H. Art., age 24.	July 18, —, '64.	Right. Died July 26, 1864.
931	*Lanier, P.*, Pt., C, 17th S. Carolina, age 33.	July 30, —, '64.	Right; circ.; sloughing. Died Aug. 17, 1864.
932	Larkin, W. R., Pt., B, 22d New York Cav.	Sept. 19, 19, '64.	Right; oval. Surg. J. W. Smith, 2d Ohio Cav. Died Oct. 30, '64; pyæmia.
933	[1]Larry, L., Pt., A, 1st New Orleans, age 23.	July 17, 17, '64.	Left; double flaps. A. A. Surg. F. Hassenburg. Erysip. Sept. 21, amp. hip joint. Died Sept. 30, '64; pyæmia, etc. *Spec.* 3738.
934	Lawyer, F. T., Pt., A, 6th Maryland.	May 5, 5, '64.	Left. Died May 10, 1864.
935	Ledbetter, J. W., Pt., H, 131st Illinois, age 28.	May 12, 12, '63.	Right; circ. Surg. A. H. Hoff, U. S. V. Died May 27, 1863; exhaustion.
936	Leddy, J., Pt., G, 4th Rhode Island, age 21.	Sept. 30, 30, '64.	Left. Died Oct. 18, '64; pyæmia. Autopsy.
937	Lesher, J. M., Pt., G, 12th Indiana.	July 20, 20, '64.	Left; flap. Surg. W. Lomax, 12th Ind. Died Oct. 2, 1864.
938	Leonard, J., Serg't, D, 55th Penn., age 27.	June 18, 18, '64.	Right. Died Aug. 11, '64; exh'n.
939	Lindsay, W., Pt., A, 11th New Jersey.	June 18, 18, '64.	Right. Died June 28, 1864.
940	Lintz, H., Pt., K, 10th N. Y. H. Art'y, age 20.	April 2, 2, '65.	Right. Died April 22, '65; typh. fever.
941	*Littlefield, M. C.*, Pt., B, 43d Georgia.	May 15, 15, '64.	Right. Ass't Surg. H. E. Goodman, U. S. V. Died May 21, '64.
942	Loetze, H., Pt., G, 9th New Jersey, age 56.	Dec. 14, 14, '62.	Right; circ. Surg. G. A. Otis, 27th Mass. Jan. 17, hæm.; lig. fem. Died Jan. 31, '63; hæm. Autop. ——; flap; sloughing. Died June 14, 1864; exhaustion.
943	Long, F., Pt., E, 14th N. Y. H. A., age 20.	June 2, 4, '64.	Left. Died July 21, 1863.
944	Long, H., Pt., K, 148th Pennsylvania.	July —, —, '63.	Left. Surg. J. W. Lyman, 57th Penn. Died May, '64. *Spec.* 3225.
945	Lord, D., Pt., I, 1st Me. Heavy Artillery.	May —, —, '64.	Left. Surg. A. C. Messenger, 57th Ohio. Died Aug. 3, 1864.
946	Lovell, J. D., Pt., I, 54th Ohio.	July 22, 23, '64.	Right; circ. A. Surg. J. D. Willard, 1st Md. P. H. B. Died Oct. 9, 1864.
947	Low, S., Corp'l, F, 17th Penn. Cav., age 23.	Aug. 25, 25, '64.	R't; circ. Surg. H. N. Small, 10th N. H. Died Oct. 4, '64; pyæm. ——. Died May 15, 1864.
948	Lowery, J., Pt., B, 10th N. Hampshire, age 24.	Aug. 6, 6, '64.	Right. Died Nov. 23, 1864.
949	Lowrey, J., Lieut., C, 16th Kentucky.	May 14, 14, '64.	Right; lat. skin flaps; circ. sect. mus. A. A. Surg. J. H. Bartholf. Died Feb. 14, '65; soft. of brain. Autopsy. *Spec.* 1369.
950	Ludwig, E., Pt., F, 6th Maryland.	Oct. 19, 19, '64.	Left. May 14, 1865, reamputat'n. Died May 20, 1865; pyæmia.
951	Lynch, J., Pt., I, 89th Penn., age 40.	July 9, 11, '64.	Left. Surg. O. J. Evans, 40th N. Y. Died Dec. 3, '64. *Spec.* 4117.
952	Mann, D., Pt., D, 39th Ohio, age 29.	July 4, 4, '64.	Left; circ. Surgs. Duval and Wilkinson, C. S. A. Died Sept. 26, 1864; pass. hæmorrhage.
953	Martin, F., Pt., H, 11th New Jersey.	Nov. 10, 10, '64.	Right; ant. post. flap. Surg. A. S. Coe, 147th N. Y. Died June 18, 1864, pyæmia.
954	*Martin, M. C.*, Pt., G, 53d North Carolina.	Sept. 19, 19, '64.	
955	Marshall, E., Pt., G, 147th N. Y., age 23.	May 28, 28, '64.	
956	*Massey, J. W.*, Pt., A, 14th N. C., age 22.	July 3, 3, '63.	Left; slough. Aug. 5, bone rem'd. Died Sept. 2, 1863; pyæmia.
957	[2]*May, W. F.*, Serg't, C, 10th South Carolina.	Sept. 19, 19, '63.	Right. Died Oct. 16, 1863; pyæmia.
958	McCollum, J., Pt., E, 16th Kentucky.	May 14, 14, '64.	——. Died May 14, 1864.
959	McConaughy, S. B., Pt., C, 116th Illinois.	May 19, 19, '63.	Left. Surg. J. B. Potter, 30th Ohio. Died May 20, 1863.
960	McCullough, J. H., Sergeant, K, 17th Iowa.	May 14, 14, '63.	Left. Died May 27, 1863.
961	McElroy, S., Serg't, I, 7th R. Island, age 33.	Oct. 1, 1, '64.	Left. Died October 25, 1864; pyæmia.
962	[3]McEvoy, J., Pt., H, 99th Penn.	Dec. 14, 15, '62.	Right; ant. post. flap. Surg. T. Hildreth, 3d Me. Died Dec. 29, 1862.
963	McGowan, W., Pt., D, 97th N. Y., age 25.	Feb. 6, 6, '65.	Left. March 27, hæmor. Died March 28, 1865.
964	McGill, R., Pt., A, 12th Maine, age 44.	May 27, 27, '63.	Left. Surg. A. C. Robertson, 159th N. Y. Died June 6, 1863.
965	McIlhaney, R., Pt., I, 29th Pennsylvania.	July 28, 28, '64.	Right. Died July 29, 1864; exhaustion.
966	Melligan, D., Pt., I, 110th New York.	June 14, 14, '63.	Left; hæmorrhage. Died Aug. 18, 1863.
967	Meranville, R. E., Corp'l, F, 2d New York Cav.	Aug. 29, 30, '62.	——. Sept. 5 and 6, hæm.; 7, lig. femur; 8, hæmorrhage. Died Sept. 12, 1862.
968	Miller, F., Pt., E, 66th New York.	Dec. 13, 15, '62.	Right. Surg. C. S. Wood, 66th N. Y. Died Dec. 20, 1862.
969	Miller, J., Pt., H, 134th New York.	June 27, 27, '64.	——. Surg. H. B. Whiton, 60th New York. Died June 28, '64.
970	*Miller, A.*, Pt., K, 2d Virginia, age 33.	May 3, 5, '63.	Left; circ. May 8, sloughing; hæm. from bowels. Died May 9, 1863.
971	*Milliner, W.*, Pt., Goss's Arkansas Reg't, age 30.	July 4, 5, '63.	Right; nec. bone remo'd. Died Sept. 7, 1863. *Spec.* 2088.
972	Mink, M., Pt., E, 28th Iowa, age 21.	Oct. 19, 19, '64.	Left; flap; sloughing; bone removed; hæmorrh. Died Dec. 7, 1864; pyæmia.
973	[4]*Minslett, J. C.*, Pt., —, 39th Alabama.	Sept. 19, 19, '63.	——. Died Sept. 30, 1863; exhaustion.
974	Mitchell, F. A., Corp'l, I, 17th Maine.	July 3, 4, '63.	Right. Surg. H. F. Lyster, 5th Mich. Died July 29, '63; exh'n.
975	Mitchell, J., Pt., L, 6th N. York Heavy Art'y, age 25.	Oct. 19, 21, '64.	Right; lat. skin flap; circ. sect. muscles. Surg. C. H. Andrews, 176th N. Y. Died Nov. 3, 1864; pyæmia. Autopsy.
976	Mohner, J., Pt., F, 15th Missouri, age 24.	Dec. 16, 16, '64.	Left; circ. Surg. T. L. Magee, 51st Ills. Died Dec. 23, 1864; irritative fever.
977	Montgomery, J., Corp'l, C, 93d Illinois.	Oct. 5, 5, '64.	Right. Ass't Surg. J. J. Whitney, 18th Wis. Died June 22, 1865.
978	*Moon, J. L.*, Pt., E, 44th North Carolina.	Oct. 3, 3, '64.	Right. Died Oct. 6, 1864.
979	[5]Moran, J., Pt., I, 6th New York.	Jan. 1, 3, '62.	Right. Surg. P. C. Pease, 6th N. York. Died Jan. 3, '62; never rallied.
980	Morear, J., Pt., 1st Massachusetts Battery.	Oct. 19, 19, '64.	Right. Died Oct. 21, 1864.
981	Morgan, J. D., Serg't, F, 22d Wisconsin.	Mar. 25, 25, '63.	Right. Died March 26, 1863.
982	Morse, A. A., Pt., D, 114th N. York, age 25.	Oct. 19, 20, '64.	Left; circ. A. Surg. B. A. Fordyce. 160th N. Y. Died Nov. 13, 1864; exhaust'n. Autopsy.
983	Murphy, P., Pt., B, 111th Penn., age 22.	Oct. 28, 30, '63.	L't; circ.; (also fract. cran.) Died April 30, '64. Aut. *Spec.* 2139.
984	Mushiltz, W., Pt., A, 11th Penn.	May 6, 6, '64.	——. June 16, nec. bone remo'd. Died June 24, '64; exhaustion. *Spec.* 2720.
985	*Nash, R. J.*, Pt., G, 9th Virginia.	July —, —, '63.	Right; hæmorrhage. Died Aug. 16, 1863.
986	New, F., Pt., E, 7th N. York.	Dec. 13, 15, '62.	——. Surg. C. S. Wood, 66th N. Y. Died Dec. 23, 1862.
987	Newton, J. H., Pt., B, 70th Indiana.	July 20, 20, '64.	Right. Died Aug. 12, 1864.
988	Nicholas, M. B., Serg't, I, 24th Iowa.	Oct 19, 19, '64.	Left; circ. Died Nov. 27, 1864; pyæmia.
989	Notestine, W. F., Capt., E, 11th Mo., age 22.	Dec. 15, 15, '64.	Left; circ. A. A. Surg. J. H. Green. Died Feb. 12, 1865; exhaustion.
990	Nunemacher, I., Pt., C, 8th Penn. Cav., age 40.	April 6, 6, '65.	Left; flap; diarr. Died April 29, 1865; pyæmia. Autopsy.
991	Oberly, F. A., Pt., D, 10th N. York, age 23.	July 24, 24, '64.	Right. Surg. G. S. Palmer, U. S. V. Died July 31, '64; exhaust'n.
992	O'Brien, T., Pt., G, 69th New York.	Sept. 17, 17, '62.	——. Sept. 26, bone protruding remo'd; tetan. Died Oct. 3, '62.
993	O'Connell, W., Pt., D, 25th Mass., age 19.	Mar. 10, 11, '65.	Left; circ. Died Mar. 17, 1865; exhaustion.
994	O'Donnell, C., Pt., A, 2d N. York Art'y, age 19.	May 19, 19, '64.	Left; circ. Died June 28, 1864; pyæmia.

[1] *Circular* No. 6, S. G. O., 1865, p. 50, CASE 16. *Circular* No. 7, S. G. O., 1867, pp. 48, 65.

[2] TERRY (C.), *Report of Wounded treated in Field Hospital of Hindman's Divis., Army of Tennessee, after the battle of Chickamauga*, in *Confed. States Med. and Surg. Jour.*, 1864, Vol. I, p. 76.

[3] O'MEAGHER (W.), *Casualties at the Battle of Fredericksburg*, in *Am. Med. Times*, 1863, Vol. VI, p. 179.

[4] TERRY (C.), *Confederate States Med. and Surg. Jour.*, 1864, Vol. I, p. 76.

[5] LYNCH (E.), *Santa Rosa Isle, Health of the 6th N. Y. Vols.*, in *American Medical Times*, Vol. IV p. 198.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
995	[1]O'Hara, J., Pt., C, 12th Penn. Res., age 40.	Dec. 14, 15, '62.	Left; ant. post. flap. Surg. J. Howe, 1st N. Y. Jan. 1, 3, '63, hæm. Died Jan. 4, '63; exh'n.
996	Palmerton, J. P., Pt., E, 76th New York.	June 18, 18, '64.	Right. Surg. G. W. Metcalf, 76th N. Y. Died June, 1864.
997	Paris, J. T., Corp'l, G, 24th Mich., age 23.	May 10, 10, '64.	Right; circ. Died May 19, 1864; exhaustion
998	*Parker, J. L.*, Pt., G, 12th Georgia.	Oct. 19, 20, '64.	Left. Died November 8, 1864.
999	Parker, S. E., Serg't, G, 147th New York.	Mar. 30, 30, '65.	Left. Died March 31, 1865.
1000	*Parsons, N. R.*, Corp'l, I, 44th N. Carolina.	Oct. 3, 3, '64.	Left. Died October 24, 1864.
1001	Pearsall, E. H., Pt., E, 2d N. Y. H. A., age 17.	June 5, 5, '64.	Left; circ. Surg. J. W. Wishart, 140th Penn. Died June 30, '64; pyæmia.
1002	Peiffer, M., Corp'l, F, 83d Penn., age 37.	May 8, 8, '64.	Left; flap. Died Oct. 28, 1864.
1003	*Pendergrast, N. F.*, Sgt., E, 55th Alabama.	July 20, 20, '64.	Lett. Died August 5, 1864.
1004	Perigo, B. T., Corp'l, A, 140th New York.	May 3, 3, '63.	——. Ass't Surg. B. Howard, U. S. A. Died May 3, 1863.
1005	*Perry, J. R.*, Pt., A, 44th North Carolina, age 31.	Oct. 14, 15, '63.	——; flap. Died Oct. 28, 1863.
1006	Pierce, T. G., jr., Pt., D, 16th Iowa, age 24.	July 31, 31, '64.	Right; circ.; gang. Died Nov. 6, 1864; exhaustion.
1007	*Pitts, C. C.*, Pt., K, 1st Alabama.	April 9, 9, '65.	Right. Surg. W. D. Murray, 161st N. Y. Died April 9, 1865.
1008	Plankington, J., Pt., E, 2d Penn. Art'y, age 24.	June 18, 18, '64.	Left; flap. Aug. 6, hæm. Died Aug. 6, 1864; exhaustion.
1009	Pollard, A., Pt., C, 4th Colored Troops, age 19.	June 15, —, '64.	Right; (also w'nd left knee joint;) ant. post. flap. Died July 21, 1864; exhaustion.
1010	Poole, G. T., Pt., G, 7th Illinois Cav., age 35.	Dec. 16, 17, '64.	Left; ant. post. flap. A. A. Surg. T. Morrison; pyæmia. Died Dec. 30, 1864.
1011	Poole, J. C., Pt., C, 145th Pennsylvania.	May 12, 12, '64.	Left. Surg. P. E. Hubon, 28th Mass. Died May 23, 1864.
1012	Potter, F. W., Corp'l, C, 7th Rhode Island.	May 13, 13, '64.	——. Surg. L. W. Bliss, 51st N. Y. Died May 18, 1864.
1013	Prentiss, W. S., Pt., A, 2d Maryland, age 26.	April 2, 2, '65.	Right; pyæmia. Died June 23, 1865.
1014	Preston, A. A., Pt., C, 2d N. Y. Mt'd Rifles.	June 2, 2, '64.	Right. Died June 7, 1864.
1015	Proctor, R., Serg't, B, 90th N. Y., age 35.	Oct. 19, 20, '64.	Right; circ. A. Surg. J. Homans, U. S. A. Died Nov. 8, '64; hæm.
1016	*Quarles, T. D.*, Pt., H, 53d Virginia, age 32.	June 19, 19, '64.	Right; flap; (also fracture left.) Died August 8, 1864.
1017	Quinn, J., Pt., H, 7th N. York Art'y, age 25.	June 18, 19, '64.	Right. Surg. G. L. Potter, 145th Penn. Died Dec. 18, '64; exh'n.
1018	[2]Rand, W. J., Pt., K, 45th Mass., age 25.	Dec. 14, 14, '62.	Right; (also amputa. left arm at shoul. joint.) Surg. I. F. Galloupe, 17th Mass. Died Jan. 24, 1863; pyæmia.
1019	Randolph, W., Pt., C, 25th Indiana.	April 6, 6, '62.	——; slough.; exposed end bone removed. Died April 9, 1862.
1020	Ranger, E. J., Pt., H, 24th Mich., age 26.	Feb. 7, 7, '65.	Left; circ. flap. Died Feb. 24, 1865; pyæmia.
1021	Raymond, W. D., Pt., D, 53d N. Y., age 28.	May 12, 12, '64.	Right; circ.; sloughing. Died June 21, 1864; pyæmia.
1022	Redman, R., Corp'l, I, 23d Michigan.	May 14, 14, '64.	——. Surg. D. L. Heath, 23d Mich. Died July 18, 1864.
1023	Reed, W. H., Pt., H, 8th Vermont, age 31.	Oct. 19, 21, '64.	Right; oval flaps. Oct. 24, hæm.; lig. fem.; 29th, hæm. Died Nov. 21, '64; peritonitis and pyæmia.
1024	*Register, B. M.*, Pt., D, 51st N. C., age 18.	June 1, 1, '64.	Right; circ. Died June 15, 1864.
1025	*Reynolds*, W., Pt., 42d Mississippi.	July 1, 3, '63.	——. Died July 19, 1863.
1026	Rich, E. H., Pt., L, 8th N. Y. H. A., age 27.	Nov. 10, 10, '64.	Right. Surg. A. Churchill, 8th N. Y. H. A. Died Dec. 20, '64; pyæmia.
1027	Richardson, A. C., Pt., B, 126th Penn., age 30.	Dec. 13, 13, '62.	——; flap. Died Jan. 29, 1863; hæmorrhage.
1028	Ricketts, L., Pt., A, 123d Indiana, age 26.	June 27, 27, '64.	Right; circ. Surg. C. W. McMillan, 1st E. Tenn. Died Aug. 29, 1864; pyæmia.
1029	Riley, R., Colonel, 75th Ohio.	May 2, 3, '63.	Right. Died May 3, 1863; exhaustion.
1030	Riley, J., Drummer, C, 145th N. Y., age 17.	July 3, 5, '63.	Left; flap. Died July 29, 1863; diarrhœa and typhoid fever.
1031	Risley, S., Pt., H, 44th New York, age 27.	May 5, 5, '64.	Right. Died June 1, 1864; exhaustion.
1032	[3]Roach, S., Pt., C, 99th Pennsylvania.	Dec. 14, 15, '62.	Right; ant. post. flap. Surg. A. J. Herr, 68th Penn. Died Jan. 13, 1863; pyæmia.
1033	Robinson, J., Serg't, H, 48th Illinois.	May —, —, '64.	Right; flap; (also exc. forearm.) Surg. A. Goslin, 48th Ill. Died June 1, 1864.
1034	*Robinett, J. A.*, Pt., G, 59th North Carolina.	July 2, 3, '63.	Left. Died July 22, 1863.
1035	Rogers, L. A., Capt., D, 98th New York, age 36.	June 2, 2, '64.	Left. Died July 10, 1864.
1036	Rogers, W. M., Corp'l, A, 116th Illinois, age 35.	July 22, 22, '64.	Left; circ. Act. Staff Surg. C. B. Richards, U. S. A. Died Sept. 20, 1864.
1037	Rowe, J. B., Corp'l, I, 11th New Hampshire.	May 16, 16, '64.	Right. Surg. J. S. Rose, 11th N. H. Died May 19, 1864; wounds.
1038	*Royster, T.*, Pt., Price's Artillery.	Oct. 22, 22, '63.	——; hæmorrhage. Died Oct. 27, 1863.
1039	*Runnells, A. J.*, Pt., D, 27th Georgia.	Aug. 19, 19, '64.	Right; circ. Surg. W. Y. White, 57th Mass. Died Aug. 22, 1864.
1040	Russell, A. R., Serg't, E, 2d Massachusetts.	Oct. 17, 19, '64.	Right; oval. Asst. Surg. E. B. Nims, 1st Vt. Cav. Died Oct. 19, 1864; tetanus.
1041	Sanders, L. C., Pt., K, 2d N. Y. H. A., age 21.	June 16, 17, '64.	Left; circ. Surg. J. W. Wishart, 140th Penn. Died July 16, '64.
1042	Sayers, J. W., Corp'l, C, 8th N. Y. Cav., age 24.	April 29, 30, '65.	Left. Died May 5, 1865; exhaustion.
1043	Scurry, J., Pt., B, 1st Minn., age 35.	Aug. 14, 14, '64.	Right. Died August 21, 1864.
1044	Scudder, L. C., Pt., I, 33d Indiana.	June 22, 22, '64.	Right. Died July 15, 1864.
1045	Scarlet, G., Pt., D, 11th Colored Troops.	Aug. 24, 25, '64.	Left; circ. Died August 25, '64; hæmorrhage.
1046	Scott, A., Corp'l, I, 121st Ohio.	June 27, 27, '64.	Right. Died June 28, 1864.
1047	Seaburn, A., Pt., G, 97th Pennsylvania.	July 30, 30, '64.	Left; ant. post. flap. Surg. D. W. Maull, 1st Del.; aneur.; lig. ex. iliac. Died Oct. 9, '64. *Sp.* 3282.
1048	Sergeant, W. H., Pt., G, 24th New York, age 28.	June 17, 18, '64.	Right; flap. Surg. S. S. French, 20th Mich. Died June 26, 1864.
1049	Shortsleeve, G., Pt., E, 15th Mass., age 20.	May 12, 12, '64.	Left. A. Surg. M. Rizer, 72d Penn. Died June 5, '64; pyæmia.
1050	Sheppard, G., Pt., C, 1st Illinois Cavalry.	Sept. —, —, '61.	Right; hæm. Oct. 20, reamputation. Died Oct. 20, 1861.
1051	[4]*Shilling, H. W.*, Pt., A, 19th Alabama.	Sept. 19, 19, '63.	——. Died September 28, 1863; exhaustion.
1052	Silliman, W., Col., 25th Colored Troops.	Dec. 9, 9, '64.	Right. Died December 17, 1864.
1053	Skillman, F., Pt., E, 114th New York.	Sept. 19, 19, '64.	Right; circ. Surg. L. P. Wagner, 114th N. Y. Died Oct. 7, '64; pyæ.
1054	Skinner, J., Pt., F, 146th New York, age 34.	May 12, 12, '64.	Right; ant. post. flap. Died May 31, 1864; pyæmia. Autopsy.
1055	[5]*Skipper, A. B.*, Pt., A, 10th South Carolina.	Sept. 19, 19, '63.	—— ; hæmorrhage. Died Nov. 2, 1863.
1056	Slater, B., Pt., B, 72d New York, age 22.	July 23, 23, '63.	Right. A. Surg. J. T. Calhoun, U. S. A. Died July 31, 1863. *Spec.* 1513.
1057	Smiley, J., Pt., B, 10th Penn. Reserves.	May 10, 10, '64.	Left. Surg. B. Rohrer, 10th Penn. Res. Died May 11, 1864.
1058	Smith, D., Pt., G, 6th Penn. Reserves.	May 12, 12, '64.	Left. Surg. W. B. Lyons, 11th Penn. Res. Died May 12, 1864
1059	*Smith, F. W.*, Pt., C, 2d S. C. Rifles, age 16.	May 25, 25, '64.	——; circ.; severe diarrh. Died June 26, 1864.
1060	Smith, H. M., Pt., G, 82d Penn., age 28.	April 6, 6, '65.	Right; lat. flap; femur prot. one inch. Died May 7, '65; pyæm.
1061	Smith, J. J., Pt., F, 11th West Virginia, age 26.	Oct. 19, 20, '64.	Left; circ.; hæm; lig. perforating artery. Died Nov. 9, '64; pyæm
1062	[6]Snowbridge, A., Pt., G, 99th Pennsylvania.	Dec. 14, 15, '62.	Right; flap. Surg. J. W. Lyman, U. S. V. Died Jan. 6, '63; effect of amputation.
1063	Solomon, H., Pt., B, 12th Missouri.	May 14, 14, '64.	Right. Surg. G. L. Carhart, 31st Iowa. Died May 17, 1864.
1064	Spear, J., Serg't, E, 6th Maryland, age 32.	June 1, 2, '64.	Left; circ. Died July 17, 1864.
1065	Spear, J. W., Pt., D, 27th Mass., age 39.	May 14, 14, '64.	Left; diarrhœa. Died July 6, '64.
1066	Sproul, J., Serg't, C, 40th New York, age 24.	Nov. 7, 7, '63.	Left; double ant. post. flap. Surg. A. Campbell, 40th N. Y. Died Dec. 7, 1863; pyæmia. Autopsy.
1067	Sprowl, J. R., Pt., B, 58th Indiana.	Sept. 19, 20, '63.	Left. Died Sept. 23, 1863.
1068	Steele, J., Pt., I, 100th Col'd Troops, age 22.	Dec. 15, 16, '64.	Left; flap. A. A. Surg. J. S. Giltner. Died Jan. 14, 1865.
1069	Stines, H., Corp'l, D, 97th New York, age 28.	June 17, 18, '64.	Left; ant. post. flap. Died July 18, 1864; exhaustion. Autopsy.
1070	Stokes, S., Pt., F, 1st Mo. S. M. Cavalry.	May 21, 22, '64.	Right; erysipelas. Died June 1, 1864; tetanus.
1071	Stoneeyphe, S., Pt., G, 131st Pennsylvania.	Dec. 13, 15, '62.	Right. Surg. C. S. Wood, 66th N. Y. Died Jan. 2, 1863.
1072	*Stowers, M. C.*, Lieut., K, 6th Georgia.	Aug. 20, 20, '64.	Right. Surg. A. A. White, 8th Md. Died Sept. 17, 1864.
1073	Strong, W. H., Pt., 121st Penn., age 20.	May 8, 10, '64.	Left; flap. Surg. J. A. Ramsey, 121st Penn. Died May 24, '64; exhaustion.
1074	*Stuckey, H. G.*, ——, age 18.	June 15, 15, '64.	Right. Died July 13, 1864.

[1] O'Meagher (W.), *loc. cit.*, in *American Medical Times*, Vol. VI, p. 179.

[2] Galloupe (I. F.), *Army Medical Intelligence*, in *Bost. Med. and Surg. Jour.*, 1863, Vol. 68, p. 205.

[3] O'Meagher (W.), *Casualties at the Battle of Fredericksburg*, in *Am. Med. Times*, 1863, Vol. VI, p. 179.

[4] Terry (C.), *loc. cit.*, p. 76.

[5] Terry (C.), *loc. cit.*, p. 76.

[6] O'Meagher (W.), *Casualties at the Battle of Fredericksburg*, in *American Medical Times*, 1863, Vol. VI, p. 179.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1075	Stulls, H., Pt., A, 6th Wisconsin, age 22.	Feb. 6, 6, '65.	Left; circ. flap. Died Feb. 19, 1865; pyæmia.
1076	Sullivan, P., Pt., F, 42d New York.	Sept. 17, 17, '62.	Right. Died Sept. 29, 1862.
1077	*Summers, H.*, Serg't, M, 21st N. C., age 30.	Sept. 19, 19, '64.	——; circ. Surg. Sutton, C. S. A. Died Nov. 4, 1864; pyæmia.
1078	Swarman, J., Pt., G, 13th Connecticut.	Sept. 19, 19, '64.	Right. Died Sept. 27, 1864.
1079	Tarbell, C. F., Corp'l, D, 21st Maine, age 19.	May 27, 27, '63.	Left. Died May 27, 1863; effect of chloroform.
1080	*Tate, H. A.*, Pt., D, 11th N. Carolina, age 31.	July 3, 3, '63.	Right. Died August 25, 1863.
1081	Taylor, J., Serg't, K, 2d Colorado Cav., age 33.	Oct. 21, 21, '64.	Right; oval flap. Anæmic. Died December 1, 1864; irritative fever.
1082	Terrell, L. B., Pt., A, 23d Michigan.	May 14, 14, '64.	Left. Died June 25, 1864.
1083	*Terry, J. R.*, Pt., K, 47th Virginia, age 42.	Aug. 20, 20, '64.	——; flap; gang. Died August 27, 1864.
1084	Thomas, F. G., Pt., D, 8th Vermont, age 20.	Oct. 19, 19, '64.	——. Died October 22, 1864.
1085	*Thomassen, J. H.*, Pt., D, 24th Virginia, age 24.	May 16, 16, '64.	Left; circ. Died June 21, 1864; pneumonia.
1086	Thompson, A., Pt., D, 8th Vermont, age 22.	Oct. 19, 21, '64.	Right. Died Oct. 21, 1864; exhaustion.
1087	Thompson, W., Pt., A, 3d Maryland.	Sept. 30, 30, '64.	Left. A. Surg. J. E. Beatty, 2d Maryland. Died Sept. 30, '64.
1088	*Thompson, W. H.*, Pt., K, 15th Tenn., age 29.	Nov. 30, De. 1, '64.	Right; anterior posterior flap; gangrene. Died Dec. 26, 1864; exhaustion.
1089	Thurston, I., Corp'l, H, 54th Indiana.	Dec. 29, 29, '62.	Right. Died January 22, 1863.
1090	Titus, L. G., Serg't, E, 51st Pennsylvania.	Dec. 13, 13, '62.	Left. Died January 7, 1863; pyæmia.
1091	*Todd, R. L.*, Pt., 11th North Carolina.	July 3, 3, '63.	Right. Died July 10, 1863.
1092	Trautwine, J., Pt., A, 15th N. Y. H. A., age 37.	Aug. 19, 20, '64.	Right. Died September 21, 1864.
1093	Tressler, S., Artificer, K, 2d Penn. H. A., age 28.	Aug. 18, 18, '64.	Right. Died September 4, 1864; pyæmia.
1094	Trester, W. B., Pt., K, 52d Indiana, age 31.	May 18, 18, '64.	Right; flap; sloughing. Died September 23, 1864.
1095	True, W. S., Pt., D, 29th Maine.	Oct. 19, 19, '64.	Right. Died October 22, 1864; shock.
1096	Tuft, J. D., Serg't, E, 5th Maryland, age 26.	June 19, 19, '64.	Right. Died July 22, 1864.
1097	Turner, S., Pt., B, 106th New York, age 40.	Sept. 19, 19, '64.	Left; circ. Died Oct. 15, 1864; peritonitis.
1098	Tuthill, D. L., Serg't, I, 7th N. Y. H. A., age 38.	May 30, 31, '64.	Left; circ. Surg. G. L. Potter, 145th Penn.; pyæmia. Died July 9, 1864.
1099	Ulum, J., Pt., H, 102d New York.	July 20, 20, '64.	Right. Hæm. from femoral art. arrested before death, but never reacted. Died July 21, 1864.
1100	Van Anken, J. L., Corp'l, K, 56th Penn.	May 12, 12, '64.	——. Died May 12, 1864.
1101	Vanausdale, W. B., Corporal, C, 203d Penn., age 24.	Jan. 13, 13, '65.	Left; flap. Surg. G. C. Jarvis, 7th Conn. Died Feb. 10, 1865; pyæmia and exhaustion.
1102	Vanderburgh, H., Corp'l, B, 129th Illinois.	July 20, 20, '64.	Right; middle third. Died July 26, 1864.
1103	Van Pelt, D., Corp'l, G, 8th Iowa, age 22.	June 10, 10, '64.	Right; flap. Died July 3, 1864.
1104	Vincent, T. R., Pt., H, 7th Iowa.	Nov. 7, 7, '61.	——. Died November 19, 1861.
1105	Volner, E., Serg't, 13th New York Battery.	July 20, 20, '64.	Left. Died September 15, 1864.
1106	Walker, W., Pt., B, 81st Indiana.	Aug. 31, 31, '64.	Left. A. Surg. S. W. Marshall, 84th Illinois. Died Sept. 10, '64.
1107	Walker, J. W., Serg't, G, 105th Penn., age 25.	May 6, 6, '64.	Left; circ. Died June 4, 1864; pyæmia.
1108	Wall, G., Pt., H, 26th New York, age 18.	Dec. 13, 14, '62.	Left. Died Jan. 23, 1863; exhaustion. Autopsy. *Spec.* 973.
1109	Walsh, E., Lieut., B, 52d New York, age 33.	May 12, 12, '64.	Right; circular; typhoid fever; diarrhœa. Died June 13, 1864.
1110	Walton, W. H., Pt., B, 3d New Hamp., age 23.	June 18, 18, '64.	Right. Died July 21, 1864; exhaustion.
1111	Ware, H. S., Pt., H, 38th New York, age 23.	May 5, 5, '62.	Right. October 9, removed three inches necrosed bone. Died October 12, 1862; exhaustion. *Spec.* 1007.
1112	Warner, C. F., Pt., G, 2d Connecticut.	Sept. 19, 19, '64.	Right; flap. Died Sept. 23, '64; exhaustion.
1113	*Warner, M.*, Pt., 13th Mississippi.	July 2, 3, '63.	Right. Died.
1114	Warner, M., Pt., H, 70th Indiana.	Aug. 12, 12, '64.	——. Died August 27, 1864.
1115	Warren, G. W., Pt., E, 100th Indiana.	May 26, 26, '64.	Right. Surg. A. Goslin, 48th Ill. Died June 9, 1864.
1116	Washington, D., Pt., A, 29th Conn., age 21.	Oct. 28, 28, '64.	Left. Surg. C. M. Clarke, 39th Ill. Died Dec. 11, 1864; irritative fever.
1117	Washington, G., Pt., A, 48th Colored Troops.	April 1, 1, '65.	——. Surg. H. Osborne, 51st C. Troops. Died April 3, 1865.
1118	Waters, J., Pt., B, 26th Michigan, age 44.	May 12, 12, '64.	Right; circ. Surg. J. W. Wishart, 140th Penn. Died June 26, '64.
1119	Webb, J., Pt., G, 11th West Virginia.	Mar. 31, 31, '65.	Right. Surg. C. M. Clarke, 39th Illinois. Died April 10, 1865.
1120	*Webb, J. D.*, Corp'l, D, 5th Alabama, age 26.	Oct. 19, 20, '64.	Left; ant. post. flap. Surg. H. McGuire, C. S. A. Necrosed. Died Feb. 26, 1865. Autopsy.
1121	Weddle, S., Serg't, L, 1st Md. P. H. B. Cav., age 35.	July 4, 6, '64.	Right; double flap. Surg. W. R. Wray, 1st Md. P. H. B. Cav. Died July 6, 1864.
1122	Wedman, L., Pt., A, 7th New York Artillery.	June 16, 16, '64.	——. Surg. A. M. Dougherty, U. S. V. Died June 23, 1864.
1123	Weeks, A. M., Pt., E, 3d N. Hamp., age 21.	June 2, 2, '64.	Right. Died July 9, 1864.
1124	Weeks, W. H., Pt., E, 10th Conn., age 36.	Aug. 15, 15, '64.	Left. Died Sept. 10, 1864; exhaustion.
1125	Wendt, C., Pt., E, 153d New York.	Oct. 19, 20, '64.	Right; oval; sloughing; hæm.; fem. secured. Died Nov. 5, '64.
1126	West, S. P., Corp'l, K, 11th N. Hampshire.	May 12, 12, '64.	Right. Surg. J. S. Ross, 11th N. H. Died May 19, 1864.
1127	Wheelock, O. R., Serg't, K, 8th Michigan.	Aug. 30, 30, '62.	Left. Died Sept. 9, 1862.
1128	White, C. S., Pt., G, 142d Penn., age 25.	Dec. 13, 13, '62.	Left; bone protruded. Died Jan. 19, 1863. Autopsy. *Spec.* 986.
1129	[1] *White, J. W.*, —, F, 39th Georgia, age 40.	May 18, 18, '64.	——; circ. June 12, one and a half ins. sawn off. Died June 29, 1864; irritative fever.
1130	Whipple, E., Pt., B, 2d Rhode Island, age 32.	Mar. 27, 27, '65.	Left; gang. Died April 5, 1865; pyæmia.
1131	[2] Wick, F., Pt., D, 1st N. Y. Art., age 32.	Dec. 13, 13, '62.	Right; circular flap; gangrene. Died March 21, 1863; gangrene. *Spec.* 1000.
1132	Wildbaek, C. W., Pt., H, 1st La., age 27.	June 14, 15, '63.	Left; circ. Nov. 11, bone rem'd; abscesses. Died Jan. 31, 1864; exhaustion.
1133	Wilkinson, A. J., Pt., G, 7th Wisconsin, age 20.	June 17, 17, '64.	Left. Surg. J. Ebersole, 19th Ind. Died July 7, 1864.
1134	Willman, H., Serg't, F, 154th New York.	July 1, 2, '63.	Left. Died July 10, 1863.
1135	Wilson, J., Lieut. Col., 43d New York.	May 5, 5, '64.	Right. Surg. J. Ebersole, 19th Ind. Died May 6, 1864. *Spec.* 2315.
1136	Wilson, C., Pt., K, 11th Mass., age 25.	Mar. 31, Ap. 1, '65.	Left; bilateral flaps. Died May 17, 1865; exhaustion.
1137	Winship, N. W., Pt., K, 86th New York.	July 2, 2, '63.	——. Died July —, 1863.
1138	Wipfelder, F., Pt., C, 52d New York.	June 1, 2, '62.	Right. June 9, hæmorrh'ge; ligation femoral artery. Died June 17, 1862.
1139	Wolf, D., Pt., A, 23d Indiana.	June 18, 18, '63.	Right. Died June 28, 1863.
1140	Wood, L., Pt., B, 65th Illinois.	June 15, 15, '64.	Right. Surg. J. F. Kimbly, 11th Kentucky. Died July 30, 1864.
1141	Woodward, J., Pt., C, 59th Illinois, age 40.	Dec. 16, 16, '64.	Left; ant. post. flap. Died Jan. 9, 1865; irritative fever.
1142	Woodward, W., Pt., C, 67th New York, age 31.	Nov. 30, De. 1, '63.	Right; circ. Died Dec. 27, 1863; pyæmia. Autopsy.
1143 1144	Woodworth, J. W., Corporal, H, 11th Infantry.	Nov. 7, 7, '63.	Both. Died November 8, 1863.
1145	Wottington, B., Corp'l, 13th Colored H. A.	May 15, 15, '65.	Left; flap. Asst. Surg. H. G. Keefer, U. S. V., and others. Died May 21, 1865.
1146	Wright, A., Pt., C, 5th N. Y. Cav., age 18.	May 5, 5, '64.	Right. Died Aug. 17, 1864; enteric fever. *Spec.* 3084.
1147	*Wynn, J. J.*, Pt., E, 20th Alabama, age 25.	Dec. 16, 17, '64.	Left; ant. post. flap. A. A. Surg. D. D. Talbot. Died Dec. 23, '64; exhaustion.
1148	*Yount, E.*, Pt., A, 23d Virginia.	Sept. 19, 19, '64.	Right; circular. Surg. J. W. Lawson, C. S. A. Died Oct. 10, 1864; pyæmia.
1149	York, H. C., Pt., A, 4th Vermont, age 44.	May 5, 5, '64.	Left; double flap; gang. extend'g to body; four inches femur exposed. Died June 7, 1864
1150	Colladay, C. W., Pt., D, Grey's Reserves.	July 2, —, '63.	Right.
1151	Consin, N. A., Pt., F, 5th Col'd Troops, aged 24.	Sept. 29, —, '64.	Right. A prisoner, not on Pension List.
1152	Hart, W., Serg't, G, 6th New York H'vy Art'y.	May 19, —, '64.	
1153	*Kirby, J. T.*, Pt., E, 58th Alabama.	Sept. 1, 1, '64.	Right. Surg. A. C. Messenger, 57th Ohio.
1154	*Laureford, G. H.*, Pt., I, 8th Georgia.	May 5, —, '64.	——. Surg. J. W. Wishart, 140th Pennsylvania.
1155	*Pierson, J.*, Pt., G, 26th North Carolina.	May 5, —, '64.	Right. Surg. J. W. Wishart, 140th Pennsylvania.
1156	*Royan, J.*, Pt., G, 10th Tennessee.	Sept. 1, 1, '64.	Left; circ. Surg. J. R. Zearing, 57th Ill. Left in hosp. Sept. 5, '64.
1157	Walker, S. T., Pt., F, 12th North Carolina.	May 15, —, '64.	Left; and wound of right thigh.

[1] O'Keefe (D. C.), *Surgical Cases of interest, treated at Institute Hospital, Atlanta, Ga., May and June*, 1864, in *Confed. States Med. and Surg. Jour.*, 1865, Vol. 2, p. 25.

[2] Thomson (W.), *Report of Cases of Hosp. Gangrene treated in Douglas Hospital, Washington, D. C.*, in *Am. Jour. Med. Sci.*, 1864, Vol. XLVII, p. 382

The seat of injury in these eleven hundred and fifty-seven primary amputations in the middle third of the thigh is reported to have been in the middle third of the femur in ninety-eight, in the lower third in three hundred and fifty-eight, in the femur without indication of the third in two hundred and ninety, in the knee joint in three hundred and fifty-three, and in the leg in fifty-eight instances.

Primary Amputations in the Lower Third of the Femur.—Of nineteen hundred and fourteen primary amputations in the lower third of the femur the result could not be ascertained in fourteen instances. Nine hundred and seventy-three operations were successful, and nine hundred and twenty-seven were fatal, a mortality of 48.7 per cent. In one hundred and fifty-eight instances the limb implicated was not indicated; in eight hundred and forty-five the right, and in nine hundred and eleven the left thigh was amputated.

Recoveries after Primary Amputations in the Lower Third of the Femur.—The nine hundred and seventy-three operations of this group were performed on nine hundred and seventy-one patients, the discrepancy in numbers being due to the fact that double amputations were performed in two instances. Two hundred and twenty-nine were Confederate, and seven hundred and forty-two were Union soldiers. Of the latter, seven hundred and thirty-four were pensioned, and four retired; the names of the remaining four patients are not borne on the rolls of the Pension Office.

CASE 444.—Corporal J. A. Crawford, Co. K, 6th Wisconsin, aged 24 years, was wounded through the knee joint, at Gettysburg, July 1, 1863. He was admitted to the Seminary Hospital, whence Acting Assistant Surgeon W. M. Welch made the following report: "The limb was amputated at the lower third of the thigh on the day following the injury. The patient came under my care on August 15th, at which time the stump was granulating slowly and there was a free discharge of healthy pus; but the flaps had sloughed, leaving the end of the femur bare. A roller bandage was applied to prevent retraction of the muscles, and warm-water dressings with disinfectants were used, iron and stimulants being given internally. The patient's general health was disturbed, though his appetite was tolerably fair. He improved gradually, and was transferred to Camp Letterman on September 2d." Assistant Surgeon H. C: May, 145th New York, continued the history as follows: "The patient came under my charge on October 12th, being very feeble and troubled with profuse and obstinate diarrhœa, having no appetite, and suffering from hectic fever and much pain, also an abscess along the course of the lower end of the bone. The stump was conical shaped, with the end of the femur exposed, and the granulations were pale and flabby. Astringents and tonics were administered. On October 30th, the diarrhœa was almost controlled, but great pain and irritation was felt about the stump, and, chloroform having been given, a sequestrum four and a half inches long, and consisting of a complete section of the lower end of the bone, was removed by forcible traction. The surfaces of the bone were found to be very rough and surrounded with a wall of callus. The patient did well after the operation; the abscesses ceased to discharge, and the cavity in the stump filled with healthy granulations. By November 6th, he had regained a good appetite, the diarrhœa was entirely checked, and his general appearance and condition were rapidly improving." On the next day the patient was transferred to Newton University Hospital, Baltimore, where the following described operation was performed on February 2, 1864, by Surgeon C. W. Jones, U. S. V., in charge: "The end of the femur being necrosed, an incision six inches in length was made on the anterior aspect of the thigh and four inches of bone removed. Thirty-six hours afterwards hæmorrhage to the amount of four ounces occurred, when the sutures were removed and a large clot of blood was taken out, after which the bleeding ceased. After this the patient's constitutional condition continued to improve and the flaps approximated. By March 24th, the stump had entirely healed with a good cushion." The patient was discharged from service May 3, 1864, and pensioned. He was paid June 4, 1879. The sequestrum was contributed to the Museum by Acting Assistant Surgeon E. A. Koerper, and is represented in FIGURE 180, and an involucrum of new bone, removed at the last operation, is shown in FIGURE 181.

FIG. 180.—Tubular sequestrum removed from stump of the right femur. *Spec.* 1971.

FIG. 181.—Involucrum, 4 inches in length, from stump of right femur. *Spec.* 2153.

CASE 445.—Private J. Miller, Co. C, 18th Kentucky, aged 38 years, received a gunshot injury of the left lower extremity, at Richmond, August 30, 1862. Acting Assistant Surgeon J. B. Smith furnished the following history: "The wound was in the left knee and thigh, and amputation was performed on the field at the lower third of the femur. The patient was admitted to Washington Park Hospital October 15th. At the time of his admission he presented evidences of severe constitutional suffering, his skin being pale and yellow, accompanied by general emaciation, night sweats, and constant diarrhœa. The stump showed two or three small openings, and there was free discharge of sero-purulent fluid. Exposed bone could be distinctly felt with the probe. Astringent medicine was given until the fæcal discharges became natural. Warm-water dressings were used to the stump and the flaps supported with adhesive plaster, the wound being syringed every morning with a weak solution of chloride of soda. By December 1st, the patient was doing well, having good appetite and gaining flesh and strength rapidly, and all the constitutional trouble being removed. The end of the bone gradually became more exposed. On January 13, 1863, the patient being considered in a suitable condition for an operation, and having been placed under the influence of chloroform,

Acting Assistant Surgeon O. D. Norton cut down to the bone about four inches above its exposed end, dividing all the tissues, and carrying the knife downward to the opening at the end of the stump. The bone, after being dissected from the tissues, was then separated by a saw about three inches above the projecting extremity, the forceps being used for the removal of the spongy bone above the point of the division. Some trouble was experienced from hæmorrhage, necessitating the ligating of two or three small vessels. Water dressings were applied. By February 10th, the wound had healed and the patient was apparently doing well. On February 20th, he had a chill, followed by fever and by pain about the stump, when a small incision was made and about half an ounce of healthy pus discharged. From this time there was a gradually lessening quantity of pus until April 20th, when the wound had healed, and the patient, to all appearances, was well, being able to walk about the ward, and all his constitutional symptoms having disappeared." The patient was discharged April 30, 1864, and pensioned. He was paid March 4, 1879. The tubular sequestrum, three inches long and surrounded by a cylindrical involucrum of spongy bone, was contributed by Dr. Smith, and constitutes *Spec.* 1094 of the Surgical Section, A. M. M. It is represented in FIG. 2 of PLATE LXX, opposite.

In the following two instances of amputation in the lower third of the thigh, the officers continued in active service until the close of the war:

CASE 446.—Major-General D. E. Sickles, U. S. V., while in command of the Third Corps, at Gettysburg, was wounded, on the evening of July 2, 1863, by a twelve-pounder solid shot, which shattered his right leg. He dismounted unassisted, and aid arriving promptly, he was removed to a sheltered ravine a short distance to the rear, where the limb was amputated low down in the thigh by Surgeon T. Sim, U. S. V., Medical Director of the Corps. The patient was then sent farther to the rear, and, on the following day, he was transferred to Washington. The stump healed with great rapidity. Two weeks after the injury the patient was able to ride about in a carriage, and early in September he was well enough to again mount a horse, the stump being completely cicatrized. The bones of the amputated leg (*Spec.* 1335) were contributed to the Museum by the patient, and the history of the case was obtained from the operator. General Sickles subsequently for several years held command in South Carolina and the Department of the South, but has been retired from active service since April 14, 1869.[1]

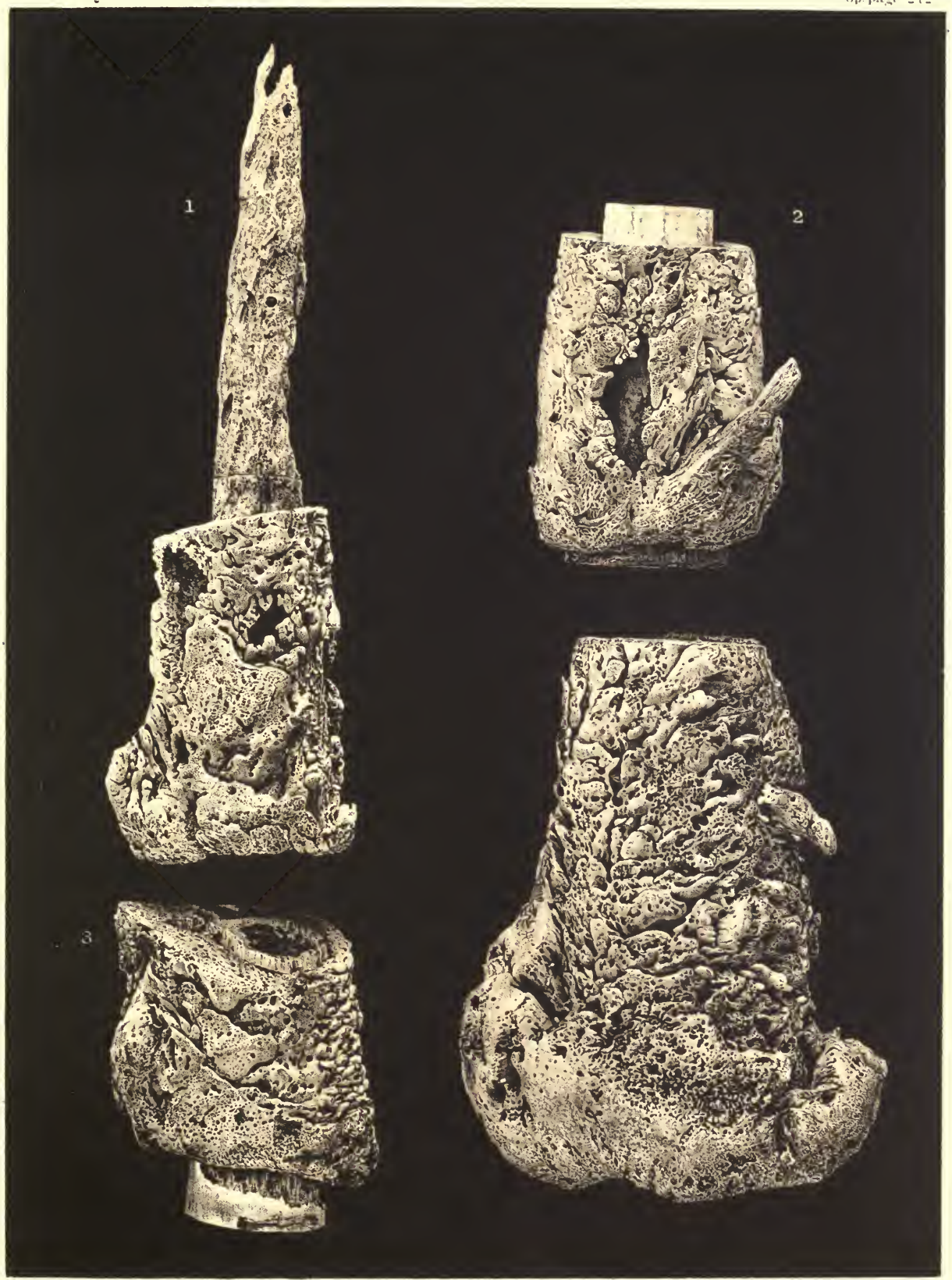
CASE 447.—Major-General *R. S. Ewell*, while commanding a division of General Jackson's Corps of the Confederate Army, was wounded in the left knee during the night of the engagement at Manassas, August 28, 1862. Dr. Hunter McGuire, Surgeon and Medical Director of the Corps, who amputated the wounded limb, published an account of the case as follows:[2] "He was kneeling on the ground and looking under some pine bushes to get a better view of the field, when he was hit upon the left patella, nearly in the centre of it, and his leg being flexed, the ball passed downward, striking the head of the tibia and splitting it into several fragments. The bullet finally lodged in the muscles of the calf of the leg. He sent for me at once, but the messenger failed to find me, and I did not know he was hurt until General Jackson sent his aid-de-camp to tell me. He was still laboring under the severe shock of the injury when I found him, although several hours had elapsed. In all gunshot wounds of the knee the shock of injury is severe, but it was especially great in this instance. The General's health, naturally not very good, was unusually bad at this time. He had also lost a great deal of sleep, and the night he was hurt was compelled to drink a large quantity of strong tea to keep awake. * * He was so much exhausted when he was shot that his surgeons thought at one time he would die from the shock of the injury. When he had sufficiently recovered from this, I advised him to submit to amputation; but he consented to it very reluctantly, partly because some surgeon had assured him that his wound was not dangerous, but one from which he would soon recover. I amputated the thigh just above the knee, performing the operation as rapidly and with as little loss of blood as I could. About ten days after the amputation, to escape capture, he was carried on a litter by some soldiers near fifty miles. The motion on the litter caused the bone to protrude, and in consequence of this and his bad health the wound sloughed. After much suffering and the loss of an inch of bone, he got well enough to go about, when one day he was so unlucky as to let his crutches slip from under him, and falling upon an icy pavement, he re-opened the wound and knocked off another piece of bone. After some months he was well enough to go back to the field again, where he performed some very active service, but from the shape of his stump, and an ill-contrived wooden leg he wore, he was frequently troubled with abrasions of the skin, small abscesses, and so on. He now (1866) uses a suitable artificial limb, and with the assistance of a cane gets along right well, being no longer liable to affections of the stump."

As already stated, amputation in the lower thirds of both thighs was twice successfully performed. One of the survivors died in 1877, over thirteen years after the operation

CASE 448.—Corporal M. Dunn, Co. H, 46th Pennsylvania, aged 21 years, was wounded at Dallas, May 25, 1864. Surgeon W. C. Bennett, U. S. V., recorded his admission to the field hospital of the 1st division, Twentieth Corps, and noted: "Canister-shot fracture of both legs, followed by excision of the head of the left fibula and amputation of the right thigh. Vessels of left leg destroyed and mortification ensuing, necessitating amputation of left thigh." Three weeks after being wounded the patient was removed to hospital at Chattanooga, where the stumps assumed a gangrenous appearance, which yielded to the application of bromine. One month later the patient was transferred to hospital No. 14, at Nashville, whence he was furloughed and proceeded to his home. He subsequently entered the Post Hospital at Elmira, and lastly, on April 24, 1865, he was admitted to Central Park Hospital, New York City. Surgeon J. J. Milhau, U. S. A., in charge of the latter, reported the following history: "The missile passed through both legs just below the knee joints. The right thigh was amputated by the flap method, just above the knee joint, eighteen hours after the injury, and circular amputation of the left thigh was performed forty hours after the reception of the wound. In August, 1864, the right thigh had to be re-amputated at the middle third, which operation was performed by the circular method, at the patient's home, by Dr. Robison, of Wellsville, New York. The stump of the right thigh closed completely about December 1, 1864, but that of the left never entirely healed, and was still discharging from three

[1] *Circular* No. 6, War Department, Surgeon General's Office, Washington, 1865, p. 38.

[2] MCGUIRE (HUNTER), *Clinical Remarks on Gunshot Wounds of Joints, etc.*, in *Richmond Medical Journal*, 1866, Vol. I. p. 262. Prof. P. F. EVE, in a communication published in the *U. S. Sanitary Commission Memoirs*, New York, 1871, Surgical Volume II, p. 64, states that "Lieutenant-General Ewell survives an amputation through the upper third of the thigh."



Ward phot.

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PLATE LXX.—INVOLUCRA OF THE FEMUR.

Fig 1.—Case of Pt. W. Vannatta, 4 Pennsylvania Cav. — Spec. 2602 Surg. Sect. A.M.M.

Fig. 2.—Case of Pt. J. Miller, 18 Kentucky. Spec. 1094 Surg. Sect. A.M.M.

Fig. 3.—Case of Pt. J. Wearing, 2 Pennsylvania Art. — Spec. 4196 Surg. Sect. A.M.M.

Fig 4.—Case of Pt. L. C. Griffin, 8 North Carolina. Spec. 3141 Surg. Sect. A.M.M.

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openings at the time of the patient's admission. On April 30th, chloroform was administered, and several pieces of necrosed bone were removed with the forceps by Acting Assistant Surgeon S. Teats, who made an incision some three inches in length on the face of the stump. The sequestrum being enclosed by a very thick involucrum, it was found necessary to remove a portion of the end of this with the gnawing forceps before the sequestrum could be extracted." The patient was discharged from service August 17, 1865, and pensioned, having been previously supplied with artificial limbs by the firm of A. A. Marks, of New York. The removed necrosed fragments were contributed to the Museum by the operator, and constitute Specimen 3193 of the Surgical Section. The pensioner died October 23, 1877. The cause of his death is alleged to have been the diseased condition of the stump of the left thigh.

In the second successful case of primary amputation of both thighs in the lower thirds the patient was a Confederate soldier:

CASE 449.—Private *C. G. Rush*, Co. C, 21st Georgia, aged 22 years, was wounded and captured during the assault on Fort Steadman, March 25, 1865. He was conveyed to the Ninth Corps field hospital, whence Assistant Surgeon S. Adams, U. S. A., contributed the pathological specimen (*Cat. Surg. Sect.*, 1866, p. 321, *Spec.* 3998), with the following history: "The injury consisted of a shell wound of the right leg below the knee joint, tearing open the joint, passing across and smashing the patella of the left leg. Surgeon L. W. Bliss, 51st New York, amputated both thighs at the lower third on the day of the injury. By April 1st the patient's general condition was excellent, his appetite and pulse good, and his tongue clean." The specimen consists of the amputated lower extremity of the left femur, with fragments of the patella. From the field hospital the patient was sent to City Point, and thence to Washington, where he was admitted to Armory Square, and subsequently to Lincoln Hospital. Surgeon J. C. McKee, U. S. A., in charge of the latter, contributed the photographs, represented in the annexed wood-cuts (FIGS. 182, 183), and described the amputation as a flap operation. The patient was released and discharged from hospital Aug. 2, 1865. Subsequently he entered and was treated for a time at St. Luke's Hospital, New York City, where, on February 28, 1866, he was provided by Dr. E. D. Hudson with artificial limbs, by means of which he was enabled to walk, requiring the assistance of two canes only.

FIG. 182.—Amputation of both thighs at lower thirds. [From a photograph.]

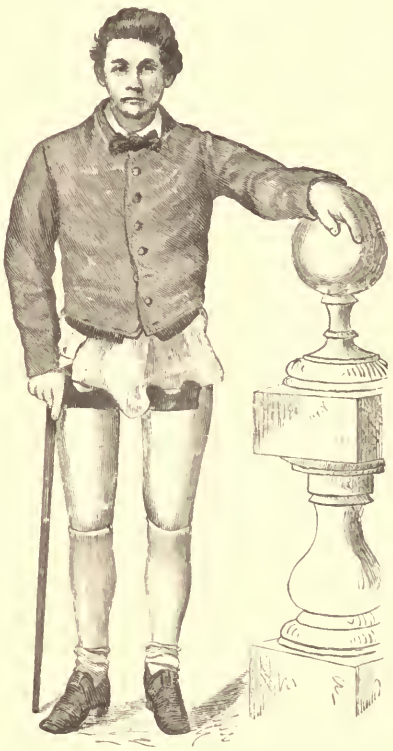

FIG. 183.—Artificial limbs applied in case of double amputation. [From a photograph.]

Twenty-seven of the seven hundred and forty-two Union soldiers who survived amputation in the middle third of the femur have died during the fourteen years since the close of the war. One case (CASE of Dunn) has already been detailed; in the following instance the patient survived the operation over fourteen years and died of phthisis:

FIG. 184.—Upper parts of bones of left leg; tuberosity of tibia split off obliquely.—*Spec.* 2344.

CASE 450.—Private C. Briot, Co. C, 39th New York, aged 26 years, was wounded in the left knee, at Bristoe Station, October 14, 1863. He was conveyed to Alexandria on the following day, and admitted to the First Division Hospital, whence Acting Assistant Surgeon C. W. Koechling transmitted the pathological specimen (FIG. 185), with the following history: "The wound was caused by a minié ball entering the external aspect of the knee, passing through the joint, and lodging. The missile was extracted from the internal aspect of the leg, on the field, by the regimental surgeon, and the limb was amputated at the lower third of the thigh, by the circular method, on October 16th, by Acting Assistant Surgeon N. Barnes. The patient came under my care on October 26th, at which time the bone protruded from the stump over an inch. For this gentle attraction of the integuments was made by adhesive strips and kept up for a week, when, the patient suffering too much pain, it was continued no longer, and a roller was applied from above downward and kept on until the bone was nearly covered. The patient improved every day, there being but very little discharge, but occasionally very severe pain in the stump. On February 8, 1864, the accompanying sequestrum was removed. On February 20th, the patient was seized with tetanic pains, which, though relieved by the free administration of opium, recurred every other day for a month. After that period the patient did well, and was able to take exercise on crutches, the stump having healed. On May 9th, the patient left the hospital on furlough." He subsequently passed through different hospitals, and lastly

FIG. 185.—Sequestrum from stump of left femur. *Spec.* 3027.

entered De Camp, David's Island, New York Harbor. On September 19, 1865, the man was discharged from service and pensioned. The upper portion of the bones of the leg of the amputated limb were forwarded to the Museum by the operator, and are represented in FIGURE 184, and a cast of the stump was contributed by Acting Assistant Surgeon G. F. Shrady. (*Cat. Surg. Sect.*, 1866, p. 548, *Spec.* 1787.) The New York City Examining Board certified, March 11, 1874: "The pensioner is unable to wear an artificial limb in consequence of excessive tenderness of the stump, rendering him unable to stand the pressure upon it. He has tried one several times, but it was so painful that he could not wear it more than a few hours." This pensioner died November 12, 1877, of phthisis pulmonalis.

Fatal Cases of Primary Amputation in the Lower Third of Femur.—Six of the nine hundred and twenty-seven cases of this group were instances of double amputations; the operations were, therefore, performed on nine hundred and twenty-one patients. Seven hundred and ninety were Union, and one hundred and thirty-one were Confederate soldiers. In the following case both thighs[1] were amputated in the lower third on the day of the injury, the patient surviving the operations eighteen days:

CASE 451.—Private D. Nicholson, Co. H, 22d Massachusetts, aged 23 years, was wounded in both thighs, at Spottsylvania, May 10, 1864. He was admitted to the field hospital of the 1st division, Fifth Corps, where Surgeon J. Thomas, 118th Pennsylvania, amputated both limbs. Surgeon R. B. Bontecou, U. S. V., reported the following termination of the case: "The patient entered Harewood Hospital, Washington, May 25th. He had undergone amputation of both thighs at the lower third the same day he received the wound, the operations being performed by the antero-posterior flap method. When admitted he was in a very weak condition, the stumps being unhealthy and showing a tendency to slough. A supporting treatment was administered. Progress, however, continued unfavorable. Death occurred from exhaustion May 28, 1864." The amputated portions of the femurs were contributed to the Museum by the operator, and constitute Specimen 2966 of the Surgical Section (FIGS. 186, 187), showing the right femur to be transversely perforated, with comminution, two inches above the condyle, by a bullet which passed on, badly grooving the left femur on the anterior face at the same level and producing a severe oblique fracture.

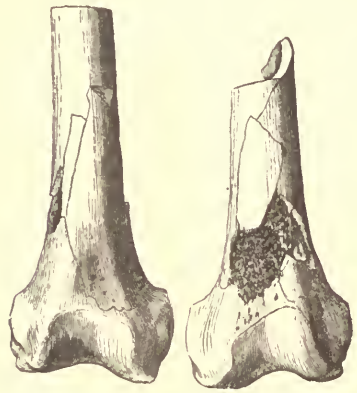

FIG. 186.—Anterior view of lower third of each femur. *Spec.* 2966.

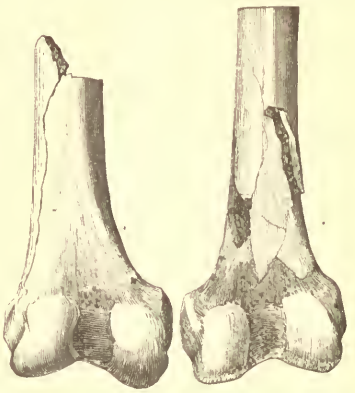

FIG. 187.—Posterior view of lower third of each femur. *Spec.* 2966.

CASE 452.—Private J. O. Blackburn, Co. E, 138th Pennsylvania, aged 35 years, was wounded at Monocacy Junction, July 9, 1864, and admitted to hospital at Frederick on the following day. Assistant Surgeon R. F. Weir, U. S. A., reported the following history: "The injury was caused by a fragment of a shell, which struck the inner side of the left knee, lacerated the soft parts, and comminuted the joint. On the day after his admission the patient was etherized, and the thigh was removed at the lower third, by Acting Assistant Surgeon W. S. Adams. The integuments in this case being in bad condition on the inner side, a circular incision was made to extend half around the limb, a long lateral flap on the outer side and a circular incision through the muscles, and the parts united by sutures and adhesive straps. The patient's condition at the time of the operation was very poor. July 13th, patient irritable; pulse 120; appetite rather poor; no effort at union by first intention. 16th, some evidence of sloughing of the flap. Ordered yeast poultices, also tartrate of potassa and iron in doses of twenty grains three times a day, and continued the stimulants and generous diet. 20th, line of demarcation well marked. 22d, slough being detached at several points; clipped it off with scissors down to the bleeding surface and thoroughly applied oakum saturated with a strong solution of permanganate of potassa, covering the whole with oiled silk. 25th, slough came away nicely, leaving a clean healthy surface. August 1st, patient doing tolerably well; granulations somewhat abundant but pale and flabby. Has obstinate diarrhœa, and is taking opiates and astringents in addition to other treatment. 10th, diarrhœa partially checked; appetite very poor; sloughing has recommenced, and permanganate of potassa is reapplied. 15th, sloughing about ceased. There is but little discharge, and the end of the stump is dry and refuses to granulate. Applied yeast poultice and continued the other treatment. 21st, patient quite despondent and evidently failing rapidly; pulse 140 and scarcely perceptible. Increased the stimulants. 28th, sloughing still continues and patient sinking. 31st, had a hæmorrhage from femoral artery to amount of eight ounces; controlled by tourniquet. Hæmorrhage occurred again on the following morning and was arrested by the tourniquet, the patient not being in condition to undergo ligation. He died at 7 o'clock P. M., on September 1, 1864. At the autopsy, eight hours after death, the body was found to be much emaciated and the muscles remarkably loose and flabby. On examining the stump to the head of the bone and removing the femoral artery and vein, the end of the artery was found to be pervious from the breaking down of the clot, and the vein much thickened and indurated." The amputated extremity of the femur, showing the inner condyle to be superficially fractured (*Spec.* 3832), and four and a half inches of the stump of the bone, being superficially necrosed (*Spec.* 3488), together with the femoral artery (*Spec.* 3980), were contributed to the Army Med. Museum by the operator.

[1] The remaining five fatal cases of amputation of both thighs in the lower third of the femur are: Pt. S. Allen, G, 59th Mass. (No. 984, TABLE XXXII, p. 257); Pt. R. S. Michael, A, 105th Penn. (No. 1551, TABLE XXXII, p. 263); Serg't E. C. Rabbit, B, 10th Missouri (No. 1652, TABLE XXXII, p. 264); Pt. J. Stewart, D, 77th New York (No. 1769, TABLE XXXII, p. 265); and Lieut. J. Whelpley, D, 1st Maine (No. 1862, TABLE XXXII, p. 267).

TABLE XXXII.

Summary of Nineteen Hundred and Fourteen Cases of Primary Amputations in the Lower Third of the Femur for Shot Fracture.

Recoveries, 1—973; Deaths, 974—1900; Result unknown, 1901—1914.

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	Abbott, O. A., Serg't, A, 14th Conn., age 24.	Oct. 27, 28, '64.	Left; circ. Surg. F. A. Dudley, 14th Conn. Disch'd June 9, '65.
2	Adair, R., Serg't, F, 7th Infantry.	Feb. 21, 22, '62.	Right; circ. A. Surg. B. Norris, U. S. A. Disch'd July 13, '62; subsequent operation.
3	Adams, E. H., Pt., C, 12th Iowa.	June 8, 8, '63.	Left; flap. Surg. A. H. Hoff, U. S. V. Disch'd Sept. 22, '63.
4	Aderhold, E., Pt., E, 6th Penn. Reserves.	Oct. 14, 14, '63	Left. Disch'd May 2, '64. Died Jan. 22, 1869.
5	Agren, A., Pt., C, 7th Minnesota.	Mar. 27, 27, '65.	Right; circ. Surg. A. T. Bartlett, 33d Mo. Disch'd June 14, 1865.
6	*Aldensen, J. J.*, Serg't, K, 46th Miss., age 32.	Nov. 30, Dec. 1, '64.	Right; anterior post. flap. Surg. McCormack, C. S. A. Provost Marshal March 7, 1865.
7	Aldrich, B., Pt., A, 155th New York.	July 9, 11, '64.	Left; ant. post. flap. A. A. Surg. W. S. Adams. Disch'd. *Spec.* 3938.
8	*Alexander, G.*, Pt., A, 4th Virginia, age 39.	May 3, 4, '63.	Right; flap. Recovery with good stump.
9	Allen, J., Corp'l, I, 22d Illinois, age 23.	Sept 19, 21, '63.	Right; flap. Surg. T. L. Magee, 51st Ill. Disch'd Feb. 27, 1864.
10	Allen, J. G., Pt., A, 77th New York, age 39.	June 21, 21, '64.	Left; ant. post. flap. Surg. G. T. Stevens, 77th N. Y. Disch'd Sept. 9, 1864.
11	Allen, R., Serg't, A, 59th Illinois, age 34.	Dec. 15, 15, '64.	Right; circ. Disch'd July 1, '65.
12	Ammerman, G., Corp'l, C, 6th Penn. Reserves, age 26.	May 6, 6, '64.	Left; ant. post. flap. Surg. C. Bowers, 6th Penn. Res. Disch'd May 30, 1865.
13	Anderson, J., Pt., I, 21st Ohio.	Jan. 2, 2, '63.	Left; flap. Disch'd March 13, 1863.
14	Anderson, J., Pt., I, 21st Kentucky.	June 22, 22, '64.	Left; flap. Surg. C. J. Walton, 21st Ky. Must. out Jan. 23, '65.
15	Andrews, A. C., Pt., H, 32d Mass., age 21.	Feb. 6, 6, '65.	Right; flap. June 10, reamp. two and a half ins. A. A. Surg. E. B. Lyon. Disch'd Oct. 20, '65.
16	Angle, H., Pt., F, 5th Wisconsin, age 31.	May 5, 5, '64.	Left; circ. Disch'd May 30, '64.
17	*Anthony, A.*, Lieut., E, 33d N. C., age 21.	Mar. 25, 25, '65.	Left; circ. A. Surg. E. P. Roche, 35th Mass. Released July 10, '65.
18	Anthony, H. G., Pt., C, 6th Vermont, age 24.	Sept. 19, 19, '64.	Left; circ. Surg. E. Phillips, 6th Vt. Disch'd June 26, 1865.
19	*Anthony, R. H.*, Pt., D, 1st Tennessee.	July 1, 2, '63.	Left. Surg. — McGuire, C. S. A. Exch'd March 17, 1864.
20	Armsberg, G., Pt., L, 62d Penn., age 18.	July 3, 3, '63.	Left. Dec. 21, exfol. removed. Disch'd Oct. 19, '64. *Spec.* 2156.
21	Armstrong, A. T., Pt., H, 31st Maine, age 24.	May 12, 14, '64.	Right; double lat. flap. Surg. J. S. Ross, 11th N. H. Disch'd Nov. 16, 1864.
22	*Ash, J.*, Pt., G, 25th S. Carolina, age 30.	May 16, 16, '64.	Left; circ. Furloughed July —, 1864.
23	Ashby, D. C., Lieut., H, 80th Indiana, age 24.	Dec. 15, 17, '64.	Right. Vermale's method. Asst. Surg. W. B. Trull, U. S. V. Mustered out May 15, 1865.
24	Ashburn, J. C., Corp'l, B, 14th W. Va., age 25.	Oct. 19, 20, '64.	Left; circ. Disch'd June 5, '65.
25	Atkins, C. S., Serg't, D, 6th Kans. Cav., age 22.	July 27, 27, '64.	Right; flap. Surg. C. E. Swasey, U. S. V. Aug. 2, hæm.; artery sec'd.. M. out. 1870, bad stump.
26	Atwell, W. P., Lieut., G, 37th Wis., age 19.	July 30, 30, '64.	Right. Disch'd Nov. 25, 1865 1871, not in good condition.
27	Auker, H., Serg't, C, 28th Penn., age 24.	May 25, 25, '64.	Left. Surg. H. E. Goodman, U. S. V. Mustered out July, 1865.
28	Ayres, D. C., Pt., I, 102d Penn., age 26.	May 5, 5, '64.	Left; circ. Disch'd Mar. 13, '65.
29	Bacon, G. F., Pt., A, 20th Maine, age 18.	Mar. 31, 31, '65.	Left; flap. Disch'd July 25, '65.
30	Bailey, W. F., Pt., A, 2d U. S. Sharpshooters.	Aug. 29, 30, '62.	Right; circular. Discharged.
31	Bakeoven, G. A., Pt., F, 72d Pennsylvania.	Nov. 27, 28, '63.	Left; flap. Surg. M. Rizer, 72d Penn. Mustered out Aug. 24, 1864. *Spec.* 1883.
32	*Baker, H. C.*, Pt., F, 48th North Carolina.	June 27, 27, '62.	Right. Surg. Gibbon, C. S. A. Retired.
33	Baker, J. D., Pt., H, 4th Iowa, age 28.	Nov. 24, 24, '63.	Left; circ. Surg. M. W. Robbins, 4th Iowa. Disch'd July 27, 1864.
34	Baker, J. W., Lieut., A, 14th Indiana.	Dec. 13, 13, '62.	Left. Disch'd February 1, 1863.
35	Baker, S., Pt., K, 16th N. Y. H. A., age 18.	Oct. 7, 7, '64.	Right; flap. Oct. 12, bone cut shorter. Disch'd Oct. 3, 1865. *Spec.* 2382.
36	Baldwin, C., Corp'l, H, 58th Penn., age 32.	June 1, 1, '64.	Left; ant. post. flap. Surg. H. C. Christy, 58th Pa. Disch'd Feb. 4, 1865.
37	*Baldwin, P. B.*, Serg't, D, 48th Alabama.	June 17, 17, '64.	——. Surg. — Cook, 47th Alabama. Recovered.
38	*Ballentine, H. J.*, Lieut., B, 42d Tenn., age 29.	Nov. 29, Dec. 1, '64.	Left; circ. Prov. Marshal June 5, 1865.
39	Bangs, L. G., Adj't. 19th Illinois, age 27.	Nov. 24, 24, '63.	Right; circ. Surg. F. H. Gross, U. S. V. Erysipelas. Mustered out July 9, 1864.
40	Bappert, M., Pt., G, 47th Ohio, age 18.	Aug. 3, 3, '64.	Left; flap. Surg. S. P. Bonner. 47th Ohio. Aug. 18, oper. May 30, '65, nec. bone rem'd. Disch'd Aug. 9, 1865.
41	*Barclay, T.*, Pt., K, 14th Louisiana.	Nov. 27, 28, '63.	——. Surg. — White. Recovery.
42	*Barker, H.*, Pt., H, 31st Virginia.	Oct. 19, 20, '64.	——; circular. Dr. G. L. Miller. Transferred.
43	Barnes, J. E., Serg't, A, 77th New York, age 37.	June 21, 21, '64.	Left; ant. post. flap. Surg. G. T. Stevens, 77th N. Y. Disch'd Oct. 26, 1864.
44	[1] *Barrett, M.*, Corp'l, E, 19th Alabama.	Sept. 19, 19, '63.	——. Amputation. Transferred to hospital Oct. 3. 1863.
45	Bartle, W., Serg't, H, 86th New York, age 25.	Nov. 17, 17, '64.	Left; circ. Surg. O. I. Owens, 40th N. Y. Disch'd June 6, '65. *Spec.* 4129.
46	Bastian, J., Pt., A, 31st Illinois.	June 27, 27, '64.	Right; circ. Surg. J. Reeves, 78th Ohio. M. out May 31, '65.
47	Bauer, J., Pt., F, 100th New York.	July 22, 22, '63.	Left; ant. flap. Surg. M. S. Kittinger. 100th N. York. Disch'd May 3, 1864.
48	Baughman, C., Pt., B, 1st Mich. Art., age 26.	Nov. 22, 22, '64.	Right; ant. post. flap. Surg. A. T. Hudson, 26th Iowa. Disch'd June 3, 1865.
49	Beall, T., Pt., C, 39th Iowa, age 28.	Oct. 5, 7, '64.	Left. Surg. J. R. Zearing, 57th Illinois. Disch'd July 8, 1865.
50	Bean, C. H., Pt., E, 11th Maine, age 19.	July 21, 21, '64.	Left; flap. Surg. N. F. Blunt, 11th Me. Disch'd June 10, '65.
51	Beightal, J., Pt., C, 93d Penn., age 39.	Mar. 25, 25, '65.	Right; flap; erysipelas. Disch'd July 12, 1865.
52	Beisse, N., Bugler, A, 1st Michigan Battery.	Oct. 8, 10, '62.	Left; circ. Surg. C. S. Muscroft, 10th Ohio. Disch'd June 7, '63.
53	Bell, G. W., Pt., H, 39th Ohio, age 26.	July 22, 22, '64.	Right; flap. Surg. J. R. Zearing, 57th Ill. Disch'd June 17, '65.
54	*Bell, J. H.*, Pt., E, 15th Alabama.	Aug. 16, 16, '64.	Left; circ. Surg. — ———, 15th Ala. Diarr. Trans. Aug. 31, '64.
55	Bellew, B., Pt., I, 4th Delaware, age 45.	July 25, 25, '64.	Right; circ. Surg. D. A. Chamberlain, 94th N. York. Disch'd July 13, 1865.
56	Bergeoin, P. P., Serg't, H, 3d Mich., age 21.	Aug. 29, 29, '62.	Right; flap; abscesses. V. R. C. June, 1863.
57	*Berry, W. T.*, Pt., Purcell's Battery.	July 1, 1, '62.	Left. Recovery.
58	Beaverson, D., Pt., H, 187th Penn., age 23.	July 10, 10, '64.	Left; circ. Disch'd July 11, '65.
59	*Bickel, J. P.*, Corp'l, G, 20th Virginia Cavalry.	Sept. 20, 20, '64.	——. Surg. — Sawers, C. S. A. Recovery.
60	Billington, S. A., Pt., C, 11th Maine, age 26.	Oct. 27, 27, '64.	Left; flap. Surg. N. Y. Leit, 76th Penn. Disch'd June 12, 1865.
61	*Billingsley, J. B.*, Pt., I, 43d Alabama, age 21.	May 16, 16, '64.	——; circ. Surg. Hilliard, C.S.A. Recovery.
62	Bish, A., Pt., G, 155th Penn., age 25.	Oct. 27, 28, '64.	Left; circ. Union by first intention. Disch'd March 17, 1865.
63	Bishop, J. H., Serg't, F, 18th Kentucky.	Aug. 30, 30, '62.	Left; flap. A. Surg. J. D. Gatch, 16th Indiana. Discharged.
64	Bishop, H., Pt., A, 88th Penn., age 20.	Dec. 13, 13, '62.	Left; flap; gang. May 1, seq. rem. Disch'd Dec. 17, '63. *Spec.* 1264.
65	Black, W. R., Serg't, G, 67th Penn., age 22.	April 6, 7, '65.	Right; ant. post. flap. A. Surg. T. F. Corson, 67th Penn. Discharged July 7, 1865.
66	Blanchard, C. H., Pt., F, 34th Mass., age 23.	Oct. 19, 19, '64.	Right; circ. Confed. Surgeon. Disch'd Jan. 9, 1865.
67	Blanchard, W., Pt., B, 90th N. York, age 22.	Oct. 19, 19, '64.	Left; flap. Disch'd July 4, 1865.
68	*Blackburn, L. G.*, Pt., D, 3d Missouri.	Oct. 4, 4, '62.	Recovery.
69	Bliven, C. J., Pt., K, 4th Rhode Island, age 21.	July 30, 30, '64.	Left; circ. A. Surg. R. Millar, 4th R. I. Sub. operat's. Disch'd Jan. 23, 1865.
70	Blossom, W. E., Pt., G, 184th N. York, age 34.	Dec. 5, 6, '64.	Left; bilat. oval flap. Surg. N. R. Barnes, 184th N. Y. Disch'd June 15, 1865.
71	Boardman, T., Pt., A, 22d Massachusetts.	June 27, 28, '62.	Right. Surg. E. Bentley, U. S. V. Two sub. op. Dis'd May 2, '64.
72	*Bolton, G. W.*, Pt., D, 44th Ala., age 39.	Sept. 20, —, '63.	Left. To Provost Marshal March 16, 1864.
73	Boland, J. C., Lieut., E, 60th New York, age 32.	May 9, 9, '64.	Left; ant. post. flap. Surg. W. B. Fox, 8th Mich. Disch'd Nov. 27, 1864.
74	Bonnell, W. D., Pt., G, 152d N. York, age 23.	Aug. 14, 14, '64.	Left; flap. Confed. Surg. Nec. Disch'd May 9, 1865.

[1] TERRY (C.), *Report of Wounded treated in Field Hospital of Hindman's Division*, etc., in *Conf. States Med. and Surg. Jour.*, 1864, Vol. I, p. 76.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
75	Boothman, M. M., Pt., H, 38th Ohio, age 18.	Sept. 1, 2, '61.	Right; flap. Surg. G. E. Sloat, 14th Ohio. Disch'd June 5, '65.
76	*Booser, L. B.*, Pt., F, 2d S. Carolina, age 25.	July 2, 3, '63.	Left. Recovery.
77	Boring, W., Corp'l, I, 7th Illinois.	Feb. 15, 15, '62.	Right. Disch'd July 17, 1862.
78	*Boss, J. M.*, Pt., A, 3d South Carolina.	July 28, 28, '64.	Right; circ.; gang. Aug 12, circ. reamp. Prison Jan. 27, 1865.
79	Bourns, W. H., Pt., G, 1st Mich. S. S., age 21.	Dec. 5, 5, '64.	Right; ant. post. flap. Surg. W. C. Shurlock, 51st Penn. Disch'd July 18, 1865.
80	Bowers, A., Pt., H, 32d Ohio.	Feb. 14, —, '64.	Left; circ. Surg. A. H. Brundage, 32d Ohio. Not a pensioner.
81	Bond, E., Pt., I, 69th Indiana.	Aug. 30, 31, '62.	Left; flap. Disch'd April 2, '63. Died April 6, 1868, of amp. and chronic diarrhœa.
82	*Bonde, J. C.*, Capt., H, 27th Virginia, age 28.	May 3, 3, '63.	Right; ant. post. flap. Retired March 11, 1864.
83	Bowers, J., Pt., I, 69th Pennsylvania.	Sept. 17, 19, '62.	Right. Surg. S. N. Sherman, 34th N. Y. Disch'd May 15, 1863.
84	Bradley, J. H., Pt., H, 121st Penn., age 26.	June 1, 2, '64.	Left; flap. Surg. J. A. Ramsay, 121st Penn. Sept. 27, ant. post. flap amp., A. A. Surg. T. T. Maury. Disch'd June 23, 1865.
85	Bradford, P., Pt., F, 1st Maine H. A., age 21.	June 17, 17, '64.	Right; flap. Disch'd Dec. 15, 1864.
86	Brady, J., Pt., C, 71st Penn., age 21.	May 30, 30, '64.	Left; flap. Surg. M. Rizer, 72d Penn. Disch'd Nov. 28, 1864.
87	*Branoski, J. N.*, Pt., G, 61st Virginia.	July 4. 4, '63.	Left. Surg. W. M. Nash, 61st Virginia. Furl'd Jan. 9, 1864.
88	Breene, D., Pt., F, 97th New York, age 19.	June 18, 19, '64.	Right; ant. post. flap. Disch'd May 17, 1865.
89	Bridges, B. F., Pt., C, 25th Indiana	Oct. 5, 6, '62.	Right; flap. Disch'd March 30, 1863.
90	[1] *Briggs, W. H.*, Serg't Major, 15th Va., age 30.	Sept. 17, 17, '62.	Left; circular. Confed. Surgeon. Furloughed Dec. 28, 1864.
91	Brink, J., Pt., C, 2d Penn. Art'y, age 48.	June 10, 10, '64.	Left; ant. post. flap. Disch'd Dec. 4, 1865.
92	Briody, P., Pt., B, 4th New York H. Art'ry, age 25.	June 18, 18, '64.	Left; ant. post. flap. Surg. H. C. Tompkins, 4th N. Y. H. A. Disch'd Jan. 31, 1865.
93	Briot, C., Pt., C, 39th N. York, age 26.	Oct. 14, 16, '63.	Right; circ. A. A. Surg. N. S. Barnes. Bone rem'd. Disch'd Sept. 20, 1865. Died Nov. 12, '77; phthisis pulm. *Specs.* 1787, 2344, 3027.
94	Bristoff, G., Corp'l, A, 2d New York Mounted Rifles, age 28.	July 17, 17, '64.	Right; double flap. Surg. J. D. Mitchell, 31st Maine. Disch'd April 4. 1865.
95	Bronson, A. B., Corp'l, K, 38th Wis., age 23.	April 2, 2, '65.	Left; circ.; (amp. finger.) Surg. W. E. Johnson, 105th N. York. Disch'd June 22, 1865.
96	*Brookfield, R.*, Capt., C, 5th N. C., age 19.	May 8, 10, '64.	Left. Nov. 3. rem'd necro. end. Released May 30, 1865.
97	Brooks, J., Pt., F, 151st New York, age 18.	July 9, 10, '64.	Left; circ. A. A. Surg. A. R. Gray. Disch'd Nov. 27, '64. *Spec.* 4034.
98	*Brotherton, H. I.*, Pt., I, 49th N. C., age 35.	Mar. 31, 31, '65.	Right. Sent to Military Prison May 30, 1865.
99	Brower, C. A., Pt., D, 14th N. Jersey, age 18.	June 3, 3, '64.	Left; circ.; gangrene. Disch'd June 1, 1865.
100	Brown, C., Pt., I, 1st Artillery, age 21.	Dec. 13, 13, '62.	Left; circ. Discharged Feb. 28, 1863.
101	Brown, E., Pt., K, 89th New York, age 35.	Oct. 27, 27, '64.	Right; circ. Surg. T. H. Squire, 89th N. Y. Disch'd Nov. 30, '65.
102	*Brown, G. W.*, Pt., L, 10th South Carolina.	July 22, 23, '64.	——. Surg. Hawkins, C. S. A. Recovery.
103	Brown, J., Pt., G, 17th Vermont, age 17.	June 17, 17, '64.	Right; flap. Disch'd May 27, 1865.
104	Brown, J. W., Pt., K, 21st Kentucky, age 30.	June 20, 20, '64.	Left; ant. post. flap. Surg. C. J. Walton, 21st Ky. Discharged March 29, 1865.
105	*Brown, T. C.*, Pt., D, 24th Virginia.	June 30, J'ly 1, '62.	——. Surgs. Niblet and Harrison. Disch'd Sept. 24. 1862.
106	Brown, W. J., Pt., D, 19th Maine, age 18.	Nov. 3, 4, '64.	Right; ant. post. flap. Surg. J. T. Myers, 59th N. Y. Disch'd August 7, 1865.
107	*Brown, W. W.*, Serg't, A, 22d Virginia, age 36.	Sept. 19, 19, '64.	Right; flap. Surg. Lowe, C. S. A. Transferred Jan. 8, 1865.
108	Browne, T. W., Pt., C, 24th New York.	Aug. 29, 29, '62.	Left. Discharged Oct. 21, 1862.
109	[2] *Bryant, W. R.*, Pt., —, 18th Mississippi.	Sept. 17, 18, '62.	Left; flap. Recovered.
110	*Buchanan, J. S.*, Pt., K, 13th S. C., age 22.	Aug. 21, 22, '64.	Left; int. flap. Surg. G. W. Metcalf, 76th N. Y. Prison Dec. 30, 1864.
111	Buck, J., Pt., A, 3d N. Hampshire, age 25.	June 4, 4, '64.	Right; circ. Disch'd May 25, '65.
112	Bugbee, S., Corp'l, E, 14th Conn., age 24.	Oct. 27, 28, '64.	Right; ant. post. flap. Surg. F. A. Dudley, 14th Conn. Hæm.; lig. art. Disch'd Aug. 23, '65. Dec., 1865, reamp. upper third.
113	Bush, W., Pt., C, 99th Penn., age 41.	June 18, 19, '64.	Left; flap. Disch'd Nov. 15, '64.
114	Butler, J. M., Pt., D, 5th Iowa.	May 16, 16, '63.	Right; circ. A. Surg. J. O. Skinner, 10th Ia., and W. H. Darrow, 5th Iowa. Gang.; nec. Disch'd Oct. 23, '63
115	*Callahan, T.*, Pt., I, 9th Georgia.	Aug. 30, 30, '62.	——. May 15, '63. reamp. upper third. Surg. S. E. Habersham, P.A.C.S. Disch'd Oct. 12. '63.
116	Campbell, D., Pt., F, 71st Indiana.	Aug. 30, 30, '62.	Right; flap. Disch'd Dec. 22, 1862. Died Feb. 4, 1864.
117	Campbell, J. M., Pt., C, 25th Ohio, age 34.	July 2, 2, '63.	Left; flap. Disch'd August 26, 1864.
118	Cameron, R., Pt., A, 62d Ohio.	April 9, 9, '65.	Left; flap. Surg. C. M. Clark, 39th Ill. Disch'd Sept. 27, '65.
119	Cardwell, J. E., Pt., C, 123d Indiana, age 32.	Aug. 6, 7, '64.	Left; circ. Surg. S. K. Crawford, 50th Ohio. Disch'd May 23, '65.
120	Carl, J. E., Pt., A, 20th Michigan, age 22.	June 18, 18, '64.	Right; ant. post. skin flap; circ. of muscles. Surg. S. S. French, 20th Mich. Disch'd Nov. 10, '64.
121	Carl, W., Pt., G, 14th Infantry, age 44.	Aug. 18, 18, '64.	Left; ant. post. flap. Surg. A. A. White, 8th Md. Gang. Duty February 18, 1865.
122	Carlyle, T., —, D, 2d N. Y. H. A., age 49.	Aug. 14, 15, '64.	Left; ant. post. flap. Surg. J. W. Buckman, 5th N. H. Disch'd May 29, 1865.
123	*Carroll, J.*, Pt., D, 10th Louisiana.	May 3, 4, '63.	Right. Surg. White, 14th La. Recovery.
124	Carson, D., Pt., I, 86th New York, age 26.	May 10, 11, '64.	Left; flap. Disch'd Nov. 2, '64.
125	Carter, J. W., Pt., C, 85th Illinois, age 24.	June 27, 27, '64.	Right; flap. Disch'd Nov. 7, '64.
126	*Carter, J. M.*, Pt., A, 26th North Carolina.	July 1, 3, '63.	Left. Surg. Warren. Recovery.
127	*Cawthorne, C. F.*, Pt., E, 15th Texas, age 39.	Nov. 30, De. 1, '64.	Right; ant. post. flap. Provost Marshal April 6, 1865.
128	Cavanaugh, J., Lieut., B, 43d N. Y., age 25.	May 5, 5, '64.	Left; flap. Surg. G. T. Stevens, 77th N. Y. Disch'd Nov. 4, '64.
129	*Chalkley, G. R.*, Lieut., B, 14th Va., age 29.	July 3, 4, '63.	Right; circ. Surg. — Doughty, C. S. A. Retired Mar. 15. '65.
130	Chamberlain, A. H., Pt., K, 8th Mich., age 23.	Aug. 30, 30, '62.	Right; circ. Surg. J. C. Wilson, 8th Mich. Disch'd Nov. 29, '62.
131	Champlain, W. H., Pt., E, 149th N. Y., age 29.	May 3, 3, '63.	Right; flap. Surg. J. V. Kendall, 149th N. Y. Disch'd July 21, '63.
132	Chapman, S. S., Pt., E, 27th Mass., age 34.	May 14, 14, '64.	Left. Mustered out Sept. 30, '64.
133	Cheeseman, R. C., Capt., A, 45th Penn., age 25.	April 2, 2, '65.	Right; flap. Surg. L. W. Bliss, 51st N. Y. M. out July 17, '65.
134	Cherington, D. W., Bugler, H, 2d West Va. Cavalry, age 30.	Sept. 22, 22, '64.	Right; oval skin flap. Surg. P. Gardner, 1st West Va. Cavalry. Disch'd March 29, 1865.
135	Cheseborough, O. B., Pt., A, 105th Ill., age 21.	May 15, 15, '64.	Right; flap. Surg. A. W. Reagan, 70th Ind. Disch'd Feb. 24, '65.
136	*Choseley, S. E.*, Serg't, B, 4th Texas, age 30.	Oct. 7, 7, '64.	Left. Prison May 4, 1865.
137	[3] *Claridy, J. B.*, Pt., C, 24th Alabama.	Sept. 19, 19, '63.	Left. Recovery.
138	Clark, A. D., Pt., C, 134th New York, age 20.	July 1, 3, '63.	Right; flap. Dec., '63, seq. rem'd. Disch'd Feb. 18, 1865.
139	Clark, D., Serg't, H, 61st Pennsylvania.	Mar. 27, 27, '65.	Right; flap. Confed. Surgeon. Mustered out June 28, 1865.
140	Clarke, J. L., Pt., H, 57th New York.	Sept. 17, 18, '62.	Right. Surg. H. Taylor, U.S.V. Disch'd Jan. 13, 1863.
141	Clarno, W., Pt., C, 3d Wisconsin, age 22.	June 16, 16, '64.	Right; circ. Surg. J. W. Brock, 66th O. Disch'd July 26, '65.
142	Clements, G. A. H., Lt., D, 1st Md. Cav., age 22.	Aug. 16, 16, '64.	Right; circ.; protrusion. Disch'd March 16, 1865.
143	Cline, J. H., Pt., K, 4th New York.	Dec. 13, 14, '62.	Right; circ. Disch'd Aug. 22, '63.
144	Clouts, A., Pt., F, 32d Missouri, age 20.	Mar. 21, 21, '65.	Left; lateral flap. Disch'd June 26, 1865.
145	*Cobb, R. W.*, Pt., E, 20th Georgia, age 39.	May 29, 30, '64.	Right; circ. Surg. C. B. Gibson, C. S. A.
146	Coder, P. M., Pt., A, 28th Iowa.	May 16, 17, '63.	Right; flap. Disch'd April 17, 1865.
147	*Coldwell, M. B.*, Corp'l, D, 1st Ga. Leg., age 24.	Sept. 14, 15, '62.	Left; gangrene; nec. p'n of shaft rem'd. Retired Feb. 24. 1865.
148	[4] *Cole. J. W.*, —, G, 28th North Carolina.	June 27, 28, '62.	Left; circ. Furloughed July 19, 1862.
149	Cole, W., Corp'l, H, 6th Mass. Cav., age 23.	May 18, 20, '64.	Right; circ. Furloughed July 10, 1864; healed.
150	Coleman, J., Pt., A, 14th Maine.	Aug. 5, 5, '62.	Right. Disch'd Sept. 22, 1862. Died Jan. 12, 1864; gastritis.
151	Collins, A., Pt., E, 36th Col'd Troops, age 51.	Sept. 29, 29, '64.	Left. Surg. J. W. Mitchell, 4th C. T. Disch'd June 1, 1865.
152	Collins, C., Pt., D, 3d Delaware, age 23.	June 18. 18, '64.	Left; flap. Mustered out June 6, 1865.
153	*Collins, J. W.*, Pt., F, 12th La., age 23.	July 29. 20, '64.	Right; circ.; gang.; sloughing. Recovery Sept. 22, 1864.
154	Collins, S. A., Pt., K, 20th Maine.	April 1, 2, '65.	Right; flap. Surg. W. H. True, 20th Maine. Disch'd ——, 1865.

[1] Fisher (G. J.), *Fifty-seven Cases of Amp. after battle of Antietam*, in *Amer. Jour. Med. Sci.*, 1863, Vol. 45, p. 47.

[2] Fisher (G. J.), *loc. cit.*, p. 47.

[3] Terry (C.), *loc. cit.*, p. 76.

[4] Smith (E. H.), *Report of cases of compound comminuted fracture of femur, Chimborazo Hosp., Third Div.*, in *Confed. States Med. and Surgical Journal*, 1864, Vol. 1, p. 24.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
155	Comstock, H., Pt., 12th Wisconsin Battery.	Sept. 2, 2, '62.	Left; flap. Disch'd Oct. 16, '63.
156	Connell, M., Pt., E, 2d Penn. Art'y. age 36.	Aug. 3, 4, '64.	Left; circ. Surg. G. A. Otis, 27th Mass. Disch'd Mar. 21, 1865.
157	*Conner, J.*, Pt., A, 47th Virginia, age 28.	July 1, 1, '63.	Left. Surg. J. S. Bruce, C. S. A. Retired Nov. 29, 1864.
158	Connor, J., Pt., G, 11th Conn., age 21.	Sept. 13, 13, '62.	Left. Surg. J. B. Whitcomb, 11th Conn. Disch'd Nov. 25, 1865.
159	Conway, P., Pt., K, 130th New York, age 29.	Sept. 29, 30, '64.	Left; circ. Disch'd July 31, '65.
160	Coons, G. W., Pt., H, 82d Ohio.	Aug. 29, 30, '62.	Left; circ. Surg. J. Y. Cantwell, 82d Ohio. Disch'd Oct. 25, '62.
161	*Cooper, J. P.*, Serg't, G, 7th S. Carolina, age 19.	Aug. 21, 21, '64.	Right; circ. Surg. T. F. Oakes, 56th Mass. Prison Mar. 1, 1865.
162	*Cooper, S.*, Pt., A, 17th Mississippi, age 34.	Oct. 19, 19, '64.	Right; circ. Surg. Patterson, C. S. A. Prison May 9, 1865.
163	*Cooper, W. R.*, Pt., E, 21st Miss., age 20.	Oct. 19, 20, '64.	Right; flap. Retired March 18, 1865.
164	Copeland, D. B., Pt., G, 2d New Hamp., age 25.	June 4, 5, '64.	Right; ant. post. flap. Dec. 6, nec. bone rem'd. Disch'd May 31, 1865.
165	Corbett, C. A., Pt., B, 8th Wisconsin, age 23.	June 6, 7, '64.	Right; ant. post. flap. Surg. J. E. Murta, 8th Wis. Disch'd Nov. 22, 1865.
166	*Cortes, L. G.*, Pt., G, 7th Louisiana, age 21.	July 3, 3, '63.	Left. Surg. Davis, C. S. A. Dec. 15, nec. bone ext. Exch'd Mar. 4, 1864.
167	Costello, T., Corp'l, E, 93d Indiana.	June 10, 12, '64.	Right; (also forearm.) Confed. surg. M. out August 10, 1865.
168	Coughlin, M., Pt., H, 94th New York, age 19.	June 3, 3, '64.	Right. Disch'd January 25, 1865.
169	*Covington, W. J.*, Pt., E, 18th N. C., age 26.	June 22, 22, '64.	Right; ant. post. flap. Surg. G. L. Potter, 145th Penn. Released July 13, 1865.
170	Cox, R. N., Pt., D, 41st Illinois.	July 12, 13, '63.	Right; circ. Disch'd Oct. 9, '63.
171	*Craig, J. B.*, Pt., E, 15th Texas, age 25.	Aug. 12, 12, '64.	Left; circ.; gangrene. Recovery Sept. 22, 1864.
172	Crawford, J. A., Pt., K, 6th Wisconsin, age 24.	July 1, 2, '63.	Right; ant. post. flap. Surg. H. C. May, 5th N. Y. Oct. 30, seq. rem. Feb. 2, '64, nec. bo. rem. 3d, hæm. Dis. May 3, '64. *Specs.* 1971, 2153.
173	Creamer, D., Pt., C, 9th Maryland, age 19.	Aug. 23, 23, '63.	Right; circ. Surg. J. Owens, U. S. V. M. out Feb. 23, '64. Died June 28, 1870.
174	Crew, M., Pt., E, 156th Illinois, age 22.	Mar. 22, 22, '65.	Left; circ. A. A. Surg. L. W. Beckwith. Mustered out.
175	Cronkite, J. W., Major, 121st N. Y., age 24.	April 6, 6, '65.	Left. Mustered out June 25, '65.
176	*Crosby, A. C.*, Corp'l, I, 5th Ga., age 36.	Nov. 29, Dc. 1, '63.	Right; ant. post. flap. March 26, '64, reamp. middle third. Pro. Marshal Dec. 1, 1864.
177	Cross, L. M., Pt., E, 58th Penn., age 23.	Sept. 29, 30, '64.	Left; circ. Disch'd March 29, 1865.
178	Cross, S. F., Pt., D, 11th Missouri, age 33.	June 6, 6, '64.	Left; circ. Surg. L. H. Baker, 24th Mo. M. out July 13, 1864.
179	*Crouse, J. L.*, Serg't, C, 31st Georgia.	Oct. 19, 19, '64.	——. Prison February 10, 1865.
180	Crowell, B., Pt., I, 20th Mass., age 24.	May 10, 10, '64.	Right; flap. Surg. H. F. Lyster, 5th Michigan. Dis. Mar. 27, '65.
181	Crowell, S., Pt., I, 93d Ohio, age 19.	June 23, 24, '64.	Right; circ. Teal's method. A. Surg. J. M. Weaver, 93d Ohio. Disch'd May 16, 1865.
182	Crowley, R., Serg't, C, 23d Illinois, age 27.	April 2, 2, '65.	Right; bi-lateral flaps. Surg. J. S. Taylor, 23d Ill. Disch'd Oct. 26, 1865.
183	Crown, G., Pt., H, 2d Vermont, age 19.	Sept. 19, 19, '64.	Left; circ. A. Surg. J. J. Meigs, 11th Vt. Disch'd June 6, 1865.
184	Cullen, D. C., Serg't, E, 32d Ohio, age 30.	July 22, 23, '64.	Right; flap. Surg. A. H. Brundage, 32d Ohio. Erysip. Disch. March 30, 1865.
185	Curtin, T., Pt., G, 147th New York, age 29.	Jan. 15, 16, '65.	Right; double flap. Surg. F. B. Kimball, 3d N. H. Nec. bone rem'd. Dis. Oct. 21, '65. *Spec.* 3114.
186	Curtis, A. A., Capt., I, 136th N. Y., age 22.	July 20, 20, '64.	Flap. Surg. B. L. Hovey, 136th N. Y. Disch'd Jan. 14, 1865.
187	Cuthbert, T., Serg't, G, 8th New York Heavy Artillery, age 44.	Oct. 27, 28, '64.	Left; ant. post. flap. Surg. F. A. Dudley, 14th Conn. Nov. 19, gangrene. 22, hæm.; lig. femor'l. Disch'd July 18, 1865.
188	Daley, E., Pt., K, 158th New York, age 18.	Sept. 28, 28, '64.	Right. Disch'd June 24, 1865.
189	Damarce, M., Corp'l, A, 25th Iowa, age 23.	Mar. 20, 20, '65.	Right; ant. post. skin flap. Surg. A. T. Hudson, 26th Iowa. Dis. July 23, 1865.
190	Danforth, H. J., Corp'l, A, 8th N. Y. Art., age 18.	May 18, 19, '64.	Right; circ.; bone prot. May 26, hæm.; lig. fem. Dis. Aug. 11, '65.
191	Daniels, H., Pt., D, 1st Louisiana, age 23.	June 14, 16, '63.	Right; flap. Disch'd Sept. 4, '64. *Spec.* 4361.
192	Dantz, W. W., Pt., F, 30th Wis., age 18.	Aug. 25, 27, '64.	Right; circ. Confed. surgeon. Disch'd Jan. 6, 1866.
193	Dare, H. C., Serg't, C, 56th Ohio.	May 1, 3, '63.	Left. Disch'd July 16, 1863.
194	Davage, J., Pt., B, 4th Col'd Troops, age 22.	June 15, 15, '64.	Right · circ. Surg. J. W. Mitchell. 4th C. T. Necrosed; six ins. of shaft rem'd. Disc'd May 20, '65.
195	Davenport, J. M., Cap't, G, 16th Kentucky.	Sept. 1, 2, '64.	Right; flap. Surg. G. E. Sloat, 14th Ohio. Mustered out Dec. 6, '64.
196	Davis, A. A., Pt., K, 6th Wisconsin, age 32.	Mar. 31, 31, '65.	Right; long ant. flap. Surg. J. C. Hall, 6th Wis. April 4, hæm.; lig. femor'l. Aug. 18, dead bone rem'd. Disch'd Sept. 14, 1865.
197	Davis, D. D., Corp'l, C, 2d Mich., age 26.	Nov. 24, 24, '63.	Left; circ. Confed. surg. Mar., '64, nec. June 1, gang. 11, nec. bone rem'd. Disch'd Aug. 3, '64. 1870, stump tender.
198	Davis, G. S., Pt., A, 185th New York, age 33.	Mar. 31, April 1, 1865.	Right; ant. post. flap. Surg. C. W. Crary, 185th N. Y. Disch'd July 26, 1865.
199	Davis, J., Pt., F, 61st Penn., age 40.	Aug. 21, 21, '64.	Left; flap. Surg. G. T. Stevens, 77th N. Y. Disch'd June 16, '65.
200	Davis, M., Pt., E, 15th Iowa, age 19.	July 5, 5, '64.	Right; lat. flap. Surg. W. H. Gibbon, 15th Iowa. Sept. 10, gang. Disch'd May 26, 1865.
201	Day, A., Pt., H, 31st C. Troops, age 20.	Sept. 15, 15, '64.	Right; circ. Jan. 7, '65, nec. bone rem'd. Disch'd June 10, 1865.
202	Day, L., Pt., A, 5th C. Troops, age 24.	Sept. 29, Oct. 1, '64.	Left; bi-lat. flap. Confed. surg. Disch'd Aug. 31, 1865.
203	*Day, W.*, Pt., A, 10th Virginia.	Aug. 28, 29, '62.	Left. Surgeon Walls. Recovery.
204	Dean, D. W., Pt., 1st Ia. Battery, age 17.	Aug. 31, 31, '64.	Left; flap. A. Surg. D. Halderman, 46th O. Dis. May 9, '65.
205	Dean, J. M., Pt., K, 3d West Va., age 22.	Sept 22, 22, '64.	Left; flap: bone prot. Dec. 30, rem. of bone. Disc'd May 30, '65.
206	Deichley, S., Pt., I, 53d Penn., age 19.	Mar. 31, 31, '65.	Left; bi-lat. skin flaps. Surg. W. Vasburgh, 111th N. Y. Disch'd August 2, 1865.
207	*Dellinger, P.*, — I, 11th North Carolina.	May 5, 5, '64.	——. Surgeon Wilson, C. S. A. Recovery.
208	Delmer, P., Pt., F, 17th Wis., age 26.	July 28, 29, '64.	L't; lat. flap. Surg. H. McKennan, 17th Wis. V. R. C. April 1, '65.
209	Demond, G., Pt., K, 145th Penn., age 32.	Dec. 13, 13, '62.	Left. Disch'd Feb. 26, 1863.
210	Dempsey, T., Corp'l, A, 2d Vermont.	May 3, 3, '63.	Right; flap. Disch'd April 19, 1864.
211	Deptitch, W., Pt., E, 3d Massachusetts.	Dec. 17, 17, '62.	Right; flap. Surg. A. A. Stocker, 3d Mass. Mustered out.
212	Dewitt, G. M., Corp'l, H, 147th N. York, age 26.	Feb. 6, 6, '65	Left; flap. Surg. A. S. Coe, 147th N. Y. Disch'd June 22, 1865.
213	Dickerson, P. B., Lt., H, 13th C. Troops, age 32.	Dec. 15, 15, '64.	Left; circ. Surg. F. W. Lytle, 36th Illinois. Furl'd Feb. 7, 1865.
214	Dickinson, I., Pt., H, 53d Indiana, age 19.	July 22, 23, '64.	Right; circ. Confed. surg. Dis. June 26, '65. Reamp. Sept., '66.
215	*Digby, C. T.*, Pt., D, 19th Georgia.	Aug. 9, 10, '62.	Left. Surg. R. Battey, C. S. A. Recovery.
216	*Dignian, E.*, Pt., B, 5th Confederate, age 25.	May 16, 16, '64.	Left; circ. Surg. L. D. Harlow, U. S. V. Pro. Mar. June 16, '65.
217	Dittman, J. H., Lieut, G, 1st Md. Cav., age 21.	Aug. 16, 16, '64.	Left; flap. Surg. R. A. Dodson, 1st Md. Cav. Disch'd Jan. 12, '65.
218	*Donthil, S. J.*, Pt., B, 2d South Carolina.	July 1, 1. '62	Left. Surgs. Salmon and Page. Recovery.
219	Dole, R. D., Corp'l, H, 38th Ohio, age 25.	Sept. 1, 2, '64.	Right; ant. post. flap. Surg. J. Haller, 38th O. Dis. May 26, '65.
220	*Dooley, W.*, Pt., Washington Art'y, age 29.	Dec. 7, 8, '64.	Left; ant. post. flap. A. A. Surg. J. R. Owens. Provost Marshal March 1, 1865.
221	Doore, C. F., Pt., K, 31st Maine, age 16.	April 2, 3, '65.	Left; circ. Surg. — Hays. Frag. bone rem'd. Dis'd July 18, '65.
222	Doran, M., Lieut., C, 14th Mich., age 28.	Mar. 19, 19, '65.	Left; circ. Surg. E. Batwell. 14th Mich. Disch'd Oct. 17, 1865.
223	*Dougherty, J. H.*, Capt., B, 11th Va. Cav., age 25.	Nov. 12, 12, '64.	Left; ant. post. flap. Sloughing. Exchanged Feb. 16, 1865.
224	Douglas, G. W., Lieut., G, 8th Tennessee.	Aug. 6, 6, '64.	Left. Surg. A. M. Wilder, U. S. V. Mustered out June 30, 1865.
225	Douglass, J. A., Pt., D, 11th Infantry, age 23.	June 18, 19, '64.	Right; circ. To Regiment Feb. 18, 1865.
226	*Downey, W. C.*, Pt., H, 43d Ala., age 32.	May 16, 16, '64.	——; circ. Furloughed August 23, 1864.
227	*Doyle, J.*, Pt., F, Phillips's Legion.	Nov. 29, 29, '63.	Right. Surg. J. S. Ross, 11th N. H. Sent to Confederate lines.
228	*Downing, J.*, Pt., K, 55th Alabama, age 25.	Nov. 30, Dc. 1, '64.	Left; ant. post. flap. Provost Marshal March 17, 1865.
229	*Drane, R.*, Pt., G, 52d Virginia, age 23.	Dec. 12, 13, '62.	Right. Doing well.
230	Driver, J., Pt., H, 3d Wis., age 18.	May 25, 25, '64.	Right; circ. Disch'd June 22, 1865.
231	Drumm, G. W., Pt., I, 82d Ohio.	Aug. 29, 30, '62	Left. Surg. J. Y. Cantwell, 82d Ohio. Disch'd Feb. 23, 1863.
232	Druse, E. H., Corp'l, A, 5th Minnesota, age 20.	Dec. 16, 17, '64.	Left; ant. post. flap. Surg. V. B. Kennedy, 5th Minn. Disch'd June 5, 1865.
233	Duell, C. N., Pt., H, 9th N. Y. H. A., age 35.	Oct. 19, 19, '64.	Right; flap. Disch'd June 9, '65.
234	Dugan, W. C., Serg't, F, 63d Ohio, age 20.	May 25, 25, '64.	Left; flap. Disch'd Jan. 2, '65.
235	Duncan, J. H., Serg't, B, 79th New York.	Oct. 10, 10, '63.	Left; ant. post. flap. Surg. J. P. Prince. 36th Mass. Discharged.
236	Dunlap, W., Pt., I, 9th New York, age 24.	July 30, 30, '64.	Right; lat. flap. Nov. 9th, gang.; hæm. 22, lig.; erysip. Disch'd May 15, '65. 1870, stump sloughing.
237	Dunn, A., Pt., A, 53d Ohio, age 21.	Aug. 30, 30, '64.	Right; circ. Surg. S. P. Bonner, 47th O. Disch'd May 3, 1865.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
238	Dunn, J. W., Pt., K, 3d Wisconsin.	June 9, 9. '63.	Right. Disch'd February 9, '64.
239, 240	Dunn, M., Corp'l, H, 46th Penn., age 21.	May 25, 26, 27, 1864.	Both; circ.; (h'd of r't fib. exc. on 25th;) gang. Aug., '64, reamp. right mid. third. May, '65, nec. bone rem'd from left. Disch'd Aug. 17, '65. Died Oct. 23, '77. *Spec.* 3193.
241	Dyer, J., Pt., F, 89th N. York, age 20.	June 4, 5, '64.	Left; circ. Disch'd June 26, '65.
242	*East, T.J.*, Serg't, I, 13th Alabama, age 22.	Aug. 19, 19, '64.	Right; circ. A. Surg. A. E. Arnold, C.S.A. Trans. Nov. 29, '64.
243	Eastwood, J. S., Pt., H, 48th Illinois, age 19.	July 21, 21, '64.	Left; doub. flap. Surg. W. Lomax, 12th Ind. Disch'd July 2, 1865.
244	*Edge, W. L.*, Pt., G, 10th S. Carolina, age 23.	De. 31, '62 Jan. 1, '63.	Left; circ. Furl'd June 16, '63.
245	Edmonds, J. J., Pt., D, 90th Penn., age 38.	June 19, 19, '64.	Left; circ. Surg. D. A. Chamberlain, 94th N. Y. Sub. operat'n. Dis. Sept. 21, '64. '70, bad stump.
246	*Edwards, G.*, Pt., C, 20th North Carolina, age 19.	July 9, 9, '64.	Right. Surg. — Bissell, C. S. A. Exch'd Sept. 21, 1864. Retired Jan. 17, 1865.
247	Edwards, G., Pt., F, 30th C. Troops, age 21.	July 30, 30, '64.	Right; flap. Surg. G. J. Potts, 23d C. T. Feb., 1865, nec. bone rem'd. Disch'd July 26, 1865.
248	Ehle, J. N., Pt., D, 2d Wisconsin.	Sept. 14, 15, '62.	Left; flap. Disch'd Mar. 5, 1863.
249	Ehle, W., Pt., A, 14th New York.	July 1, 2, '62.	Right; flap. Discharged.
250	*Eidson, J. W.*, Lieut., G, 7th South Carolina.	Sept. 20, 20, '63.	Right. Surg. — Carlisle. Recovery.
251	*Elam, R. S.*, Corp'l, E, 22d Va. Bat'ry, age 32.	July 2, 2, '63.	Right. Sept. 23, nec. bone rem'd. Provost Marshal Oct. 13, 1863.
252	Elfwing, N. A., Major, 48th N. Y., age 33.	Feb. 21, 21, '65.	Right; circ. Surg. A. D. Palmer, 9th Me. M. out Sept. 12, 1865.
253	Elliott, J. J., Pt., L, 1st Maine Cav., age 20.	Aug. 25, 26, '64.	Right; flap. Confed. surgeon. Disch'd June 30, 1865.
254	Ellen, H., Pt., C, 3d Mo., age 27.	May 28, 28, '64.	Left; flap. Surg. G. L. Carhart, 31st Iowa. Disch'd Sept. 27, '64.
255	Ellis, F., Pt., B, 21st Me.	May 27, 28, '63.	Left; circ. Surg. G. E. Brickett, 21st Maine. M. out Aug. 25, '63.
256	Ellis, R., Pt., C, 81st Indiana, age 21.	June 23, 23, '64.	Right; flap. Surg. C. J. Walton, 21st Ky. Disch'd May 22, 1865.
257	Ellsner, C., Pt., B, 20th Mass., age 25.	May 5, 6, '64.	Left; ant. posterior flap. Disch'd June 9, 1865.
258	Ellwood, J., Pt., I, 2d Mich., age 28.	Mar. 5, 5, '64.	Left; flap. Surg. G. B. Cogswell, 29th Mass. Disch'd Sept. 5, '64.
259	Embree, H. A., Pt., C, 5th N. Y. H. A., age 23.	July 18, 19, '64.	Left; flap. Confed. surg. Dise'd June 3, 1865.
260	Emerson, S., Corp'l, C, 8th Maine, age 44.	July 24, 26, '64.	Left; flap. Surg. H. C. Levensaler, 8th Me. July 18, '65, seq. seven ins. long rem'd. Disch'd October 11, 1865.
261	Esehbach, H., Pt., I, 118th Penn., age 48.	June 22, 22, '64.	Left; bi-lat. flap. Surg. W. Holbrook, 18th Mass. Exfoliation. Disch'd June 30, 1865.
262	Estle, J. L. P., Pt., H, 27th Ohio.	Mar. 13, 13, '62.	Right; flap. Surg. W. R. Thrall, 27th O. Disch'd Aug. 26, 1862.
263	Estes, B. F., Pt., F, 10th Kentucky, age 24.	Sept. 1, 3, '64.	Left; circ. A. Surg. R. W. Varney, 31st O. Duty Nov. 29, '64.
264	Evans, J. B., Pt., D, 24th Ind., age 26.	April 9, 9, '65.	Right; flap. Disch'd June 5, '65.
265	*Everly, A. F.*, Pt., A, 16th Virginia.	Aug. 28, 28, '62.	Left. Surg. — Walls. Recovery.
266	[1]*Ewell, R. S.*, Lieut.-General.	Aug. 30, 30, '62.	Left. Surg. H. McGuire, C. S. A. Returned to active service.
267	[2]Fabry, J., Pt., K, 4th Artillery, age 38.	Aug. 16, 17, '64.	Left; circ. Surg. G. W. Jackson, 53d Penn. Exfol.; abscess. May 15, '70, amp. hip j t. *Specs.* 5684, 5685, 5687, 5699, 5702.
268	*Fagan, J. B.*, Lt.-Col., 15th Ala., age 29.	July 3, 3, '63.	Left. July 31, rem. of nec. bone. Exch'd and furloughed.
269	Fagar, W., Pt., B, 59th New York, age 19.	Aug. 14, 15, '64.	Left; flap. Disch'd Nov. 7, 1864.
270	Farley, C. J., Capt., B, 5th N. Y. Cav., age 42.	Sept. 19, 20, '64.	R't; circ. Surg. L. P. Woods, 5th N. Y. Cav. Disch'd Jan. 11, '65.
271	Fasnacht, W. E., Pt., G, 147th Penn., age 20.	May 25, 26, '64.	Left; circular. Recovery.
272	Fawlks, N. G., Pt., D, 13th Tenn. Cavalry, age 45.	April 12, 13, '64.	Left; ant. post. flap. A. A. Surg. C. Fitch. Erysipelas. Disch'd October 26, 1864.
273	Fay, J. S., Pt., F, 13th Massachusetts.	April 30, 30, '63.	Right; circ.; (amp. f. arm.) Surg. A. W. Whitney, 13th Mass. Discharged Sept. 19, 1863.
274	Ferguson, D., Lieut., A, 113th Illinois, age 27.	Jan. 11, 11, '63.	Left. Surg. G. S. Walker, 6th Mo. Bone prot.; hæms.; lig. femoral. Disch'd Sept. 3, 1863.
275	Field, A., Corporal, C, 113th Ohio, age 29.	June 22, 22, '64.	Left; flap. Surg. A. Wilson, 113th Ohio. Disch'd Aug. 17, 1864.
276	Finke, F., Corp'l, F, 10th Illinois, age 26.	Mar. 21, 21, '65.	Right; flap. Surg. A. B. Monohan. 63d Ohio. Disch'd June 27, '65.
277	Finnegan, T., Pt., F, 72d New York, age 45.	July 23, 24, '63.	R't; lat. flap. Surg. C. K. Irwine, 72d N. Y. June, '64, nec. bone extracted. Disch'd July 2, '64.
278	*Fisher, E. D.*, Pt., A, — Louisiana, age 19.	De. 30, '62, Jan. 1, '63.	Left. To Camp Morton March 22, 1863.
279	Fisher, N., Pt., H, 37th Ohio, age 27.	Nov. 25, 25, '63.	Right; circ. Surg. A. Weidenbach, 37th Ohio. Disch'd Oct. 1, 1864. *Spec.* 3216.
280	Fitzherbert, A., Pt., E, 11th Maine, age 20.	April 9, 9, '65.	Right; ant. post. flap. Surg. H. C. Levensaler, 8th Me. Disch'd June 26, 1865.
281	Fitzpatrick, J., Pt., F, 8th N. Jersey, age 23.	April 2, 2, '65.	Left. Mustered out July 28, '65.
282	Fleming, J., Pt., D, 2d Artillery, age 21.	Nov. 8, 8, '63.	Left; flap. Disch'd July 4, '65.
283	Flood, W., Pt., C, 1st Md. P. H. B., age 20.	Mar. 1, 2, '64.	Right; skin flap; circ. muscles. A. A. Surg. W. S. Adams. Dis. May 27, '64. Died Dec. 6, teta. and expos. after reamp. *Sp.* 3936.
284	Fogerty, M. J., Pt., F, 12th Infantry.	Aug. 18, 19, '64.	Right; flap. A. Surg. P. Goddard, U.S.A. Disch'd March 9, 1865.
285	Fogg, H. M., Pt., E, 1st Maine, age 22.	Oct. 19, 20, '64.	Left; gang.; ant. post. flap. Surg. G. T. Stevens, 77th N.Y. Gang.; slough'g. Disch'd June 8, '65.
286	Foote, M. J., Capt., B, 70th N. York, age 28.	June 17, 17, '64.	Right. Surg. J. Ash, 70th N. Y. Furloughed Sept. 16, 1864.
287	Ford, C., Pt., C, 106th Pennsylvania.	Sept. 17, 17, '62.	Right. Surg. S. N. Sherman, 34th N. Y. Disch'd Jan. 10, 1863.
288	Ford, J. A., Pt., H, 38th Wisconsin, age 30.	April 2, 2, '65.	Right; circ. Surg. W. B. Fox, 8th Mich. Disch'd June 1, 1865.
289	Foreman, A., Pt., D, 150th Pennsylvania, age 21.	July 1, 1, '63.	Left; ant. post. flap. Oct. 11, bone prot. rem. Disch'd Dec. 14, '64. *Spec.* 2597.
290	Fox, J., Pt., D, 16th Michigan, age 24.	May 17, 18, '65.	Right; ant. post. skin flap; circ. sect. mus. Disch'd Aug. 5, '65.
291	Franks, J. W., Pt., E, 6th Iowa Cavalry.	Aug. 28, 30, '64.	Left; doub. flap. Surg. O. Hoyt, 30th Wis. Disch'd Mar. 30, '65.
292	*Franklin, D. M.*, Pt., A, 30th Georgia.	July 20, 20, '64.	Left. Sent to Prison Oct. 31, '64.
293	*Frazer, J. R.*, Pt., B, 44th Tennessee.	Sept. 19, 19, '63.	——. Surgs. Jackson and Gannaway. Recovery.
294	Frazier, J. B., Corp'l, F, 26th New York.	Dec. 13, 14, '62.	Left. Disch'd June 6, 1863.
295	Freeman, A. B., Pt., E, 69th Indiana.	Aug. 30, 30, '62.	Left. A. Surg. W. B. Witt, 69th Ind. Disch'd March 20, 1863.
296	Freeman, A. J., Pt., C, 115th N. Y., age 19.	May 7, 7, '64.	Left; flap. Disch'd May 10, '65.
297	Freeman, P., Pt., D, 139th Penn., age 46.	Sept. 19, 20, '64.	Left; ant. post. flap. Surg. W. A. Barry, 98th Penn. Disch'd June 8, 1865.
298	*Frishan, N.*, Pt., E, 21st Mississippi.	May 6, 7, '64.	Right. Asst. Surg. G. H. Peets, 21st Miss. Recovery.
299	Fuller, C. A., Lieut., C, 61st New York.	July 2, 3, '63.	Left. Surg. C.S. Woods, 66th N.Y. (H'd hum. exc.) Dis. Dec. 15, '63.
300	Fulke, C., Pt., H, 11th Penn. Reserves.	Dec. 13, 14, '62.	Left. Disch'd Oct. 24, 1863.
301	Gallagher, H., Pt, K, 99th Penn., age 22.	May 5, 6, '64.	Left; circ. Surg. G. L. Potter, 145th Penn. M. out July 1, 1865. Nec. stump. Died Nov. 20, '69; consumption.
302	Galusha, C., Pt., D, 17th Infantry.	Dec. 13, 13, '62.	Right. Disch'd June 15, 1863. 1870, stump discharging.
303	Galvin, I., Pt., D, 14th Michigan, age 20.	July 6, 6, '64.	Left; circ. Surg. E. Batwell, 14th Mich. Gang.; exf. Disch'd June 19, 1865.
304	Garnett, W. H., Pt., B, 20th Conn., age 21.	Oct. 28, 28, '64.	Right. Mustered out Oct. 24, '65.
305	Garrahan, W., Pt., 7th N. Y. H. A., age 28.	June 3, 3, '64.	Right; circ. Surg. P. E. Hubon, 28th Mass. Sept. 30, seq. rem'd. Disch'd July 6, 1865.
306	Garvey, J., Pt., E, 99th Penn., age 34.	April 6, 6, '65.	Right; circ. Surg. H. F. Lyster, 5th Mich. Disch'd June 20 '65.
307	Gatchell, A. A., Pt., A, 39th Iowa, age 26.	Oct. 5, 6, '64.	Left; circ. Surg. W. L. Leonard, 7th Ill. Disch'd Dec. 16, 1864.
308	Gates, G. W., Corp'l, I, 140th N. Y., age 30.	May 5, 6, '64.	Right; circ. Surg. J. A. Straith, C. S. A. Gang.; car. bone rem. Dis. Aug. 2, '65. '70, bad stump.
309	Geer, I. S., Capt., C, 3d Michigan, age 36.	May 6, 6, '64.	Right; circ. Confed. surg. Mustered out Sept. 21, 1864.
310	Gentry, T., Pt., F, 27th Indiana.	Sept. 17, 19, '62.	Left; flap. Disch'd Nov. 29, '62.
311	Gerke, H., Lieut., I, 52d New York.	June 3, 3, '62.	Right. Surg. J. C. Rappold, 52d N. Y. Bone prot.; subs. opera. Disch'd May 23, 1865.
312	*Gerold, G. F.*, Pt., E, 19th Virginia.	June 27, 28, '62.	——. Surg. Chancellor, 19th Va. Recovery.
313	Gerrish, W., Pt., H, 20th Maine, age 28.	June 3, 4, '64.	Left; double ant. flap. Disch'd Jan. 14, 1865.
314	*Gibbs, G. A.*, Pt., D, 18th Mississippi.	June 23, 23, '64.	——. Surg. Griffin, C. S. A. Recovery.
315	*Gibbs, W. S. S.*, Pt., A, 12th Miss., age 22.	May 12, 12, '64.	Right; circ. Retired Mar. 2, '65.
316	Gifford, J. O., Pt., B, 26th Michigan, age 20.	Nov. 30, 30, '63.	Left. Disch'd June 15, 1864.
317	Gilchrist, D. R., Pt., H, 3d Vermont, age 22.	May 5, 5, '64.	Left; flap. Surg. G. T. Stevens, 77th N.Y. July 1, nec. bone rem. Disch'd Aug. 12, '65. *Spec.* 2814.

[1] McGuire (H.), *Shot Wounds of Joints*, in *Richmond Med. Jour.*, 1866, Vol. I, p. 262.

[2] Otis (G. A.), *Mem. of a Case of Re-amp. at the Hip*, in *Am. Jour. Med. Sci's*, 1871, Vol. LXI, N. S., p. 141, *Circular* No. 3, p. 215, S. G. O., 1871.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
318	Gill, C., Corp'l, F, 105th Penn., age 22.	Oct. 27, 29, '64.	Right; circ. Surg. — Smith, C. S. A. Disch'd June 28, 1865.
319	*Glass, J.*, Corp'l, G, 48th Mississippi.	June 27, 27, '64.	Left. Recovery.
320	*Gomer, A. P.*, Lieut., F, 3d Virginia, age 27.	July 3, 3, '63.	Left; circ. Surg. Mayo, C. S. A. Provost Marshal Oct. 15, 1863.
321	Goodex, L., Pt., E, 29th Penn., age 22.	May 15, 15, '64.	Left; flap. A. Surg. W. F. Smith, 28th Penn. Abscess: bone prot. Disch'd July 4, 1865.
322	*Gorman, W. H.*, Pt., —, 1st Maryland Battery.	June 15, 15, '63.	——. Surg. Hunter. Recovery.
323	Gormaa, T. J., Pt., —, 83d Ohio, age 21.	April 8, 10, '64.	Left; flap. Surg. J. F. Hess, 96th Ohio. Disch'd Aug. 30, 1864.
324	Gould, H. P., Serg't, G, 12th Kentucky, age 24.	Aug. 6, 6, '64.	Right; circ. Surg. W. H. Mullins, 12th Ky. Disch'd July 14, '65.
325	Gould, J., Pt., H, 2d Col'd Troops, age 46.	July 1, 1, '64.	Left; circ.; nec. bone discharged. Disch'd July 27, 1865.
326	Graeter, C., Pt., K, 7th Ohio.	Sept. 17, 17, '62.	Left; circ. Disch'd Dec. 18, '62.
327	Graham, M. J., Lieut., F, 9th New York, age 25.	Sept. 17, 17, '62.	Right; circ. Surg. G. H. Humphreys, 9th N. Y. M. out May 20, '63. *Spec.* 1436.
328	Grant, G., Pt., K, 161st New York, age 18.	April 8, 10, '64.	Left; ant. post. flap. Surg. J. F. Hess, 96th O. July 21, '65, nec. bone rem. Disch'd Aug. 10, '65.
329	Greene, C. T., Capt. and A. A. General, U. S. V., age 22.	Nov. 27, 27, '63.	Right; flap. Surgs. J. L. Dunn, 109th Penn. and J. A. Wolfe, 29th Penn. M. out Sept. 19, 1865.
330	Green, J., Pt., B, 34th New York, age 24.	Sept. 17, 19, '62.	Right; flap; two ins. bone rem'd; slough. Disch'd Mar. 10, 1863.
331	Green, J., Pt., B, 6th Penn. Cavalry.	July 3, 5, '63.	Right; circ. A. Surg. R. F. Weir, U. S. A. Disch'd Sept. 1, 1863. *Spec.* 3897.
332	Green, P., Pt., F, 3d Vt., age 33.	May 5, 7, '64.	Left; ant. post. flap. Surg. E. Phillips, 6th Vt. Disch'd May 31, 1865.
333	Greenleaf, R., Seaman, U. S. S. Iroquois.	April 22, 22, '62.	Right. Surg — Vreeland, U. S. N. Discharged.
334	Greenlief, H., Corp'l, G, 17th Mass., age 25.	Dec. 17, 17, '62.	Left; flap. Surg. I. F. Galloupe, 17th Mass. Disch'd May 31, '63.
335	Greer, J. S., Pt., I, 43d Ohio, age 28.	May 14, 14, '64.	Left; circ. Surg. F. M. Rose, 43d Ohio. Disch'd July 29, '65. 1870, stump discharging.
336	*Greer, T. I.*, Lieut., B, 18th S. C., age 22.	Mar. 29, 29, '65.	Left; circ. Released June 9, '65.
337	Griffin, J., Pt., B, 9th Maine, age 27.	Oct. 27, 27, '64.	Left; circ. Surg. A. M. Clark, U. S. V. Gang. Disch. Jan. 30, '66.
338	*Griffin, J. J.*, Pt., I, 50th Georgia, age 27.	July 2, 3, '63.	Left; flap; hæm. recurrent. Exchanged Nov. 12, 1863.
339	*Grimes, S. R.*, Corp'l. C, 47th Alabama, age 21.	Oct. 7, 8, '64.	Left. Recovery Feb. 28, 1865.
340	Grim, D. D., Pt., D, 1st Cavalry, age 23.	May 7, 7, '64.	Left. Discharged July 22, 1864.
341	Gronoble, I. I., Pt., I, 148th Penn., age 18.	May 10, 11, '64.	Left; circ. Surg. W. C. Byington, 183d Penn. Disch'd June 8, '65.
342	Grouse, B., Pt., B, 13th Conn., age 25.	April 14, 14, '63.	Right; flap. Disch'd Oct. 10, '63.
343	*Grover, J. W.*, Pt., E, 29th Georgia, age 20.	Nov. 30, Dc. 1, '64.	Left; circ. Provost Marshal Mar. 1, 1865.
344	Guenther, H., Pt, G, 65th Illinois, age 21.	Nov. 26, 26, '64.	Right; circ. Surg. — Dunn, 58th N. C. Disch'd July 31, 1865.
345	Haberkern, J., Pt., I, 7th Wisconsin, age 21.	Feb. 6, 7, '65.	Right; circ. June 1, reamp. flap, mid. third. Disch'd Nov. 1, '65.
346	Hagemyer, A., Pt., C, 15th N. Y. H. A., age 30.	Mar. 31, 31, '65.	Right; flap. Surg. A. A. White, 8th Md. Disch'd Sept. 20, '65.
347	*Hair, R. A.*, Pt., E, 5th S. Carolina, age 32.	May 29, 30, '64.	Left; lat. flap. Surg. C. B. Gibson, C. S. A. Recovered.
348	Halfpenny, J., Pt., H, 90th Penn., age 18.	Aug. 20, 20, '64.	Left; flap. Confed. surg. Disch'd Sept. 8, 1865.
349	Hall, J. W., Capt., K, 4th N. Y. Cavalry, age 23.	June 11, 12, '64.	Left; flap. Surg. B. G. Streeter, 4th N. Y. C. M. out July 17, '65.
350	*Hall, M. V.*, Pt., A, 31st Virginia.	May 5, 5, '64.	Left. Surg. Atkinson, C. S. A. Retired Dec. 14, 1864.
351	Hall, W., Pt., H, 4th W. Virginia.	May 19, 19, '63.	Right; flap. Surg. E. D. Kittoe, U. S. V. Disch'd Mar. 4, 1864.
352	Hamilton, J. F., Pt., G, 39th Illinois, age 21.	Oct. 13, 13, '64.	Right; flap. Surg. C. M. Clark, 39th Ill. Reamp. upper third. Disch'd June 5, 1865.
353	Hammer, L., Pt., C, 47th Ohio.	May 22, 22, '63.	Right; flap. Surg. S. P. Bonner, 47th Ohio. Disch'd Oct. 6, 1863.
354	Hampel, A., Corp'l, E, 82d Illinois, age 28.	Mar. 16, 16, '65.	Right; ant. post. flap (Skey's). Disch'd Sept. 7, 1865.
355	*Hampton, T. E.*, Pt., I, 14th South Carolina.	July 1, 2, '63.	Right. Surg. L. V. Huot, C. S. A. Paroled Sept. 5, 1863.
356	*Hamrick, A.*, Pt., E, 45th Tenn., age 25.	Nov. 30, Dc. 1, '64.	Right; ant. post. flap. Provost Marshal March 21, 1865.
357	Hancock, J. W., Pt., H, 1st Kentucky Cavalry.	Jan. 17, 18, '65.	Left; flap. Surg. H. Brown, 1st Ky. Cav. Disch'd Aug. 1, 1865.
358	*Hancock, W. L.*, Pt., D, 42d Miss., age 25.	July 1, 2, '63.	Right; flaps sloughed. July 24, reamp. middle third. Paroled Sept. 5, 1863.
359	Hardendorf, A., Pt., D, 6th N. York Cavalry.	Aug. 29, 29, '62.	Left; circ. Disch'd Jan. 13, 1863.
360	*Hardee, T. J.*, Capt., H, 9th Georgia.	Nov. 16, 16, '63.	Right. Surg. — Gilmore, C. S. A. Recovery.
361	Harding, J., Pt., A, 86th Indiana, age 28.	Nov. 25, 26, '63.	Left; flap. Surg. W. J. Burgess, 17th Ky. Disch'd Nov. 12, '64.
362	Harding, R., Pt., I, 13th Col'd Troops, age 22.	Dec. 17, 17, '64.	Left; flap. A. A. Surg. J. S. Giltner. Disch'd Oct. 12, 1865.
363	Hardy, A. T., Pt., A, 8th Maine, age 25.	May 16, 16, '64.	Left; double flap. Duty Dec. 14, 1864.
364	Hare, S. P., Lieut., D, 49th Ohio, age 23.	May 27, 27, '64.	Right; circ. A. Surg. W. H. Park, 49th O. Disch'd Oct. 25, 1864.
365	Harley, D., Corp'l, I, 73d Penn., age 30.	Nov. 25, 25, '63.	Left. Discharged May 30, 1864. Died Sept. 14, 1869.
366	*Harold, W. O.*, Serg't, B, 57th Alabama, age 25.	Nov. 30, Dc. 1, '64.	Left; ant. posterior flap. Provost Marshal March 1, 1865.
367	*Harper, W.*, Pt., B, 11th Virginia.	Jan. 24, 25, '64.	——. Surg. — Tripler, C. S. A. Recovered.
368	Harris, H. D., Pt., D, 7th New Hampshire.	July 18, 19, '63.	Right; flap. Surg. W. W. Brown, 7th N. H. Disch'd Mar. 4, 1864.
369	*Harris, W. C.*, Pt., A, 3d Alabama.	Oct. 19, 20, '64.	Left; circ. Surg. J. M. G. McGuire, C. S. A. Prov. Mar. April 8, '65.
370	Harrison, W. H., Pt., E, 39th N. Jersey, age 32.	April 2, 3, '65.	Left; circ. Surg. J. H. Kimball, 31st Me. Disch'd Aug. 18, 1865.
371	*Hart, B. F.*, Pt., C, 55th Virginia, age 21.	Dec. 13, 13, '62.	Left. Surg. — Spence, C. S. A. Retired April 1, 1865.
372	Harding, E., Pt., K, 93d Penn., age 19.	Sept. 19, 19, '64.	Right; double flap. Subs. opera. Disch'd March 23, 1866.
373	Hartman, J., Pt., A, 37th Wisconsin, age 16.	June 19, 20, '64.	Left; flap. Surg. W. B. Fox, 8th Mich. June 27, hæm.; lig. fem. Disch'd Aug. 14, 1865.
374	Hartler, J., Pt., E, 50th Penn., age 20.	May 12, 13, '64.	Left; circ.; gangrene; bone prot. Disch'd Aug. 19, 1865.
375	*Hastey, N. B.*, Pt., E, 20th Georgia.	May 6, 6, '64.	Left. Surgeon — Secan, C. S. A. Recovery.
376	Hatch, M. T., Serg't, B, 3d Vermont, age 25.	Oct. 19, 19, '64.	Right; ant. post. flap. Surg. E. Phillips, 6th Vermont. Sloughing. Disch'd July 25, 1865.
377	Haverfield, G. A., Serg't, H, 126th Ohio, age 24.	Sept. 21, 22, '64.	Right; gangrenous. Discharged May 22, 1865.
378	*Hayes, J.*, Serg't, A, 5th North Carolina.	Sept. 19, 19, '64.	Right; circ. Surg. Hicks, C. S. A. Released April 1, 1865.
379	*Hayes, T.*, Pt., E, 25th N. Carolina, age 28.	Feb. 14, 14, '65.	Left. Paroled May 11, 1865.
380	Haynes, G., Pt., B, 26th Illinois.	Aug. 3, 3, '64.	Right; circ. Surg. J. H. Hutchison, 15th Mich. Disch'd Aug. 28, 1864. Feb. 28, 1865, flap reamp. middle third.
381	Headley, A., Pt., C, 2d Rhode Island, age 25.	May 5, 6, '64.	Left; flap. Sept. 15, necro. bone remo. Disch'd May 4, 1865.
382	[1] Heckert, P., Pt, F, 120th Ohio.	July 10, 10, '63.	Left; flap. Disch'd Oct. 7, 1863.
383	Hearing, J., Lieut., G, 58th Ohio.	April 29, 29, '63.	Left; flap. Disch'd Dec. 23, '63.
384	Heath, P., Pt., A, 9th N. York Cavalry.	June 11, 11, '64.	Left; flap. Duty Sept. 1, 1864.
385	Hebing, G. A., Pt., I, 23d Iowa.	May 17, 17, '63.	Left; circ. Surg. J. C. Ross, 94th Ill. Disch'd Aug. 17, 1863.
386	Heizeman, H., Pt., D, 77th Penn., age 19.	May 14, 14, '64.	Right; flap. Surg. S. H. Kersey, 30th Ind. Disch'd Mar. 28, '65.
387	Helen, G. F., Pt., B, 114th Penn., age 18.	July 2, 3, '63.	Right; flap. Healed by first intention. Disch'd April 12, '64.
388	Hellings, J., Pt., H, 5th Penn. Cav., age 22.	April 2, 2, '65.	Right; flap. Disch'd July 19, 1865.
389	Henderson, A., Pt., E, 86th N. York, age 22.	Aug. 14, 14, '64.	Left; circ. Disch'd April 26, '65.
390	Henry, M., Pt., I, 69th Ohio, age 19.	Nov. 25, 26, '63.	Left; lat. flap. Surg. L. Slusser, 69th Ohio. Nec. bone removed. Disch'd Feb. 6, 1865.
391	Hensel, C. W., Pt., D, 66th Indiana, age 20.	May 14, 14, '64.	Right; flap. Disch'd Jan. 13, '65.
392	Hensley, E., Corp'l, I, 39th Kentucky, age 18.	Oct. 2, 2, '64.	Right; circ. Surg. J. G. Hatchitt, U. S. V. Disch'd June 20, 1865.
393	*Herrin, T. J.*, Pt., F, 10th Georgia, age 21.	April 6, 6, '65.	Left; flap. Released June 14, '65.
394	Herron, E. R., Capt., D, 4th Wisconsin, age 24.	May 27, 27, '63.	Right. Disch'd Nov. 20, 1863.
395	*Hickey, C. M.*, Pt., H, 7th Louisiana.	July 1, 1, '63.	Left. Surg. — Davis, C. S. A. Recovery.
396	Hickey, N., Serg't, C, 7th N. Y. H. A., age 23.	Oct. 12, 12, '64.	Left; circ. Surg. J. E. Pomfret, 7th New York Heavy Artillery. Disch'd Aug. 15, 1865.
397	Hill, J., Corp'l, B, 123d Indiana, age 27.	July 28, 28, '64.	Right; flap. Surg. A. M. Wilder, U. S. V. Disch'd June 24, 1865.
398	*Hill, J. W.*, Pt., I, 10th Alabama, age 23.	Oct. 28, 29, '64.	Right. Disch'd Jan. 15, 1865.
399	[2] Hiller, W. P., Pt., A, 2d N. Y. H. A., age 41.	July 27, 27, '64.	Left. Teale's op.; ant. post. flap. Surg. J. W. Wishart, 140th Penn. Disch'd April 3, 1865.
400	*Hines, J. D. E.*, Pt., H, 4th Alabama.	May 6, 6, '64.	Right. Surg. — Hudson, C. S. A. Recovery.
401	Hinson, T., Pt., G, 39th Indiana.	April 7, 8, '62.	Right; flap. Disch'd Sept. 25, '63.
402	*Hinson, W. H.*, Pt., H, 25th N. C., age 37.	Sept. 19, 19, '64.	Right; circ. Surg. Bissell, 28th N. C. Prison Jan. 5, 1865.

[1] Bryan (J.), *Cases of Amputations from the Armies of the Southwest*, in *Am. Med. Times*, 1863, Vol. 7, p. 288, Case XXXI.

[2] O'Meagher (W.), *Surgical Cases from Field Hospitals*, in *Med. and Surg. Rep.*, 1865, Vol. XII, p. 253.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
403	*Hitt, H. L.*, Pt., F, 3d South Carolina.	July 1, 1, '62.	Right. Surg. — Sammond, C. S. A. Disch'd October 14, 1862.
404	*Hodgins, I. M.*, Pt., D, 34th N. C., age 30.	July 1, 1, '63.	Left; flap. Exchanged Nov. 12, 1863.
405	Hoffman, P., Corp'l, B, 107th Ohio, age 21.	July 2, 2, '63.	Left; circular. Surg. — Purcell. Disch'd July 30, 1864.
406	*Hoge, W. F.*, Pt., D, Kirkpatrick's Battery.	June 3, 3, '64.	——. Surg. — Capers, C. S. A. Recovery.
407	Hollingshead, A., Pt., K, 2d West Virginia.	June 8, 9, '62.	Left; flap. Surg. R. W. Hazlett, 2d W. Va. Disch'd Aug. 22, '62.
408	*Holt, A.*, Pt., G, 12th N. Carolina, age 20.	May 2, 2, '63.	Left; circ. Surg. — Hicks, C. S. A. Furl'd Oct. 4, 1864.
409	Hopkins, O., Pt., K, 7th Michigan.	June 1. 1, '62.	Right. Surg. A. N. Dougherty, U. S. V. Disch'd March 5, 1863.
410	Hopkins, W., Pt., C, 111th Penn., age 21.	July 3, 4, '63.	Left. Surg. G. P. Oliver, 111th Penn. Discharged.
411	Horner, G. W., Pt., G, 17th Ohio, age 22.	May 14, 14, '64.	Right; double flap. Vet. Reserve Corps Jan. 14, 1865.
412	Horton, W. M., Serg't, B, 81st N. Y., age 34.	June 3, 5, '64.	Left; circ. Disch'd Jan. 19, 1865.
413	Howard, H. H., Pt., G, 114th N. Y., age 23.	Sept. 19, 19, '64.	Left; circ.; necrosis. Discharged May 20, 1865.
414	Howard, T. M. D., Pt., L, 1st Me. H. Art., age 20.	June 18. 19, '64.	Right; flap. Duty Oct. 26, 1865.
415	Howald, C., Corp'l, K, 10th Mich., age 21.	Sept. 3, 3, '64.	Right; flap. Surg. C. H. Mills, 125th Ill. Mustered out, 1865.
416	Howe, R. P., Pt., G, 120th New York, age 23.	July 30, 30, '64.	Right; ant. post. flap. Disch'd Jan. 7, 1865.
417	*Howland, J.*, ——, B, 1st Georgia.	Sept. 14, 14, '62.	——; flaps sloughed; bone prot. rem'd; small arts. tied. Recov.
418	*Hoyle, B. M.*, Pt., F, 34th North Carolina.	June 27, 29, '62.	Left. Surg. Ross. Retired Feb. 23, 1865.
419	Huffman, J., Corp'l, M, 1st Penn. Cav., age 28.	July 28, 28, '64.	Left; circ. Disch'd May 20, '65. Stump unsound in 1870.
420	Hughes, E., Pt., I, 55th Penn., age 22.	Sept. 29, 30, '64.	Right; flap. Surg. — Mitchell, C. S. A. Nec.; rem. seq. Disch'd Feb. 28, 1866.
421	Hume, J., Lieut., F, 140th New York, age 31.	May 5, 5, '64.	Left. Disch'd Oct. 12, 1864.
422	*Humphries, H.*, Pt., I, 45th Alabama, age 31.	Nov. 29, 29, '64.	Left; circ. Provost Marshal May 6, 1865.
423	[1]Humphrey, W. H., Lt., G, 4th Vermont, age 29.	April 2, 2, '65.	Right; flap. Surg. C. B. Park, jr., 11th Vt. Pyæmia. Disc'd Aug. 3, 1865.
424	Hunt, C. E., Lieut., C, 59th N. York, age 26.	May 9, 10, '64.	Left; flap. Surg. W. J. Burr, 42d N. Y. Disch'd Sept. 30, 1864.
425	*Hunter, B. F.*, Pt., K, 19th Georgia, age 23.	July 7, 7, '64.	Right; (also wound of right arm.) Retired January 13, 1865
426	Hunter, C., Corp'l, G, 35th Indiana, age 21.	Aug. 10, 12, '64.	Right; circ. Surg. F. M. Rose, 43d Ohio. Hæm.; gang.; necr. bone ext'd, 1865. Disch'd Dec. 3, '65. '70, stump open. *Sp.* 4247.
427	*Hutton, H.*, Serg't, B, 62d Virginia, age 20.	Sept. 19, 19, '64.	R't; circ. Surg. — Love, C. S. A. Sloughing. Prison Feb. 16, '65.
428	Ingraham, F., Pt., E, 1st Maine Cav., age 22.	Aug. 23, 23, '64.	Left; flap. Surg. W. B. Rezner, 6th O. Cav. Disch'd June 24, '65.
429	*Irby, A. V.*, Pt., D, 44th Virginia.	Sept. 17, 17, '62.	Right. Furloughed Nov. 21, '64.
430	Ivers, J., Pt., K, 10th Iowa.	May 16, 17, '63.	Left; flap. Disch'd Aug. 14, '63.
431	Jackson, J., Pt., A, 22d Cl'd Troops, age 25.	Sept. 29, 30, '64.	Right; circ. Disch'd April 10, '65.
432	*Jacobs, J.*, Pt., K, 1st Mo.	Sept. 2, 2, '64.	——. Surg. A. H. Ramsie, C. S. A. Recovery.
433	Janney, J., Pt., B, 14th New York.	July 1, 2, '63.	Left; circ. Disch'd April 12, '64.
434	Jarvis, R., Pt., E, 3d N. Hampshire, age 19.	May 13, 15, '64.	Left; double flap. Feb. 24, reamp. nec. bone. Disch'd Oct. 26, '65.
435	Jenkins, E., Pt., K, 125th Illinois, age 19.	July 19, 19, '64.	Right; ant. post. flap. Disch'd Sept. 9, 1865.
436	*Johnson, L. D.*, Pt., F, 9th Tenn. Cav., age 41.	Aug. 14, 14, '64.	Right; circ. Prov. Marshal Nov. 16, 1864.
437	Johnson, S., Pt., D, 23d Massachusetts.	Mar. 14, 14, '62.	Left; circ. Surg. G. Derby, 23d Mass. Discharged.
438	Johnston, T., Pt., H, 8th New York, age 24.	June 3, 4, '64.	Right; flap. Surg. M. Rizer, 72d Penn. Disch'd May 31, 1865.
439	Jones, D. M., Lieut.-Col., 110th Pennsylvania.	July 2, 2, '63.	Left; circ. Surg. D. S. Hays, 110th Penn. Disch'd Oct. 9, '63.
440	Jones, E. W., Serg't, H, 26th Illinois, age 26.	Mar. 22, 22, '65.	Right; flap. Surg. A. Sabine, 70th Ohio. Disch'd June 18, '65.
441	Joss, J. C., Lieut., G, 2d Michigan, age 23.	May 6, 6, '64.	Left. Surgeon E. J. Bonine, 2d Mich. Disch'd Sept. 26, 1864.
442	Judge, T., Serg't, H, 62d New York, age 32.	Oct. 19, 19, '61.	Left; ant. post. flap. Discharged April 10, 1865.
443	Kahl, M., Pt., A, 37th O. age 37.	Mar. 21, 22, '65.	Left; bi-lateral flaps. Surg. F. N. Barnes, 116th Ill. Dis. Oct. 21, '65
444	*Kane, J. J.*, Lieut., H, 6th Ala., age 24.	July 2, 2, '63.	Left. Surg. Whitfield, C. S. A. Provost Marshal March 17, '64.
445	Kaufman, W. H., Pt., A, 9th Penn. Cav., age 20.	Dec. 31, 31, '62.	Left. Disch'd Sept. 18, 1863.
446	Kaylor, A., Corp'l, I, 2d Ohio Cav., age 25.	Mar. 31, Ap. 1, '65.	Right; circ. Mustered out June 6, 1865.
447	Kean, J., Pt., E, 42d N. York, age 30.	May 12, 12, '64.	Left; flap. Surg. W. J. Burr, 42d N. Y. Disch'd Feb. 16, 1865.
448	Keegan, J., Corp'l, D, 58th Pennsylvania.	Sept. 30, 30, '64.	Left; flap. Duty. Jan. 29, 1866, mustered out.
449	Keep, D. S., Corp'l, I, 142d Penn., age 25.	May 5, 5, '64.	Left; circ. Discharged Sept. 27, 1864.
450	Keller, C., Pt., B, 43d Illinois, age 19.	April 6, 8, '62.	Left; reamp. upper third; necro. bone rem'd. Disch'd Mar. 9, 63.
451	Keller, S. P., Corp'l, E, 1st Maryland, age 23.	Aug. 18, 19, '64.	Right; ant. post. flap. Surg. A. A. White, 8th Md. Dis. May 14, '65.
452	Kelley, E., Corp'l, C, 25th Indiana, age 26.	Mar. 21, 21, '65.	Right; ant. post. flap. Surg. A. B. Monohan, 63d Ohio. Disch'd July 9, 1865.
453	Kelley, J., Pt., H, 60th Indiana, age 39.	Nov. 3, 3, '63.	Right. Disch'd March 10, 1864.
454	*Kelley, J. R.*, Pt., B, 14th Georgia.	May 23, 24, '64.	Right. Surg. — Henderson, 14th Georgia. Recovery.
455	Kelly, T. J., Pt., D, 49th New York, age 19.	May 4, 5, '63.	Left; long ant., short post. flap. Disch'd Aug. 23, '64. '67, reamp.
456	Kelly, T., Pt., G, 183d Penn., age 35.	June 3, 3, '64.	Right; flap. Surg. P. E. Hubon. 98th Mass. Disch'd Mar. 2, '65. *Spec.* 2934.
457	Kelly, V. B., Corp'l, B, 108th N. York, age 22.	May 10, 12, '64.	Right; flap. Surg. F. M. Wafer, 108th N. Y. Duty Sept. 19, 1864.
458	Kelly, W., Pt., I, 100th Indiana, age 26.	Nov. 23, 23, '64.	Left; lat. flap. Surg. B. N. Bond. 27th Mo. Disch'd June 9, 1865.
459	Kemp, R., Pt., K, 6th N. Y. H. A., age 33.	May 30, 31, '64.	Right; flap. Disch'd Sept. 21, '64.
460	Kennedy, J., Pt., G, 42d New York, age 42.	May 12, 12, '64.	Right; circ. Surg. S. H. Plumb, 82d N. Y. Seq. rem. Disch'd Oct. 5, 1865.
461	Kennedy, J., Pt., B, 110th Pennsylvania, age 20.	Aug. 16, 16, '64.	Right; flap. Surg. D. S. Hays, 110th Penn. M. out Jan. 17, '66.
462	Kennedy, J., Pt., C, 157th Pennsylvania, age 19.	June 19, 19, '64.	Right; flap. A. Surg. N. R. Barnes, 76th N. Y. Disch'd June 30, '65. 1870, not healed.
463	Kennison, A., Pt., A, 19th Maine, age 39.	July 2, 2, '63.	Right; flap. Disch'd Sept. 19, 1863.
464	Keough, P., Pt., C, 33d New Jersey, age 24.	May 13, 14, '64.	Left; circ. Surg. N. Gay, U. S. V. Gang. Dec. 2, reamp., circ., mid. A. Surg. J. T. Calhoun, U. S. A. Disch'd Aug. 20, '65.
465	Kimball, W. H., Lieut., D, 47th Ohio, age 21.	Aug. 4, 4, '64.	Right. Surg. S. P. Bonner, 47th Ohio. Disch'd Nov. 1, 1864.
466	Kimberly, E. P., Pt., C, 10th Vermont, age 20.	Sept. 19, 21, '64.	Left; circ. A. Surg. W. G. Bryant, 122d Ohio. Disch'd June 12, '65.
467	Kincaid, W. H., Capt., I, 93d New York.	Aug. 16, 16, '64.	Left; flap. Surg. S. Smith, 93d N. Y. Disch'd Nov. 23, 1864.
468	King, J., Pt., D, 124th Ohio, age 18.	Dec. 16, 16, '64.	Right; circ.; gang. Disch'd May 16, '65. 1870, stump unhealthy.
469	*King, J. J.*, Pt., D, 60th Alabama.	Aug. 29, 29, '64.	Right. Surg. — Walls, C. S. A. Recovery.
470	Kingsbury, A., Pt., I, 117th N. York, age 20.	Sept. 29, 29, '64.	Right; circ. Surg. D. McFalls, 142d N. Y. Disch'd Aug. 15, '65.
471	Kircher, H., Capt., E, 12th Missouri.	Nov. 27, 27, '63.	Left; flap; (also amp. right arm.) Surg. J. Spiegelhalter, 12th Mo. Mustered out Nov. 14, 1864.
472	Kirkham, A. W., Pt., A, 115th N. Y., age 32.	Feb. 20, 20, '64.	Left; flap. Confederate surgeon. Disch'd May 20, 1865.
473	*Kirkman, B.*, Serg't, K, 10th Louisiana.	May 4, 4, '63.	Right. Surg. — White, C. S. A. Furl'd July 3, 1863.
474	Kirkwood, B. F., Corp'l, H, 7th Md., age 23.	Aug. 18, 19, '64.	Left; lat. flap. Surg. R. H. Robinson, 7th Md. Disch'd April 10, 1865.
475	Kishbauch, A., Pt., I, 143d Penn., age 21.	May 12, 12, '64.	Left; (Teale's rectangular meth.) Slough'g; end of bone removed. Mustered out Dec. 28, 1865.
476	Kittlein, J., Pt., D, 8th Maryland, age 21.	May 5, 7, '64.	Left; ant. post. flap. Confed. surgeon. Disch'd June 2, 1865.
477	Klett, J., Pt., F, 5th N. York H'vy Art., age 36.	Aug. 25, 27, '64.	Left; circ. A. Surg. T. C. Smith, 116th Ohio. Oct., reamp. Disch. July 7, 1865.
478	Klinegger, F., Pt., I, 41st Ohio, age 32.	Dec. 15, 15, '64.	Right; circ. Disch'd June 5, '65.
479	Klinger, C., Pt., D, 33d Ohio, age 19.	Aug. 5, 5, '64.	Right; flap; gang. Disch'd, 1865.
480	Knight, A. J., Corp'l, C, 37th Mass., age 26.	April 2, 2, '65.	Left; ant. post. flap. Discharged Sept. 4, 1865.
481	*Knight, D. E.*, Pt., B, 17th South Carolina.	Mar. —, —, '65.	Right. Provost Marshal May 10, 1865.
482	Knight, E. O., Pt., K, 97th New York, age 18.	May 5, 6, '64.	Left; circ. Surg. W. B. Chambers, 97th N. Y. Dis. July 12, '65.
483	Knight, F. W., Pt., E, 9th Maine, age 24.	July 27, 27, '64.	Left; circ. Surg. A. D. Palmer, 9th Me. M. out Oct. 4, 1865.
484	Knight, W. A., Pt., H, 4th R. Island, age 25.	Sept. 17, 17, '62.	Right; dou. flap. Surg. M. Storrs, 8th Conn. Disch'd Nov. 7, 1863.
485	Krause, J., Pt., B, 7th Wisconsin, age 35.	Mar. 31, Ap. 1 '65.	Right; flap. Disch'd July 12, '65.
486	Kresgie, F., Pt., I, 81st Penn., age 24.	Aug. 16, 16, '64.	Left; flap. Surg. J. H. Buckman, 5th N. H. Disch'd April 13, '65.
487	Kretzler, A., Corp'l, D, 162d New York.	June 14, 14, '63.	Right; ant. rect. flap; (amp. forearm.) Surg. W. B. Eager, jr., 162d N. Y. Disch'd August 29, 1863. Died July 8, '76; phthisis pulmo.
488	Kuble, J. U., Pt., K, 2d Wisconsin.	Aug. 28, 30, '62.	Right. Disch'd October 18, '62.

[1] Lidell (J. A.) *On Pyæmia*, in *U. S. San. Com. Mem.*, 1870, Surg. Vol. 1, Sect. Third, p. 535, Case XII.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
489	Kugan, M., Pt., K, 145th Penn., age 21.	Aug 16, 16, '64.	Right; circ. Surg. G. L. Potter, 145th Penn. M. out Oct. 30, '65.
490	*Kurtner, C.*, Pt., A, 31st Virginia Battery.	Sept. 19, 19, '64.	——. Provost Marshal Dec. 17, 1864.
491	*Kyle, H.*, Pt., D, 6th N. Carolina, age 40.	July 1, 2, '63.	Right; flap. Provost Marshal Oct. 15, 1863.
492	Lake, E., Pt., D, 8th Penn. Cavalry, age 19.	Oct. 28, 30, '64.	Right; flap. Surg. W. L. Baylor, C. S. A. Disch'd Aug. 29, 1865.
493	Lamarsna, J. J., Pt., D, 127th Illinois, age 18.	June 19, 19, '64.	Left; flap. Surg. A. C. Messenger, 57th Ohio. Disch'd March 18, 1865.
494	Lambert, G., Pt., H, 53d Indiana.	Oct. 5, 5, '62.	Left. Discharged April 7, 1863.
495	Lambson, J. F., Pt., A, 4th Iowa, age 26.	May 14, 15, '64.	Left; flap. Surg. B. N. Bond, 27th Mo. Disch'd Oct. 7, 1865.
496	*Land, J.*, Pt., B, 10th Ga.	May 24, 24, '64.	Right; circular. Recovery.
497	*Landis, T. J.*, Corp'l, D, 2d Arkansas, age 25.	Nov. 30, De. 1, '64.	Left; ant. post. flap. Prov. Marshal March 7, 1865.
498	Lansperger, C., Pt., F, 11th Penn., age 34.	May 6, 6, '64.	Left; circ. Confed. surg. Ulceration. Disch'd March 31, 1865.
499	Lapoint, V., Pt., A, 81st New York, age 35.	June 3, 3, '64.	Right; ant. post. flap; nec. seq. rem'd. Disch'd June 16, 1865. *Specs.* 2373, 3765.
500	Larke, W., Pt., E, 9th Wisconsin.	Sept. 30, 30, '62.	Left; circ. Disch'd April 20, '63.
501	Laton, J. M., Serg't, A, 8th New Hampshire.	June 14, 14, '63.	Left; circ. Discharged June 17, 1864.
502	*Lavergne, A.*, Pt., Austin's Battery, age 22.	Mar. 28, 28, '65.	Right; circ. Dr. Miller. June 8, dise. bone rem'd. Aug., '65, left hospital. *Spec.* 482.
503	Lawrence, C., Corp'l, E, 90th New York.	June 10, 10, '63.	L't; circ.; (amp. forearm.) Surg. E. S. Hoffman, 90th N. Y. Sub. operations. Disch'd Nov. 21, '63.
504	Lawrence, J. A., Corp'l, A, 77th N. Y., age 21.	June 21, 21, '64.	Left; ant. post. flap. Surg. G. T. Stevens, 77th N. Y. M. out.
505	Lawrence, F. J., Pt., B, 159th N. Y., age 17.	Sept. 19, 20, '64.	Left; circ. Surg. C. H. Andrus, 176th N. Y. Hæm. July, 1865, seq. rem'd. Disch'd Mar. 3, '66.
506	*Lawrence, W. E.*, Lieut., F, 32d N. Carolina.	Oct. 14. 14, '63.	Left. Surgeon — Butt, C. S. A. Furl'd February 5, 1865.
507	*Laxton, J. L.*, Serg't, F, 3d North Carolina.	June 1, 1, '64.	Left. Surg. — Walker, C. S. A. Retired Feb. 1, 1865.
508	Leach, M., Pt., C, 50th Illinois, age 21.	Mar. 21, 21, '65.	Left; ant. post. skin flap. Disch'd June 30, 1865.
509	*Lee, T.*, Pt., K, 45th Ala., age 30.	Nov. 29, 30, '64.	Right; circ. Surg. — Ringgold, C. S. A. Pro. Mar. April 2, '65.
510	*Lennard, J. M.*, Pt., C, 3d Georgia Cavalry.	Sept. 21, 23, '63.	——. Surg. — Burton, C. S. A. Recovery.
511	Lewin, J., Pt., D, 7th Maine, age 34.	June 3, 4, '64.	Right. Surg. G. T. Stevens, 77th N. Y. Gang.; fem. prot. Disch'd Oct. 17, '64. Re-amp. flap, mid. third, Oct. 21, 1865.
512	Leyson, J., Pt., D, 20th Mass., age 19.	Dec. 13, 13, '62.	Right. Surg. J. Dwinelle, 106th Penn. Disch'd June 6, 1863.
513	Lichstein, L., Lieut., F, 98th Penn., age 28.	June 18, 18, '64.	Right. Surg. W. A. Barry, 98th Penn. Duty Nov. 15, 1865.
514	Lilley, M. A., Serg't, H, 46th Ohio, age 26.	Aug. 3, 3, '64.	Right; flap. A. Surg. D. Halderman, 46th Ohio. Erysipelas. Disch'd June 9, 1865.
515	Lindley, F. W., Pt., K, 103d Ohio, age 25.	June 19, 21, '64.	Left; flap. Surg. J. H. Rodgers, 104th Ohio. Hæm.; gangrene. Disch'd June 30, 1865.
516	Lindsley, M. W., Pt., G, 1st N. Y. Drag., age 21.	April 2, 2, '65.	Left; flap. Disch'd Oct. 29, '65.
517	Linthurst, C. W., Corp'l, I, 1st Penn. Reserves.	Aug. 30, 30, '62.	Right. Disch'd Oct. 10, '62. Died May 8, 1870; consumption and general debility from injury.
518	*Little, W. M.*, Corp'l, I, 8th Louisiana.	Feb. 10, 11, '64.	——. Surg. — Momenier, C. S. A. Recovery.
519	Long, D. B., Pt., E, 75th Illinois.	Oct. 8, 9, '62.	Left. Disch'd Dec. 9, '62. Sub. operation 1870.
520	Loomis, D., Pt., I, 38th Ohio, age 18.	Sept. 1, 2, '64.	Right; flap. Surg. C. N. Fowler, 105th Ohio. M. out May 17, '65.
521	Losie, J. M., Capt., A, 107th N. York, age 34.	May 25, 26, '64	Right; flap. Surg. J. Chapman, 123d N. Y. Disch'd Jan. 31, '65.
522	Lowrey, A., Pt., G, 104th Ohio.	Sept. 11, 11, '62.	Left; circ. Surg. K. G. Thomas, 104th Ohio. Disch'd Sept. 28, '62.
523	Lozier, T. H., Pt., B, 2d Penn. Cav., age 18.	June 11, 11, '64.	Right; circ. Surg. W. M. Weidman, 2d Penn. Cav'y. Disch'd March 2, 1865.
524	Ludaka, A., Pt., L, 102d Penn., age 26.	Sept. 19, 19, '64.	L't; flap. A. Surg. J. Homans, jr., U. S. A. Disch'd Aug. 21, '65.
525	Luhman, E., Seaman, U. S. Navy, age 28.	Mar. 15, 15, '63.	Left; flap. Disch'd Dec. 14, '63. Died June 12, '69; consumpt'n.
526	*Lundugan, P.*, Serg't, A, 5th C. S.	Sept. 20, 20, '63.	Left. Surg. — Vaughn, C. S. A. Recovery.
527	Lupton, J. W., Pt., C, 14th N. Jersey, age 21.	July 9, 10, '64.	Left; circ. A. Surg. R. F. Weir, U. S. A. Disch'd April 3, 1865. *Specs.* 2306, 3924.
528	Luscombe, F. E., Pt., E, 17th Wis., age 21.	May 19, 20, '63.	Left; circ. Disch'd Mar. 29, '64.
529	*Lynch, J.*, Serg't, I, 17th Tennessee.	Sept. 20, 20, '63.	Right. Surg. W. H. Gentry, 17th Tenn. Recovery.
530	*Madden, J. S.*, Capt., D, 32d Miss., age 34.	Nov. 30, De. 1, '64.	Left; circular. Provost Marshal March 1, 1865.
531	*Maddox, J.*, Corp'l, K, 5th Louisiana.	July 2, 2, '63.	Left. Surg. — Strickland, C. S. A. Paroled Sept. 5, 1863.
532	Magee, J., Pt., G, 2d Rhode Island.	May 5, 5, '64.	Right; flap. Surg. G. W. Carr, 2d R. Island. M. out Oct. 16, 1864. 1870, stump discharging.
533	Maher, J., Pt., F, 4th Infantry, age 27.	Dec. 14, 14, '62.	Right; circ. A. Surg. A. M. Clark, U. S. V. Gang.; erysip.; remo. exfol. Disch'd July 8, 1863.
534	Maire, C. L., Corp'l, K, 109th Penn., age 37.	June 15, 16, '64.	Left; flap. Surg. J. L. Dunn, 109th Penn. Disch'd June 27, '65.
535	*Malbry, P. S.*, Pt., K, 3d Alabama.	May 30, J'ne 1, '64.	Right; lat. flap. Surg. C. B. Gibson, C. S. A. Transferred June 3, 1864.
536	*Mallory, D. C.*, Serg't, F, 4th Virginia.	Nov. 27, 28, '63.	Right. Surg. — Holt, C. S. A. Furloughed Jan. 19, 1864.
537	Manning, A. F., Pt., D, 50th New York.	June 3, 3, '63.	Right; flap. Disch'd Sept. 30, 1863.
538	*Manning, G. W.*, Pt., A, 15th Virginia.	April 13, 13, '63.	Right. Surg. — Lewis, C. S. A. Furloughed June 24, 1863.
539	Marlow, J., Pt., I, 7th Kentucky.	May 16, 16, '63.	Right. Surg. W. Berry, 7th Ky. Disch'd Sept. 21, 1863.
540	Marsh, D. W., Pt., H, 150th N. York, age 21.	June 29, 29, '64.	R't; circ. Surg. C. M. Campbell, 150th N. Y. Mar., '65, seq. rem. Disch'd Sept. 11, '65. *Spec.* 476.
541	*Marshall, C.*, Pt., E, 11th Virginia, age 22.	July 3, 3, '63.	Left. Provost Marshal Sept. 25, 1863.
542	Martin, H., Pt., H, 8th N. Jersey, age 23.	Mar. 31, Ap. 1, '65.	Left; circ. Surg. H. F. Lyster, 5th Mich. Disch'd Sept. 8, 1865.
543	Mashan, R. W., Pt., K, 149th N. Y., age 22.	May 27, 27, '64.	Left; flap. Surg. J. V. Kendall. 149th N. Y. Disch. June 13, '65.
544	Masters, N., Pt., D, 8th N. Y. Cavalry, age 26.	June 13, 13, '64.	Right; circ. Disch'd March 25, 1865.
545	*Mattox, M. F.*, Pt., H, 13th Virginia, age 34.	Sept. 19, 19, '64.	Left; circ. Prov. Marshal April 1, 1865.
546	Maynard, M., Pt., D, 36th Mass., age 20.	July 20, 20, '64.	Left; circ. Disch'd Feb. 4, '65.
547	*McBride, W. H.*, Pt., B, 44th Virginia, age 30.	Mar. 25, 25, '65.	Right; circ. Surg. W. G. Hunter, 211th Penn. Provost Marshal July 20, 1865. *Spec.* 3996.
548	McBride, P., Pt., D, 1st New York, age 23.	Sept. 1, 1, '62.	Left; sloughing. Disch'd April 4, 1863.
549	McCaffrey, P., Pt., C, 5th N. Jersey, age 29.	Sept. 14, 14, '64.	Right; ant. post. flap. Surg. H. F. Lyster, 5th Mich. Disch'd Apr. 17, 1865. *Spec.* 4112.
550	*McCaleb, B.*, Pt., D, 1st Tenn. Cav., age 25.	Sept. 22, 23, '64.	Right; ant. post. flap; bone prot.; gang. Disch'd Nov. 23, 1865.
551	McCann, A. J., Serg't, K, 36th Wis., age 23.	June 17, 17, '64.	Right; circ. Surg. N. Hayward, 20th Mass. Disch'd Sept. 27, '64.
552	McCann, D., Pt., D, 40th New York, age 39.	Nov. 27, 28, '63.	Left; ant. post. flap. Discharged Nov. 8, 1864.
553	McCann, H., Serg't, A, 95th Penn., age 21.	April 2, 2, '65.	Left; flap. Surg. C. C. McGlaughlin, 95th Penn. Disch'd —, 1865.
554	McCarthy, B., Pt., K, 170th N. Y., age 28.	June 16, 17, '64.	Left; circ. Surg. D. W. Maull, 1st Del. May, '65, seq. rem. Disch. Oct. 19, '65. Died April 5, '70. *Spec.* 1581.
555	McCarthy, J., Pt., D, 139th N. Y., age 21.	June 1, 2, '64.	Right; circ. Dec. 30, dead bone remo'd. Disch'd May 22, 1865.
556	McCarthy, W., Pt., B, 27th Michigan.	Oct. 11, 11, '63.	Left. Disch'd May 29, 1865.
557	McCaughey, T. M., Pt., D, 74th Ill., age 18.	May 17, 18, '64.	Left. Surg. W. P. Pierce, 88th Ill. Disch'd May 18, '65; never healed. Died Jan. 20, 1867.
558	McClellan, W. R., Serg't, A, 209th Penn., age 27.	Mar. 25, 25, '65.	Left; circ. flap. Surg. W. G. Hunter, 211th Penn. Disch'd July 28, 1865. *Spec.* 4029.
559	McCloskey, Pt., U. S. Marines, age 28.	March 8, 8, '62.	Left. Disch'd Aug. 21, '62. Died January 14, 1863.
560	McColloch, W. M., Pt., K, 20th Indiana.	June 25, 26, '62.	Left; flap. Confederate surgeon. Disch'd August 8, 1862.
561	McConnell, A. F., Corp'l, K, 121st Ohio, age 24.	Mar. 16, 16, '65.	Right; double flap. Surg. T. B. Williams, 121st Ohio. Disch'd June 16, 1865.
562	*McConnell, J.*, Capt., F, 4th Georgia, age 22.	Mar. 25, 26, '65.	Left; circ. A. Surg. E. M. Smyser, 48th Penn. Released June 14, 1865. *Spec.* 3993.
563	McConnell, J. J., Serg't, G, 3d Ind. Cav., age 25.	Oct. 11, 12, '63.	Right; ant. post. flap. Surg. E. W. H. Beck, 3d Ind. Cavalry. Disch'd Sept. 5, 1864.
564	*McCord, T. N.*, Pt., Forest's Cavalry, age 28.	Aug. 21, 22, '64.	Left; ant. post. flap. A. Surg. J. C. G. Happersett, U. S. A. Retired March 16, 1865.
565	*McCready, J. A.*, Serg't, E, 12th Ala., age 29.	Sept. 20, 20, '64.	Right; circ. Confed. surgeon. Prison Jan. 5, 1865.
566	*McCutcheon, G. H.*, Pt., E, 6th South Carolina.	Sept. 30, Oct. 2, '64.	Left; post. flap; (also w'd of head, arm, and foot.) A. Surg. S. P. Breckinridge, C. S. A. Recovery. *Spec.* 5515.
567	McDonald, D., Serg't, A, 101st New York, age 24.	July 21, 21, '64.	Right; flap. Surg. G. M. Beaks, 141st N. Y. Dec. 10, gangrene. Disch'd Sept. 20, 1865.
568	McDonald, J., Pt., D, 4th New Jersey, age 23.	April 2, 2, '65.	Left; circ. Surg. H. Plumb, 2d Conn. Heavy Artillery. Disch'd Sept. 11, 1865.
569	*McDonald, P.*, Pt., F, 54th Tenn., age 25.	Sept. 19, 19, '63.	Left. Surg. — Smith, C. S. A. Transf'd June 16, 1865.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
570	McDowell, C., Pt., I, 117th New York, age 21.	July 4, 4, '64.	Right; ant. post. flap Surg. H. W. Carpenter, 117th New York. Disch'd Jan. 19, 1866. *Spec.* 390.
571	McElroy, R. D., Pt., A, 4th N. Y. H. A., age 38.	June 18, 18, '64.	Left; circ. Surg. H. C. Tompkins, 4th N.Y.H.A. Dis. Nov. 21, '64.
572	*McFarland, J. H.*, Capt., G, 1st Missouri.	May 16, 17, '63.	——. Surg. — Taylor, C. S. A. Recovery.
573	*McGaha, W. H.*, Pt., A, 2d Virginia.	July 3, 3, '63.	Right. Surg. — Strath, C. S. A. Exchanged March 3, 1864.
574	McGuire, T., Pt., D, 21st Illinois, age 22.	June 21, 21, '64.	Right; flap. A. Surg. J. L. Reat, 21st Ill. Disch'd Feb. 27, 1865.
575	McIntire, H., Pt., C, 12th New Jersey, age 21.	Mar. 28, 29, '65.	Left; ant. post. flap. Surg. S. H. Plumb, 82d N. Y. Disch'd June 6, 1865.
576	*McKinney, J. F.*, Pt., F, 44th Miss., age 26.	Dec. 16, 16, '64.	Right; ant. post. flap. Provost Marshal March 27, 1865.
577	McKinstrey, R., Pt., C, 70th New York.	June 25, 25, '62.	Right. Surg. T. Sim. U. S. V. Disch'd Sept. 29, 1862.
578	McMahon, H. F., Pt., L, 1st Mass. Artillery.	June 16, 17, '64.	Left; circ. Disch'd Nov. 14, '64.
579	McMahon, M., Pt., D, 15th Infantry, age 19.	July 3, 4, '64.	Right; ant. post. flap. Disch'd Aug. 29, 1865.
580	McMahon, P., Pt., G, 32d Wis., age 27.	Mar. 22, 22, '65.	Left; flap. Surg. A. B. Monohan, 63d Ohio. M. out June 20, '65; not healed 1870.
581	*McMann, J.*, Pt., F, 48th Alabama, age 18.	July 2, 3, '63.	Left. Exch'd Sept. 25, '63, and furloughed.
582	McManus, J., Serg't, G, 69th Indiana.	May 16, 16, '63.	Right; flap. Disch'd Nov. 6, '63.
583	McMillan, C., Corp'l, F, 4th West Virginia.	May 19, 20, '63.	Left. Disch'd Sept. 22, 1863.
584	McRea, P., Pt., H, 153d New York, age 24.	Sept. 19, 19, '64.	Right; circ. Surg. N. L. Snow, 153d N. Y. Disch'd June 14, '65.
585	Meaker, W., Pt., G, 5th Michigan, age 19.	June 16, 17, '64.	Left; circ. Surg. H. F. Lyster, 5th Mich. Disch'd Nov. 9, '65. *Spec.* 3218.
586	*Meetz, T.*, Corp'l, C, 5th Alabama, age 31.	Oct. 19, 19, '64.	Left; ant. post. flap. Surg. — Mushett, 5th Ala. Prison Feb. 10, 1865.
587	Meidam, S., Pt., E, 5th Wis., age 17.	April 2, 2, '65.	Left; flap. Disch'd Sept. 1, 1865.
588	*Meinhart, P.*, Pt., D, 6th Louisiana.	May 4, 5, '63.	Right. Surg. W. A. Robertson, 6th La. Recovery.
589	Meis, W., Pt., E, 9th N. Jersey, age 30.	May 6, 6, '64.	Right; flap. Disch'd Feb. 12, 1865.
590	Meissner, D. F., Pt., K, 34th N. Jersey, age 19.	July 10, 12, '64.	Left; flap. Disch'd Nov. 2, 1864.
591	Merrick, G. W., Major, 187th Penn., age 26.	June 18, 18, '64.	Right; circ. Disch'd Sept. 30, 1864.
592	Merrill, C., Pt., K, 4th New Hampshire.	Aug. 27, 27, '63.	Right; flap. Surg. S. A. Green, 24th Mass. Disch'd Nov. 25, '63.
593	Mersheimer, G., Pt., D, 109th Penn., age 22.	June 16, 16, '64.	Right; flap. Surg. J. L. Dunn, 109th Penn. Disch'd Aug. 2, '65.
594	Messer, S. L., Pt., E, 20th Maine, age 33.	Mar. 31, 31, '65.	Left; flap; erysip. Discharged August 17, 1865.
595	*Milan, J. K.*, Lieut., F, 17th Arkansas.	June 11, 11, '63.	Right. Surg. — Mitchell, C. S. A. Furloughed Oct. 9, 1864.
596	Miles, J., Pt., F, 53d Ind., age 22.	Nov. 24, 24, '64.	Right; circ. Disch'd June 26, '65.
597	Miller, C., Pt., E, 43d New York, age 20.	May 5, 6, '64.	Left; flap. Disch'd Dec. 24, 1864.
598	Miller, C. A., Pt., G, 20th Wisconsin, age 27.	April 27, 27, '65.	Left; circ. Surg. O. Peabody, 23d Iowa. Gang. Dis. Aug. 5, '65.
599	*Miller, F. M.*, Pt., Nelson Battery.	July 18, 18, '64.	——. Surg. — Love, C. S. A. Recovery.
600	Miller, J., Corp'l, F, 2d Artillery, age 33.	Aug. 11, 11, '64.	Right; flap. A. A. Surg. Maxwell. Fort McHenry July 2, 1865.
601	Miller, J., Pt., K, 118th Penn., age 30.	Sept. 30, Oct. 1, '64.	Left; circ. Mar. 29, '65, bone rem. Disch'd Sept. 9, 1865. *Spec.* 4349.
602	Miller, J., Corp'l, B, 73d Ohio, age 25.	Mar. 19, 19, '65.	Right; circ. Disch'd August 22, 1865.
603	Miller, J., Pt., C, 18th Kentucky, age 38.	Aug. 30, 30, '62.	Left; flap; bone exp. rem. Disch. April 23, 1864. *Spec.* 1094.
604	*Millis, H. C.*, Lieut., B, 45th North Carolina.	Oct. 14, 14, '63.	Left. Surgeon — Butts, C. S. A. Recovery.
605	Mills, S. S., Serg't, B, 7th Minnesota, age 39.	Dec. 16, 17, '64.	Right; circ. Surg. V. P. Kennedy, 5th Minn. Disch'd Mar. 28, '65.
606	Minnich, A., Serg't, K, 200th Penn., age 24.	Mar. 25, 27, '65.	Right; ant. post. flap. Surg. W. O. McDonald, U. S. V. Disch'd July 19, 1865. *Spec.* 4134.
607	*Minshew, J.*, Pt., G, 50th Georgia, age 29.	July 2, 3, '63.	Left; nec. bone rem'd. Provost Marshal Sept. 28, 1863.
608	*Mitchell, S. J.*, Corp'l, A, 58th Virginia, age 32.	May 29, 30, '64.	Right; ant. post. flap. Prison Oct. 1, 1864.
609	Moffitt, S., Lieut.-Col., 96th N. Y., age 28.	Oct. 27, 28, '64.	Left; circ. A. Surg. W. Woodward, 39th Ill., and Surg. T. H. Squire, 89th N. Y. Must. out.
610	Molegan, L. G., Pt., H, 32d Mass., age 24.	Oct. 19, 19, '64.	Left; lat. flap. Dis. Sept. 8, '65. Died Oct. 22, '69; anæmia and pain resulting from amputation.
611	Monroe, E., Pt., H, 59th Illinois, age 24.	Dec. 15, 15, '64.	Right; circ. M. out May 27, '65.
612	*Moore, A. M.*, Pt., Washington Bat., age 18.	April 2, 2, '65.	Right. Released June 21, 1865.
613	Moore, P., Pt., E, 1st Vt. H. Art., age 19.	June 1, 2, '64.	Left; double flap. Surg. C. B. Park, 1st Vermont H. A.; necro. Disch'd August 11, 1865.
614	Moore, H. F., Pt., C, 20th Penn. Cav., age 19.	April 9, 9, '65.	Right; circ. Disch'd April 11, '66.
615	Morton, H., Serg't, D, 23d Wis., age 25.	Nov. 3, 4, '63.	Left; flap. Surg. J. S. McGrew, 83d Ohio. Disch'd Mar. 10, '64.
616	[1]Morse, S. L., Pt., E, 24th Iowa.	May 16, 16, '63.	Right; double flap; gangrene. Disch'd Sept. 15, 1863.
617	Moss, E., Pt., F, 7th Col'd Artillery, age 23.	Oct. 30, 30, '64.	Right; flap. Recovered.
618	Mothersbaugh, S., Pt., B, 91st Penn., age 35.	Oct. 27, 27, '64.	Right; ant. post. flap. Disch'd July 13, 1865.
619	Muller, G., Pt., A, 40th New York, age 32.	July 2, 4, '63.	Right; antero-rectangular. Dis. Feb. 20, 1864. *Spec.* 1478.
620	Murphy, D., Pt., D, 20th Mass., age 23.	Dec. 13, 13, '62.	Left. Surg. J. Dwinelle, 106th Penn. Disch'd Sept., 1863.
621	*Murphy, J. D.*, Serg't, F, 42d Tenn., age 18.	Nov. 30, Dec. 1, '64.	Left; circ. A. Surg. A. I. Gustine, 48th Tenn. Pro. Mar. May 6, '65.
622	Murphy, P., Corp'l, H, 147th N. York, age 22.	May 12, 12, '64.	Left; flap. Surg. A. S. Coe, 147th N.Y. Disch'd Sept. 9, 1865.
623	*Murray, R. W.*, Pt., F, 4th Texas.	May 6, 6, '64.	Right. Surg. R. M. Terrill, P. A. C. S. Recovery.
624	Murray, M., Pt., A, 4th Delaware, age 19.	June 2, 3, '64.	Left; flap. Surg. A. S. Coe, 147th N. Y. Disch'd May 16, 1865.
625	Murray, R, Corp'l, D, 2d N. York M. R., age 18.	Sept. 30, 30, '64.	Left; double flap. Surg. R. T. Paine, jr., 2d N. Y. M. R. Gang. Disch'd June 15, 1865.
626	Myers, C., Pt., 1st Conn., age 32.	April 5, 6, '65.	Right; circ. Surg. E. Bentley, U. S. V. Disch'd July 10, 1865.
627	Naragon, A. C., Pt., F, 19th Ohio, age 24.	Sept. 19, 21, '63.	Left; circ. flap. Confed. surgeon. Disch'd Sept. 25, 1864.
628	Naughton, E., Pt., F, 3d N. Jersey Cav., age 21.	Aug. 25, 25, '64.	Left; ant. post. flap Surg. W. W. Bowlby, 3d N. J. Cav. Disch'd Oct. 26, '65. April 20, '68, flap reamp. mid. third. *Spec.* 2443.
629	Neat, W., Pt., I, 28th Ill.	Oct. 4, 4, '62.	Right; circular. Reamputation. Disch'd April 17, 1863.
630	Neidhart, J., Lieut., D, 10th Conn., age 24.	Mar. 30, 30, '65.	Right. Surg. C. M. Clark, 39th Illinois. M. out Sept. 2, 1865.
631	Newell, A., Pt., F, 14th Ohio, age 17.	June 14, 14, '64.	Left; circ.; flap. Surg. G. E. Sloat, 14th Ohio. Disch'd June 21, '65.
632	Newell, T. L., Pt., F, 11th Penn., age 19.	May 8, 10, '64.	Left; circ. Disch'd July 21, '65.
633	Newton, J. M., Serg't, D, 12th Illinois.	Oct. 3, 5, '62.	Left; flap. Disch'd May 13, '65.
634	Nice, W. T., Pt., B, 1st Penn. Artillery.	Dec. 13, 13, '62.	Right. Disch'd June 3, 1863.
635	Nichols, H., Pt., K, 138th Penn., age 20.	June 2, 2, '64.	Right; circ.; bone prot. Sept. 27, reamp.; ant. post. flap, middle third. Disch'd April 19, 1865.
636	Nickason, A., Serg't, I, 75th New York, age 35.	Sept. 19, 19, '64.	Left; circ. A. Surg. B. Fordyce, 160th N.Y. Disch'd May 25, '65.
637	Nickle, J., Serg't, H, 140th Penn., age 24.	Dec. 9, 10, '64.	Right; ant. post. flap. Surg. J. W. Wishart, 140th Penn. Disch'd May 19, 1865.
638	Nigh, J., Serg't, C, 35th Illinois, age 33.	Sept. 19, 19, '63.	Right; flap. Surg. S. B. Hawley, 35th Illinois. M. out July, 1864.
639	*Norman, W. B.*, Pt., D.	Sept. 3, 4, '64.	Right; circ. Surg. — Barr, C. S. A. Prison Nov. 19, 1864.
640	Norris, J. A., Capt., C, 98th Ohio.	July 20, 20, '64.	Right. Surg. T. B. Williams, 121st Ohio. Disch'd Oct. 3, 1864.
641	Obier, J., Pt., E, 1st Delaware, age 27.	Dec. 13, 14, '62.	Right. Surg. D. W. Maull, 1st Del. Dec. 28, reamp. mid. third. A. A. Surg. H. Stone. Nec. May 7, '64, reamp. up. third. A. A. Surg. R. J. Lewis. Disch. Dec. 3, '64.
642	O'Brien, P., Pt., G, 34th Mass., age 27.	June 18, 18, '64.	Left; flap; sloughing. Disch'd February 4, 1865.
643	O'Bryan, P., Pt., F, 7th Maine, age 35.	Sept. 17, —, '62.	Left. Disch'd June 29, '63. Died July 9, '66; effects of amp.
644	Oliver, J., Pt., L, 72d Pennsylvania.	Sept. 17, 18, '62.	Right. Surg. S. G. Lane, 5th Pa. Res. Disch'd Dec. 1, 1862.
645	Oliver, J., Pt., A, 2d Michigan Cavalry.	Oct. 8, 8, '62.	Left; flap. Surg. C. L. Henderson, 2d Mich. Cav. Dis. Dec. 17, '62.
646	Ordway, A., Pt., L, 1st Maine Cavalry.	June 22, 23, '64.	Left; circ. Mustered out.
647	Osborne, J., Pt., G, 132d Pennsylvania.	May 3, 3, '63.	Left; circ. Disch'd Nov. 7, 1863.
648	*Oslin, J. O.*, Pt., A, 2d Tennessee.	Sept. 20, 20, '63.	Left. Surgeon — Holt, C. S. A. Recovery.
649	*Ollew, J. B.*, Pt., A, 43d N. C., age 26.	Oct. 19, 19, '64.	Left. Pro. Marshal April 1, 1865.
650	Ott, C. A., Pt., B, 155th Penn., age 19.	June 18, 19, '64.	Left; circ. Surg. J. A. E. Reed, 155th Penn. Gangrene. Disch'd May 25, 1865.
651	Palmer, H. H., Corp'l, B, 2d Ohio Cavalry.	July 3, 3, '63.	Right; circular. Confed. surgeon. Discharged.
652	Park, G. A., Pt., A, 81st Ohio, age 29.	Aug. 25, 25, '64.	Left; flap. Surg. W. C. Jacobs, 81st Ohio. Disch'd May 5, 1865.
653	Park, S. W., Colonel, 2d New York, age 36.	May 3, 3, '63.	Right. Surg. H. McLane, 2d N.Y. Mustered out May 26, 1863.
654	Parker, M., Pt., H, 1st Arkansas, age 20.	May 16, 17, '64.	Left; circ. Surg. C. E. Swasey, U. S. V. Disch'd July 19, 1865.

[1] Bryan (J), *loc cit.*, p. 287.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
655	Parker, M. F., Pt., E, 19th Michigan, age 25.	May 15, 16, '64.	Left; flap. Surg. J. Bennett, 19th Mich. Disch'd Oct. 16, 1864.
656	Parker, W., Pt., I, 1st Mass. H. Art'y, age 27.	June 16, 18, '64.	Right; circ. Disch'd Feb. 27, '65.
657	Parker, W. F., Pt., F, 10th Iowa, age 21.	Oct. 21, 21, '64.	Left; circ. Surg. R. J. Mohr, 10th Iowa. Disch'd Aug. 21, 1865.
658	Parquette, H., Pt., I, 1st N. H. H. Art'y, age 21.	Sept. 14, 14, '64.	Right. (Teale's method.) Surg. R. B. Bontecou, U. S. V. Gang.; hæm. Dis. Oct. 1, '65. *Spec.* 3244.
659	Parquetti, J., Pt., B, 1st California Cavalry.	July 29, 30, '65.	Left; circ. A. Surg. H. E. Brown, U. S. A. Disch'd June 25, 1866. *Spec.* 4383.
660	Parsons, W. D., Pt., B, 2d Vermont, age 18.	April 2, 2, '65.	Right; circ. Surg. C. B. Park, jr., 11th Vt. Disch'd Aug. 11, '65.
661	*Patterson, W. H.*, Lieut., C, 37th Virginia.	Aug. 2, 2, '64.	——; ant. post. flap. A. Surg. Anderson, C. S. A. Prov. Mars. Nov. 1, 1864.
662	*Payne, L. D.*, Serg't, D, 44th Virginia, age 22.	Mar. 25, 25, '65.	Left. A. Surg. E. P. Roche, 35th Mass. Released June 14, 1865. *Spec.* 4015.
663	Peak, R., Pt., E, 66th Illinois, age 19.	Aug. 4, 4, '64.	Left; ant. post. flap. Surg. J. Pogue, 66th Ill. Erysip. Feb. 21, '65, reamp. mid. third; circ. flap. A. A. Surg. S. W. Thompson. Mustered out July 19, '65.
664	Perkins, G., Pt., A, 64th New York, age 22.	Mar. 25, 26, '65.	Left; ant. post. flap. Surg. M. H. Raymond, 26th Mich. Exfol. Disch'd Nov. 17, 1865.
665	Perkins, H. E., Serg't, C, 7th Vt., age 22.	Mar. 29, 29, '65.	Left; flap. Surg. C. Winne, 77th Illinois. Disch'd Nov. 25, 1865.
666	Perrin, W. S., Lieut., C, 1st R. I. Art'y, age 24.	Aug. 25, 26, '64.	Right; circ. Disch'd Feb. 4, '65. Died August 13, 1876.
667	Peters, J., Pt., K, 203d Penn., age 30.	Jan. 15, 15, '65.	Right; circ. Surg. L. Barnes, 6th Col'd Troops. Bone prot. Disc'd July 18, 1865.
668	Philo, E. R., Pt., I, 1st Sharpshooters, age 24.	Aug. 15, 15, '64.	Left; ant. post. flap. Discharged March 2, 1865.
669	*Picquet, L. A.*, Pt., A, 63d Georgia.	May 28, 30, '64.	——. Surg. — Brown, C. S. A. Recovery.
670	Pierce, C. L., Lieut., K, 9th N. Y. Cav., age 23.	April 1, 1, '65.	Right; flap. Surgs. R. Curran, 9th N. Y. Cav., and A. P. Clark, 6th N. Y. Cav. M. out Sept. 25, '65.
671	Pierce, T. D., Pt., A, 8th Tenn., age 37.	Nov. 28, 28, '64.	Left; circ. Surg. J. Sparks, 8th Tenn. Disch'd March 18, 1865.
672	Pine, J. A., Pt., I, 168th Ohio, age 18.	June 11, 11, '64.	Right; ant. post. flap. Dr. McNeese. Disch'd Oct. 18, 1864.
673	Pinson, J. V., Pt., K, 31st Indiana.	April 6, 6, '62.	Left. Disch'd October 7, 1862.
674	Plunkett, C., Pt., B, 4th Rhode Island, age 27.	July 15, 15, '64.	Left; ant. post. flap. A. Surg. R. Millar, 4th R. I. M. out Oct. 15, 1864.
675	Pool, D. E., Pt., D, 53d Illinois.	July 14, 16, '63.	Left; circ. Surg. Hinkley. Two subs. oper. Disch'd Oct. 10, '63.
676	*Pope, W.*, Pt., K, 10th Alabama.	May 3, 4, '63.	Left. Surg. — Taylor, C. S. A. Furloughed July 3, 1863.
677	Poulson, W. S., Corp'l, F, 98th Ohio.	Oct. 8, 10, '62.	Right; flap. Surg. S. Marks, 10th Wis. Disch'd Feb. 15, 1863.
678	[1] *Powell, J. W.*, Pt., A, 19th Alabama.	Sept. 19, 19, '63.	——. Recovery.
679	Powell, S., Corp'l, F, 21st Ohio, age 20.	Aug. 11, 11, '64.	Left; flap. Surg. D. S. Young, 21st Ohio. Gang.; necro. bone rem. Disch'd June 5, 1865.
680	Powers, D., Pt., E, 35th Indiana.	Jan. 2, 3, '63.	Left. Surg. C. J. Walton, 21st Ky. Mustered out Mar. 27, '63.
681	*Price, E.*, Pt., B, 35th Virginia Cavalry.	Nov. 29, 30, '63.	Left. Recovery.
682	*Prince, S. W.*, Pt., I, 24th South Carolina, age 17.	Nov. 30, De. 1, '64.	L't; lat. flap. Surg. McKinley, C. S. A. Gang. Pro. Mar. May 30, '65.
683	Printy, T., Pt., G, 20th Indiana, age 33.	June 25, 26, '62.	Right; doub. flap. Confed. surg. Disch'd July 8, '63. *Spec.* 367.
684	Prior, W., Pt., H, 72d Pennsylvania.	Sept. 17, 18, '62.	Right; flap. Surg. B. A. Vanderkieft, U. S. V. Dis. Jan. 11, '63.
685	Quinn, J., Pt., G, 21st Penn. Cav., age 22.	Oct. 27, 27, '64.	Left; flap. Disch'd Oct. 17, 1865.
686	Quinn, M., Pt., B, 55th New York.	June 27, 27, '62.	Left. Disch'd Feb. 13, 1863.
687	*Quinn, M.*, Pt., A, 14th Louisiana.	Aug. 28, 28, '62.	Left. Surg. — White, C. S. A. Gang.; abscess, fistulæ. Recov.
688	Rabardy, J., Pt., K, 12th Massachusetts.	Sept. 17, 17, '62.	Left. Surg. J. McL. Hayward, 12th Mass. Disch'd Dec. 1, '62.
689	Ragan, J., Pt., B, 4th Mass. Cav., age 19.	Oct. 27, 27, '64.	R't. Con. surg. Kebel. Mar. 3, '65. reamp.; circ. A. A. Surg. F. H. Getchell. Disch'd July 27, '65.
690	*Raley, C. S.*, Pt., G, 60th Georgia.	Mar. 5, 5, '65.	——. Provost Marshal May 10, 1865.
691	Ramsey, W. R., Serg't, F, 150th Penn.	May 6, 8, '64.	Left; flap. Confed. surg. Disch'd June 3, 1865.
692	Rausher, H., Pt., D, 25th Iowa, age 24.	Sept. 1, 2, '64.	Left; ant. post. skin flap; gang. Nit. acid. Disch'd Sept. 12, '65.
693	Raynor, L. H., Pt., F, 1st Vermont, age 21.	June 4, 4, '64.	R't; lat. flap. Surg. C. B. Park, jr., 1st Vt. H. A. Gang. Disch'd Feb 21, '65. 1870, stump bad.
694	Reason, W., Pt., H, 2d Cavalry, age 22.	Sept. 14, 15, '64.	Right; skin flaps; circ. muscle. A. A. Surg. W. B. McCausland. Duty Apr. 2, '65. *Sps.* 3914, 1574.
695	*Reagan, W. B. L.*, Lieut., 16th Tenn. Bat., age 25.	July 24, 24, '64.	Right. Surg. — Love, P. A. C. S. For exch. Nov. 22, 1864.
696	Rector, C. J., Lieut., C, 185th N. York, age 21.	Mar. 29, 29, '65.	Left; double flap. Surg. P. L. Sonnick, 187th N. Y. Must. out May 29, 1865.
697	Reed, G. P., Sergeant, I, 104th Ohio, age 32.	June 11, 11, '64.	Left; circ. Surg. J. H. Rodgers, 104th Ohio. Disch'd Oct. 25, '64.
698	Reeves, J. J., Pt., F, 1st Maine H. A., age 27.	June 18, 19, '64.	Left; flap. Disch'd Dec. 3, 1864.
699	Regner, M., Pt., E, 6th Wisconsin, age 25.	Feb. 6, 7, '65.	Left; circ. Disch'd Aug. 21, '65.
700	*Reitzel, H. J.*, Pt., A, 12th North Carolina.	July 20, 20, '64.	——. Surg. — Hinkle, C. S. A. Recovery.
701	Renner, A., Pt., K, 26th Iowa, age 16.	May 14, 14, '64.	Left; flap. Surg. A. Sabine, 76th Ohio. Sept., 1864, bone exfol. Jan., 1865, reamp.; double flap, middle third. A. A. Surg. J. M. Adler. Disch'd May 26, 1865.
702	Reynolds, E. B., Pt., 3d Iowa Battery, age 18.	Mar. 7, 8, '62.	Right. Surg. B. J. Newland, 22d Ind. Disch'd July 6, 1863.
703	Rice, A. V., Colonel, 57th Ohio, age 27.	June 27, 27, '64.	Right; circ. Surg. A. C. Messenger, 57th Ohio. Recovery. Promoted. Mustered out.
704	Rice, A. D., Pt., B, 38th Wisconsin, age 17.	April 3, 3, '65.	Left; circ. Surg W. C. Shurlock, 51st Penn. Disch'd Aug. 12, '65.
705	Rice, E., Pt., F, 113th Ohio, age 25.	June 22, 23, '64.	R't; flap. Surg. A. Wilson, 113th Ohio. Disch'd May 3, 1865.
706	Rice, L., Pt., K, 16th Michigan, age 22.	Sept. 30, 30, '64.	Left; flap. Disch'd Mar. 21, 1865.
707	*Rice, W. H.*, Captain, Rice's Battery.	Oct. 3, 3, '61.	Left. Surg. — Daily, C. S. A. Recovery.
708	*Richards, R.*, Pt., C, 51st Virginia, age 27.	Aug. 17, 18, '64.	Right. Prison Nov. 19, 1864.
709	Ricker, J. W., Lieut., I, 48th Massachusetts.	May 27, 27, '63.	Right; flap. Surg. Y. G. Hurd, 48th Mass. M. out Sept. 3, '63.
710	Rider, J., Pt., D, 98th Illinois.	Sept. 19, 19, '63.	Right. Disch'd May 2, 1864.
711	*Rider, J. F.*, Pt., A, 4th Virginia, age 37.	May 3, 5, '63.	Right; ant. post. flap. Furl'd June 14, 1863. Recovered with good stump.
712	*Ried, L. W.*, Adj., 25th Virginia Cavalry.	Oct. 8, 9, '64.	——. Surg. — Fleming, C. S. A. Recovery.
713	Riggs, H., Pt., F, 27th Ohio.	Oct. 4, 6, '62.	Right; circ. Disch'd Apr. 8, '63.
714	Rigsbey, N. L., Pt., A, 19th Indiana, age 20.	June 20, 20, '64.	Right: circ. Surg. J. Ebersole, 19th Ind. Disch'd Nov. 14, '64.
715	Riley, H., Pt., F, 13th Infantry, age 30.	Dec. 29, 29, '62.	R't. Surg. E. O. F. Roller, 55th Ill. Gang. Feb., '64. seq. rem. Disch. Nov. 19, '64. Died Oct. 10, '68. *Spec.* 2676.
716	*Rind, E.*, Pt., B, 5th Tennessee.	June 25, 25, '64.	Left. Surg. — Carder, C. S. A. Recovery.
717	Ritchey, D., Pt., K, 208th Penn., age 25.	Mar. 25, 25, '65.	Left; ant. post. flap. A. Surg. W. Carroll, U. S. V. Disch'd June 28, 1865. Died May 14, 1872; lung disease. *Spec.* 4132.
718	*Roach, J. F.*, Lieut., E, 45th N. C., age 20.	Sept. 19, 19, '64.	Right; circ. Surg. — Singlet, C. S. A. Prison Nov. 19, 1864.
719	Roberts, C., Pt., H, 45th Ohio, age 23.	June 27, 27, '64.	Right: ant. post. flap. Surg. F. H. Kearney, 45th Ohio. Gang.; end of bone exp. Disch'd June 27, '65.
720	Roberts, O. D., Serg't, H, 118th Penn.	Sept. 30, 30, '64.	Left; circ. Disch'd July 18, '65.
721	Roberts, W. W., Corp'l, A, 8th Illinois Cavalry.	Oct. 12, 12, '63.	Left; circ. A. Surg. T. W. Stull, 8th Ill. Cav. Disch'd Apr. 27, '64.
722	*Robertson, J.*, Pt., I, 18th Mississippi.	May 8, 8, '64.	——. Surg. — Griffin, 18th Miss. Recovery.
723	Robinett, M. P., Pt., E, 65th Ohio, age 20.	Nov. 29, 30, '64.	Right; flap. Confed. surg. Disch. Sept. 6, 1865.
724	*Robinson, J. B.*, Serg't, B, 18th South Carolina.	Mar. 25, 25, '65.	Right; circ. Surg. W. L. Bayler, C. S. A. Prov. Mar. May 10, '65.
725	Rodgers, T. J., Pt., E, 47th Ohio, age 20.	July 22, 22, '64.	Right; flap. Surg. S. P. Bonner, 47th Ohio. Disch'd June 30, '65.
726	*Rogers, C. H.*, Corp'l, I, Cobb's Legion Cav.	Nov. 27, 27, '63.	Right. Surg. — Taylor, C. S. A. Furloughed Jan. 26, 1864.
727	Rogers, G., Pt., C, 2d Michigan, age 24.	July 11, 11, '63.	Left; circ. Disch'd June 6, 1864.
728	Rose, E. E., Pt., F, 47th Indiana, age 34.	Mar. 27, 27, '65.	Left; flap. Surg. J. L. Dicken, 47th Ind. Disch'd July 26, '65.
729	Rose, F., Pt., D, 57th N. York, age 20.	Oct. 14, 15, '63.	Right; circ.; (amp. arm.) Surg. W. W. Potter, 57th N. Y. Seq. rem. Dis. Oct. 3, '64. *Spec.* 3104.
730	Rose, H. A., Pt., F, 10th N. Y. Cavalry, age 16.	July 30, 30, '64.	Left; ant. post. flap. Subs. oper. Disch'd Feb. 7, 1865.
731	Ross, H., Pt., A, 16th Iowa.	May 21, 21, '63.	Left; flap. Surg. J. Pomerene, 42d Ohio. Disch'd Aug. 28, '63.
732	Ross, W. E. W., Lieut. Col., 31st Col'd Troops.	July 30, 30, '64.	Left; circ. Surg. J. P. Prince, 36th Mass. M. out Mar. 11, '65.
733	Roth, J., Pt., B, 12th Missouri, age 23.	May 14, 14, '64.	Left; flap. Surg. A. T. Hudson, 26th Iowa. Gang. Discharged April 18, 1865.
734	Rourke, J., Pt., I, 1st Louisiana Cav., age 25.	Jan. 30, 31, '65.	Left; flap. A. A. Surg. J. Brady. Disch'd Oct. 19, 1865.
735	*Royal, H. S.*, Serg't, A, 30th N. C., age 26.	May 3, 3, '63.	——; circ. Surg. — Bridges, C. S. A. Furl'd June 23, 1863.

[1] TERRY (C.), *loc. cit.*, p. 76.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
736	Runyon, J. A., Lieut., A, 74th Indiana, age 18.	June 14; 14, '64.	Right; circ. Disch'd Nov. 5, '64.
737 738	*Rush, C. G.*, Pt., C, 21st Georgia, age 22.	Mar. 25, 25, '65.	Both; ant. post. flap. Surg. L.W. Bliss, 51st N. Y. Released Aug. 2, 1865. *Spec.* 3998.
739	Rust, C. W., Serg't, C, 8th Kansas, age 22.	Dec. 15, 15, '64.	Right; circ. Surg. H. B. Tuttle, 89th Ill. Disch'd June 14, 1865.
740	*Ryan, J. A.*, Lieut., L, 5th Virginia.	May 3, 3, '63.	Right; ant. post. flap. Surg. J. W. Walls, P. A. C. S. Retired Feb. 16, 1864.
741	Ryan, T., Pt., G, 90th Illinois, age 28.	Nov. 25, 27, '63.	Left; flap. Surg. H. Strong, 90th Illinois. Disch'd March 19, '65.
742	Saeger, D. L., Pt., A, 19th Ohio, age 24.	Sept. 2, 3, '64.	Right; flap. Surg. B. M. Failer, 19th Ohio. Gang. Disch'd May 16, 1865.
743	Sage, W., Pt., E, 42d Ohio.	May 1, 1, '63.	Left; flap. Surg. J. Pomerene, 42d Ohio. Disch'd July 23, '63.
744	Saila, A., Corp'l, I, 65th Ohio, age 24.	June 18, 19, '64.	Left; flap; gangrene. Disch'd Aug. 17, 1865.
745	Saladal, L., Pt., E, 9th N. Hampshire, age 23.	July 30, 30, '64.	Left; anterior post. flap. Disch'd March 29, 1866.
746	Sanborn, S. F., Pt., E, 21st Wisconsin, age 24.	Sept. 1, 2, '64.	Right; circular. Surg. S. Marks, 10th Wis. M. out May 25, 1865.
747	Sanford, J. R., Capt., B, 33d N. Jersey, age 40.	May 8, 9, '64.	Right; circ. Surg. J. Reily, 33d N. J. Disch'd Sept. 12, 1864.
748	Santo, C., Pt., F, 60th New York, age 20.	July 1, 2, '63.	Left; ant. post. flap; gang.; nec. seq. rem. Disch'd Sept. 20, '64.
749	Santry, J., Pt., I, 14th N. Hampshire, age 20.	Oct. 19, 21, '64.	Left; circ. Surg. W. W. Root, 75th N.Y. Bone prot. Dis. June 6, '65.
750	*Saunders, B.*, Serg't, I, 53d Georgia, age 28.	May —, —, '64.	Right. Surg. J. J. Knott, P. A. C. S. Recovery.
751	Sawyer, J. H., Q. M. Serg't, 36th Mass.	May 31, Je. 1, '63.	Left; double flap. Surg. J. P. Prince, 36th Mass. Disch'd Jan. 19, 1864.
752	[1] Sawyer, W. C., Capt., H, 23d Mass.	Mar. 14, 14, '62.	Left; circ. Surg. G. Derby, 23d Mass. Disch'd Nov. 17, 1862.
753	*Saxon, W. T.*, Serg't, E, 51st Georgia, age 21.	May 3, 3, '63.	Right. Surg. — Todd, C. S. A. Gang.; bone prot. Retired Dec. 22, 1864.
754	*Scales, J. R.*, Pt., H, 43d Alabama.	Sept. 14, 14, '64.	—. Surg. — Luckie, C. S. A. Recovery.
755	Schriner, L., Pt., K, 81st Penn., age 18.	Sept. 17, 19, '62.	Left. Surg. G. B. Cogswell, 29th Mass. Dis. Dec. 27, '62. V. R. C.
756	Schwartz, F., Pt., B, 1st Maryland, age 49.	Aug. 21, 22, '64.	Right; ant. post. flap; gangrene. Mustered out Dec. 24, 1864.
757	Scott, J., Serg't, A, 126th Ohio, age 27.	Oct. 19, 19, '64.	Left; lat. flap. Disch'd May 20, 1865.
758	Scram, J., Pt., D, 134th New York, age 31.	Dec. 19, 19, '64.	Right; flap. Surg. J. L. Dunn, 109th Penn. Dis. Aug. 18, '65.
759	Sebastian, J. M., Serg't, A, 7th Kentucky.	May 16, 16, '63.	Right; flap. Surgs J. Pomerene, 42d Ohio, and W. Berry, 7th Ky. Disch'd Sept. 1, 1863.
760	Serey, J., Pt., K, 17th Conn., age 17.	July 1, 1, '63.	Left; circ. Confed. surg. Disch'd May 14, 1864.
761	Shackley, F. H. M., Corp., B, 32d Maine, age 19.	June 18, 18, '64.	Right; circ.; slough'g; bone prot. Mustered out Dec. 12, 1864.
762	*Shaeffield, W. J.*, Pt., H, 19th Georgia, age 22.	June 18, 18, '64.	Right. Refired March 15, 1865.
763	Shafer, E., Pt., K, 23d Michigan, age 21.	May 15, 15, '64.	Right; circ.; gangrene. Disch'd June 7, 1865.
764	Shaffer, J., Corp'l, C, 61st New York, age 26.	April 7, 7, '65.	Left; circ. Disch'd Nov. 6, 1865.
765	Shaffer, M. V., Pt., G, 105th Penn., age 25.	May 6, 8, '64.	Right; flap. Surg. W. Watson, 105th Penn. Dis. June 17, '65.
766	Shaffer, T., Pt., F, 138th Penn., age 26.	Sept. 21, 22, '64.	Left. Disch'd June 12, 1865.
767	Shane, J. B., Lieut., D, 16th Ky., age 23.	Aug. 6, 7, '64.	Left. Surg. J. H. Rodgers, 104th Ohio. M. out July 15, 1865.
768	Shannon, W. M., Pt., G, 14th W. Va., age 23.	June 18, 18, '64.	Right; circ. Confed. surg. Exfol. rem. Dis. June 2, '65. *Spec.* 108.
769	Shattuck, W. W., Pt., C, 7th Michigan.	May 31, Je. 2, '62.	Left; circ. Disch'd July 18, '62.
770	Shelly, J., Pt., D, 46th Penn., age 24.	July 20, 21, '64.	Left; ant. post. flap. Disc'd June 10, 1865.
771	Shelly, W. H., Pt., I, 5th Michigan, age 26.	May 5, 6, '64.	Left; flap. A. Surg. H. C. Grover, 20th Ind. Disch'd May 6, 1865.
772	Shepardson, C., Corp'l, G, 114th New York.	Sept. 19, 19, '64.	Right; flap. A. Surg. J. Homans, jr., U. S. A. Disch'd June 8, '65.
773	Sherwood, H., Serg't, C, 4th Michigan.	June 20, 22, '64.	Right; flap. Surg. W. H. Gibbon, 15th Iowa. Recovery.
774	Shields, R., Pt., K, 12th Wis. Bat'ry, age 20.	Mar. 21, 21, '65.	Right; circ., with lat. flaps. Surg. A. T. Hudson, 26th Iowa. Discharged Sept. 1, 1865.
775	Shoop, S., Pt., F, 200th Penn., age 23.	Mar. 25, 27, '65.	Right; long ant. short post. flap. Surg. W. O. McDonald, U. S. V. Disch'd July 5, '65. *Spec.* 4136.
776	Short, S. A., Serg't, A, 73d Illinois, age 26.	July 20, 21, '64.	Right; flap. Surg. W. P. Peiree, 88th Ill. Slough'g; hæm.; lig. Disch'd Jan. 18, 1865.
777	Shrieve, A. T., Pt., A, 6th Maryland, age 22.	June 1, 2, '64.	Left; ant. post. flap. Surg. C. T. Simpers, 6th Md. Dis. May 14, '65.
778	Shrum, J., Pt., H, 139th Penn., age 19.	Sept. 19, 19, '64.	Left; lat. flap. Surg. W. A. Barry, 98th Penn. Disch'd Mar. 20, '65. Died Aug. 10, 1870.
779	*Sibley, P. H.*, Pt., E, 18th Mississippi.	May 6, 6, '64.	—. Surg. — Griffin, 18th Miss. Recovery.
780	Sickles, D. E., Major General, U. S. V.	July 2, 2, '63.	Right. Surg. T. Sim, U. S. V. Recovery. *Spec.* 1335.
781	Sieben, J., Serg't, D, 4th New York.	Sept. 17, 19, '62.	Right. Discharged Feb. 9, 1863.
782	Sinks, J. F., Q. M. S'g't, 61st Ohio, age 22.	June 22, 22, '64.	Left; circ. Surg. H. K. Spooner, 61st Ohio. Erysip. Discharged March 31, 1865.
783	Simmons, P., Pt., I, 60th Ohio, age 46.	Aug. 18, 18, '64.	Left; flap. Disch'd Feb. 7, 1865.
784	Sisco, M., Pt., D, 11th Vermont, age 19.	Oct. 19, 20, '64.	Right; flap. Disch'd May 27, '65.
785	Sivert, C. W., Pt., I, 2d West Virginia.	Aug. 23, 23, '62.	Right. Surg. R. W. Hazlett, 2d W. Va. Disch'd Feb. 2, '63. Died April 7, 1876; consumption.
786	Skellie, E., Corp'l, D, 112th New York.	Sept. 29, 29, '64.	R't; circ. Surg. C. E. Washburn, 112th N. Y. Dis. June 24, 1865.
787	Skidmore, G., Pt., I, 53d Ohio, age 39.	June 27, 27, '64.	Left; ant. post. flap. Surg. A. C. Messenger, 57th Ohio. Disch'd Jan. 3, 1865.
788	Slack, O. F., Pt., E, Purnell Md. Leg., age 20.	June 3, 3, '64.	Right; flap. Surg. J. O'Donnell, Purnell Legion. Disch'd Oct. 16, 1864.
789	Slater, W. H., Capt., G, 15th New Jersey.	Dec. 13, 13, '62.	Right. A. Surg. W. E. Mattison, 3d N. J. Disch'd April 22, 1865.
790	Slaughter, J. L., Pt., E, 4th C'd Troops, age 18.	Sept. 29, 29, '64.	Left; circ. A. Surg. G. G. Odiorne, 4th Col'd Troops. Gang. Dis. March 27, 1865.
791	Smathers, H., Pt., E, 53d Ohio, age 23.	June 23, 23, '64.	Left; flap. A. Staff Surg. C. B. Richards, U.S.A. Disch'd June 17, 1865.
792	Smith, E., Pt., B, 4th Col'd Troops, age 18.	Sept. 29, 29, '64.	Right; lat. flap. A. Surg. M. Phillips, 22d Col'd Troops. Disch'd July 19, 1865.
793	Smith, G., Pt., A, 14th Conn., age 19.	Oct. 1, 1, '64.	Right; flap. Surg. F. A. Dudley, 14th Conn. Disch'd June 16, '65.
794	Smith, H., Pt., A, 149th Penn., age 25.	June 1, 1, '64.	Left; ant. post. skin flap; circ. sect. muscles. Disch'd Dec. 8, 1864.
795	Smith, H. C., Pt., A, 10th Conn., age 25.	April 2, 2, '65.	Left; long ant. flap. Surg. T. H. Squire, 89th N.Y. Disch'd July 31, 1865.
796	Smith, J., Serg't, E, 61st New York, age 23.	April 7, 8, '65.	R't; circ. Surg. W. B. Hartman, 116th Penn. Dis. July 20, 1865.
797	Smith, J., Pt., D, 6th N. Hampshire, age 27.	June 3, 4, '64.	Left; flap. Disch'd Aug. 2, 1865.
798	Smith, J., Corp'l, F, 3d Artillery.	May 2, 2, '63.	Right; flap. Disch'd Sept. 29, '63.
799	Smith, J. A., Pt., E, 115th New York, age 21.	May 7, 8, '64.	Left; flap. Confed. surg. Disch'd July 20, 1865.
800	*Smith, J. G.*, Pt., B, 61st Alabama, age 42.	Mar. 25, 25, '65.	Right; circular. Recovery.
801	*Smith, J. O.*, Pt., H, 62d Virginia, age 40.	July 6, 6, '63.	Right; circ. Exch'd Nov. 12, '63.
802	Smith, J. R., Serg't, E, 53d Penn., age 34.	Mar. 31, Ap. 1, '65.	Right; circ. Surg. P. E. Hubon, 28th Mass. Disch'd July 14, '65.
803	Smith, N. B., Pt., H, 98th Ohio, age 18.	July 20, 21, '64.	Left; flap. Disch'd Jan. 2, 1865.
804	Smith, S., Corp'l, K, 22d Col'd Troops, age 22.	Sept. 29, 29, '64.	Right; lateral flap. Disch'd June 13, 1865.
805	*Smith, S. H.*, Pt., B, 24th Virginia.	June 30, J'y 1, '62.	—. Surg. — Neblitt, C. S. A. Recovery.
806	Smith, T. N., Pt., B, 43d New York, age 30.	Oct. 19, 20, '64.	Right; ant. post. flap. Surg. G. T. Stevens, 77th N.Y. Discharged January 26, 1865.
807	*Smith, W. E.*, Capt., E, 4th Georgia.	June 25, 25, '62.	—. Surg. W. H. Philpost, C. S. A. Recovery.
808	*Smith, W. H.*, Serg't, C, 17th South Carolina.	Mar. 25, 25, '65.	Right; circ. Surg. W. L. Baylor, C.S.A. Released May 10, 1865.
809	Smock, G. W., Corp'l, A, 14th New York S. M., age 18.	April 29, 30, '63.	Right; circ. Surg. R. B. Brown, 31st N. J. Disch'd June 15, '64. *Spec.* 1144.
810	*Sneed, J. R.*, Serg't, K, 19th S. C., age 23.	July 22, 22, '64.	Right. Surg. — Hawkins, C.S.A. Retired Feb. 24, 1865.
811	Snoddy, W., Pt., D, 46th Penn., age 49.	Dec. 9, 11, '64.	Right; flap. Surg. H. Z. Gill, U. S. V. Disch'd June 19, 1865.
812	Snowble, J. F., Serg't, H, 72d New York, age 31.	July 23, 24, '63.	Right; circ. Surg. C. K. Irwine, 72d N. Y. Bone exfol. Disch'd July 27, 1864.
813	Snyder, J. O., Lieut., B, 7th Penn. Reserves.	Dec. 13, 13, '62.	Left; flap. Surg. C. Bower, 6th Pa. Res. - Disch'd April 1, 1863.
814	Snyder, W. P., Pt., H, 7th N.Y. H. A., age 22.	Nov. 27, 27, '64.	Right; flap. Surg. J. E. Pomfret, 7th New York Heavy Artillery. Disch'd June 6, 1865.
815	Solan, T., Pt., K, 10th N. Hamp., age 30.	July 30, 30, '64.	Left; circ. Disch'd Oct. 26, 1865.
816	Song, P., Pt., H, 47th N. York, age 24.	Aug. 16, 18, '64.	Left; flap. Confed. surg. Disch'd Oct. 26, '64. 1870, stump always sore.
817	Soper, I, Pt., B, 4th Wisconsin.	May 27, 27, '63.	Left; flap. Surg. W. R. Bronnell, 12th Conn. Disch'd July 14, '63.
818	Southworth, J. E., S'g't, C, 1st U.S.S.S., age 26.	Nov. 7, 7, '63.	Right. Discharged June 28, 1864.
819	Spalding, L. G., Pt., B, 4th Vt., age 29.	Nov. 7, 7, '63.	Left. Disch'd March 28, 1864.

[1] DERBY (G.), *Army Med. Intelligence*, in *Boston Med. and Surg. Jour.*, 1862, Vol. 66, p. 198. OTIS (G. A.), *ibid.*, p. 239.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
820	Specht, J., Pt., A, 49th New York, age 45.	Mar. 25, '65.	Left; flap; gangrene; necrosis. Disch'd Sept. 18,'65. *Spec.* 4174.
821	Spinnings, T., Pt., F, 137th N. York, age 19.	July 2, 3, '63.	Right; circ. A. A. Surg. W. S. Woods. Gang.: necro. Nov. 7, reamp. up. third. Disch'd Sept. 14, 1864. *Spec.* 4185.
822	[1]*Spivey, W. W.*, Pt., K, 27th Alabama.	Sept. 19, 19, '63.	——. Recovery.
823	Sprinkle, S. M., Pt., I, 39th Ohio, age 23.	July 30, 30, '64.	Left; flap. Surg. J. C. Denise, 27th Ohio. Disch'd Dec. 2, '65; sub. amputations.
824	Squires, C. W., Pt., B, 16th Connecticut.	April 20, 20, '64.	Left; circ. Surg. N. Mayer, 16th Conn. Disch'd April 17, 1865.
825	Staples, R. C., Pt., F, 7th Illinois.	Oct. 4, 4, '62.	Right; flap. Surg. R. L. Metcalf, 7th Ill. Disch'd Nov. 26, 1862.
826	*Stark, A. E.*, Serg't, H, 49th Virginia, age 28.	Oct. 19, 20, '64.	Left; double lat. flap. Surg. J. M. G. McGuire, C. S. A. Exchanged Feb. 16, 1865.
827	Stark, J. T., Serg't, I, 13th Ky., age 25.	May 28, 28, '64.	Left; ant. post. flap. Surg. C. D. Moore, 13th Ky. Disch'd June 10, 1865.
828	Starr, A. T., Pt., F, 106th Penn., age 23.	June 16, 16, '64.	Left; circ. Surg. H. A. Martin, U. S. V. Disch'd Jan. 17, '65.
829	*Staton, G. D.*, Pt., F, 48th Alabama, age 28.	Aug. 16, 17, '64.	Right; circ. Disch'd Jan. 15, 1865.
830	*Steel, B.*, Serg't, C, 9th Georgia, age 22.	Aug. 14, 14, '64.	Left. Surg. W. S. Cooper, 125th N. Y. Prison Oct. 26, 1864.
831	Stephens, A. F., Pt., H, 65th Illinois, age 19.	Nov. 25, 26, '64.	Left; flap. Surg. J. H. Rodgers, 104th Ohio. Disch'd June 13,'65.
832	Stephens, G., Pt., C, 1st Cavalry, age 35.	July 28, 28, '64.	Left: ant. post. flap. A. A. Surg. C. Rogers. Disch'd March 8, 1865. Operation Jan., 1866.
833	*Stephens, S. B.*, Pt., G, 8th Georgia.	Oct. 7, 7, '64.	Right. Surg. J. S. Jackson, C. S. A. Recovery.
834	Stephenson, R., Pt., B, 19th C. Troops, age 19.	June 23, 23, '64.	Left; flap. Surg. D. MacKay, 29th C. T. Disch'd April 17, 1865.
835	Stevenson, G., Pt., A, 7th Indiana, age 23.	June 18, 18, '64.	Right; flap. Surg. G. W. New, 7th Ind. Gang. Dis. Oct. 5,'64.
836	Stickles, J. R., Pt., M, 2d Mich. Cav., age 18.	June 11, 11, '64.	Left; flap; gang. July 11, flap, middle third. A. Surg. R. Rae, 1st N. Y. Drag. Dis. Mar. 10,'65.
837	Stickney, J. G., Serg't, D, 6th Vt., age 24.	Aug. 21, 21, '64.	Left; ant. post. flap. Surg. E. Phillips, 6th Vt. Exfol.; gang. Disch'd Oct. 12, 1865.
838	*Stinson, A.*, Pt., I, 38th N. Carolina, age 20.	April 2, 2, '65.	Right. Trans'd for release June 21, 1865.
839	St. Martz, W., Serg't, F, 59th Illinois, age 26.	Dec. 15, 16, '64.	Right; ant. post. flap. A. Surg. H. P. Jennings, 51st O. Gang. Disch'd June 26, 1865.
840	Stone, D., Pt., C, 63d Pennsylvania.	Aug. 29, 29, '62.	Left. Discharged Jan. 13, 1863.
841	Strong, R. M., Lt.-Col., 19th Wis., age 34.	Oct. 27, 29, '64.	Left; ant. post. flap. A. Surg. — Gibbs, C. S. A. Discharged April 11, 1865.
842	*Stubblefield, W. H.*, Pt., C, 2d S. C., age 19.	June 1, 3, '64.	Left; circ. June 15, medulla prot. from bone. Released June 14,'65.
843	Sturgis, W. H., Pt., K, 9th Maine, age 25.	May 18, 18, '64.	Right; flap. Surg. A. D. Palmer, 9th Me. M. out Sept. 27, 1864.
844	Sturman, J. A., Pt., A, 3d Ind. Cav., age 19.	Aug. 3, 4, '62.	Left; circ. flaps. Exfol. Disch'd April 22, 1863.
845	*Suggs, R. R.*, Pt., M, 8th S. C., age 22.	July 1, 3, '63.	Left. Transferred Sept. 28, '63.
846	Sutton, J. M., Lieut., E, 148th Penn., age 22.	May 10, 11, '64.	Left; circ. Surg. J. W. Wishart, 140th Penn. Dis. Nov. 2, 1864. Nov. 13, '64. reamp. up. third. '70, stump not healthy. *Sp.* 2280.
847	Swartz, J., Pt., K, 3d N. Jersey Cav., age 20.	June 1, 1, '64.	Right; ant. post. flap. Disch'd April 26, 1865.
848	Swayne, W., Col., 43d Ohio, age 30.	Feb. 2, 2, '65.	Right; flap. Surg. F. M. Rose. 43d Ohio. Hæm.; lig. small art. Retired.
849	Sweezey, I. T., Serg't, I, 150th N. York, age 19.	Dec. 13, 15, '64.	Left; flap. Surg. H. Z. Gill, U. S. V. (Also amp. left sec'd fing'r.) Disch'd July 19, 1865.
850	Swisher, J., Corp'l, B, 81st Ohio, age 22.	Aug. 7, 7, '64.	Left; circ. A. Surg. J. C. Simonson, 66th Ind. Disch'd May, 9,'65.
851	Sykes, O., Pt., C, 123d Ohio, age 17.	Sept. 19, 20, '64.	Left; circ. Disch'd June 3, 1865.
852	*Tatom, R. P.*, Pt., C, 19th Georgia.	Aug. 19, 19, '64.	Left. Surg. — Matthews, C. S. A. Recovery.
853	Taylor, F. L. Pt., E, 17th Vermont, age 22.	April 2, 2, '65.	Left; circ. Surg. L. W. Bliss, 51st N. Y. Bone prot. Disch'd November 4, 1865.
854	*Taylor, J. H.*, Lieut., F, 16th South Carolina.	June 19, 19, '64.	——. Surg. — Cooper, C. S. A. Recovery.
855	Taylor, J., Pt., A, 19th Michigan. age 19.	June 22, 22, '64.	Right; flap. Surg. J. Bennett, 19th Mich. Disch'd Sept. 13,'65.
856	Temple, J. B., Pt., A, 8th N. York Art'y, age 57.	June 22, 22, '64.	Left; ant post. flap. Surg. M. F. Regan, 164th N. Y. Seq. rem. Disch'd Aug. 25, 1865.
857	Tennis, S., Pt., F, 24th Missouri, age 28.	Dec. 28, 28, '62.	Right; hæm. Disch'd July 15, 1863.
858	Terry, W., Pt., G, 8th New Jersey, age 19.	Oct. 7, 7, '64.	Left; circ. A. Surg. — Johnson, C. S. A. April 14, '65, reamp. mid. third. Disch'd June 28,'65.
859	Thair, J., Pt., E, 22d Ky.	May 22, 22, '63.	Left. Surg. B. F. Stevenson, 22d Ky. Disch'd Aug. 1, 1863.
860	*Thompson, H.*, Pt., A, 2d Tennessee.	Sept. 20, 20, '63.	——. Surg. — Bates, C. S. A. Recovery.
861	Thompson, H., Pt., G, 7th Indiana, age 23.	May 5, 5, '64.	Right; ant. post. flap. Mustered out Sept. 20, 1864.
862	Thompson, M., Serg't, D, 88th Indiana, age 24.	Mar. 19, 19, '65.	L't; dou. flap. Surg. D. S. Young, 21st Ohio. Disch'd Oct. 17, '65.
863	Thompson, J. R., Pt., C, 40th Indiana, age 20.	Nov. 25, 27, '63.	Left; flap. Disch'd Dec. 1, 1864.
864	Thompson, J. A., Serg't, G, 79th N. Y., age 42.	May 9, 10, '64.	Left; circ. Surg. S. S. French, 20th Mich. Nec. bone removed. Disch'd Aug. 15,'64. *Spec.* 2968.
865	Thompson, S. J., Serg't, B, 79th Ind., age 22.	Nov. 25, 26, '63.	Left; flap. A. A. Surg. R. Wirth. Gang.; necro. Dec. 4, reamp.; circ. Disch'd Aug. 25, 1864.
866	*Thanason, T. B.*, Pt., E, 17th Miss., age 27.	Sept. 3, 3, '64.	Left; double flap. Surg. — Patterson, C. S. A. For exchange Nov. 22, 1864.
867	Thornton, R., Pt., I, 29th Conn., age 18.	Oct. 27, 27, '64.	Left; flap. Surg. N. Y. Leit. 76th Penn. Disch'd Aug. 16, 1865.
868	*Thurmer, J. W.*, Capt., D, 13th Mississippi.	Dec. 11, 11, '62.	Right. Surgs. Hill and Franklin, C. S. A. Retired Oct. 29, 1864.
869	*Tomlin, J.*, Pt., A, 21st Tenn., age 19.	Dec. 8, 8, '64.	Left; bi-lateral flap. Provost Marshal May 6, 1865.
870	Tompkins, S. C., Serg't, F, 159th New York.	May 2, 3, '63.	Left; ant. post. flap. Surg. C. Robertson, 159th N. Y. Disch'd Aug. 1, 1863.
871	*Torrance, R. A.*, Pt., H, 8th Texas Cavalry.	Dec. 26, 26, '63.	Left. Surg — Holmes, C. S. A. Recovery.
872	Tower, D. W., Lieut., B, 17th Iowa.	May 16, '16, '63.	Left: flap. Surg. J. H. Ealy, 17th Iowa. Pieces of bone removed. Mustered out May 5, 1865.
873	Townsend, A., Lieut., G, 18th Infantry, age 20.	Aug. 7, 7, '64.	Left; circ. Surg. L. Slusser, 66th Ohio. Retired Dec., 1864.
874	*Tramell, J. V.*, Pt., L, 6th Alabama, age 21.	July 1, 1, '63.	Left. Provost Marshal Sept. 10, 1863.
875	*Treadway, J. A.*, Pt., H, 43d N. Carolina.	July 2, 2, '63.	Left. Paroled Sept. 25, 1863.
876	Trexler, W. G., Pt., B, 93d Pennsylvania.	May 31, Je. 2, '62.	Left: flap: prot. bone removed. Disch'd July 5, 1862.
877	Trow, W., Pt., A, 8th N. York Art'y, age 26.	June 3, 3, '64.	Left: flap. A. Surg. C. H. Pegg, 8th N. Y. H. A. Hæm.; nec. bone removed. Disch'd Sept. 20,'65.
878	Truckey, G. F., Pt., A, 7th Wis., age 19.	June 17, 18, '64.	Right; circ. Surg. C. N. Chamberlain, U. S. V. Disch'd Oct. 17, 1864.
879	Truesdell, J. W., Pt., L, 54th Penn, age 21.	July 18, 19, '64.	Right; circ. Disch'd Sept. 14, 1864.
880	Tryon, J. L., Serg't, H, 9th New York, age 33.	June 11, 11, '64.	Right; flap. Surg. B. G. Streeter, 4th N. Y. Cav. Dis. Apr. 28,'65.
881	*Tumblin, S. H.*, Pt., H, 22d N. Carolina.	May 2, 4, '63.	Left. Recovery.
882	Turnbull, J. M., Lieut., C, 36th Illinois.	May 26, 27, '64.	Left; flap. Surg. W. P. Peirce, 88th Ill. Resigned Nov. 4, 1864.
883	Turner, C. H., Pt., B, 38th New York, age 24.	Dec. 13, 15, '62.	Right. Confed. surg. Gang.; hæm. Mar. 1,'63, amp. up. third; hæm. Disch'd Sept. 9, 1863.
884	*Turner, P. L.*, Pt., A, 23d N. Carolina, age 19.	Oct. 11, 12, '63.	——. Furloughed Feb. 6, 1864.
885	Underwood, C., Serg't, D, 36th Mass., age 27.	Sept. 30, Oct. 1, '64.	Left. Discharged July 12, 1865. 1865, dis. bone removed. Died April 30, 1867.
886	Underwood, J., Pt., F, 41st Ohio, age 23.	Dec. 15, 16, '64.	Right; ant. post. flap. Disch'd May 11, 1865.
887	Usher, J., Pt., D, 107th New York, age 26.	May 25, 27, '64.	Left; ant. post. flap. Surg. W. C. Bennett, U. S. V. Dis. June 6,'65.
888	Utter, W., Pt., K, 8th Iowa, age 21.	July 19, 20, '63.	Right; semi-circ. integ. flaps; circ. ent mus. Surg. H. Z. Gill, U. S. V. Exfol. Disch'd Oct. 21, 1863.
889	*Van Lear, A. G. L.*, Pt., K, 5th Virginia.	May 3, 3, '63.	Right; circ. May 15, hæm.; lig. femoral. Recovery.
890	[2]*Vick, R. A.*, Pt., E, 43d N. Carolina, age 37.	Oct. 19, 19, '64.	Right; necr. Mar. 11, '65, reamp. hip joint. Recovery.
891	Vickery, D. L., Pt., I, 40th Indiana, age 23.	Nov. 25, 27, '63.	Left; circ. Disch'd May 20, 1864.
892	Walbridge, H. C., Pt., E, 145th Penn., age 18.	June 16, 17, '64.	Left; flap. Surg. G. L. Potter, 145th Penn. Disch'd June 8,'65.
893	Wager, M. H., Pt., G, 123d Ohio, age 39.	Mar. 31, 31, '65.	Right; circ. Surg. T. H. Squire, 89th N. Y. Recovery.
894	Walker, G. R., Pt., E, 7th West Virginia.	July 4, 5, '62.	Left; flap. A. A. Surg. C. G. Page. Disch'd Oct. 23, 1862.
895	Walker, H., Pt., K, 6th Vermont.	April 16, 18, '62.	Right. Surg. H. Janes, 3d Vt. Disch'd August 22, 1864.
896	Walker, S., Serg't, F, 155th Penn., age 29.	May 3, 3, '63.	Right; ant post. flap. A. Surg. D. D. Swift, 126th Penn. Lieut. V. R. C. March 11, 1864.
897	[3]Wallace, D. P., Pt., K, 42d Ohio.	July 12, 12, '63.	R't; circ. Surg. J. Pomerene, 42d Ohio. Disch'd Oct. 7, 1863.

[1] TERRY (C.), *loc. cit.*, p. 76.

[2] FAUNTLEROY (A. M.), *Hip Joint Amp.-Rec.*, in *Richmond Med. Jour.*, 1866, Vol. I, p. 7. *Circular* No. 7, S. G. O., 1867, pp. 50, 65, etc.

[3] BRYAN (J.), *loc. cit.*, Vol. 7, p. 288.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
898	Wallace, R. T., Pt., A, 76th Penn., age 33.	Oct. 22, 24, '62.	Left; ant. post. flap. Surg. R. B Bontecou, U. S.V. Disch'd Jan. 8, 1864. *Specs.* 2031, 3018.
899	Walsh, R. L., Pt., E, 8th Ohio, age 24.	May 10, 10, '64.	Left. Surg. J. L. Brenton, 8th O. Disch'd Oct. 13, 1864.
900	Wanzer, J., Pt., G, 137th New York.	Oct. 29, 30, '63.	R't; ant. flap. Surg. G. P. Oliver, 111th Penn. Disch'd Mar. 1, '64.
901	Ward, F. B., Corp'l, F, 20th Maine, age 22.	July 2, 3, '63.	Right; flap; erysipelas. Disch'd Nov. 28, 1864.
902	*Ward, T. W.*, Pt., E, 14th Alabama.	May 30, 30, '64.	Right; dou. flap. Surg. — Dixon, C. S. A. Involucrum removed. Disch'd July 17, 1865.
903	Wardell, S., Corp'l, A, 14th N.Y.H.A., age 23.	June 2, 3, '64.	Left; circ. Disch'd June 23, '65.
904	*Watkins, J. R.*, Pt., G, 43d N. C., age 37.	July 12, 12, '64.	Left; lateral flap. Prison Oct. 14, 1864.
905	Watson, G. W., Lieut., H, 20th Penn., age 35.	May 5, 7, '64.	Right; circ. Disch'd Nov. 14, '65.
906	Watson, M. F., Lieut., I, 5th Artillery.	July 2, 3, '63.	Right; circ. A. Surg. B. Howard, U. S. A. Promoted. *Spec.* 1382.
907	Webb, W. E., Serg't, K, 100th Ohio, age 22.	Aug. 6, 7, '64.	Left; circ. Surg. G. A. Collamore, 100th O. Gang. Dis. Mar. 27, '65.
908	Weiler, G. S., Pt., G, 65th Illinois, age 29.	Nov. 29, 29, '64.	Right; circ. Confederate surg. Disch'd June 5, 1865.
909	Wells, D., Corp'l, E, 121st New York, age 28.	Oct. 19, 20, '64.	Right; circ. Disch'd June 12, 1865.
910	*Wells, G.*, Serg't, K, 7th Louisiana, age 21.	Sept. 19, 19, '64.	Left; circ. Surg. — Davis, C. S. A. Provost Marshal Feb. 11, 1865.
911	Welsh, J., Pt., H, 6th Kentucky, age 26.	June 23, 23, '64.	Left; circ; nec. bone removed. Disch'd April 10, 1865.
912	Welton, F. G., Pt., B, 42d Illinois, age 21.	May 29, 29, '64.	Right; circ. Surg. Z. P. Hanson, 42d Ill. Disch'd Mar. 20, 1865.
913	Werle, M., Pt., K, 66th N. York, age 23.	June 16, 16, '64.	Left; ant. post. flap. Surg. G. L. Potter, 145th Penn. Discharged June 24, 1865.
914	Werth, W., Pt., E, 7th New York, age 32.	April 7, 7, '65.	L't; dou. flap. Surg. W. Vasburgh, 111th N. Y. Dis. Aug. 18, 1865.
915	*Westbrook, J. W.*, Lieut., B, 4th Miss., age 23.	Nov. 30, Dec. 1, '64.	Left; circ. Pro. Marshal Feb. 6, 1865.
916	Wetler, H., Lieut., H, 8th Penn. Res., age 20.	Aug. 28, 28, '62.	Right. Surg. L. W. Read, 1st Pa. Reserves. Disch'd Sept. 29, '62.
917	Whealan, J., Pt., D, 123d Ohio, age 23.	Dec. 15, 16, '63.	Left; flap. Surg. O. Ferris, 123d Ohio. Disch'd May 23, 1864.
918	*Wheeler, P.*, Pt., K, 61st N. Carolina, age 23.	Sept. 30, 30, '64.	Right. Prison April 14, 1865.
919	White, A. J., Pt., H, 155th Pennsylvania, age 19.	June 22, 22, '64.	Left; flap; erysip.; gang.; bone remov'd. Disch'd Nov. 10, 1864.
920	White, G. C., Pt., F, 144th New York, age 40.	Nov. 30, De. 2, '64.	Right; aut. post. flap. A. Surg. C. T. Reber, U. S. V. Disch'd Aug. 11, 1865.
921	White, J., Corp'l, E, 6th Tennessee, age 28.	May 27, 27, '64.	Left. Surg. C. W. McMillan, 1st Tenn. Disch'd May 9, 1865.
922	White, J. M., Pt., A, 55th Illinois.	June 27, 27, '64.	Right; circ. A. Surg. J. T. Smith, 75th Ill. Disch'd June 6, 1865.
923	*White, P. P.*, Pt., A, 20th N. Carolina, age 21.	July 1, 2, '63.	Left. Surg. — Bissell, C. S. A. Exchanged.
924	Whitlock, R., Pt., G, 11th Connecticut.	Sept. 13, 13, '62.	Left. Disch'd Dec. 31, '62. Died of apoplexy Dec. 16, 1864.
925	*Whitner, P. W.*, Pt., A, 12th N. C., age 24.	July 1 1, '63.	Left. Exchanged Nov. 12, 1863.
926	Whitney, J. F., Corp'l, C, 14th Mich., age 21.	Mar. 16, 16, '65.	Left; circ. Surg. A. Wilson, 113th Ohio. Disch'd June 25, 1865.
927	Whitney, W. E., Pt., I, 21st Mich., age 53.	Dec 13, 13, '64.	Left; circ. flap. Surg. J. Avery, 21st Mich. Disch'd June 16, '65.
928	Whittingham, A., Serg't, E, 28th Penn.	Sept. 17, 17, '62.	Left. Disch'd December 31, '62.
929	Wicks, B., Pt., A, 89th N. Y., age 20.	Sept. 17, 19, '62.	Left; flap. Surg. T. H. Squire, 89th N. Y. Disch'd Feb. 23, '63.
930	*Wiggs, J. H.*, Pt., I, 16th N. Carolina, age 23.	April 7, 7, '65.	Left; circ. Released June 14, '65.
931	*Wiginton, J. T.*, Pt., K, 28th Tennessee, age 18.	Sept. 1, 1, '64.	Left; circ. Surg. — Wilson, 28th Tenn. Pro. Mar. Nov. 16, 1864.
932	Wiley, W. A., Colonel, 41st Ohio.	Nov. 25, 25, '63.	Left. Disch'd June 7, 1864. Maj. V. R. C. April 19, 1865.
933	Williams, B., Pt., E, 6th Colored Troops.	Feb. 11, 11, '65.	Left; circ. A. Surg. H. C. Merryweather. 5th Colored Troops. Disch'd July 25, 1865.
934	Williams, E. C., Pt., D, 3d Wis., age 23.	Mar. 16, 16, '65.	Right; circ. (Skey's operation.) Disch'd Sept. 1, 1865.
935	Williams, E. S., Pt., H, 2d Wis., age 23.	July 1, 2, '63.	Right; circ. Disch'd December 1, 1863.
936	Williams, G. J., Corp'l, B, 42d Ohio.	May 1, 1, '63.	Left; flap. Surg. J. Pomerene, 43d Ohio. Disch'd Oct. 29, 1863.
937	Williams, J., Pt., C, 1st Infantry, age 28.	Feb. 22, 22, '65.	Left; ant. post. flap. Surg. A. J. H. Buzzell, 3d N. H. Disch'd Sept. 22, 1865.
938	Williams, T. H., Corp'l, E, 13th New Jersey.	July 3, 3, '63.	Left; double flap. Surg. J. A. Freeman, 13th N. J. Disch'd Nov. 7, '63. Died May 16, '70.
939	Williamson, J. J., Lieut., B, 2d New York Art'y, age 30.	June 3, 3, '64.	Right; circ. Surg. J. W. Wishart, 140th Penn. Nec. bone remov'd. Disch'd Feb 25, 1865.
940	*Wilkerson, W. H.*, Lieut., G, 44th Virginia.	May 10, 11, '64.	——. Surg. — Graves, 44th Va. Recovery.
941	Wilkins, J., C'rp'l, L, 14th N. Y. H. A., age 33.	Aug. 19, 20, '64.	Right; circ. Surg. W. V. White, 57th Mass. Disch'd May 30, '65.
942	Wilkinson, J. W., Pt., A, 187th Penn., age 40.	June 19, 20, '64.	Right; ant. posterior flaps. Surg. W. F. Humphrey, 149th Penn. Disch'd Jan. 19, 1865.
943	Wilkinson, S. F., Pt., D, 150th N. York, age 40.	Mar. 16, 16, '65.	Right; circ. Surg. C. M. Campbell, 150th N.Y. Disch'd June 17, 1865.
944	Wilson, A., Corp'l, H, 6th New York Cavalry.	Oct 15, 15, '63.	Right; circ. Surgs. A. P. Clark, 6th N. Y. Cav., and W. H. Rulison, 9th N. Y. Cav. Discharged April 26, 1864.
945	Wilson, E. E., Pt., H, 110th Penn., age 20.	July 2, 4, '63.	Right; flap. Surg. H. F. Lyster, 5th Mich. Disch'd Aug. 7, '64.
946	Wilson, G., Pt., I, 95th Ohio.	Aug. 30, 31, '62.	Left; circ. Surg. H. Z. Gill, 95th Ohio. Disch'd Nov. 28, 1862.
947	Wilson, H., Pt., I, 45th Missouri, age 19.	Oct. 7, 7, '64.	Right; bi-lat. flap. Confed. surg. Disch'd Jan. 31, 1865.
948	Wilson, P. P., Lieut., H, 5th Connecticut.	June 22, 23, '64.	Right; (also wound of left leg.) Surg. J. Chapman, 123d N. Y. Disch'd Dec. 22, '64; sub. oper.
949	Wilson, R., Pt., E, 49th Indiana.	Dec. 29, 29, '62.	Right; flap. Disch'd March 16, '63. 1870, stump sore.
950	*Wilson, S.*, Pt., F, 65th Georgia, age 26.	Nov. 30, De. 1, '64.	Left; lat. flap. Provost Marshal March 2, 1865.
951	Wilson, W., Pt., I, 1st Massachusetts.	June 25 25, '62.	Left; circ. Disch'd Sept. 29, '62.
952	Winder, J., Pt., E, 43d New York, age 39.	Oct. 19, 20, '64.	Left; long ant. flap; sloughing. Disch'd July 10, 1865.
953	Wing, A. O., Pt., F, 1st Maine Art'y, age 27.	June 18, 19, '64.	Left; circ. Discharged 1865.
954	*Winstead, W. D.*, Pt., H, 16th North Carolina.	July 1, 1, '63.	Right. Surg. — Murphy, C. S. A. Exchanged March 17, 1864.
955	*Woodle, R.*, Pt., F, 21st South Carolina.	June 16, 16, '64.	——. Surg. — Muller, C. S. A. Recovery.
956	Wood, I., Corp'l, G, 94th Ohio, age 22.	May 14, 14, '64.	Left; flap. Disch'd Dec. 2, 1864.
957	Woods, W., Pt., G, 32d New York.	May 7, 7, '62.	Right; (also wound of left leg.) Disch'd Sept. 15, 1862.
958	Woolbough, J. R., Pt., I, 118th Penn., age 33.	Oct. 1, 1, '64.	Left; flap. Surg. J. Thomas, 118th Penn. Nec. bone rem'd. Disch'd July 25, 1865.
959	*Workman, A. J.*, Pt., I, 29th Virginia, age 20.	May 16, 16, '64.	Right; circ. Retired February 22, 1865.
960	Wright, A., Pt, I, 68th Colored Troops, age 24.	April 9, 10, '65.	Left; circ. skin flap; circ. sect. muscles. A. Surg. B. F. Lyford, 68th C. T. Disch'd June 10, '65.
961	Wright, J. C., Serg't, C, 58th Illinois.	Oct. 3, 4, '62.	Left; flap. Confed. surg. Disch'd April 10, 1863.
962	Wylie, R., Pt., D, 23d Penn. Militia.	July 1, 2, '63.	Right. Surg. — Neill, Dickenson College. M. out Aug. 4, '63.
963	Wyse, C. F., Pt., F, 69th New York.	Sept. 17, 19, '62.	Left; circ. Disch'd Mar. 30, '63.
964	Yale, T., Corp'l, H, 23d Wisconsin.	Jan. 11, 11, '63.	Right; flap. Surg. J. B. Sparks, 19th Kentucky. Disch'd March 7, 1863.
965	Yatton, G. W., Pt., D, 10th N. Y. Heavy Art., age 23.	April 2, 2, '65.	Right; flap. Surg. O. S. Copeland, 10th N. Y. Art'y. Disch'd Oct. 3, 1865.
966	Yeager, B., Pt., A, 9th New Jersey, age 21.	May 6, 6, '64.	Left; circ.; bone rem'd. Disch'd Feb. 25, 1865. *Spec.* 2972.
967	Yeiser, J., Pt., F, 10th Iowa.	Nov. 25. 25, '63.	Right; circ. Surg. R. J. Mohr, 10th Iowa. Disch'd Nov. 23, '64.
968	Yemmans, F., Pt., B, 8th Mich. Cavalry, age 32.	Nov. 25, 25, '64.	Left. Confed. surg. Gang. Mar. 26, '65, reamp.; circ.; mid. third. Dr. S. L. Norris, Saugatuck. Disch'd June 10, 1865.
969	Young, A. L., Corp'l, F, 46th Penn., age 24.	July 20, 21, '64.	Left; flap. Disch'd July 28, '65.
970	Young, G., Serg't, G, 8th Michigan, age 23.	June 17, 17, '64.	Left; circ. Surg. W. B. Fox, 8th Mich. Gang. Disch. June 9, '65.
971	Young, L., Corp'l, F, 81st Ohio, age 22.	July 22, 22, '64.	Right; flap. Surg. W. C. Jacobs, 81st Ohio. Disch'd Feb. 17, '65
972	Zahnizer, M. B., Pt., B, 140th Penn., age 21.	May 12, 12, '64.	Right; circ.; gangrene. Disch'd July 4, 1865.
973	Zimmerman, H., Pt., E, 11th Indiana, age 18.	Aug. 24, 24, '64.	Left; flap. Surg. J. A. Comington, 11th Ind. Disch'd Mar. 20, '65
974	Abrams, L., Pt., D, 158th New York, age 30.	April 2, 2, '65.	R't; flap. Surg. H. C. Levensaler, 8th Me. Died June 5, '65; irritative fever.
975	Aiken, W., Pt., G, 105th Pennsylvania.	May 2, 2, '63.	Right. Died June 9, 1863.
976	Albert, G., Pt., A, 27th Michigan, age 30.	July 30, 30, '64.	Left; circ. Surg. W. C. Shurlock, 51st Penn. Died Aug. 27, '64; exhaustion.
977	Alderson, B., Pt., E, 111th Illinois.	July 22, 22, '64.	Left. Surg. A. C. Messenger, 57th Ohio. Died Aug. 14, 1864.
978	Aldinger, C., Pt., E, 7th New York.	Dec. 13, 13, '62.	Right. Surg. C. S. Wood, 66th N. Y. Died Dec. 28, 1862.
979	Alexander, A. C., Pt., H, 64th Ohio, age 20.	Dec. 13, 13, '64.	Right; (also other wounds;) flap. Surgeon J. H. Hutchison, 15th Mich. Died Dec. 13, 1864.
980	Alexander, N. A., Pt., A, 5th Iowa, age 23.	Sept. 19, 19, '62.	Left. Surg. J. G. F. Holston, U. S. V. Died Sept. 29, 1862.
981	Allen, D., Serg't, G, 4th Maine, age 21.	May 5, 5, '64.	Left; flap. Died June 6, 1864.
982	Alien, G., Pt., H, 12th Missouri.	June 5, 5, '63.	Right. Surg. J. Spiegelhalter, 12th Mo. Died June 25, 1863.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
983	Allen, E. S., Serg't, D, 3d Maine, age 36.	July 2, 3, '63.	Left. Died Aug. 7, 1863; hæm.
984	Allen, S., Pt., G, 59th Mass., age 19.	June 17, 17, '64.	Both. Died June 27, 1864.
985			
986	*Almon, W. J.*, Pt., F, 5th North Carolina.	May 8, 8, '64.	Left; circ.; slough.; hæm. recurrent. Died May 24, '64; exh'n.
987	Alpen, R., Pt., F, 20th Massachusetts.	May 30, —, '64.	Left. Died June 14, 1864.
988	Alsop, W., Pt., F, 33d Indiana.	June 25, 25, '64.	Right. Surg. J. Bennett, 19th Mich. Died July 3, 1864.
989	Alva, J., Corp'l, F, 13th Ohio Cav., age 21.	Oct. 1, 1, '64.	Right. Died Nov. 5, 1864; chr. diarrhœa and wounds.
990	Anderson, J. B., Pt., H, 81st Indiana, age 33.	June 20, 20, '64.	Left. Surg C. J. Walton, 21st Ky. Died July 1, 1864.
991	Anderson, J. S., Pt., A, 123d Ohio, age 22.	July 18, —, '64.	Right. Died August 11, 1864.
992	*Anderson, J. H.*, Corp'l, H, 59th Georgia.	Nov. 29, 29, '63.	Left. Surg. A. M. Wilder, U. S. V. Died December 12, 1863.
993	Andrews, J., Pt., D, 11th Vermont.	Sept. 19, 19, '64.	Right; circ. Died Sept. 28, '64; gen'l depress'n of nerv's system.
994	Andrews, J., Capt., D, 66th Illinois.	May 27, 27, '64.	——; flap. Surg. W. R. March, 2d Iowa. Hæm. Died June 23, 1864; pyæmia.
995	*Anglen, T. R.*, Pt., D, 36th Virginia.	July 3, 3, '63.	——. Died October 8, 1863; chr. diarrhœa.
996	Antonio, J., Pt., A, 11th Conn., age 31.	June 6, 6, '64.	Right; ant. post. flap. Died June 14, 1864; exhaustion.
997	*Argo, J. E.*, —, H, 1st Georgia.	Sept. 14, 15, '62.	——. Injured end of stump, causing slough. Died Oct. 16, 1862.
998	Armond, F., Pt., D, 1st Delaware, age 39.	May 18, 18, '64.	Right. Died May 30, 1864; pyæmia.
999	Armstrong, F., Serg't, A, 58th Mass., age 30.	June 3, 3, '64.	Left; flap; hæm.; lig.; hæm. rec'd. Died July 18, 1864; exhaustion.
1000	Armstrong, J., Serg't, M, 21st Penn. Cav., age 28.	June 18, 18, '64.	Right; circ. Died July 11, '64; pyæmia.
1001	Armstrong, S., Pt., G, 2d Mich., age 45.	June 18, 18, '64.	Left. Died June 29, 1864.
1002	*Armstrong, T. H.*, Pt., D, 7th S. Carolina Cav.	Aug. 18, 19, '64.	Right; circ. Surg. ——, 7th S. C. Cav. Died Oct. 9, 1864.
1003	Arnich, M., Pt., K, 200th Pennsylvania.	Mar. 25, 25, '65.	——. Died March 29, 1865.
1004	Atwood, R. W., Corp'l, C, 105th Illinois.	May 27, 27, '64.	Right. Surg. J. W. Hastings, 33d Mass. Died June 4, 1864.
1005	Austin, H. K. N., Serg't, E, 9th N. Y. H. A., age 35.	June 1, 3, '64.	Left; circ. Died June 30, 1864; pyæmia.
1006	Bailey, H., Corp'l, B, 39th Illinois, age 27.	May 20, 20, '64.	Right. Died June 11, '64; pyæm.
1007	Baines, J. A., Pt., G, 55th Illinois, age 25.	July 22, 23, '64.	Left; flap. Act. Staff Surg. C. B. Richards, U. S. A. Died July 25, 1864.
1008	Baker, C., Pt., 12th Wisconsin Battery.	Oct. 5, 5, '64.	Left. A. Surg. J. J. Whitney, 18th Wis. Died Oct. 15, 1864.
1009	Bamberker, J., Pt., F, 2d Missouri.	Sept. 19, 19, '63.	Left. Died October 25, 1863.
1010	Banks, E. M., Pt., H, 16th Maine.	Dec. 13, 13, 62.	Left. Died December 16, 1862.
1011	Banning, L., Pt., A, 122d New York.	Sept. 19, 19, '64.	Left. Died October 12, 1864; exhaustion.
1012	Barbour, S. V., Pt., E, 9th N. Y. H. Art'ry, age 28.	Oct. 19, 20, '64.	Left; ant. post. flap. Surg. G. T. Stevens, 77th N. Y. Hæm. fatal before discovery, Oct. 27, 1864.
1013	Barclay, W. H., Lieut., K, 7th N. Y., age 23.	June 3, 5, '64.	Right; circ. Surg. G. L. Potter, 145th Penn. Oozing of blood; diarr. Died July 6, '64; exh'n.
1014	Barker, J., Pt., I, 58th Mass., age 42.	June 17, 17, '64.	Right; (amputa. left knee joint.) Died June 28, 1864.
1015	Barnes, C., Pt., D, 40th New York, age 21.	May 5, 6, '64.	Right; hæm. June 17, lig. fem. Died June 19, 1864.
1016	Barnes, H., Pt., H, 14th Indiana.	Sept. 17, 17, '62.	Right. Died October 7, 1862.
1017	Barnes, J. M., Corp'l, A, 12th Kentucky, age 31.	Aug. 6, 6, '64.	Right; circ. Surg. C. S. Frink, U. S. V. Died Nov. 14, '64; exh'n.
1018	Barnes, S. W., Pt., H, 140th Penn.	July 3, 3, '63.	Right. Died August 2, 1863.
1019	Barnett, P., Pt., F, 3d Delaware.	June 18, 18, '64.	Left. Surg. C. N. Chamberlain, U. S. V. Died July 1, 1864.
1020	Barringer, F., Pt., E, 140th Penn., age 18.	June 16, 18, '64.	Right; lat. flap. Surg. J. W. Wishart, 140th Penn. Died July 15, 1864.
1021	Bartlett, M., Pt., G, 10th Maine.	Sept. 17, 17, '62.	Right. Died November 6, 1862.
1022	*Bass, W. L.*, Pt., K, 6th Georgia.	May 16, 17, '64.	——; flap. Died July 30, 1864.
1023	Battee, P., Sergeant, B, 76th Ohio.	Sept. 1, 1, '64.	Left. Died September 4, 1864.
1024	*Battles, T.*, Pt., —, 36th Alabama.	Nov. 25, 25, '63.	Right; flap. Surg. A. Sabine, 76th Ohio. Died Nov. 26, 1863.
1025	*Beach, J. T.*, Adj't, 5th Louisiana.	May 4, 5, '63.	——; pneumonia; pyæmia. Died May 28, 1863.
1026	Beard, H., Pt., F, 46th Pennsylvania.	July 20, 20, '64.	Left; (also w'nd of face.) Died October 17, 1864.
1027	Beaty, S., Pt., B, 30th Ohio, age 44.	June 16, 16, '64.	Left; double flap. A. Surg. C. B. Richards, 30th Ohio. Died June 16, '64; shock and loss of blood.
1028	Bebout, B., Corp'l, D, 140th Penn.	July 2, —, '63.	——. Died August 9, 1863.
1029	Bebout, L., S'g't, D, 140th Penn., age 32.	June 3, 3, '64.	Left; circ. Surg. J. W. Wishart, 140th Penn. Died Oct. 8, '64; disease of stomach.
1030	Bechtell, D. R., Pt., B, 21st Penn., age 23.	June 18, 18, '64.	Right. Died July 16, 1864.
1031	Bechtolt, F., Pt., G, 54th Ohio.	July 3, 3, '64.	Left. A. Surg. C. B. Richards, 30th Ohio. Died Aug. 28, '64.
1032	Beck, C., Pt., D, 29th Ohio.	July 28, 28, '64.	Left; circ. Surg. A. K. Ifield, 20th Ohio. Died Sept. 16, '64.
1033	Beck, G. W., Pt., C, 21st Illinois.	June —, —, '64.	Left. Surg. A. L. Cox, U. S. V. Died June 24, 1864.
1034	*Beckman, W. W.*, Serg't, D, 27th S. C., age 33.	June 16, 16, '64.	Right; circular. Died June 25, 1864; pyæmia.
1035	Beckwith, C. J., Pt., C, 26th Connecticut.	June 14, 14, '63.	Right. Died June 26, 1863.
1036	Beeker, J. J., Pt., K, 89th Ohio.	June 27, 27, '64.	Left. Died July 22, 1864.
1037	Belcher, F., Pt., B, 49th Mass., age 20.	May 27, 27, '63.	Right. Died June 10, '63; diphtheria.
1038	Bell, H., Pt., I, 36th Col'd Troops.	Sept. 29, 29, '64.	——. Died October 15, 1864.
1039	Bell, R. H., Capt., F, 7th N. Y. H. A., age 37.	May 7, —, '64.	Left; hæm.; lig. femoral. Died June 24, 1864; exhaustion.
1040	Benedict, A., Serg't, A, 104th Illinois.	May 14, 14, '64.	Left. Died May 20, 1864.
1041	Bennett, T., Pt., F, 199th Pennsylvania.	April 9, 9, '65.	Left; circ. Surg. G. DeLandre, 158th N. Y. Died May 29, '65.
1042	Benton, G. M., Lieut., B, 12th Conn.	Oct. 19, 19, '64.	Right. Confed. surg. Died Nov. 4, 1864; general depression.
1043	Berry, E. P., Capt., E, 5th N. Jersey, age 24.	July 2, 3, '63.	Left. July 8, hæm. Died same day.
1044	Betts, J. S., Pt., F, 40th New York, age 22.	Nov. 26, 26, '63.	Left; ant. post. flap. Surg. H. F. Lyster, 5th Mich. Died Dec. 17, 1863; pyæmia.
1045	*Bibbs, W. J.*, Pt., G, 32d Tenn., age 35.	May 15, 16, '64.	Right; circ. Ass't Surg. W. F. Smith, 28th Penn. Gang.; lig. femoral on face of stump. Died Sept. 23, '64; acute diarrhœa.
1046	Biddle, G. C., Pt., C, 205th Penn., age 25.	April 2, 3, '65.	Right; ant. post. flap. Surg. W. O. McDonald, U. S. V. Died April 25, '65; pyæm. *Spec.* 4159.
1047	Biddle, H., Corporal, C, 148th Pennsylvania.	Oct. 27, 27, '64.	Right. Died January 28, 1865.
1048	Bigalow, C., Pt., E, 17th Infantry, age 16.	May 5, —, '64.	Left; flap; gastric irritability. Died May 30, 1864.
1049	Birmingham, A., Lieut., A, 69th New York.	Dec. 13, 13, '62.	Right; (amputa. left ankle joint.) Died December 17, 1862.
1050	Bishop, L., Sergeant, C, 154th New York.	July 1, 1, '63.	Left. Died July 31, 1863.
1051	Bitter, L., Pt., B, 180th Ohio.	Dec. 7, 7, '64.	Right. Ass't Surg. J. W. Reed, 115th Ohio. Died Dec. 9, 1864.
1052	Blackburn, J., Pt., E, 138th Penn., age 35.	July 9, 11, '64.	Left; circ. A. A. Surg. W. S. Adams. Hæm. recurrent. Died Sept. 1, 1864; hæm. and exh'n. *Specs.* 3882, 3848, 3980.
1053	Blackwell, E., Pt., F, 13th Colored Troops, age 24.	Dec. 15, 16, '64.	Right; flap. A. A. Surg. J. S. Giltner. Died Dec. 27, 1864.
1054	Blanchard, W., Captain, K, 13th Illinois.	Nov. 27, 27, '63.	Left. Surg. S. C. Plummer, 13th Ill. Died Dec. 4, 1863.
1055	Blaney, J. W., Pt., E, 7th West Virginia.	Dec. 13, 13, '62.	——. Died December —, 1862.
1056	Blett, D., Lieut., F, 1st Penn. Rifles, age 35.	May 8, 9, '64.	Right; circ. Surg. J. J. Comfort, 1st Penn. Rifles. Died June 30, 1864; pyæmia.
1057	Bodley, E., Pt., B, 59th Indiana, age 28.	Sept. 19, 19, '63.	Left; flap. Surg. A. M. McMahon, 64th Ohio. Sept. 28, '63, hæm.; lig. fem., fatal six hours after.
1058	Bohrer, T., Serg't, I, 159th New York.	April 13, 13, '63.	——. Died April 14, 1863.
1059	Bond, R., Pt., A, 24th Mass., age 28.	Aug. 14, 16, '64.	Left; circ. A. A. Surg. S. J. Holley. Died Sept. 2, '64; irritative fever.
1060	Bonhaum, A., Pt., F, 143d Penn., age 43.	June 18, 18, '64.	Right. Died Aug. 7, '64; exh'n.
1061	Bonneberg, J., Pt., E, 12th Missouri.	Dec. 29, 29, '62.	——. Died January 14, 1863.
1062	Bonyea, R., Pt., F, 118th New York, age 33.	June 3, 3, '64.	Left; circ.; hæm. Died July 8, 1864; pyæmia. *Spec.* 2030.
1063	Boughton, J. H., Corp'l, E, 2d Conn. H. Art'ry.	Sept. 19, 19, '64.	Right; flap. Died Oct. 20, 1864; exhaustion.
1064	Boutwell, R. T., Pt., B, 4th Vermont.	May 12, 12, '64.	Left. Died May 12, 1864.
1065	Bowman, H. M., Pt., H, 60th Ind., age 21.	Nov. 3, 3, '63.	Left. Surg. J. S. McGrew, 83d Ohio. Died Feb. 1, 1864.
1066	Boyd, W. A., Maj., 84th Indiana, age 37.	May 7, 7, '64.	Left. Ass't Surg. H. Kirby, 84th Ind. Died July 11, 1864.
1067	Boyle, M., Pt., D, 1st Delaware.	Dec. 13, 13, '62.	Right. Died Dec. 31, 1862; pyæmia and tetanus.
1068	Boyles, T. R., Pt., D, 187th Pennsylvania.	June 18, 18, '64.	Right. Died June 19, 1864.
1069	Bradford, J. M., Pt., B, 16th Michigan.	Feb. 6, 6, '65.	Left. Died February 17, 1865.
1070	Bradford, W. H., Pt., A, 38th Wisconsin, age 26.	June 17, 17, '64.	Left; circ. Surg. W. B. Fox, 8th Mich. Died June 25, 1864.
1071	Bradley, P., Serg't, C, 16th Michigan.	Aug. 21, 21, '64.	Left; (also amp. right leg.) Died Sept. 16, 1864.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1072	*Brand*, A., Serg't, K, 21st S. C., age 30.	May 16, 18, '64.	Left; flap; slough'g bone exp'd. Died June 1, 1864.
1073	*Brandshaw, H. H.*, Pt., G, 7th Tennessee.	July 3, 3, '63.	Died.
1074	Brause, A. D., Pt., H, 49th Penn., age 20.	Sept. 19, 19, '64.	Right; circ.; pyæmic symptoms. Died Nov. 19, 1864.
1075	Bremer, E., Pt., A, 39th New York, age 29.	Feb. 6, 8, 64.	Left; flap. Surg. A. N. Dougherty, U. S. V. Stump diseased. Died June 1, '64. *Spec.* 2043.
1076	*Brewer, J. S.*, Corp'l, A, 20th South Carolina.	Oct. 19, 19, '64.	——. Died November 8, 1864.
1077	Brickley, P., Pt., B, 6th Tennessee.	May 14, 14, '64.	Right. Surg. D. L. Heath, 23d Mich. Died July 28, 1864.
1078	*Briggs, M. W.*, Pt., C, 24th Virginia.	.....	Left. Died July 19, 1862.
1079	Brihm, J., Recruit, age 38.	Aug. 26, 26, '64.	Right; circ. Surg. G. L. Sutton, U. S. V. Gangrene. Died Oct. 8, 1864.
1080	Broomeling, T., Pt., C, 106th N. York, age 24.	July 9, 10, '64.	Left; circ. A.A.Surg.G.M.Paullin. Gangrene. Died August 11, 1864; diphtheria.
1081	Brown, W. H. H., Lt. Col., 61st Ohio.	July 20, —, '64.	Right. Died September 5, 1864.
1082	Brown, H. Z., Pt., F, 1st Mass. H. A., age 29.	June 18, 18, '64.	——. Died June 20, 1864.
1083	Brown, J. F., Lieut., F, 147th N. Y., age 29.	May 12, 12, '64.	Right; flap; erysipelatous. Died July 14, '64; exh'n. *Spec.* 3573.
1084	Brown, J. W., Pt., K, 3d Michigan.	July 3, 3, '63.	Right. Died July —, 1863.
1085	Brown, O. S., Serg't, F, 145th Pennsylvania.	July 3, 3, '63.	——. Died July 29, 1863.
1086	Bryant, D., Pt., C, 19th Massachusetts.	Sept. 17, 17, '62.	Right. Died October 8, 1862.
1087	*Bryant, J. C.*, Pt., B, 18th Georgia, age 29.	April 6, 7, '65.	Left; flap. Died April 28, 1865; exhaustion.
1088	Buchanan, A, Corp'l, K, 19th Mass., age 28.	May 12, 13, '64.	Left; long ant. flap. Surg. J. F. Dyer, 19th Mass. Died Je. 2, '64.
1089	Bump, J., Pt., M, 8th N. York Art'y, age 18.	June 3, 3, '64.	Right; circ. Surg. S. H. Plumb, 82d N. Y. Died July 7, 1864; pyæmia.
1090	Bunting, J. M., Pt., B, 95th Pennsylvania.	Nov. 29, 29, '64.	Left. Surg. N. A. Hursam, 17th Me. Died Dec. 5, '64. *Spec.* 4119.
1091	Burbank, W. H., Lieut., 58th Massachusetts.	June —, —, '64.	Right. Died June 10, 1864.
1092	Burdy, T., Pt., K, 71st Pennsylvania.	June 29, 29, '62.	Right; ulcer. dead bone exp'd. Nov. 29, reamp. six ins. higher. A. A. Surg. R. P. Thomas. Died Dec. 12, 1862; pyæmia.
1093	Burfell, L., Pt., D, 118th Ohio.	May 14, 14, '64.	Right. Died July 30, 1864.
1094	Burghart, C. H., Lieut., K, 4th New York H'vy Artillery, age 20.	April 2, 2, '65.	Left; flap. Surg. G. B. Parker, U. S. V. Died April 17, 1865; result of wound.
1095	*Burgin, C. H.*, Serg't, H, 5th Ala., age 24.	Oct. 19, 19, '64.	——; circ.; bone exposed. Died November 28, 1864; pyæmia.
1096	Burley, W., Pt., K, 73d Ohio, age 40.	Oct. 28, 30, '63.	Left; circular; gangrene. Died November 1, 1863.
1097	Burke, V., Pt., B, 1st Mich., age 30.	June 17, 19, '64.	Left; flap. A. A. Surg. W. S. Forbes. Died July 25, '64; pyæ.
1098	Burmaster, J., Pt., D, 88th Illinois.	Sept. 19, 19, '63.	Right. Died October 8, 1863.
1099	Burns, P., Pt., C, 5th New York.	Aug. 20, 20, '64.	——. Died August 25, 1864.
1100	Burns, P., Pt., E, 15th Infantry.	Aug. 10, —, '64.	Right. Died August 17, 1864.
1101	Burns, R., Pt., A, 23d Illinois.	April 2, 2, '65.	Right; flap. Surg. J. S. Taylor, 23d Illinois. Died April 4, '65.
1102	Burr, T., Pt., K 112th New York, age 33.	June 3, 3, '64.	Right. Died June 20, 1864.
1103	Bush, J., Corp'l, F, 90th New York.	June 14, 14, '63.	Right. Surg. E. S. Hoffman, 90th N. Y. Died June 24, 1863.
1104	Bushnell, O., Pt., A, 101st Illinois.	June 4, 4, '64.	Right. Died June 14, 1864.
1105	Butcher, J., Serg't, F, 37th Wis., age 45.	June 17, 17, '64.	Left; oval flap. Surg. W. B. Fox, 8th Mich. Died June 25, 1864.
1106	Butler, L., Pt., B, 181st Ohio, age 43.	Dec. 7, 7, '64.	Right; circ. A. Surg. J. W. Reed, 115th Ohio. Died Dec. 9, 1864; exhaustion.
1107	*Butler, J. N.*, Pt., C, 1st Georgia, age 41.	Dec. —, —, '64.	Left. Died January 5, 1865.
1108	Byers, J. H., Pt., G, 35th Iowa.	May 14, 14, '63.	Right. Surg. J. B. Rice, 72d Ohio. Died.
1109	Byrne, W., Corp'l, F, 60th Ohio, age 19.	May 9, 9, '64.	Left; colliquative diarrh. Died May 22, 1864.
1110	Cahill, J., Pt., K, 170th New York, age 43.	May 24, —, '64.	Left; phleg. erysip. Died July 3, 1864.
1111	*Calhoun, C. H.*, Lieut., F, 5th Va., age 21.	May 3, 4, '63.	Right; ant. post. flap. Died May 8, 1863; hæmorrhage.
1112	Calman, E. F., Serg't, E, 5th N. Y. H. A., age 29.	Aug. 25, 27, '64.	Rt; circ. A. Surg. T. C. Smith, 116th Ohio. Died Sept. 1, 1864.
1113	[1] Cameron, D. H., Pt., C, 4th Rhode Island.	Mar. 14, 14, '62.	Right; circ. Surg. G. Derby, 23d Mass. April 5, hæm.; lig. fem. Died April 6, 1862; exhaustion.
1114	*Campbell*, A., Lieut., H, 33d Alabama.	Nov. 27, 27, '63.	——; circ. Surg. J. C. Morgan, 29th Missouri. Died.
1115	Campbell, B., Pt., A, 81st Ohio.	Aug. 25, 25, '64.	Left. Surg. J. Pogue, 66th Ill. Died Oct. 19, 1864.
1116	*Campbell, S. G.*, Pt., F, 58th Virginia, age 31.	May 31, Je. 1, '64.	Left; circ. June 20, hæm.; 21, lig. Died June 23, '64; pyæmia.
1117	Campher, L., Pt., G, 4th Colored Troops.	Sept. 29, 29, '64.	——. Died October 27, 1864.
1118	Capen, S. L., Pt., B, 207th Penn., age 22.	April 2, 2, '65.	Right. Died April 14, 1865.
1119	Carey, O., Pt., E, 86th New York, age 21.	May 24, 24, '64.	Left; diarrhœa. Died June 2, 1864; pyæmia.
1120	Carlin, J., Pt., C, 41st Ohio.	Nov. 25, 25, '63.	Left. Died December 9, 1863.
1121	Carlton, R. B., Pt., F, 3d Vermont, age 22.	May 5, 6, '64.	Right; ant. post. flap. Died May 26, 1864; pyæmia.
1122	Carmer, D., Corp'l, L, 14th N. Y. H. A., age 19.	Aug. 19, 19, '64.	Left. Surg. T. F. Oakes, 56th Mass. Died Sept. 13, 1864.
1123	Carnahan, J. A., Pt., K, 10th Michigan.	Sept. 1, 1, '64.	Left. Died Oct. 4, 1864; chronic diarrhœa.
1124	Carney, J., Pt., F, 155th New York, age 35.	June 3, 3, '64.	Right; lateral flap. Died June 13, 1864.
1125	Carpenter, J. M., Pt., C, 33d Indiana.	July 20, 20, '64.	Left. Died July 21, 1864.
1126	Carroll, J., Pt., A, 20th Massachusetts.	Dec. 13, 13, '62.	Right. Died January 15, 1863; pyæmia.
1127	Carroll, W., Pt., H, 66th Illinois.	May 28, 28, '64.	——. Surg. W. F. Cady, 12th Ill. Died June 15, '64; pyæmia.
1128	Carter, C. S., Pt., D, 50th Penn., age 22.	May 12, —, '64.	Right. May 20, hæm.; lig. fem. Died June 3, 1864.
1129	Casey, T., Serg't-Major, 51st Illinois.	Sept. 19, 21, '63.	Left. Died Oct. 4, 1863; pyæmia.
1130	Cassidy, M., Pt., C, 90th New York.	June 14, —, '63.	Left. A. A. Surg. — Kendall, U. S. N. Died June 22, 1863.
1131	*Causey, B. F.*, Pt., F, 30th Georgia, age 21.	Nov. 29, 30, '64.	Left; lateral flap. Died March 8, 1865; exhaustion.
1132	Cave, R., Pt., F, 8th Illinois Cav., age 29.	Aug. 1, 3, '63.	Lt; circ. A.A. Surg. C. Carvallo. Died Aug. 20, 1863. *Spec.* 1677.
1133	*Certain, W. R.*, Pt., H, 47th North Carolina.	June 1, 1, '64.	——. Surg. C. B. Gibson, C. S. A. Died June 12, 1864; exhaustion.
1134	Chancellor, H. C., jr., Lieut., B, 150th Penn.	July 3, 3, '63.	Left. Died Aug. 5, 1863.
1135	*Chandler, W. S. J.*, Pt., A, 1st Maryland.	July 3, 4, '63.	Right. Died July 9, 1863.
1136	Cheever, W., Pt., A, 30th Mass., age 28.	Oct. 19, 21, '64.	Right; ant. post flap. Died Nov. 24, 1864; pyæmia.
1137	Churchill, W. H., Serg't, H, 2d U. S. S. S.	Oct. 27, —, '64.	Right; circ. Died Nov. 7, 1864; wounds.
1138	Clark, G. H., Serg't, I, 2d N. Y. H. Art'ry, age 32.	June 5, 6, '64.	Left; ant. post. flap. Surg. G. L. Potter, 145th Penn. Typhoid fever. Died July 20, 1864.
1139	Clark, G. F., Pt., A, 149th New York.	May 15, 15, '64.	Right. Surg. C. H. Lord, 102d New York. Died May 23, '64.
1140	Clark, J., Pt., A, 83d Ohio, age 18.	April 9, 9, '65.	Right; flap. Died May 4, 1865; pyæmia.
1141	Clark, J., Pt., 13th New York Battery.	July 20, 20, '64.	Left. Died August 22, 1864.
1142	*Clark, J.*, Pt., —, 38th North Carolina.	July 3, 3, '63.	——. Died.
1143	*Clark, J. L.*, Serg't, G, 5th S. C. Cav., age 27.	May 28, 29, '64.	Right; don. skin flap; sloughed. Died June 18, 1864; pyæmia.
1144	Clark, S. F., Serg't, D, 1st Massachusetts.	Dec. 13, 13, '62.	——; flap. Died December 30, 1862.
1145	Clark, W. D., Pt., A, 3d New Jersey, age 26.	May 8, 8, '64.	Right; femur protrud. and exfol. Died June 25, '64; pyæmia.
1146	Cleaveland, J. F., Pt., G, 16th Maine, age 25.	Dec. 13, 14, '62.	Left; flap. Dec. 30, hæm.; fem. ligated. Died Dec. 31, 1862; exhaustion.
1147	Clough, J. E., Pt., B, 11th Mass., age 50.	April 1, 2, '65.	Left; oval ant. post. flap. Surg. H. F. Lyster, 5th Mich. Diarr., phlebitis, slough. Died April 23, 1865; exhaustion.
1148	Cobaugh, J., Pt., A, 10th Penn. Reserves.	May 6, 6, '64.	Right. Surg. B. Rohrer, 10th Penn. Res. Died May 19, 1864.
1149	Coffee, J., Pt., E, 69th New York.	Sept. 17, 17, '62.	Right; circ. A. A. Surg. A. V. Cherbonnier. Prot. fem. rem'd; necrosed. Died Jan. 28, 1863.
1150	Cogswell, W. H., Lieut., B, 2d Connecticut.	Sept. 19, 19, '64.	Left; circular. Died October 7, 1864; exhaustion.
1151	Cole, C., Pt., H, 124th Indiana, age 20.	Mar. 10, 10, '65.	Right; circ. Died April 19, '65.
1152	Cole, W., Corp'l, G, 5th Michigan.	July 2, 2, '63.	Left; hæmorrhage. Died July 13, 1863.
1153	Cone, C. C., Lieut., I, 8th Col'd Tr'ps, age 21.	Sept. 29, 29, '64.	Left. Died October 22, 1864; exhaustion.
1154	Conner, E., Pt., D, 72d Pennsylvania.	Sept. 17, 17, '62.	Right. Died October 10, 1862.
1155	Connor, D. C., Pt., C, 90th Ohio, age 21.	Dec. 16, 16, '64.	Left; flap. A. Surg. R. J. Hill 45th Ohio. Died Jan. 11, 1865.
1156	Converse, D. B., Pt., G, 129th Illinois.	June 4, 4, '64.	Left. A. Surg. G. M. Trowbridge, 19th Mich. Died Sept. 4, 1864.
1157	Conway, R., Pt., F, 30th Iowa, age 18.	Jan. 11, 11, '63.	Right. Died February 18, 1863.
1158	Cook, J. B., Lieut., H, 148th Penn., age 24.	May 5, 5, '64.	Right. Died June 1, 1864.
1159	*Cook, W. D.*, Lieut., F, 21st S. C., age 36.	Jan. 15, 15, '65.	Left. Died April 29, 1865.

[1] Thompson (J. H.), *Wounded at the Battle of New Berne*, in *Am. Med. Times*, 1862, Vol. 5, p. 6.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1160	Coons, H., Pt., K, 100th New York, age 42.	Sept. 9, 9, '64.	Right. Surg. M. S. Kittenger, 100th N. Y. Died Jan. 25, '65; enteritis, etc.
1161	Cooper, D., Pt., D, 5th New York Artillery.	June 5, 5, '64.	Right; sloughing. Died July 26, 1864.
1162	*Cope, W. M.*, Serg't, I, 33d Mississippi.	July 20, 20, '64.	Left. Died August 5, 1864.
1163	Coppernall, C., Pt., B, 75th New York.	June 14, 14, '63.	Left. Died June 29, 1863.
1164	*Corkeran, W. J.*, Pt., F, 56th Virginia.	.....	Right. Died April 29, 1865.
1165	Corn, J., Pt., K, 88th Pennsylvania.	July 3, 3, '63.	Right. Died July 9, 1863.
1166	Corpine, F., Pt., H, 11th Penn. Cav., age 64.	Mar. 31, 31, '65.	Right; flap. Died April 6, 1865; exhaustion.
1167	Cosgrove, J. W., Serg't, A, 56th Mass., age 21.	Aug. 19, 20, '64.	Right; circ. Died Sept. 1, 1864; exhaustion.
1168	Costello, C., Pt., P, 28th Pennsylvania.	Sept. 17, 17, '62.	Right. Died Sept. 23, 1862.
1169	*Covington, J. A.*, Serg't, G, 23d South Carolina.	Mar. —, —, '65.	Right. Died July 3, 1865.
1170	Craig, J., Pt., A, 119th Pennsylvania.	May 5, 5, '64.	Left; flap; slough'g. Died May 26, 1864.
1171	Cramer, R., Pt., I, 21st Michigan.	Mar. 19, 19, '65.	Right. Died April 4, 1865.
1172	Cress, H., Corp'l, K, 95th Penn., age 25.	May 6, 7, '64.	Right; ant. post. flap; abscesses; diarrhœa. Died July 8, 1864.
1173	*Crews, M. A.*, Pt., F, 2d South Carolina, age 36.	June 1, 3, '64.	Right; hæm.; lig. femoral. Died Oct. 25, 1864; tuberculosis.
1174	Crisler, W. R., Corp'l, C, 107th New York.	Mar. 16, 16, '65.	Right. (Skey's operation.) Surg. J. Chapman, 123d N. Y. Died March 17, 1865.
1175	Cronan, T., Pt., C, 149th New York.	May 25. —, '64.	Right. Died June 8, 1864.
1176	Cronin, D., Pt., F, 59th New York.	Dec. 13, 13, '62.	Left. Died January 18, 1863.
1177	Crow, T., Pt., B, 86th Indiana.	Sept. 19, 19, '63.	Left. Died October 29, 1863.
1178	Crulip, W. B., Pt., F, 53d Penn., age 18.	June 3, 4, '64.	Left; circ. Died July 10, 1864; pyæmia. *Spec.* 3165.
1179	Cummings, G. P., Serg't, K, 1st Mass Art., age 26.	June 18, 18, '64.	Right; post. flap; pyæmia. Died Sept. 9, 1864.
1180	*Cunningham, P.*, Pt., H, 5th Texas.	Jan. 27, 28, '64.	Right; circ. Surg. C. W. McMillan, 1st E. Tenn. Died Feb. 18, 1864; exhaustion.
1181	Cunningham, S., Pt., D, 13th Indiana Cavalry, age 29.	Dec. 4, 5, '64.	Right; circ. Surg. H. B. Johnson, 115th O. Recurrent hæm.; lig. fem'l. Died Jan. 26, 1865.
1182	Cunningham, H. L., Corporal, G, 22d Wis.	May 16, 16, '64.	Right. Surg. J. Bennett, 19th Mich. Died June 26, 1864.
1183	Cuppernull, C. E., Pt., K, 6th Wis., age 29.	June 18, 19, '64.	Left; ant. post. flap. Died Aug. 13, 1864; gang., exhaustion.
1184	Curach, C., Pt., D, 10th Ohio.	Oct. 8, 8, '62.	Left. Died November 4, 1862.
1185	Daggett, C. H., Corp'l, B, 1st Me. H. Art., age 18.	June 19, 19, '64.	Left; ant. post. mus. flap; gang. Died June 30, 1864; severity of wound, etc.
1186	Dailey, B. H., Pt., A, 18th Ohio, age 21.	Dec. 15, 15, '64.	Left; lat. flap. A. A. Surg. M. L. Herr. Gang. Died Jan. 8, '65.
1187	Dallsby, J. O., Pt., I, 22d Indiana.	June 27, 27, '64.	Right. Died June 30, 1864.
1188	Daly, J. M., Pt., H, 40th Indiana, age 22.	Nov. 25, 27, '63.	Left; circ.; gangrene. Died Dec. 7, 1863.
1189	Danforth, M., Pt., A, 116th Ohio, age 18.	Sept. 13, 13, '64.	Left. Died September 20, 1864.
1190	*Daniels, B. F.*, Corp'l, B, 4th Louisiana.	July 28, 28, '64.	Left. Died August 3, 1864.
1191	Darrow, J., Corp'l, I, 59th New York.	Nov. 10, 10, '64.	——. Surg. D. W. Maull, 1st Del. Died Nov. 12, 1864.
1192	Daum, L., Pt., G, 5th New York.	Aug. 20, 20, '64.	——. Died August 23, 1864.
1193	Davis, A., Pt., D, 44th New York, age 23.	May 5, 5, '64.	Right. Died June 1, 1864.
1194	Davis, H. J., Lieut., K, 30th Ohio, age 22.	May 22, 24, '63.	Right; circ. Ass't Surg. H. M. Sprague, U. S. A. Died June 5, 1863. *Spec.* 1623.
1195	Davis, J. P., Pt., C, 27th Mass., age 34.	May 14, 14, '64.	Left; diarrhœa. Died June 19, 1864; exhaustion.
1196	Dawley, E., Pt., K, 19th Michigan.	June 25, 25, '64.	Left. Died July 11, 1864.
1197	Day, C. C., Pt., A, 19th Wisconsin, age 29.	May 13, 13, '64.	Left; flap; recurrent hæm. Died June 16, 1864.
1198	*Day, S. M.*, Pt., I, 4th Virginia, age 18.	May 3, 4, '63.	Left; circ. Died June 9, 1863.
1199	Dean, W., Pt., D, 10th Missouri.	Sept. 19, 19, '62.	Left. Died September 30, 1862.
1200	Dempsey, C., Pt., G, 32d Mass., age 38.	May 12, 12, '64.	Left; circ. Died June 7, 1864; pyæmia.
1201	Derocher, G., Pt., I, 1st Maine, age 23.	May 12, 12, '64.	Right; flap; femur prot. Died February 20, 1865.
1202	Detwyler, G., Pt., D, 7th New Jersey, age 19.	June 22, 22, '64.	Right; flap. Died August 1, '64.
1203	Devlin, A., Pt., H, 20th Massachusetts.	June 1, 1, '62.	——; bone prot.; removal of bone. Died June 18, 1862; pyæmia.
1204	Dewey, E. E., Pt., F, 1st Vermont, age 31.	June 1, 1, '64.	Right; circ.; gang. Died Aug. 7, 1864; pyæmia.
1205	Dice, J., Pt., A, 149th New York.	May 25, 25, '64.	Right. Died May 27, 1864.
1206	Dick, J., Pt., K, 7th N. York.	Dec. 13, 13, '62.	——. Died December 20, 1862.
1207	Dickensheet, D., Pt., B, 71st Illinois, age 26.	Dec. 7, 8, '62.	Right; circ. Surg. P. Harvey, 19th Iowa. Sloughing; hæm. Died Dec. 22, 1862; exhaustion.
1208	*Dickerson, C.*, Corp'l, C, 48th N. C., age 29.	April 1, 1, '65.	Right. Surg. T. H. Squire, 89th N. Y. Died May 7, '65; exh'n.
1209	Dietrich, J., Pt., H, 11th Pennsylvania.	Dec. 13, 13, '62.	Right; flap. Died Dec. 13, 1862.
1210	Dingman, A. W., Pt., D, 91st N. Y., age 23.	Mar. 30, 31, '65.	Left; ant. post. flap. Surg. J. C. Hall, 6th Wis. Died April 17, 1865; exhaustion.
1211	*Dix, I. I.*, Pt., D, 4th Virginia.	May 3, 5, '63.	Right; ant. post. flap; slough'g. Died May 7, 1863.
1212	Dodge, H. N., Corp'l, G, 10th Massachusetts.	May 5, 5, '64.	——. Surg. G. T. Stevens, 77th N. Y. Died May 22, 1864.
1213	Doman, I., Pt., C, 198th Penn., age 16.	Mar. 29, 29, '65.	Left; circ.; erysip. Died April 19, 1865; pyæmia.
1214	Dormoy, G., Pt., K, 75th Illinois.	June 27, 27, '64.	Right. Surg. T. M. Cook, 101st Ohio. Died June 30, 1864.
1215	Dougherty, J., Pt., D, 9th N. Hampshire.	May 12, 12, '64.	——. Surg. W. C. Shurlock, 51st Penn. Died May 18, 1864.
1216	Douglass, E., Pt., K, 9th N. Hampshire.	May 12, 12, '64.	——. Surg. J. S. Ross, 11th N. Hampshire. Died May 17, '64.
1217	Douglass, D., Pt., E, 9th N. Y. H. Art., age 40.	June 1, 3, '64.	Left; circ.; gangrene. Died July 31, 1864; pyæmia.
1218	Draper, I. T., Pt., E, 3d Delaware, age 37.	June 17, 19, '64.	Left; flap. July 9, 11, 12, hæm. Died July 12, 1864.
1219	*Dudley, J. A.*, Pt., E, 58th Virginia.	Sept. 19, 19, '64.	Left; circ.; flap opened, stump exposed. Died Oct. 23, '64; diarr.
1220	Dudley, A., Pt., C, 15th Infantry.	Aug. 7, 7, '64.	Right. Died September 5, 1864.
1221	Duenisch, T., Pt., F, 37th Ohio.	May 17, 17, '62.	Left; gangrenous. Died May 30, 1862.
1222	Duncan, W. H., Pt., A, 87th New York.	June 1, 1, '62.	Right; gangrene. Died June 11, 1862.
1223	Dunn, A., Pt., H, 1st Missouri Cavalry.	April 4, 4, '64.	Left. A. Surg. W. W. Bailey, 1st Mo. Cav. Died April 5, 1864.
1224	Dupple, S., Pt., K, 142d Penn., age 20.	May 12, 13, '64.	Right; circ. July 18., 19, hæm. Died July 21; hæm. *Spec.* 2885.
1225	Durant, C., Pt., D, 32d Mass., age 35.	Feb. 6, 8, '65.	Right. Died February 12, 1865.
1226	Dwire, W. J., Pt., G, 55th Ohio.	May 15, 15, '64.	Right; (also wound of left thigh and testes.) Removal of testes. Died May 30, 1864.
1227	Dwyre, J., Pt., K, 176th New York.	Sept. 19, 19, '64.	Right. Died Sept. 23, 1864.
1228	Dykeman, W., Pt., B, 5th Michigan, age 45.	May 11, 12, '64.	Left; circ. Surg. H. F. Lyster, 5th Mich. Died July 15, '64; pneum.
1229	Eagan, J., Pt., E, 10th New York.	June 17, 17, '64.	Left. Surg. D. W. Maull, 1st Del. Died July 6, 1864.
1230	Eaton, J., Pt., G, 16th Maine, age 27.	June 17, 17, '64.	Left. Died July 8, 1864.
1231	Eaton, L., Pt., I, 17th Indiana, age 18.	June 21, 21, '64.	Right. Surg. B. N. Bond, 27th Mo. Died July 16, 1864; hæm.
1232	Eddie, J., Pt., K, 3d Michigan, age 23.	May 5, 5, '64.	Left; circ. Died June 2, 1864; pyæmia
1233	Edwards, G., Pt., H, 21st Connecticut, age 20.	July 30, 30, '64.	Right; flap. Surg. N. Y. Leet, 76th Penn. Died Sept. 4, 1864.
1234	Egan, J., Pt., G, 2d N. Y. State Militia, age 18.	Sept. 17, 17, '62.	Right. Surg. S. N. Sherman, 34th N. Y. Died Sept. 25, 1862.
1235	Eiznor, J., Pt., F, 120th New York.	Mar. 25, 25, '65.	Right. Died April 22, 1865.
1236	Elam, S. A., Pt., A, 33d Wisconsin, age 26.	Mar. 30, 30, '65.	Left; flap. Surg. L. Dyer, 81st Ill. Died June 6, 1865; chronic diarrhœa and erysipelas.
1237	*Elkin, C. R.*, Pt., E, 22d Georgia, age 22.	May 24, 24, '64.	Right; circ.; missile lodged in left knee. Died June 19, '64; pyæm.
1238	Ellingwood, H., Pt., K, 79th Indiana.	Sept. 1, 1, '64.	Left. Died September 24, 1864.
1239	Ellison, R., Corp'l, E, 86th New York.	Oct. 16, 16, '64.	Left. Surg. H. F. Lyster, 5th Mich. Died Oct. 25, '64. *Spec.* 4116.
1240	Emerson, H., Pt., I, 88th Illinois, age 34.	Nov. 30, De. 1, '64.	Left; circ. A. A. Surg. J. C. Taylor. Gang. Died Dec. 13, 1864; irritative fever.
1241	*Enbank, J. G.*, Pt., A, 51st Alabama.	June 3, 3, '64.	——; lat. flaps. Surg. — Black, C. S. A. Died June 5, '64; exh'n.
1242	Estel, A., Corp'l, F, 10th N. Y. Cav., age 21.	June 24, 24, '64.	Left; circ. Died July 22, 1864; pyæmia.
1243	Etters, B. J., Pt., G, 51st Penn., age 18.	May 9, 9, '64.	Right; circ. Died May 30, 1864; exhaustion.
1244	Faber, J. C., Serg't, G, 210th Penn., age 28.	April 1, 2, '65.	Left. Died May 17, 1865; pyæm.
1245	Faehndrich, J., Pt., C, 52d New York.	Dec. 13, —, '62.	Left. Supposed to have died. *Spec.* 1362.
1246	Fales, A., Pt., F, 9th N. Y. H. A., age 20.	July 9, 10, '64.	Right; circ. A. A. Surg. J. C. Shimer. Gangrene. Died July 13, 1864.
1247	Fales, J. A., Corp'l, K, 3d Vermont, age 45.	Aug. 21, 21, '64.	Left. Died September 21, 1864.
1248	Farrelly, B., Pt., K, 100th New York, age 37.	May 17, 17, '64.	Left. Died July 21, 1864; exh'n.
1249	Faust, P. L., Pt., A, 79th Penn., age 26.	Aug. 10, 10, '64.	Left; hæm.; fem. art'y lig'd. Died October 2, 1864.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1250	Ferguson, W., Corp'l, D, 1st Artillery age 20.	Oct. 7, 7, '64.	Left. Died December 9, 1864; pyæmia.
1251	Ferrer, H., Pt., D, 96th Ohio, age 20.	Nov. 3, 3, '63.	Left: (also wound of right knee.) Died Nov. 18, 1863.
1252	Fetler, R., Pt., C, 9th Ill. Cavalry, age 30.	Dec. 17, 17, '64.	Left; circ. A. A. Surg. R. G. Ludlow. Died March 13, 1865.
1253	Finaughty, M., Serg't, G, 10th Inf'y, age 30.	July 2, 3, '63.	Right; flap; hæm. from femoral. Died July 7, 1863; exhaustion.
1254	Fisher, N., Pt., F, 22d Col'd Troops, age 23.	Sept. 29, 29, '64.	Right. Died October 30, 1864.
1255	Fitch, M., Pt., A, 14th New York H'vy Art'y.	Mar. 25, 25, '65.	Left; circ.; (also wounds of left shoulder and thoracic parietes.) Died May 2, 1865.
1256	Flax, S., Pt., C, 90th Ohio.	July 3, 4, '64.	Left. Surg. C. J. Walton, 21st Ky. Died Sept. 4, 1864.
1257	*Fletcher, G. W.*, Corp'l, K, 3d Arizona Cav., age 32.	May 18, 18, '64.	Left. Died August 30, 1864; gangrene.
1258	Flood, P., Pt., H, 28th Massachusetts.	May 12, 12, '64.	——. Surg. P. E. Hubon, 28th Mass. Died May 16, 1864.
1259	Ford, E. T., Pt., C, 121st New York.	Sept. 19, 19, '64.	Right; flap. Died Oct. 8, 1864; exhaustion.
1260	Forston, W., Pt., F, 53d Indiana.	Oct. 5, 5, '62.	——. Died October 9, 1862.
1261	Fortney, H., Pt., F, 12th West Virginia.	June 5, 5, '64.	Left. Died June 12, 1864.
1262	Foster, J., Pt., K, 82d Indiana, age 20.	Aug 7, 7, '64.	Left. Surg. C. S. Arthur, 75th Ind. Died Feb. 17, 1865; pneum.
1263	Fredenburgh, W., Pt., D, 111th Penn.	Sept. 17, 17, '62.	Right. Died November —, 1862.
1264	Fredericks, D., Pt., G, 58th Penn., age 42.	Sept. 30, 30, '64.	Left. Died Oct. 27, 1864; pyæm.
1265	French, G. W., Pt., C, 13th Iowa, age 26.	July 20, 21, '64.	Right; lateral flap. Surg. M. W. Thomas, 13th Iowa. Died Nov. 24, 1864; exhaustion.
1266	Frost, W. H., Pt., A, 32d Wisconsin.	Feb. 3, 3, '65.	Left. Surg. A. B. Monohan, 63d Ohio. Died Feb. 25, '65; pyæm.
1267	Fullerton, A. B., Pt., A, 1st Vt. H. Art., age 26.	Mar. 25, 25, '65.	Left. Died April 4, '65; pyæmia.
1268	Garl, W. O., Pt., G, 36th Iowa.	April 4, 4, '64.	Right. Surg. S. H. Sawyers, 36th Iowa. Died April 7, 1864.
1269	Garland, M. H., Pt., D, 13th New Jersey.	June 4, 4, '64.	Left. A. Surg. L. W. Kennedy, 123d N. York. Died June 24, '64.
1270	Garnish, J., Pt., F, 8th Michigan, age 46.	June 3, 3, '64.	Left; circ. Surg. W. B. Fox, 8th Mich. Died June 30, 1864.
1271	Gay, J. C., Pt., A, 7th Maine, age 37.	June 1, 1, '64.	Right. Surg. G. T. Stevens, 77th N. Y. Gaug. Died Dec. 26, '64.
1272	Gear, W., Pt., E, 14th Illinois.	Oct. 5, 5, '62.	——. Died October 7, 1862.
1273	*Gentry, W. H.*, Pt., G, 44th Virginia.	Mar. 25, 25, '65.	Left. Surg. L. W. Bliss, 51st N. Y. Died April 5, '65. *Spec.* 4020.
1274	George, A. I., Pt., C, 4th Penn. Cav., age 29.	Mar. 29, 29, '65.	Left; flap. Surg. W. G. Keir, 91st Penn. Died Apr. 29, '65; pyæm.
1275	Gerard, C., Pt., K, 35th Massachusetts.	Aug. 19, 19, '64.	Left; circ. Surg. T. F. Oakes, 56th Mass. Died Aug. 30, 1864.
1276	Geringer, J. H., Pt., H, 1st North Carolina.	July —, —, '63.	Left. Died July 28, 1863.
1277	Gerry, W. H., Pt., H, 7th Mass., age 30.	May 5, 5, '62.	Right. Died May 22, 1862; pyæmia.
1278	Gibbons, P., Pt., E, 150th Penn., age 29.	Oct. 27, 28, '64.	Right; flap. Died Jan. 5, 1865; pyæmia.
1279	Gibbs, A., Pt., I, 6th C'd Troops, age 22.	Sept. 29, 29, '64.	Left. Died March 12, '65; pneumonia and amputation.
1280	Gibney, T., Pt., A, 69th New York.	Sept. 17, 17, '62.	Right. Died Dec. 22, 1862.
1281	Gibson, J. M., Corp'l, A, 3d Kentucky, age 34.	Nov. 25, 27, '63.	Right. Died Jan. 11, '64; pyæm.
1282	Giddings, J. A., Pt., G, 3d Wisconsin, age 17	May 3, 3, '63.	Right; circ. Died June 9, 1863; pyæmia. *Specs.* 1241, 1242.
1283	Gillespie, B. F., Pt., G, 30th Ohio, age 32.	July 28, 28, '64.	Right; circ. Act. Staff Surg. C. B. Richards, U.S.A. Died Aug. 9, 1864; empyema.
1284	Gillespie, J. D., Serg't, E, 49th Penn., age 21.	April 6, 7, '65.	Right; circ.; hæm.; diarrh. Died May 12, 1865; exhaustion.
1285	*Gilley, C. H.*, Pt., K, 60th Georgia.	Dec. 13, 13, '62.	Left. Died December 18, 1862.
1286	Gillmore, R., Pt., F, 91st New York, age 20.	Mar. 31, 31, '65.	Right; ant. post. flaps. Died May 25, 1865; exhaustion.
1287	Gilman, W., Corp'l, K, 32d Mass., age 31.	July 2, 3, '63.	Left. Died July 28, '63; pyæmia.
1288	Gilt, J. A., Corp'l, G, 130th Indiana, age 33.	Dec. 16, 16, '64.	Left; (Vermale's method.) Ass't Surg. W. B. Trull, U. S. V. Died Jan. 2, 1865; typhoid fever.
1289	Ginither, J. A., Pt., B, 49th Penn., age 22.	May 10, 12, '64.	Right. Died June 4, '64; pyæmia.
1290	*Glasgow, A. L.*, Pt., H, 21st N. C., age 26.	July 2, 3, '63.	Right. Died October 18, 1863.
1291	Gleason, T. E., Corp'l, D, 66th Illinois.	July 22, 22, '64.	Left. Surg. W. R. Marsh, 2d Ia. Died Nov. 2, 1864; wounds.
1292	Glidden, G., Pt., K, 40th Mass., age 22.	May 15, 15, '64.	Left. Died June 13, 1864; exh'n.
1293	*Goff, C.*, Pt., G, 22d Va.	Sept. 19, 19, '64.	——; circ. Died October 1, 1864; pyæmia.
1294	[1]*Goode, P.*, Corp'l, G, 26th Tennessee, age 22.	May 15, 15, '64.	Right; flap. Died June 27, '64; asthenia.
1295	*Goodson, A. A.*, Pt., K, 22d N. C., age 25.	Sept. 19, 19, '64.	——; circ.; hæm. Oct. 20, reamp. at mid. Died Oct. 27, '64; pyæm.
1296	Gordon, J., Pt., C, 1st Michigan Artillery.	Feb. 3, 3, '65.	Right. Surg. A. B. Monohan, 63d Ohio. Died Feb. 10, 1865.
1297	Gould, J. P., Col., 59th Massachusetts.	July 30, 30, '64.	Left: circ. Surg. W. Ingalls, 59th Mass. Died Aug. 22, 1864.
1298	*Grady, F.*, Pt., D, 8th N. C. Battalion.	Feb. 12, 14, '63.	Left. Surg. C. A. Cowgill, U.S.V. Died Feb. 15, 1863.
1299	Graves, E., Serg't, F, 37th Massachusetts.	May 5, 5, '64.	——. Surg. G. T. Stevens, 77th New York. Died May 26, 1864.
1300	Gray, E. F., Pt., G, 26th Illinois.	May 13, 13, '64.	Left; flap. Surg. W. Lomax, 12th Ind. Died July 5, 1864.
1301	Gray, H. M., Serg't, E, 37th Illinois, age 30.	Dec. 7, 9, '62.	Right; ant. post. flap. A. Surg. M. A. Mosher, 20th Wis. Died Dec. 17, 1862; hæmorrhage.
1302	Green, E. B., Pt., H, 55th Ohio.	May 15, 15, '64.	Right. Died June 20, 1864.
1303	*Green, H. W.*, Serg't, D, 31st Miss.	July 20, 20, '64.	Right. Died October 25, 1864.
1304	Green, J., Pt., B, 1st R. I. Artillery.	July 3, 3, '63.	Right. Surg. G. Chaddock, 7th Mich. Died July 16, 1863.
1305	Green, T. W., Pt., F, 151st New York, age 26.	July 9, 11, '64.	R't; circ. A. A. Surg. J. C. Shimer. Died Aug. 4, 1864. *Spec.* 3935.
1306	Greenlee, A. F., Pt., F, 140th Pennsylvania.	July 3, 3, '63.	——. Died August 3, 1863.
1307	Griffith, J., Pt., K, 5th Connecticut.	Dec. 20, 20, '63.	Left. Died December 24, 1863.
1308	Griffith, B., Corp'l, G, 18th Ohio.	Dec. 31, 31, '62.	——. Died February 6, 1863.
1309	*Guillery, A.*, Pt., A, Miles's Legion.	.....	Left. Died May 23, 1863.
1310	Gwynn, J., Pt., I, 70th Ohio.	Aug. 28, 28, '64.	Right; circ. Surg. R. Morris, 103d Illinois. Died Oct. 3, 1864.
1311	Hackathorn, J., Pt., F, 126th Ohio, age 21.	May 12, 14, '64.	Left; ant. post. flap. Died June 9, 1864; exhaustion.
1312	*Hagan, L. H.*, Pt., K, 23d North Carolina, age 18.	July 1, 2, '63.	Left. Died September 18, 1863, diarrhœa.
1313	Haines, J., Pt., E, 50th Penn., age 19.	June 7, 8, '64.	Right; circ. Surg. S. S. French, 20th Mich. Died June 26, 1864; exhaustion.
1314	Haines, J. C., Pt., B, 52d Ohio.	July 22, 22, '64.	Left. Died July 30, 1864.
1315	Hall, J. W., Pt., G, 4th Michigan, age 24.	May 13, 13, '64.	Left; long ant. flap. Died July 6, 1864; exhaustion.
1316	Ham, J. C., Pt., B, 87th Penn., age 24.	Oct. 19, 20, '64.	Left; ant. post. flap. Oct. 28, fem. artery lig. Died Oct. 28, 1864; hæmorrhage.
1317	*Hamrick, A.*, Corp'l, H, 28th N. C., age 23.	May 11, 11, '64.	Left; ant. post. flap. Died June 13, 1864; exhaustion.
1318	Hanes, E., Pt., K, 7th N. Y. H. A., age 20.	June 8, 8, '64.	Right; circ. Surg. G. L. Potter, 145th Penn. Died July 10, '64; pyæmia.
1319	Hankins, G. S., Pt., B, 142d N. York, age 20.	July 4, 4, '64.	Left; (also w'nd of wrist.) Died July 15, 1864; exhaustion.
1320	Hardy, A., Pt., C, 140th New York, age 33.	June 16, 16, '64.	Right. Died July 7, 1864.
1321	Hardy, G. E., Pt., I, 13th N. Hampshire, age 31.	Sept. 30, Oct. 1, '64.	Right. Died Oct. 15, 1864; mortification following amputation.
1322	Harland, D. G., Corp'l, B, 84th Illinois.	Dec. 31, 31, '62.	——. Died January 3, 1863.
1323	Harle, B. B., Serg't, E, 158th N. York, age 24.	Sept. 30, 30, '64.	Left. Surg. F. L. Ainsworth, U.S. V. Died Nov. 16, '64; irrita. fev.
1324	Harper, J. L., Pt., C, 63d Indiana.	Feb. 18, 18, '65.	Right. Died Feb. 28, 1865.
1325	Harrington, T., Serg't, A, 6th Mass. Cav., age 29.	May 18, 20, '64.	Left; circ. A. Surg. C. H. Andrus, 128th N. Y. Died July 14, 1865; chronic diarrhœa.
1326	Harrington, W., Pt., B, 90th New York.	June 14, 14, '63.	Right. Surg. E. S. Hoffman, 90th New York. Died Sept. 2, 1863.
1327	Harris, H. B., Serg't, G, 46th Pennsylvania.	July 20, —, '64.	Right. Died July 27, 1864.
1328	*Harris, J. L.*, Pt., F, 56th Virginia.	July 3, 3, '63.	Left. Died July 16, 1863.
1329	*Harrison, F.*, Pt., M, 1st Texas Legion.	Dec. 24, 25, '62.	——. Died December 31, 1862.
1330	Harry, L., Pt., I, 147th Penn., age 23.	Dec. 19, 19, '64.	Right. Died Dec. 20, 1864.
1331	*Hartman, C.*, Pt., I, 1st Louisiana.	July 13, 13, '63.	Right. A. Surg. J. T. Myers, 91st New York. Died July 13, '63.
1332	Haskell, C., Pt., F, 2d Mass. Art'y, age 22.	Mar. 10, 11, '65.	Left; circ. Died Mar. 30, 1865; shock of wound and operation.
1333	Haskill, C., Pt., F, 82d Ohio.	July 1, 1, '63.	Right. Died July —, 1863.
1334	Hawk, C., Pt., H, 210th Penn., age 26.	Mar. 31, 31, '65.	Right; ant. post. flap; (also flesh w'nd r't thigh.) Died May 9, '65.
1335	Hawks, E., Corp'l, G, 115th Penn., age 37.	May 12, 12, '64.	Right; flap. Died June 8, 1864. *Spec.* 4547.
1336	Hays, G. W., Corp'l, K, 2d Michigan, age 19.	June 17, 17, '64.	Left; circ.; (and exc'n right knee joint.) Died July 2, '64; exh'n. *Spec.* 3046.
1337	Heistand, B., Pt., E, 11th Missouri, age 17.	Dec. 15, 16, '64.	Left; circ. Died Jan. 7, 1865.
1338	Henderson, N. W., Pt., E, 123d Ohio, age 16.	Sept. 19, 20, '64.	Right; circ.; (and excis'n of ulna.) Died Nov. 4, 1864; pyæmia.

[1] O'KEEFE (D. C.), *Surgical Cases of Interest, treated at Institute Hospital, Atlanta, Ga., May and June*, 1864, in *Confederate States Med. and Surg. Jour.*, 1865, Vol. II, p. 29.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1339	Hendricks, M., Corp'l, C, 4th Delaware, age 40.	June 17, 19, '64.	Left; dou. flap. Surg. A. S. Coe, 147th N. Y. Died July 2, 1864.
1340	Henry, W., Pt., I, 30th Indiana.	May 7, 7, '64.	——. Surg. C. J. Walton, 21st Ky. Died June 26, 1864.
1341	Herman, I., Pt., B, 27th Michigan, age 19.	May 12, 12, '64.	Right; circ. Died June 3, 1864.
1342	*Herron, G. S.*, Pt., F, 7th S. Carolina, age 21.	Aug. 19, 20, '64.	Right; circ. Surg. J. F. Hutchinson, 107th Penn. Died Sept. 18, 1864; pyæmia. *Spec.* 4155.
1343	Hickman, R., Corp'l, E, 1st Del. Cav., age 23.	Oct. 17, 18, '64.	Left; ant. pos'. flap. Confed. surg. Died Feb. 27, '65; typhoid pneumonia and chronic diarrhœa.
1344	*Hicks, J.*, Pt., D, 56th N. Carolina, age 20.	Mar. 25, 25, '65.	Right; flap. Surg. T. F. Oakes, 56th Mass. Died April 15, 1865. *Spec.* 3995.
1345	Hicks, J. W., Pt., A, 37th Indiana.	May 31, 31, '64.	Left. Died June 13, 1864.
1346	*Higgins, J.*, Pt., I, 6th Louisiana.	July 9, 11, '64.	——; circ. Surg. C. H. Todd, C. S. A. Died July 25, 1864.
1347	Higgins, N., Pt., M, 1st Me. H. A., age 44.	June 21, 22, '64.	Right. Died October 2, 1864.
1348	Highland, W., Pt., E, 41st Ohio.	Nov. 25, 25, '63.	Right. Died December 26, 1863.
1349	Higley, A., Serg't, E, 68th Ohio.	July 21, 21, '64.	Left. Surg. E. M. Rogers, 12th Wis. Died July 25, 1864.
1350	Hildreth, N., Corp'l, B, 94th N. York, age 21.	Feb. 7, 8, '65.	Left. Surg. C. N. Chamberlain, U. S. V. Died Mar. 4, '65; pyæmia. *Specs.* 1504, 1595.
1351	Hill, D. S., Lieut., G, 10th Vermont.	Sept. 19, 19, '64.	Left. Died October 26, 1864.
1352	Hill, E., Pt., C, 114th Illinois.	May 22, 22, '63.	Right. Died August 14, 1863; gangrene and chronic diarrhœa.
1353	Hill, H. W., Pt., A, 24th New York Cavalry.	June 18, 18, '64.	Right; (also flesh w'nd left thigh.) Surg. W. B. Fox, 8th Mich. Died at Andersonville, Nov. 8, 1864.
1354	Hill, W., Pt., A, 32d Colored Troops, age 21.	Dec. 7, 7, '64.	Right. Died December 16, 1864; pyæmia.
1355	Hillman, J., Pt., C, 31st Massachusetts.	June 14, 14, '63.	Left. Died July 8 1863.
1356	Hinkley, A. P., Corp'l, C, 1st Me. H. A., age 19.	June 18, 18, '64.	Left. Died Aug. 1, '64; pyæmia and osteomyelitis. *Spec.* 2918.
1357	Hinton, A. B., Serg't, H, 4th C. Troops, age 26.	Sept. 29, 29, '64.	Right. Died October 21, 1864; exhaustion.
1358	Hipp, A., Pt., F, 15th Missouri.	June 26, —, '64.	Left. Died July 16, 1864.
1359	Hockley, E. J., Serg't, B, 12th Mass., age 23.	Dec. 13, 13, '62.	Right; flap. Died Dec. —, 1862.
1360	Holden, G. W., Pt., I, 33d Indiana.	July 20, 20, '64.	Left. Died August 16, 1864.
1361	*Holden, H.*, Pt., I, 42d N. Carolina.	May 19, 19, '64.	Left; circ.; gangrene. Died July 29, 1864.
1362	Holman, J., Pt., F, 11th Missouri, age 22.	Dec. 16, 17, '64.	Right; circ. Died Feb. 6, 1865.
1363	Holmes, D. H., Pt., D, 7th Maine, age 23.	May 12, 12, '64.	Left; ant. post. flap. Surg. F. M. Everleth, 7th Me. Died June 2, 1864; exhaustion.
1364	Holmes, G. E., Serg't, I, 19th Maine, age 21.	May 12, 12, '64.	Left. Surg. W. J. Burr, 42d N.Y. Died June 15, '64; pyæmia.
1365	Homans, S. C., Pt., E, 91st Pennsylvania.	Oct. 27, 27, '64.	Left. Died November 6, 1864.
1366	Hoogland, E., Pt., A, 2d N.Y. Mt'd Rifl., age 19.	June 17, 17, '64.	Right; circ.; (also w'nd left leg.) Died July 5, 1864; pyæmia.
1367	Hoover, J., Pt., K, 55th Ohio.	June 19, 19, '64.	Right. Died June 22, 1864.
1368	Hopper, W., Serg't, A, 46th Pennsylvania.	May 3, 3, '63.	Left. Died May 5, 1863.
1369	Horth, M. F., Pt., D, 179th New York.	July 10, 10, '64.	Right; circ. Surg. G. W. Snow, 35th Mass. Died Sept. 6, 1864; chronic diarrhœa.
1370	Horton, A., Pt., B, 48th New York, age 19.	June 3, 3, '64.	Right; lat. flap. June 16, fem'l ligated on face of stump. Died June 23, 1864; exhaustion.
1371	Horton, I., Pt., G, 150th New York.	July —, —, '64.	Right. Died August 10, 1864.
1372	Houck, W. F., Pt., D, 138th Illinois, age 26.	June 21, 21, '64.	Left. Surg. T. M. Cook, 101st Ohio. Died June 23, 1864.
1373	Hough, A., Serg't, H, 15th Indiana, age 31.	Nov. 25, 27, '63.	Left; circ.; gangrene. Died Jan. 6, 1864.
1374	Houston, J. W., Serg't, C, 7th Ill. Cav., age 23.	Dec. 15, 17, '64.	Left; circ. A. A. Surg. J. N. Van Meter. Died Dec. 31, '64; irrita. fever and colliquative diarrhœa.
1375	Howard, F. H., Lieut., F, 2d N. Y. Art'y, age 25.	June 1, 1, '64.	Left; circ. Surg. G. L. Potter, 145th Penn. Died Aug. 17, '64. *Spec.* 1397.
1376	Howe, H. A., Corp'l, I, 95th New York, age 40.	June 19, 19, '64.	Left. Surg. G. W. Metcalf, 76th New York. Died July 25, 1864.
1377	Hubbard, W., Serg't, A, 12th Connecticut.	Oct. 19, 19, '64.	Right. Died October 21, 1864.
1378	Hudson, F., Serg't, B, 132d N. York, age 24.	Mar. 7, 9, '65.	Left; flap. A. Surg. E. F. Hendricks, 15th Conn. Died March 23, 1865; hæmorrhage.
1379	Hudson, H., Pt., D, 7th Mass., age 25.	May 5, —, '64.	Right. Died May 31, 1864.
1380	*Hudson, T. F.*, Pt., A, 4th Louisiana, age 23.	Dec. 16, 17, '64.	Right; ant. post. flap. A. A. Surg. R. L. McClure. Died Dec. 24, 1864; exhaustion.
1381	Huett, L. A., Pt., E, 51st Indiana.	Dec. 30, 30, '62.	——. Died February 27, 1863.
1382	Huff, W. F., Pt., G, 119th Penn., age 22.	May 5, 6, '64.	L't; circ. Surg. P. Leidy, 119th Pa. Died June 6, 1864; pyæmia.
1383	Humphreys, C. J., Corp'l, H, 81st N. Y., age 25.	June 3, 3, '64.	Right. Surg. J. H. Lee, 21st Conn. Died Aug. 17, 1864; diarrhœa.
1384	Humphries, J., Pt., B, 50th Ohio, age 47.	July 21, 21, '64.	R't. Surg. J. W. Lawton, U. S. V. Gang. Died August 24, 1864.
1385	Hunker, J. C., Pt., D, 2d N.Y. Mt'd Rifl., age 30.	July 17, 17, '64.	R't; circ. A. Surg. E. M. Smyser, 48th Penn. Died Aug. 29, 1864; pyæmia.
1386	Hunnewell, J., Pt., H, 31st Maine, age 36.	June 25, 25, '64.	Left; flap. Died July 21, 1864; exhaustion.
1387	Hunter, J., Serg't, B, 57th Pennsylvania.	July 3, 3, '63.	Left. Died July 22, 1863.
1388	Hurley, J., Pt., B, 8th Maryland, age 33.	May 5, 5, '64.	Left. Died June 5, 1864.
1389	Hutchinson, G., Pt., K, 13th Iowa.	July 21, 21, '64.	Right. Died July 29, 1864.
1390	Hutchinson, R. D., Pt., G, 89th Indiana, age 21.	April 9, 9, '65.	Right; circ. Died April 24, '65; hæmorrhage.
1391	*Hyett, C. P.*, Capt., 6th Miss., age 25.	Aug. 21, 21, '64.	Lett. Died Sept. 22, 1864.
1392	*Ingraham, G.*, Pt., K, 15th Alabama, age 22.	July 3, 3, '63.	Right. Died August 3, 1863.
1393	Jackson, E. D., Pt., G, 11th New York, age 24.	Nov. 25, 26, '64.	Right; semi-circ. skin flaps; circ. incis'n muscles. A. A. Surg. J. F. Musgrove. Died Mar. 6, '65; consumption.
1394	*Jackson, G. W.*, Pt., H, 16th Georgia.	Sept. 14, 15, '62.	——. Died Oct. 17, 1862; exh'n.
1395	Jackson, P., Pt., E, 31st Colored Troops.	Oct. 28, 28, '64.	Left; (also wound right thigh.) Surg. E. Jackson, 30th Colored Troops. Died Nov. 20, 1864.
1396	Jackson, W. H., Pt., E, 1st Penn. Rifles.	Dec. 13, 13, '62.	Left; (also wound of right knee.) Died December 14, 1862.
1397	Jackson, W., Pt., G, 107th New York.	May 25, 25, '64.	R't; circ. A. Surg. L. W. Kennedy, 123d N. Y. Died June 4, '64.
1398	Jacobs, J., Serg't, G, 90th New York.	June 14, 14, '63.	——. Surg. W. Y. Provost, 159th N. Y. Died June 23, 1863.
1399	Jacquith, A. J., Capt., I, 1st Me. H. A., age 32.	June 16, 18, '64.	Right; flap. Died July 11, 1864; prostration.
1400	*Johns, J. A.*, Pt., G, 5th Florida.	Sept. 17, 17, '62.	Left; hæm.; femoral artery lig'd. Died October 5, 1862.
1401	Johnson, A. A., Pt., F, 107th New York.	May 25, 25, '64.	Right. Surg. P. H. Flood, 107th N. Y. Died June 1, 1864.
1402	Johnson, C. L., Pt., B, 1st Tennessee.	Aug. 6, 6, '64.	Left; (also amp. right leg.) Died August 21, 1864.
1403	*Johnson, P. C.*, Corp'l, C, 48th N. Carolina.	April 1, 1, '65.	Right; circ. Surg. C. M. Clark, 35th Ill. Died April 3, 1865.
1404	Johnson, S., Pt., C, 110th Pennsylvania.	May 5, 6, '64.	——. Died May 11, 1864.
1405	*Johnston, T.*, Pt., I, 42d Mississippi.	July 3, 3, '63.	Left. Died Aug. 14, '64; pyæm.
1406	*Jones, A. A.*, —, K, 7th North Carolina.	.....	——; circular. Died.
1407	*Jones, J. O.*, Pt., I, 11th Virginia.	July 3, 3, '63.	Right. Died July 15, 1863.
1408	Jones, M., Pt., K, 16th Maine, age 24.	Dec. 13, 13, '62.	Left; flap. Died Jan. 16, 1863; pyæmia.
1409	Jones, S. W., Pt., B, 1st Mass. H. A., age 29.	May 19, 19, '64.	Left; flap; (also fract. of forearm.) Died of hæm. from radial artery June 1, 1864. *Spec.* 2262.
1410	Jones, W., Pt., B, 23d Colored Troops.	July 30, 31, '64.	Right; flap. Died August 19, '64; pyæmia.
1411	Jones, W. A., Pt., A, 6th Iowa.	Nov. 24, 25, '63.	Right. Surg. R. L. Von Harlingen, 70th Ohio. Died Dec. 24, 1863; pneumonia.
1412	Justin, J. H., Corp'l, E, 57th Illinois.	—, '62.	Left. Died November 2, 1862.
1413	Justis, E., Pt., A, 90th Ohio, age 29.	June 27, 28, '64.	Right. Died August 3, 1864.
1414	Kaser, J., Serg't, B, 107th Penn., age 24.	June 21, 21, '64.	Right. Died August 5, 1864; gangrene and exhaustion.
1415	Karr, M., Pt., H, 1st New York Dragoons, age 21.	May 7, 7, '64.	Left; circ. Surg. B. G. Streeter, 4th N.Y. Cav. Died May 27, '64; pyæmia.
1416	*Keating, P.*, Pt., F, Phil. Legion.	Dec. 13, 13, '62.	——. Died March 6, '63; sloughing of stump.
1417	Keaton, J. M., Pt., D, 19th Indiana, age 24.	May 12, 12, '64.	Left; hæm.; lig. of fem. artery. Died June 12, 1864.
1418	Keese, W., Corp'l, G, 74th New York, age 31.	July 23, 24, '63.	Left; hæm.; lig. of fem. artery. Died May 8, 1864.
1419	Keilholz, D. P., Corp'l, K, 65th New York.	May, '64, Primary.	——. Died May 10, 1864.
1420	Kelly, D. F., Pt., C, 67th New York, age 25.	June 8, 8, '64.	Left. Died June 19, 1864.
1421	Kelly, T., Pt., G, 51st N. York, age 34.	May 12, 12, '64.	Right. Surg. J. S. Ross, 11th N. Hampshire. Died May 29, '64; pyæmia.
1422	Kelly, W. B., Pt., F, 39th Mass., age 23.	Aug. 18, 18, '64.	——. Died August 18, 1864.
1423	Kelly, W. R., Pt., A, 7th Maine, age 43.	May 12, 12, '64.	Left; ant. post. flap. Died July 9, 1864.
1424	Kemp, L. M., Pt., L, 2d N.Y. Mt'd Rifl., age 21.	June 17, —, '64.	Left. Died July 6, 1864.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1425	*Kennaman, W.*, Pt., G, 12th Alabama, age 32.	May 12, 12, '64.	Left; ant. post. flap. Died June 14, 1864; exhaustion.
1426	*Kent, P. A.*, Pt., B, 14th Mississippi.	Nov. 25, 25, '63.	Left; circ. Died Dec. 5, 1863.
1427	Kerr, T., Pt., L, 83d New York, age 26.	May 10, 10, '64.	Left. Died May 23, 1864.
1428	Kester, F. M., Pt., I, 71st Ohio, age 22.	Dec. 16, 17, '64.	Left; lat. flap. A.A. Surg. M. L. Ilerr. Died Dec. 29, '64; pyæm.
1429	Kiefer, M. L., Pt., B, 6th Penn. Res., age 33.	May 8, 10, '64.	Right; flap. Surg. C. Bower, 6th Penn. Res. Died June 26, 1864; pyæmia.
1430	Kimball, D. C., Pt., B, 4th Mich., age 21.	July 2, 3, '63.	Left. Died July 6, 1863; traumatic tetanus.
1431	Kimberly, D., Pt., E, 7th Connecticut, age 27.	June 2, 2, '64.	Left. Died July 5, 1864; irritative fever.
1432	King, P., Pt., E, 97th N. York, age 33.	June 18, 19, '64.	Left. Surg. J. W. Anawalt, 11th Pa. Died Oct. 19, '64. *Spec.* 4145.
1433	*Kinsey, W. S.*, Private, Blount's Va. Battery.	June 17, 17, '64.	Left; circ. Died July 12, 1864; jaundice.
1434	Kinsley, J., Corp'l, K, 58th Penn., age 27.	Sept. 30, 30, '64.	Right. Died Oct. 17, '64; exhaustion and diarrhœa.
1435	Kirk, E., Pt., A, 98th Ohio.	June 27, 27, '64.	Left. Died August 5, 1864.
1436	Kirkendall, D., Pt., B, 73d Ohio.	May 25, 25, '64.	Right. Died July 7, 1864.
1437	Klinkhart, C., Pt., B, 149th N. York, age 25.	June 16, 16, '64.	——; circ. Surg. J. V. Kendall, 149th N. Y. Died July 11, 1864; pyæmia.
1438	Knight, A. B., Pt., B, 86th New York.	May 11, 11, '64.	Right; circ. Surg. H. F. Lyster, 5th Mich. Died May 20, 1864; exhaustion.
1439	Knoll, J., Pt., C, 26th Michigan.	May 10, 10, '64.	——. Surg. J. W. Wishart, 140th Penn. Died May 12, 1864.
1440	Krum, D., Capt., B, 139th Pennsylvania, age 50.	Sept. 21, 22, '64.	Right. Surg. S. F. Chapin, 139th Penn. Oct. 15, one inch of bone rem'd. Died Nov. 25, '64; exh'n.
1441	Kunkle, D., Pt., E, 57th Penn., age 19.	Oct. 2, 2, '64.	Left. Surg. O. Everts, 20th Ind. Nov. 26, ant. post. flap, mid. third. A.A. Surg. J. H. Packard. Died Dec. 16, '64; exhaustion. *Specs.* 3715, 4122.
1442	Kunkle, J., Pt., E, 148th Pennsylvania.	July 3, 3, '63.	Left. Surg. C. S. Wood, 66th N.Y. Died July 24, 1863.
1443	Ladd, C., Serg't, E, 25th Ohio.	July 1, 1, '63	Right. Died July 14, 1863.
1444	Lamb, T., Citizen.	Primary, 1862.	——; double flap. Surg. E. C. Franklin, U.S.V. Died —, 1862.
1445	Lamphere, L. O., Pt., G, 21st Connecticut.	June 30, 30, '64.	Left; (also amp. of right leg.) Died July 22, 1864; tetanus.
1446	Lane, A. H., Pt., D, 104th Illinois, age 26.	Aug. 7, 7, '64.	Right. Sept. 21, circ. re-amp. at middle third. Died Oct. 4, 1864.
1447	Lane, J., Pt, A, 37th Wisconsin, age 25.	June 17, 18, '64.	Left. Surg. W. B. Fox, 8th Mich. Died July 7, 1864.
1448	*Lanier, W. B.*, Capt., H, 61st North Carolina.	May 15, 15, '64	Right; lat. flap. Died May 19, '64.
1449	Lankow, F., Pt., E, 26th Wisconsin.	May 25, 25, '64.	Right. Died June 4, 1864.
1450	Laury, J., Pt., B, 56th Pennsylvania.	May 8, 8, '64.	——. Died May 9, 1864.
1451	Lawrence, D. W., Pt., C, 7th Michigan.	Sept. 17, 17, '62.	Right. Died September —, '62.
1452	Lawrence, T. J., Pt., B, 8th N. Hampshire.	May 27, 27, '63.	Right. Died June 30, 1863.
1453	*Lawson, E.*, Pt., F, 30th Alabama, age 22.	Dec. 16, 18, '64.	Right; ant. post. flap. A.A. Surg. R. L. McClure. Died Feb. 9, '65.
1454	Laydon, D., Pt., G, 54th Indiana.	Dec. 28, 28, '62.	Left. Died February 24, 1863; pyæmia.
1455	Leather, E., Pt., B, 55th Ohio, age 43.	Mar. 16, 16, '65.	Right; circ. Died April 23, 1865; fatty degeneration of the heart.
1456	Lee, D., Pt., G, 57th Massachusetts, age 30.	Aug. 19, 20, '64.	Left; circ. Surg. F. F. Oakes, 56th Mass. Died Sept. 27, 1864; pyæmia.
1457	Lee, F. G., Pt., B, 120th Indiana, age 20.	Mar. 9, 10, '65.	Right; ant. post. flap. Died Mar. 16, 1865; exhaustion.
1458	Lee, J. H., Pt., I, 29th Iowa.	July 4, 4, '63.	Right. Died July 31, 1863.
1459	Leech, C., Pt., A, 63d Ohio.	Oct. 3, 4, '62.	Right. Died October 4, 1862.
1460	Lefler, J., Pt., D, 82d Ohio, age 21.	June 18, 18, '64.	Right. Died August 10, 1864; pyæmia.
1461	Legett, A. S., Pt., D, 9th Kentucky.	Jan. 1, 1, '63.	Left. Died January 2, 1863.
1462	Leghtback, H., Pt., E, 2d New Jersey, age 21.	May 5, 6, '64.	Right; circ. Died July 23, 1864; diarrhœa.
1463	[1]*Lence, R.*, Lt., —, 18th Mississippi, age 35.	Sept. 17, 17, '62.	——; circ. Confed. surg. Died Sept. 21, 1862; pyæmia.
1464	Leonard, J. H., Pt., E, 9th N. Y. Hvy Artillery.	Oct. 19, 20, '64.	Right. Died October 28, 1864.
1465	Leonard, J. D., Pt., I, 1st Michigan Artillery.	July 4, 4, '64.	Left. Died July 8, 1864.
1466	Lesley, J., Pt., A, 116th Illinois.	June 27, 27, '64.	Left. Surg. A. C. Messenger, 57th Ohio. Died Sept. 20, 1864.
1467	Letner, D., Lieut., B, 30th Iowa.	May 22, 24, '63.	Right; circ. Ass't Surg. H. M. Sprague, U. S. A. Gang. Died May 29, 1863. *Spec.* 1621.
1468	Lewis, J., Pt., K, 8th Vt., age 18.	Oct. 19, 21, '64.	Right; flap; erysip.; gang. Died Nov. 11, 1864; exhaustion.
1469	*Lewis, J. R.*, Pt., H, 53d Georgia, age 32.	July, '63, Primary.	Left; (also right leg at point of election.) Surg. J. J. Knott, P. A. C. S. Died July 10, 1863.
1470	Lewis, J. W., Pt., D, 140th Penn., age 18.	June 7, 7, '64.	Right; circ. Surg. J. W. Wishart, 140th Penn. Died June 11, 1864.
1471	Lienthardt, E., Serg't, K, 52d New York, age 42.	June 23, 23, '64.	Right; double lat. flap. Died August 14, 1864.
1472	Lilly, A., Pt., A, 85th Indiana.	May 25, —, '64.	Left. Died July 2, 1864.
1473	Linaweaver, C., Corp'l, K, 57th Illinois.	Oct. 12, 12, '64.	Right. Died October 16, 1864; hæmorrhage.
1474	Lindsay, J., Pt., A, 134th Pennsylvania.	Dec. 13, 13, '62.	Right. Died January 15, 1863.
1475	Lindsey, S., Pt., A, 73d Ohio, age 22.	Mar. 19, 19, '65.	Right; (also fract. left leg.) Died April 30, 1865; exhaustion.
1476	*Link, G.*, Pt., F, 9th La., age 27.	July 9, 10, '64.	Left; circ. Died July 10, 1864.
1477	Liston, W., Pt., D, 21st Illinois.	Sept. 19, 19, '63.	Left. Died October 8, 1863.
1478	Lock, J. L., Pt., I. 59th Illinois, age 23.	Dec. 15, 16, '64.	Left; ant. post. flap. Died Jan. 31, 1865.
1479	Locy, M., Pt., A, 135th Pennsylvania.	Dec. 13, 13, '62.	Left. Died December 13, 1862.
1480	Long, T., Pt., B, 56th Massachusetts.	My 18, '64, Primary.	Right. Died May 20, 1864.
1481	*Longmeyer, J.*, Pt., Capt. Brown's Co., (?) age 18.	Oct. 13, 15, '63.	Right. Died October 21, 1863.
1482	Loss, J. E., Pt., I, 184th Penn., age 28.	Oct. 1, 2, '64.	Left; ant. post. flap. Surgeon G. Chaddock, 7th Michigan. Died Nov. 23, 1864.
1483	Loucks, D., Pt., C, 106th New York, age 17.	Oct. 19, 19, '64.	Right; circ. Died Nov. 16, 1864; typhoid fever.
1484	Louison, W., Pt., G, 81st Pennsylvania.	Sept. 17, 17, '62.	Left. Died.
1485	Love, T. W., Pt., D, 74th Illinois.	June, '64, Primary.	Right. Died July 12, 1864.
1486	Love, W., Pt., G, 16th Maine, age 19.	May 12, 12, '64.	Right. Died May 26, 1864; pyæmia.
1487	Lovett, G. G., Lieut., G, 119th Penn., age 22.	May 6, 8, '64.	Left. Died May 31, '64; pyæmia.
1488	Lowe, J., Pt., B, 54th Pennsylvania.	April 2, 2, '65.	Left. Surg. R. R. Clark, 34th Mass. Died May 6, 1865.
1489	Lowery, W. J., Pt., D, 64th New York, age 18.	Mar. 25, 25, '65.	Right. Surg. M. H. Raymond, 26th Mich. Died June 14, 1865; exhaustion and diarrhœa.
1490	*Lowthrop, J.*, —, K, 43d North Carolina, age 23.	July 12, 13, '64.	Left. Surg. G. T. Stevens, 77th N. Y. Gang. Died July 13, '64.
1491	Lunn, J., Pt., D, 5th N. York Hvy Artillery.	July 17, 17, '64.	Right; ant. post. flap. Confed. surg. Died Dec. 13, '64; exh'n.
1492	Lunt, C. W., Serg't., F, 22d Massachusetts.	May 10, 10, '64.	Right. Died May 12, 1864.
1493	[2]Lurchin, R. W., Pt., F, 6th Maine, age 28.	May 3, 3, '63.	Right; circ. Died June 1, 1863; pyæmia.
1494	*Lyle, W. H.*, Pt., I, 11th Mississippi.	July 3, 3, '63.	——. Died August 1, 1863.
1495	*Lynch, H. W.*, Pt., F, 13th Georgia.	July 9, 11, '64.	——; circ. Surg. C. H. Todd, C. S. A. Died Aug. 12, '64. *Sp.* 3824.
1496	Lynch, J. A., Serg't, B, 24th Michigan.	May 14, 14, '64.	——. Died May 17, 1864.
1497	Lyons, J. N., Pt., I, 42d Ohio.	Dec. 29, 29, '62.	Right. Died January 3, 1863.
1498	Mackey, J., Pt., B, 9th Indiana.	June, '64, Primary.	Right. Surg. J. N. Beach, 40th Ohio. Died July 4, 1864.
1499	Maddock, C. H., Pt, F, 1st Maine, age 22.	Oct. 1, 1, '64.	Left; (also exc. of metacarpus.) Surg. J. S. Jemison, 86th N. Y. Died Oct. 27, '64; exh'n. *Sp.* 4121.
1500	Maguire, C. F., Pt., F, 14th New York Art'y.	June 17, 17, '64.	Left. Died June 23, 1864.
1501	Malone, J., Pt., E, 9th N. York State Militia.	Dec. 13, 13, '62.	——. Died January 1, 1863.
1502	Mann, E., Pt., C, 53d O., age 22.	Mar. 21, 21, '65.	Left. Died May 1, 1865; typhoid fever.
1503	Mann, J. I., Pt., B, 26th Michigan, age 21.	June 7, 7, '64.	Right; circular. Died Aug. 19, 1864.
1504	*Markham, W. D.*, Pt., —, 47th N. Carolina.	July 3, 3, '63.	——. Died July 16, 1863.
1505	Marshall, G. W., Pt., D, 64th New York.	July, '63, Primary.	——. Died July 16, 1863.
1506	Marshall, L., Pt., F, 27th Mass., age 24.	Mar. 14, 14, '62.	Right. Died March 14, 1862.
1507	*Marshbrun, S. W.*, Maj., 53d Georgia.	Oct. 19, 19, '64.	Right; (also wound through left knee.) Surg. J. J. Knott, P. A. C. S. Died Nov. 18, 1864.

[1] FISHER (G. J.), *Report of Fifty-seven Cases of Amputations in the Hospitals near Sharpsburg, Md., after the battle of Antietam, Sept.* 17, 1862, in *Am. Jour. Med. Sci.*, 1863, Vol. XLV, p. 47.

[2] LIDELL (J. A.), *Suppurative Osteomyelitis (acute) following Primary Amputation of the Right Thigh*, in *Surgical Memoirs of the War of the Rebellion, Collected and Published by the U. S. Sanitary Commission, Surgical Volume* I. p. 350. *Ibid.* On *Thrombosis and embolism*, in *Am. Jour. Med. Sci.*, 1872. New Series. Vol. LXIV, p. 353.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1508	Martin, R., Corp'l, F, 93d New York.	May 5, 6, '64.	——. Died May 7, 1864.
1509	Martin, A. J., Pt., F, 82d Ohio.	July 2?, 20, '64.	Right. Died September 5, 1864.
1510	Mason, D., Pt., K, 32d Wisconsin.	Mar. 21, 21, '65.	Right. Surg. A. B. Monohan, 63d Ohio. Died March 29, 1865.
1511	Mason, H. W., Pt., B, 24th Wisconsin, age 21.	Nov. 30, Dec. 1, '64.	Right; circ. Surg. J. R. Ludlow, U.S.V. Died Dec. 23, '64; pyæm.
1512	*Massie, J. W.*, Lt., G, 19th Virginia.	July 2, 3, '63.	Left. Died.
1513	*Matthews, B.*, —, H, 16th Georgia.	Sept. 14, 15, '62.	——. Died Sept. 28, '62; exhaustion.
1514	Matthews, W., Corp'l, B, 78th Pennsylvania.	Jan. 2, 4, '63.	Right. Surg. C. J. Walton, 21st Ky. Died Jan. 16, 1863.
1515	May, P., Pt., A, 5th Mich.	May 5, 6, '64.	——. Died May 19, 1864.
1516	Mazerva, G., Pt., A, 86th New York.	May 5, 6, '64.	Left. Died May 7, 1864.
1517	*McBride, J. A.*, Pt., —, 7th C. S. Cav., age 26.	Oct. 27, 27, '64.	——; circ. Surg. J. T. Kelby, C. S. A. Died Oct. 28, 1864.
1518	*McBride, M. C.*, Lieut., G, 9th Louisiana.	July 9, 9, '64.	——; circ. Surg. C. H. Todd, C. S. A. Died July 22, 1864.
1519	McCandless, W. W., Pt., H, 84th Illinois.	Dec. 31, 31, '62.	Right. Died.
1520	McCarthy, D., Pt., B, 39th Indiana.	Sept. 19, 19, '63.	——. Died Oct. 8, 1863.
1521	*McCarthy, J.*, Pt., Carpenter's Battery.	Sept. 19, 20, '64.	——; circ. Surg. G. W. Burdett, C.S.A. Died Sept. 21, '64; shock.
1522	McCartney, J., Corp'l, H, 149th Penn., age 24.	June 18, 18, '64.	——; flap. Died Feb. 11, 1865, while on furlough.
1523	McClarence, F., Pt., F, 20th Massachusetts.	July 3, 3, '63.	Left. Surg. N. Hayward, 20th Mass. Died July 20, 1863.
1524	McComb, J., Captain, D, 12th N. Jersey, age 25.	June 3, 3, '64.	Left. Surg. A. Satterthwaite, 12th N. J. Died July 2, 1864.
1525	*McCometon, A. J.*, Pt., F, 55th Alabama.	July 20, 20, '64.	Left. Died July 29, 1864.
1526	McCormick, N., Corp'l, E, 4th Delaware.	June 17, 17, '64.	——. Surg. D. S. Hopkins, 4th Delaware. Died June 22, 1864.
1527	McCullough, S. E., Corp., A, 47th Illinois.	May 22. 24, '63.	R't; circ. A. Surg. H. M. Sprague, U.S.A. Died J'y 12, '63. *Sp.* 1622.
1528	McCullough, W., Pt., D, 11th Pennsylvania.	May 5, 5, '64.	Right. Died May 16, 1864.
1529	McCurdy, T., Pt., H, 38th Indiana.	Aug. 31, 31, '64.	Right. Died Sept. 3, 1864.
1530	McDill, R., Pt., I, 81st Ohio, age 25.	Mar. 19, 19, '65.	Left; circ. Surg. W. C. Jacobs, 81st O. Died May 7, '65; diphth.
1531	McDonald, H., Corp'l, D, 35th Ohio.	June 19, 19, '64.	Left. Died August 2, 1864.
1532	McDonald, P., Pt., B, 170th New York.	May 18, 18, '64.	Right. Surg. M. Rizer, 72d Penn. Died May 18, 1864.
1533	McDougal, A. L., Col., 123d New York.	June 4, 4, '64.	Right. A. Surg. L. W. Kennedy, 123d N. Y. Died June 23, '64.
1534	*McFadden, J. L.*, Pt., C, 34th N. C., age 18.	June 23, 23, '64.	Right; ant. post. flap. Surg. J. H. Buckman, 5th New Hampshire. Died July 22, 1864.
1535	*McFarland, J. A.*, Corp'l, E, 18th Tennessee.	My 15, '64. Primary.	——. Died May 27, 1864.
1536	McGarvey, M., Corp'l, C, 4th Infantry.	June 2, 2, '64.	Left. Died Dec. 3, 1864.
1537	McGenty, E., Pt., E, 68th Pennsylvania.	July 3, 3, '63.	Left. Died July 23, 1863.
1538	McGrath, J., Pt., E, 88th New York, age 36.	June 16, 17, '64.	Left. A. Surg. J. S. Smith, U.S.A. Died June 29, '64. *Spec.* 3766.
1539	McGraw, H., Lieut., K, 140th New York.	July 1, 1, '63.	——. Died July 8, 1863.
1540	McKenzie, A., Corp'l, M, 8th N. Y. H. A., age 21.	June 3, 4, '64.	Right; ant. post. flap. Surg. G. W. McCune, 14th Ind. Died July 11, 1864.
1541	*McKnight, L. W.*, Pt., C, 2d Tenn. Cav., age 22.	Mar. 25, 27, '64.	Right; flap. Surg. H. P. Stearns, U. S. V. Died April 16, 1864.
1542	McLeod, J., Pt., F, 16th Infantry.	May 27, 27, '64.	Right. Died June 11, 1864.
1543	McNew, C., Pt., E, 34th Iowa, age 25.	Jan. 11, 11, '63.	Right. Died February 17, 1863; wound.
1544	[1]*McNutt, J.*, Lieut., —, 17th Miss., age 26.	Sept. 17, 18, '62.	——; flap. Died Sept. 19, 1862; shock and exhaustion.
1545	*Melane, R. B.*, Pt., L, 1st Tenn. Cavalry.	Oct. 9, '63. Primary.	——. Died October 27, 1863.
1546	Menich, J., Pt., F, 10th New Jersey.	May 6, 6, '64.	Left. Died May 28, 1864.
1547	Meniott, E., Pt., D, 6th Mo. S. M. Cav., age 23.	May 3, 4, '65.	Left; flap. Surg. F. G. Porter, U. S. V. Lig. fem. Died May 29, 1865; exhaustion.
1548	Menzie, J. R., Pt., I, 9th N. Y. H'vy Artillery.	Oct. 19, 19, '64.	Right. Died October —, 1864.
1549	Messinger, W., Pt., A, 3d Vermont.	June 7, 7, '64.	Right. Died June 8, 1864.
1550	Meyer, J., Pt., K, 2d N. Y. H. A., age 23.	April 7, 8, '65.	Right; circ. Surg. P. E. Hubon, 28th Mass. Died May 25, 1865; pyæmia.
1551 1552	Michael, R. S., Pt., A, 105th Pennsyvania.	July 3, 3, '63.	Right and left. Died July 16, '63.
1553	Miller, B., Pt., B, 185th New York.	Mar. 25, 25, '65.	Right. Died May 22, 1865.
1554	Miller, J., Pt., F, 88th Penn., age 39.	May 10, 10, '64.	Right; flap. Died May 31, 1864.
1555	Miller, J., Pt., G, 6th Indiana.	May 14, 14, '64.	Right. Died May 28, 1864.
1556	*Miller, J.*, Pt., E, 57th N. Carolina.	April 6, 6, '65.	Right; flap. Died May 6, 1865; exhaustion.
1557	*Miller, J. E.*, Pt., H, 33d Virginia, age 22.	May 3, 5, '63.	——; circular; sloughing. Died May 14, 1863.
1558	Miller, S. K., Serg't, K, 2d Ohio Cav., age 23.	Sept. 19, 19, '64.	Left; circ. Died Dec. 20, 1864; pyæmia.
1559	Miller, W. S., Pt., K, 8th Indiana Cavalry.	Aug. 28, 28, '64.	Right. Died October 12, 1864; remittent fever.
1560	Mills, A. B., Pt., E, 16th Maine, age 19.	July 3, 3, '63.	Right. Died October 7, 1863.
1561	Minoque, J., Pt., G, 12th Infantry, age 24.	May 12, 12, '64.	Left; flap. A. Surg. P. Adolphus, U.S.A. Died June 21, '64; exh'n.
1562	Mitchell, G., Pt., D, 2d Maryland, age 42.	June 19, 19, '64.	Left; circ. Died July 12, 1864; pyæmia.
1563	Mitchell, J., Citizen employé, age 25.	Oct. 10, 10, '64.	Left; ant. post. flap. A. A. Surg. M. H. Hend. Died Oct. 15, '64; double pneumonia.
1564	Mitchell, B. J., Lieut., B, 1st Maine.	Oct. 19, 19, '64.	Right. Died Nov. 12, '64; secondary hæmorrhage.
1565	Monroe, M., Pt., E, 109th New York, age 28.	June 17, 17, '64.	Left. Died June 27, 1865.
1566	Moody, J., Pt., H, 17th Vermont, age 45.	April 2, 2, '65.	Right. A. Surg. E. P. Roche, 35th Mass. Died April 24, 1865.
1567	*Moore, J. T.*, Pt., G, 45th North Carolina, age 20.	July 12, 14, '64.	Left; circ. A. Surg. J. C. McKee, U. S. A. Died August 9, 1864. *Spec.* 2856.
1568	*Moore, L. M.*, Lieut., —, 17th Mississippi.	July 3, 3, '63.	Left. Died August 2, 1863.
1569	Moore, W. B., Pt., E, 11th N. Hampsbire, age 34.	May 25, 26, '64.	Right; circ.: (also w'd left thigh.) Surg. J. S. Ross, 11th N.H. Died June 24, 1864; pyæmia.
1570	Moran, H., Pt., K, 155th New York, age 25.	June 3, —, '64.	Left. Died June 18, 1864.
1571	Morey, D. D., Serg't, C, 9th Maine, age 28.	May 20, 30, '64.	Left. Died July 22, 1864; operation and chronic diarrhœa.
1572	Morill, D. H., Corp'l, C, 31st Maine, age 22.	May 18, 18, '64.	Left. Surg. J. S. Ross, 11th N. Hampshire. Died May 20, 1864.
1573	Morris, J., Pt., F, 39th Illinois, age 40.	June 1, 2, '64.	Left. Died July 8, 1864.
1574	*Morris, W. C.*, Pt., E, 4th Alabama, age 24.	May 19, 19, '64.	Right; flap. June 1, hæm.: lig. femoral. Died June 2, '64; hæm.
1575	Morris, W., —, C, 44th New York, age 30.	July 2, 3, '63.	Left. Died July 22, '63; pyæmia.
1576	Morrison, J. H., Pt., B, 19th Massachusetts.	Dec. 13, 13, '62.	——. Died December 16, 1862.
1577	Morse, W. E., Pt., B, 2d New Hampshire.	Dec. 13, 13, '62.	Left. Died December 18, 1862.
1578	Morse, R., Pt., C, 100th Ohio, age 20.	Aug. 6, 6, '64.	Right; circ. Surg. C. S. Frink, U. S. V. Died Nov. 22, 1864.
1579	Morton, B. T., Pt., H, 2d Ohio Cav., age 24.	June 18, 20, '64.	Right; circ. Surg. J. H. Whitford, 36th O. Hæm. Died July 2, '64.
1580	Morton, D. H., Pt., D, 149th Penn., age 20.	May 23. 24, '64.	Right; short ant. and long post. flaps. Surg. W. F. Humphrey, 149th Penn. Died June 6, 1864: pyæmia. *Spec.* 2795.
1581	*Morton, J. W.*, Pt., E, 18th Virginia.	July 3, 3, '63.	——. Died July 23, 1863.
1582	Morton, P., Pt., I, 83d Penn., age 35.	May 10, 10, '64.	Right; circ. Died May 20, 1864; hæmorrhage.
1583	Mullen, W. W., Pt., D, 57th Indiana.	June 4, 4, '64.	Right. Died June 18, 1864.
1584	Mullen, C., Serg't, M, 7th Penn. Cavalry.	April 7, 7, '65.	Left. Died May 18, 1865; amp. and pneumonia.
1585	Murphy, P., Pt., D, 28th Pennsylvania.	June 15. 15, '64.	——. Died June 17, 1864.
1586	Myers, R. P., Pt., K, 111th New York.	July 3, 3, '63.	Left. Surg. H. M. McAbee, 4th O. Died August 31, 1863.
1587	Nash, J. A., Pt., H, 1st Mass. H. A., age 19.	June 21, 21, '64.	Right; ant. post. flap. Died June 30, 1864; exhaustion.
1588	Nason, S. H., Pt., F, 1st Maine H. A., age 28.	June 18, 18, '64.	Left; ant. post. flap. Surg. H. F. Lyster, 5th Mich. Died July 4, 1864; pyæmia.
1589	Nauss, J., Pt., C, 82d Ohio, age 24.	July 20, 20, '64.	Right. Died October 19, 1864.
1590	Neal, F., Pt., M, 21st Pa. Cavalry.	June 18, 18, '64.	Right. Died June 19, 1864.
1591	Neal, L., Corp'l, I, 2d Ky. Cavalry.	Dec. 15, 17, '61.	——. Died December 17, 1861; shock.
1592	*Neilson, G.*, Corp'l, Tarrant's Battery.	Dec. 16, 16, '64.	Right; circ. Died Jan. 14, 1865.
1593	*Nelson, O.*, Pt., F, 40th Mississippi.	July 20, 20, '64.	Left. Died July 26, 1864.
1594	Nelson, R., Pt., E, 26th Pennsylvania.	Dec. 13, 13, '62.	——; circ. Died Dec. 15, 1862.
1595	[2]*Newman, W. G.*, Pt., H, 58th Virginia, age 34.	Aug. 9, 10, '62.	——; flap. Died Sept. 27, 1862.

[1] Fisher, (G. J.), *Amp. after Battle of Antietam*, in *Am. Jour. Med. Sci.*, 1863, Vol. XLV, p. 47.

[2] Chalmers (H. S.), *Report of Three Cases illustrating the Correlation existing between Erysipelas, Diphtheria (and Hospital Gangrene?)*, in *Confed. States Med. and Surg. Jour.*, 1864, Vol. I, p. 86.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1596	Newton, W., Capt., E, 2d Ohio Cavalry.	Mar. 31, 31, '65.	Left. Died April 8, 1865.
1597	Nicholas, I., Corp'l, G, 7th C. Troops, age 21.	Oct. 28, 28, '64.	Right. Died Nov. 28, 1864; irritative fever.
1598	Nichols, D., Pt., E, 31st Maine.	May 12, 12, '64.	——. Surg. P. O'M. Edson, 17th Vt. Died May 22, 1864.
1599 / 1600	Nicholson, D., Pt., H, 23d Mass., age 23.	May 10, 10, '64.	Both thighs; ant. post. flap. Surg. J. Thomas, 118th Penn. Died May 28, '64; exh'n. *Spec.* 2966.
1601	Nickerson, J., Pt., D, 3d R. I. Artillery, age 38.	Nov. 10, 10, '63.	Right; ant. post. flap. Surg. S. W. Gross, U. S. V. Died Nov. 20, 1863; erysipelas.
1602	Nolton, A. W., Pt., F, 93d New York, age 22.	May 12, 14, '61.	Left; circ. Died June 4, 1864; pyæmia.
1603	Norton, M., Pt., I, 117th New York.	May 13, 13, '64.	Right. Died May 28, 1864.
1604	Nunamaker, W., Pt, A, 77th Pennsylvania.	Aug. 5, 5, '64.	Right. Surg. J. N. McCandless, 77th Penn. Died Aug. 15, 1864.
1605	O'Connor, P., Pt, B, 147th New York, age 33.	May 25, 26, '64.	Left: ant. post. flap. Died June 14, 1864; pyæmia.
1606	Ogden, T. W., Pt., F, 94th New York, age 16.	Oct. 19, 19, '64.	Right. Died October 29, 1864.
1607	Osgood, G. H., Serg't., K, 111th Pennsylvania.	June 27, 27, '64.	Right. Died July 25, 1864.
1608	*Otley, J. K.*, Adj't, 32d North Carolina.	Mar. 25, 25, '65.	Left. Surg. J. T. Kilby, C. S. A. Died April 25, 1865.
1609	Owen, E. F., Pt., B, 29th Penn., age 42.	Dec. 17, 17, '64.	Right; circ. Died Feb. 5, 1865; exhaustion.
1610	*Owens, B. E.*, Pt., C, 30th Virginia.	Mar. '65, Primary.	Right. Died May 10, 1865.
1611	Page, B. M., Pt., I, 126th Ohio, age 21.	May 12, 12, '64.	Left; circ. Died May 26, 1864.
1612	*Paine, B.*, Musician, E, 1st Alabama, age 22.	Dec. 15, 15, '64.	Right; ant. post. flap. Died Dec. 24, 1864.
1613	Patterson, J., Corp'l, K, 10th Missouri, age 22.	Oct. 18, 18. '63.	Left. Died Jan. 20, 1864; chronic dyspepsia and diarrhœa.
1614	Parker, L. H., Serg't, D, 12th N. H., age 26.	July 2, 3, '63.	——. Died July 24, 1863; hæmorrhage.
1615	Parnell, E., Pt., A, 111th New York.	July 2, 3, '63.	Right. Surg. H. M. McAbee, 4th Ohio. Died July 13, 1863.
1616	Parsons, W., Serg't, K, 124th N. York, age 29.	May 5, 6, '64.	Right. Died July 3, 1864.
1617	Paschall, A. O., Pt., G, 124th Indiana, age 23.	Mar. 10, 10, '65.	Right; ant. post. flap. Died Mar 16, 1865; exhaustion.
1618	Patten, H. L., Maj., 20th Mass., age 28.	Aug. 16, 17, '64.	Left; anterior post. flap. Surg. N. Hayward, 20th Mass. Died Sept. 10, 1864; pyæmia.
1619	Paul, J., Serg't, B, 152d New York, age 24.	May 30, 31, '64.	Left; flap. Surg. M. Rizer, 72d Penn. Died June 30, '64; pyæm.
1620	Peck, W. R., Pt., I, 1st Minnesota.	July 3, 5, '63.	Right; hæm.; ligat'n. Died July 21, 1863.
1621	Peden, J., Corp'l, A, 140th Pennsylvania.	May 8, 8, '64.	——: circ. Surg. J. W. Wishart, 140th Penn. Died May 15, 1864.
1622	Pelkey, J., Pt., H, 2d Minnesota.	Nov. 25, 25, '63.	——. Died Nov. 28, 1863.
1623	Perkins, M., Pt., D, 18th Massachusetts.	Dec. 12, 13, '62.	Left; (also wound of right side and lung.) Died Dec. 20, 1862.
1624	Perry, H. H., Corp'l, K, 57th Mass., age 20.	Mar. 25, 25, '65.	Right; ant. post. flap. Died April 9, 1865; apoplexy.
1625	Peters, E., Pt., C, 29th Conn. (Col'd.)	Oct. 27, 27, '64.	Left. Surg. A. C. Barlow, 62d Ohio. Died Nov. 17, 1864.
1626	Peterson, O. C., Pt., A, 5th Minnesota, age 31.	Dec. 16, 16, '64.	Left; circ. Surg. V. B. Kennedy, 5th Minn. Died Jan. 13, 1865.
1627	Peterson, P. B., Adj't, 78th New York.	Sept. 17, 17, '62.	Left. Died October 13, 1862.
1628	*Peterson, O.*, Pt., G, 39th North Carolina, age 25.	Nov. 30, Dec. 1, '64.	Left; lat. flap. Died May 18, '65; exhaustion.
1629	Phelps, R. E., Corp'l, K, 49th Massachusetts.	May 27, 27, '63.	Right. Died August 9, 1863.
1630	*Phelps, C. B.*, Pt., H, 38th Virginia.	May 15, 16, '64.	Left; circ. Died June 11, 1864.
1631	Phipps, J., Pt., A, 187th Pennsylvania, age 19.	June 25, 25, '64.	Left. Died July 4, 1864; exh'n and irritative fever.
1632	Phyfe, W. F., Pt., E, 10th New York, age 22.	Sept. 27, 28, '64.	Left; anterior post. flap. Surg. G. Chaddock, 7th Mich. Died Oct. 18, 1864: exhaustion.
1633	Pickens, P., Serg't, F, 141st Pennsylvania.	July 3, 3. '63.	Left; (also wound of right leg.) Died July 10, 1863.
1634	Pike, S., Serg't, I, 10th Ohio Cavalry.	Aug. 28, 28, '64.	Right. Died October 9, 1864.
1635	Platts, N., Serg't, D, 100th Illinois.	July 22, 22, '64.	Left. Died September 16, 1864.
1636	Polleys, T. A., Serg't, H, 6th Wisconsin, age 25.	June 18, 19, '64.	Right; posterior flap. Surg. J. H. Beech, 24th Mich. Gang. Died June 30, 1864; hæmorrhage.
1637	Pomeroy, W., Pt., B, 1st Maine H. A., age 30.	June 18, 18, '64.	Right; circ. Died June 27, 1864; pyæmia.
1638	Pool, E. G., Pt., A, 12th Massachusetts.	Sept. 17, 17, '62.	Right. Died October 14, 1862.
1639	Poppleton, B. H., Pt., B, 7th Iowa, aged 21.	July 22, 22, '64.	Left. Surg. W. C. Jacobs, 81st Ohio. Died Sept. 7, 1864.
1640	Posey, E., Pt., A, 39th Colored Troops.	Oct. 28, 28, '64.	Right. Surg. M. Tucker, 39th Col'd Troops. Died Nov. 9, '64; hæm.
1641	Post, J. K., Pt., B, 112th New York, age 21.	June 1, 3, '64.	Right; circ. Died June 21, 1864; exhaustion.
1642	Potter, W. M., Pt., E, 84th Pennsylvania.	May 3, 3, '63.	Left. Died May 20, 1863.
1643	Pratt, A., Pt., D, 34th Massachusetts.	Sept. 19, 20, '64.	——. Died September 20, 1864, on operating table.
1644	Price, J., Pt., C, 78th Penn., age 53.	Sept 28, 28, '64.	Right; lat. flap. Died Oct. 18, '64; surgical pneumonia.
1645	Priest, J., Corp'l, D, 129th Illinois.	July 20, 20, '64.	Right. Died August 24, 1864.
1646	Pritchett, J. L., Pt, A, 87th Illinois.	April 9, 9, '64.	Right; circ. Died April 30, '64.
1647	*Pryor, W.*, Pt., F, 21st Mississippi.	Dec. 12, 12, '62.	——. Died December 18, 1862.
1648	Pulley, D. W., Pt., E, 60th Illinois, age 20.	Dec. 15, 16, '64.	Right; lat. flap. A. A. Surg. L. Sinclair. Erys. Died Feb. 4, '65.
1649	Pune, D. S., Pt., A, 79th Ohio.	July 20, 20, '64.	Left. Died August 4, 1864.
1650	Putnam, C., Corp'l, E, 64th New York, age 27.	Mar. 31, 31. '65.	Left; circ. Died June 22, 1865; pyæmia. *Spec.* 4238.
1651	Quinn, F., Pt., K, 147th New York, age 40.	July 30, Au. 1, '64.	Right; circ. A. A. Surg. S. J. Holley. Died August 2, 1864.
1652 / 1653	Rabbit, E. C., Serg't, B, 10th Missouri.	Nov. 24, 25, '63.	Both. Surg. E. J. Buck, 18th Wis. Died Dec. 26, 1863.
1654	[1] *Rainwater, J. G.*, Pt., —, 18th Miss., age 28.	Sept. 17, 19, '62.	Left; circ.; (hæm. fr. ant. tib. art.; gang.) Died Sept. 22, '62; pyæ.
1655	Rapp, J., Pt., C, 11th Conn., age 31.	June 19, 19, '64.	Right. Died July 13, 1864.
1656	[2] *Rate, J. B.*, Pt., —, 45th Virginia, age 23.	Sept. 17, 17, '62.	Left; circ. Confederate surgeon. Died Sept. 30, 1862; pyæmia.
1657	Rayburn, S. Y., Serg't, D, 27th Indiana.	July 3, 3, '63.	Left: circ. Surg. W. H. Twiford, 27th Indiana. Died Aug. 1, '63.
1658	Reardon, J., Pt., D, 52d Ohio.	June 27, 27, '64.	Left. Died July 4, 1864.
1659	Ream, C., Pt., I, 26th N. York, age 60.	Dec. 13, 14, '62.	Right. Died January 6, 1863; pyæmia.
1660	Recolder, G., Pt., A, 79th Penn., age 18.	June 16, 16, '64.	Left; circ. Died July 24, 1864; pyæmia.
1661	Reddick, G. H., Serg't, F, 20th Indiana.	July 2, 2, '63.	Left. Died July 6, 1863.
1662	*Reece, E.*, Pt., I, 36th Alabama.	May 15, 15, '64.	Left. Asst. Surg. C. H. Burbeck, 60th N. Y. Died May 17, 1864.
1663	*Reed, J.*, Pt., C, 15th Va., age 26.	June 18, 20, '64.	Left. Confed. surgeon. Nov. 1, fem. lig. Nov. 8, re amp. at up. third. Surg. G. S. Palmer, U. S. V. Hæm. Died Nov. 14, '64; exh'n.
1664	Reed, J., Pt., G, 123d Ohio.	May 15, 15, '64.	Right. Died July 10, 1864.
1665	Reedy, C. T., Pt., G, 40th Ohio.	June 20, 20, '64.	Right. Surg. J. N. Beach, 40th Ohio. Died July 19, '64: pyæm.
1666	Reeves, A., Pt., C, 36th Ohio.	Nov. 23, 23, '63.	Right. Died December 18, 1863.
1667	Reeves, W. J., Pt., C, 10th Missouri.	May 14, 14, '63.	Left. Died Aug. 3, 1863; chronic diarrhœa.
1668	Reidman, G., Pt., I, 15th Massachusetts, age 44.	Sept. 17, 17, '62.	Left. Died September 30, 1862.
1669	Remele, D., Pt., E, 109th New York, age 19.	May 6, —, '64.	Left; circ. Died Aug. 8, 1864; diarrhœa.
1670	Renerson, W. R., Pt., E, 1st Maine, age 27.	June 16, 16, '64.	Left; ant. post. flap. Died Aug. 9, 1864.
1671	Reynolds, W. T., Pt., A, 4th Delaware.	April 5, 5, '65.	Right; circ. Died April 30, 1865.
1672	Rhea, J. M., Pt., I, 8th Iowa.	June 20, 20, '63.	Right; circ. Surg. H. Z. Gill, 95th Ohio. Died July 25, 1863.
1673	Richards, A. J., Pt., K, 9th N. H., age 25.	May 30, 30, '64.	Left; circ. Died June 20, 1864; exhaustion.
1674	Richardson, W. A., Pt., G, 6th Iowa.	Nov. 25, 25, '63.	Right; circ. A. Surg. W. S. Lambert. 6th Iowa. Died December 24, 1863; pneumonia.
1675	Riley, P., Pt., G, 42d Massachusetts, age 19.	Aug. 27, 28, '64.	Left. Died October 4, 1864; pyæmia.
1676	Riling, J., Pt., C, 159th New York.	April 13, —, '63.	Left. Died Oct. 6, 1863; chronic diarrhœa.
1677	Ripley, C. A., Pt., E, 2d Iowa.	July 4, 4, '64.	——. A. Surg. A. F. Marsh, 56th Ill. Died July 15, 1864.
1678	Ripley, L. D., Pt., E. 10th West Va., age 29.	Sept. 19, 19, '64.	Left. Died October 17, 1864.
1679	Ritka, A., Pt., M, 4th N. Y. Cav., age 32.	Sept. 19, 19, '64.	Right; circ. Died Feb. 26, 1865; typhoid fever.
1680	Robarge, L. J., Corp'l, I, 5th Cavalry, age 30.	Mar. 1, 2, '64.	Left; circ. A. Surg. J. W. Williams, U. S. A. Died March 14, 1864; tetanus. *Spec.* 2151.
1681	Roberts, W. H., Pt., E, 33d Ohio.	May 14, 14. '64.	Left. Died May 23, 1864.
1682	Robinson, F., Pt., D, 3d Cavalry.	Mar. 5, 5, '64.	Left. A. Surg. B. Durham, jr., 72d Ill. Died June 22, '64; diarrhœa.
1683	Robinson, D. W., Pt. F, 53d Mass., age 43.	May 27, 27, '63.	Left. Died June 6, 1863.
1684	Robinson, H., Capt., G, 55th Ohio.	May 3, 5, '63.	Left; circ. Died May 11, 1863; exhaustion.
1685	Robinson, J., Pt., K, 123d Ohio, age 24.	Sept. 3, 4, '61.	Left; flap. A. A. Surg. J. R. Uhler. Died Sept. 10, 1864.

[1] Fisher (G. J.), *Report of Fifty-Seven Cases of Amputations, in the Hospitals near Sharpsburg, Md., after the Battle of Antietam, Sept.* 17, 1862, in *Am. Jour. Med. Sci.*, 1863, Vol. XLV, p. 47.

[2] Fisher (G. J.), *op. cit.*, p. 47.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1686	Robinson, J. T., Pt., A, 1st Ohio Artillery.	June 4, 4, '64.	Left. Surg. E. B. Glick, 40th Ind. Died June 26, 1864.
1687	Robinson, P. P., Corp'l, A, 57th Penn.	May 5, 6, '64.	——. Died May 6, 1864.
1688	Rodgers, J. A., Pt., G, 1st Cavalry, age 19.	Aug. 25, 26, '64.	Left; flap. A. A. Surg. J. R. Uhler. Died Oct. 2, 1864.
1689	Rodgers, W. B., Pt., D, 88th Penn.	Sept. 17, 17, '62.	Left. Died Oct. 17, 1862.
1690	Roff, W. H., Lieut., H, 2d N. Y. H. A., age 35.	June 6, –, '64.	Left. Surg. P. E. Hubon, 28th Mass. Died June 30, 1864.
1691	Rogers, G., Pt., E, 104th Ohio, age 19.	July 8, 8, '64.	Right. Died July 8, 1864.
1692	Rogers, S., Pt., F, 1st Maine, age 21.	June 18, 18, '64.	Left. Died August 6, 1864.
1693	Rolfe, G., Pt., H, 2d N.Y. Cavalry, age 36.	April 1, 1, '65.	Left; circ. Died April 21, 1865; pyæmia.
1694	Rolfs, D. B., Pt., D, 6th N. Y. H. A., age 42.	June 1, 1, '64.	Right. Died June 26, 1864.
1695	Roper, S., Pt., A, 140th Penn., age 43.	June 16, 17, '64.	Left; circ. Surg. J. W. Wishurt, 140th Penn. Hæm.; lig. fem'l art. Died Aug. 10, '64; exh'n.
1696	Rose, W. H., Pt., C, 105th Illinois.	May 27, 27, '64.	Right. A. Surg. G. M. Trowbridge, 19th Mich. Supposed to be dead.
1697	Ross, E., Serg't, G, 52d New York.	Dec. 13, 13, '62.	——. Died December 19, 1862.
1698	Ross, R. E., Corp'l, H, 36th Indiana.	Sept. 19, 20, '63.	Left. Died Sept. 30, 1863.
1699	Rouark, T. H., Pt., F, 1st Maryland, age 25.	Aug. 3, 3, '64.	Left. Surg A. A. White, 8th Md. Died Oct. 6, '64. *Spec.* 4855.
1700	Roussel, E. G., Capt., G, 73d Penn.	Sept. 17, 17, '62.	——. Died October 11, 1862.
1701	Rowe, A. F., Pt., A, 1st Maine H. A., age 30.	June 16, 16, '64.	Right; (also amp. finger.) Hæm. Died July 29, '64; gangrene and pyæmia. *Spec.* 2907.
1702	Rumbell, J. F., Corp'l, F, 7th Infantry.	Feb. 21, 22, '62.	——. A. Surg. B. Norris, U. S. A. Died March 25, 1862.
1703	Rumsey, J. W., Pt., A, 3d Md., age 43.	June 2, 4, '64.	Left. Died July 11, 1865; fatty degenerat'n of heart. *Spec.* 4290.
1704	Rupert, H., Pt., M, 2d Penn. Cav., age 21.	June 24, 25, '64.	Left; circ. Died July 8, 1864.
1705	Russell, A. P., Capt., 1st Maine, age 28.	Sept. 20, 22, '64.	Left; circular. A. A. Surg. A. A. Younglove. Died Oct. 2, 1864.
1706	Russell, W., Pt., B, 90th Pennsylvania.	Dec. 13, 13, '62.	Left. Died Jan. 1, 1863; pyæmia.
1707	Ryan, W. J., Pt., E, 2d N. Y. State Militia.	Sept. 17, 17, '62.	Right. Died October 2, 1862.
1708	Sargent, O. H. P., Pt., G, 22d Mass., age 30.	May 1, 1, '62.	——. Died May 30, 1862; pyæmia.
1709	Schaeffer, T., Pt., C, 26th Wisconsin.	May 25, 25, '64.	Right. Died June 20, 1864.
1710	Schleehter, J., Pt., —, 5th Cavalry, age 27.	Fy 18, '64, Primary.	Right; (also fracture of left leg.) Died July 25, 1864.
1711	Schmidt, J., Pt., A, 60th Indiana.	July 10, 11, '63.	Left. Died July 11, 1863.
1712	Schnapp, C., Pt., I, 76th New York.	June 20, 21, '64.	Left; double flap. Surg. J. H. Beech, 24th Mich. Gang. Died July 24, 1864; exhaustion.
1713	Schoner, W., Pt., E, 82d Illinois.	May 3, 3, '63.	Right. Died June 5, 1863.
1714	Schwartzwaelder, A., Pt., D, 32d Indiana.	Nov. 25, 25, '63.	Right. Died Dec. 27, 1863.
1715	Scott, C. L., Fife Major. 33th Indiana.	June 27, 27, '64.	Left. Surg. S. H. Kersey, 36th Ind. Died July 28, 1864.
1716	Scott, W., Pt., C, 39th Illinois, age 19.	Oct. 13, 13, '61.	Right; circ. Died Nov. 10, '64.
1717	Searcey, D., Pt., E, 19th Kentucky.	Dec. 20, 20, '62.	Right. Died Feb. 5, '63; pyæmia.
1718	Seidolph, L. Pt., B, 39th New York, age 19.	June 16, 16, '64.	Left; circ. Surg. J. W. Wishart, 140th Penn. Died Sept. 27, '64.
1719	Sevoy, W., Pt., A, 27th Iowa.	May 18, 18, '64.	Right; (also wound of left heel) Died May 21, 1864.
1720	Shank, A., Pt., C, 1st Penn. Cavalry, age 23.	Oct. 14, 16, '64.	Right; ant. post. flap. Surg. E. Bentley, U. S. V. Died Oct. 24, 1863; hæmorrhage.
1721	Shanks, J., Pt., D, 21st Kentucky, age 29.	June 20, 20, '64.	Left. Surg. C. J. Walton, 21st Ky. Died July 17, 1864.
1722	Shannon, R. G., Capt., F, 25th Indiana.	Mar. 21, 21, '65.	Right. Surg. A. B. Monohan, 63d Ohio. Died March 23, 1865.
1723	Sharp, C. D., Serg't, D, 140th Penn.	July 2, 3, '63.	Left; (also wound of right thigh.) Died August 10, 1863.
1724	Sharp, J., Pt., E, 14th N. Y. H. A., age 20.	July 30, 30, '64.	Right; circ. Surg. J. Oliver, 21st Mass. Died Sept. 8, '64; pyæm.
1725	Shattuck, A. B., Capt., E, 11th N. Hampshire.	Dec. 13, 13, '62.	Right. Died December 17, 1862.
1726	Shaw, A. J., Pt., H, 113th Ohio.	June 27, 27, '64.	Left. Died July 19, 1864.
1727	*Shelton, J. A. J.*, Lieut., G, 50th Tennessee.	Aug. 30, 30, '64.	——. Gang. Died Oct. 23, '64; pyæmia.
1728	Shelvin, W., Colored Pioneer.	Aug. 31, 31, '64.	Right. Surg. A. T. Hudson, 26th Iowa. Died Aug. 31, 1864.
1729	Shields, P., Pt, D, 6th Wisconsin.	April 29, 29, '63.	Left. A. Surg. J. T. Duffield, 7th Ind. Bone rem'd; hæm.; lig. of fem. June 9, lig. of exter. iliac. Died June 19, '64. *Spec.* 1143.
1730	Shipper, R., Corp'l, C, 12th Illinois, age 19.	Oct. 5, 5, '64.	Right; circ. Surg. P. N. Woods, 39th Iowa. Died Dec. 26, 1864.
1731	Shoemaker, G., Pt., B, 39th New York.	July 2, 3, '63.	——. Surg. F. Wolf, 39th New York. Died July 25, 1863.
1732	Shorey, R., Pt., I, 17th Maine, age 45.	Nov. 27, 29, '63.	Right; ant. post. flap. Died Dec. 10, 1863; gangrene.
1733	Showalter, J., Pt., C, 53d Penn., age 20.	June 3, 3, '64.	Right. Surg. G. L. Potter, 145th Penn. Died June 24, '64. *Sp* 665.
1734	Shuster, G., Serg't, G, 30th Ohio.	June 27, 27, '64.	Right. Surg. A. C. Messenger, 57th Ohio. Died July 26, 1864.
1735	Silman, W. L., Corp'l, K, 32d Mass.	July 3, 3, '63.	Left. Died July 28, 1863.
1736	Simmons, J. K., Pt., D, 210th Penn., age 38.	April 1, 1, '65.	Left; (also wound of right leg.) Surgeon A. A. White, 8th Md. Died April 12, 1865; pyæmia.
1737	Simmons, D. F., Pt., G, 38th Mass.	April 30, —, '63.	Left. Died May 10, 1863.
1738	Simmons, S. S., Sergt., D, 84th Penn.	Nov. 27, 28, '63.	Right. Died December 9, 1863.
1739	*Simmons, T. N.*, Corp'l, C, 14th Tenn.	July 3, 3, '63.	Right. Died July 16, 1863.
1740	Singer, L., Pt., F, 174th New York.	July 11, 13, '63.	Left; hæm.; fem. ligated. Died July 17, 1863.
1741	Sisey, J., Pt., K, 21st Kentucky.	June 27, 27, '64.	Left. Surg C. J. Walton, 21st Ky. Died July 6, 1864.
1742	Sloan, M., Pt, H, 47th Indiana.	May 5, 5, '64.	Left. Died May 7, 1864.
1743	Smith, A. C., Corp'l, C, 20th Connecticut.	Mar. 19, 21, '65.	Right. Died March 28, 1865.
1744	Smith, E., Pt., C, 18th N. Y. Cavalry, age 38.	May 4, 4, '64.	Right; circ. Surg. C. Powers, 160th N.Y. Died June 19, 1864.
1745	Smith, H., Pt., I, 14th N. Jersey, age 24.	June 7, 7, '64.	Right; flap; (also left leg at knee joint.) Died June 17, 1864.
1746	Smith, H., Pt., A, 88th Pennsylvania.	June 18, 18, '64.	Right. Died July 3, 1864.
1747	Smith, H. D., Pt., H, 18th Infantry.	May 31, 31, '64.	Right. Died June 19, 1864.
1748	Smith, J. F., Pt., C, 61st New York, age 17.	April 8, 9, '65.	Right. A. Surg. W. B. Hartman, 116th Penn. Died May 24, '65; pyæmia.
1749	Smith, J. N., Pt., E, 7th Wisconsin, age 17.	May 10, 10, '64.	Left. Died July 3, 1864; pyæm.
1750	Smith, J. W., Corp'l, E, 42d Indiana.	June 27, 27, '64.	Right. Died July 18, 1864.
1751	Smith, T., Serg't, G, 4th N. Y. H. A., age 22.	June 18, 18, '64.	Right; ant. post. flap. Died June 29, 1864; exhaustion.
1752	Smith, W., Pt., B, 17th Kentucky.	Sept. 19, 19, '63.	Left. Died Oct. 11, 1863.
1753	Snodgrass, N., Pt., F, 3d Tennessee, age 24.	May 14, 14, '64.	Right. Died July 29, 1864.
1754	Snyder, W. H., Musician, G, 23d Kentucky.	Nov. 25, 25, '63.	Right. Died December 23, 1863.
1755	Sockwell, B. F., Pt., D, 25th New Jersey.	Dec. 13, 13, '62.	Left. Died February 5, 1863.
1756	Sovy, J. L., Serg't, B, 124th Ohio.	May 15, 15, '64.	Right. Died July 16, 1864.
1757	Sparry, J. E., Corp'l, L, 1st Vermont Cavalry.	July 3, 3, '63.	Right. Died July 15, 1863.
1758	Spaulding, D., Pt., K, 16th Maine, age 29.	May 10, 10, '64.	Left; circ. Died May 20, 1864; exhaustion.
1759	Sporleder, L., Pt., B, 187th Penn.	June 18, 18, '64.	Left. Died June 19, 1864.
1760	Sprague, T. M., Pt., C, 1st Maine.	Oct. 19, 20, '64.	Left; oval skin and circ. muscles. Surg. G. T. Stevens, 77th N.Y. Died Oct. 26, '64; toxicohæmia.
1761	Springer, S., Pt., A, 37th Wisconsin, age 15.	June 18, 19, '64.	Left; circ.: (also w'd right thigh.) Surg. S. S. French, 20th Mich. Died Sept. 4, '64; ch. diarrhœa.
1762	Stanislaus, J., Pt., I, 1st Maine, age 46.	Mar. 25, 25, '65.	Right; ant. post. flap. Died May 16, 1865; pyæmic intoxication.
1763	Steel, L. F., Pt., F, 11th Pennsylvania.	May 5, 5, '64.	Right. Died May 19, 1864.
1764	Steele, G. S., Pt., D, 126th New York, age 23.	June 22, 23, '64.	Left; circ. Surg. A. Van Devere, 66th N. Y. July 23, hæm.; fem. lig. Died July 29, '64; exh'n.
1765	Sterling, E. E., Corp'l, E, 143d Penn., age 32.	May 9, 10, '64.	Right; flap; hæm.; lig. small art. Died August 12, '64; pyæmia.
1766	Stetson, J. M., Pt., H, 57th Mass., age 17.	May 13, 13, '64.	Right; ant. post. flap. Died May 29, 1864; pyæmia.
1767	Stevens, D. H., Pt., D, 5th Penn., age 24.	May 6, 6, '64.	Right. Died June 19, 1864.
1768	Steward, C. A., Pt., 5th Maine Battery.	May 3, 3, '63.	——. Died May 11, 1863.
1769 1770	Stewart, J., Pt., D, 77th New York, age 38.	Mar. 25, 25, '65.	Right and left. Died April 17, 1865; pyæmic intoxication.
1771	Stiles, J., Pt., A, 2d Delaware.	July 2, –, '63.	Right. Died July —, 1863.
1772	Stoner, W. K., Pt., A, 53d Ohio.	July 3, 3, '64.	Right. Surg. A. C. Messenger, 57th Ohio. Died Sept. 15, '64.
1773	Stooksbury, R., Serg't, F, 6th Tennessee.	May 14, 14, '64.	Right. Surg. D. L. Heath, 23d Mich. Died May 26, 1864.
1774	Stout, S., Pt., I, 143d Pennsylvania.	May, '63, Primary.	Right; double flap. Surg. W. F. Humphrey, 149th Penn. Died July 11, 1863.

[1] JONES (J.), *Investigations upon the Nature, Causes, and Treatment of Hospital Gangrene as it prevailed in the Confederate Armies*, in *United States Sanitary Commission Memoirs*, 1871, *Surgical Volume* II, p. 403.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1775	[1]Stubblebein, H., Pt., C, 96th Penn.	May 3, 3, '63.	Left; circ. Died June 2, 1863; pyæmia.
1776	Sullivan, M., Corp'l, E, 17th Wisconsin.	Aug. 20, 20, '64.	Left. Died September 20, 1864.
1777	Summerville, J. H., Pt., D, 11th Pa. Res., age 19.	Dec. 15, 15, '62.	——. Feb. 15, '63, reamp. in mid. third. Died Feb. 28, '63; pyæm.
1778	Sumner, F. H., Pt., H, 39th Mass., age 29.	Feb. 7, 7, '65.	Left; ant. post. flap. Died Feb. 25, 1865; pyæmia.
1779	Sutton, S. S., Pt., K, 12th New Jersey.	June 3, 3, '64.	Right. Surg. F. F. Burmeister, 69th Penn. Died June 7, 1864. *Spec.* 3364.
1780	Swain, J. G., Pt., I, 20th Mass., age 19.	Dec. 13, 13, '62.	Left; ant. post. flap.; seq. rem'd. Oct. 8, reamp. mid. third. Died Oct. 16, '63; pyæm. *Spec.* 1265.
1781	Sweinhart, P., Pt., C, 47th Penn., age 23.	Oct. 19, 19, '64.	Left; circ. Died Nov. 18, 1864; diphtheria.
1782	Swisher, C., Pt., B, 3d Va. Mounted Infantry.	Aug. 26, 26, '63.	Right. Died in the hands of the enemy.
1783	Swyer, W., Pt., C, 143d Penn., age 24.	May 10, 10, '64.	Right; flap. Died June 18, 1864; exhaustion.
1784	Tack, G. D., Pt., E, 77th New York.	May 12, 12, '64.	Left. Died May 18, 1864.
1785	Taggart, C. F., Maj., 2d Penn. Cav., age 32.	Oct. 22, 23, '63.	Left; circ. Surg. W. M. Weidman, 2d Penn. Cav. Died Oct. 24, '63. *Spec.* 1765.
1786	Tanner, L. M., Corp'l, E, 37th Mass., age 21.	April 2, 2, '65.	Right. Died May 18, 1865; pyæmia.
1787	Tanner, R. J., Serg't, C, 103d Illinois.	July 28, 28, '64.	Right. Died August 21, 1864.
1788	Taylor, A., Pt., A, 1st Vermont Cavalry.	May 5, 5, '64.	——. Died May 6, 1864.
1789	Taylor, D. W., Pt., D, 81st Indiana.	June 27, 27, '64.	Left. Surg. T. M. Cook, 101st O. Died July 3, 1864.
1790	Taylor, R., Pt., G, 5th New Hampshire.	July 3. 3, '63.	——. Died July 11, 1863.
1791	Taylor, W., Pt, E, 188th New York.	Mar. 31, 31, '65.	Left. Died April 12, 1865.
1792	Terry, W. B., Pt., B, 6th Connecticut.	Oct. 7, 7, '64.	Left. Died Nov. 1, 1864.
1793	Theurer, P., Pt., D, 82d Ohio, age 32.	May 25, 25, '64.	Right; circ. Surg. G. M. Beaks. 141st N. Y. Died July 14, '64; exhaustion.
1794	Thomas, B., Pt., G, 70th Indiana.	May 15, 15, '64.	Right. A. Surg D. L. Jewett, 20th Conn. Died June 21, 1864.
1795	Thomas, J. L., Pt., B, 2d Maine.	May 27, 27, '62.	——. Died June 19, 1862.
1796	*Thomason, J.*, Pt., B, 49th North Carolina, age 28.	July 14, 14, '64.	Left: circ. Died July 20, 1864; gangrene.
1797	Thompson, G., Pt., A, 71st Penn., age 50.	June 3, 3, '64.	Left; circ. Surg. F. F. Burmeister, 69th Penn. Died Aug. 23, 1864; ch. diarrhœa. *Spec.* 3489.
1798	*Thompson, T. B.*, Pt., G, 52d North Carolina.	July 2, 3, '63.	Left. Surg. H. M. McAbee, 4th Ohio. Died Aug. 9, 1863.
1799	Thompson, R. W., Pt., G, 53d Ohio, age 23.	July 22, 22, '64.	Left. Surg. F. N. Barnes, 116th Illinois. Died Nov 2, 1864.
1800	*Thompson, W.*, Pt., I, 12th Virginia.	May 15, 15, '64.	Right. Died June 27, 1864.
1801	Thorp, E., Pt., G, 1st Penn. Art'y, age 20.	Aug. 4, 5, '64.	L't: circ. A. A. Surg. W. S. Adams. Hæm.; fem. art. tied. Died Aug. 12, '64; hæm. *Specs.* 3929, 3960.
1802	Tiekner, W., Pt., D, 96th Pennsylvania.	Sept. 17, 17, '62.	Left. Died Nov. 16, 1862.
1803	*Tiller, G. M.*, Lieut., C, 64th Miss., age 20.	Dec. 15, 15, '64.	Right; circ.; (also w'nd left leg.) A. A. Surg. F. B. Nossinger. Died Jan. 1, 1865; tetanus.
1804	Tillinger, C., Lieut., K, 3d Missouri.	Aug. 10, 10, '61.	——. Died Sept. 5, 1861.
1805	Tindall, J., Pt., E, 1st Delaware, age 38.	Feb. 8, 8, '64.	Left. Died Feb. 13, 1864. *Specs.* 2115, 2087, 2041.
1806	Tinker, G., Corp'l, I, 27th Illinois, age 19.	Nov. 25, 27, '63.	Left; circ. Died Jan. 25, 1864.
1807	Tipton, S., Pt., H, 97th Indiana.	June 27, 27, '64.	Left. Surg. J. H. Hutchison, 15th Mich. Died July 20, 1864.
1808	Todd, G. W., Major, 91st Pennsylvania.	Dec. 13, 13, '62.	——. Died Dec. 19, 1862.
1809	Tomilson, A., Pt., I, 39th Illinois, age 21.	Aug. 16, 16, '64.	Right; circ. Hæm. Died Sept. 14, '64; syncope.
1810	Tomlinson, A., Pt., E, 116th Penn., age 36.	June 1, 1, '64.	Right; circ. Surg. P. E. Hubon, 28th Mass. Died June 18, 1864.
1811	Tompkins, G., Pt., G, 84th Illinois.	Dec. 31, 31, '62.	Left. Died Jan. 19, 1863.
1812	Tourtelotte, C. A., Serg't, H, 18th Conn.	June 18, 18, '64.	Left. Died August 15, 1864.
1813	Toy, J., Pt., E, 7th Missouri.	June 25, 25, '63.	Left; circ. Surg. J. S. Reeves, 78th O. Died July 9, '63; pyæm.
1814	Transcht, N., Pt., F, 14th Maine, age 28.	Oct. 19, 19, '64.	Right; ant. post. flap; (also w'nd left arm.) Sphacelus; phlebitis. Died Nov. 15, '64; pyæmia.
1815	Tremlett, H. M., Lieut. Col., 39th Mass.	Mar. 30, 30, '65.	Left. Died June 6, 1865.
1816	Trimmer, Adam, Pt., H, 143d Penn., age 21.	June 18, 19, '64.	Left. Died August 14, '64; irritative fever.
1817	Trint, J. M., Pt., I, 29th Iowa, age 22.	July 4, 4 '63.	Left. Gang. Died July 26, '63; exhaustion.
1818	*Tudar, S.*, Pt., G, 61st Virginia, age 40.	July 30, 31, '64.	Right; circ. Hæm. Died Sept. 21, 1864.
1819	Turnball, E., Corp'l, K, 48th N. York, age 19.	June 3, 3, '64.	Left; circ. Died July 21, 1864; abscess of brain.
1820	Turnbaugh, J., Pt., E, 208th Penn., age 21.	April 2, 2, '65.	Left. Died April 14, '65; exhaustion.
1821	*Turner, T. C.*, Corp'l, C, 12th Georgia, age 29.	July 12, 14, '64.	Left; circ. A. Surg. J. C. McKee, U. S. A. Died Dec. 26, 1864; exhaustion. *Specs.* 2842, 3518. *Photo. Ser.*, Vol. IV, No. 165.
1822	Turney, E., Serg't, D, 27th Indiana.	July 3, 3, '63.	Right. Surg. W. H. Twiford, 27th Ind. Died July 6, '63; secondary hæmorrhage.
1823	Upton, A., Pt., D, 59th Massachusetts.	Jan. 11, 11, '65.	Left. Died January 22, 1865.
1824	Unknown, 85th N. York.	My 30, '62. Primary.	——; (hæm.) Died.
1825	Unknown, 56th Pennsylvania.	May 6, 7, '64.	Left. Died May 27, 1864; exhaustion.
1826	Usher, S., Lieut., G, 17th Maine.	April 5, 5, '65.	Left. Died April 7, 1865.
1827	Vache, H. W., Pt, K 45th Penn., age 20.	June 3, 3, '64.	Left; flap. Died June 9, 1864.
1828	Van Blarcome, A. H., Pt., D, 65th N. Y., age 21.	May 10, 10, '64.	Right; circ. Died June 3, 1864.
1829	Vance, W. H., Pt., G, 33d Ohio.	May 25, 25, '64.	Left. Died June 3, 1864.
1830	Vandamark, D., Pt., B, 30th Indiana.	Aug. 31, 31, '64.	——. Surg. T. M. Cook, 101st Ohio. Died Sept. 21, 1864.
1831	Van Gordon, J., Pt., F, 58th Penn.	Sept. 29, 30, '64.	Left; circ. Surg. T. H. Squire, 89th New York. Died October 30, 1864.
1832	Van Ingen, G., Adjutant, 89th N. Y., age 29.	Sept. 17, 19, '62.	——. Died Oct. 20, 62; diarrhœa.
1833	Van Vliet, J., Pt., H, 107th New York.	May 25, 25, '64.	Right: (also exeision of right radius.) Died June 24, 1864.
1834	Vaughan, J., Pt., F, 6th Kentucky.	Jan. 2, 4, '63.	Right. A. A. Surg. W. B. Cary. Died January 11, 1863.
1835	Viele, M., Pt., D, 111th New York.	June 16, 16, '64.	Left; circ. Surg. J. W. Wishart, 140th Penn. Died June 27, '64.
1836	Violet, J., Corp'l, A, 13th Penn. Cav., age 22.	Sept. 29, 29, '64.	Left; (also wound of right thigh.) Died Jan. 26, 1865.
1837	Wager, J. A., Pt., C, 115th N. Y., age 19.	May 17, 17, '64.	Left. May 19, rem. of bone. Died June 6, 1864; irritative fever.
1838	Walby, M., Pt., D, 114th New York.	Sept. 19, 19, '64.	Left; circ. Surg. L. P. Wagner. 114th N. Y. Died Oct. 7, 1864; pyæmia.
1839	Walker, A. H., Pt., K, 31st Indiana, age 24.	June 21, 21, '64.	Right. Surg. R. H. Tipton, 90th Ohio. Died July 18, '64; pyæm.
1840	Walker, L. M., Pt., A, 39th Mass., age 22.	June 22, 22, '64.	Right. Died June 30, 1864.
1841	Walker, S., Lieut., D, 133d Penn.	Dec. 13, 13, '62.	Right. Surg. C. Gray, 7th N. Y. Died Dec. 18, 1862.
1842	*Wallace, W. C.*, Capt., A, 61st Virginia.	Aug. 19, 19, '64.	Left; circ. Surg. W. V. White, 57th Mass. Died Aug. 22, 1864.
1843	[2]Ward, D., Corp'l, H, 13th West Va., age 19.	Oct. 19, 20, '64.	R't. Surg. G. T. Stevens, 77th N. Y. Dec. 30, rem. of bone. Died Jan. 16, '65. *Specs.* 4219, 4223.
1844	*Ward, G. W.*, Pt., K, 13th North Carolina.	July 3, 3, '63.	Left; (also wound of right leg.) Died July 12, 1863.
1845	Ward, J., Pt., C, 98th N. York, age 21.	May 16, 16, '64.	Right. Died August 29, 1864; exhaustion.
1846	Ward, J. H., Pt., D, 27th Massachusetts.	May 12, 12, '64.	——. Surg. L. W. Bliss, 51st N. Y. Died May —, 1864.
1847	Warner, J., Serg't, F, 28th Kentucky.	June 17, 17, '64.	Right. Surg. E. B. Glick, 40th Indiana. Died June 20, 1864.
1848	*Watson, J. H.*, Pt., I, 26th North Carolina.	June 3, 3, '64.	——. Died June 11, 1864; diarrhœa.
1849	Watts, T., Pt., F, 26th Pennsylvania.	Nov. 27, 27, '63.	Right. Died Dec. 9, 1863.
1850	*Weaver, A.*, Pt., G, 63d Georgia.	June 29, 29, '64.	Right. Died June 29, 1864.
1851	*Webster, B. L.*, Pt., A, 21st North Carolina.	May 4, '63, Primary.	Left; circ. Died June 17, 1863; debility.
1852	Weck, I. Pt., D, 1st New York Artillery.	Dec. 13, 13, '62.	Right. Died March 21, 1863.
1853	*Weir, J. A.*, Pt., K, 3d Virginia.	July —, —, '63.	——. Died July 8, 1863; erysipelas; tetanus.
1854	Welin, P., Pt., E, 1st Minnesota.	July 3, 3, '63.	Left. Died July 26, 1863.
1855	Weller, G. A., Pt., C, 54th Pennsylvania.	May 15, 15, '64.	Left. Died June 14, 1864.
1856	Wells, E., Pt., I. 12th Iowa, age 21.	Dec. 16, 16, '64.	Right; ant. post. flap. Surg. S. W. Huff, 12th Iowa. Profunda lig. Died Dec. 21, '64; hæmorrhage.
1857	Welman, W. F., Pt., I. 1st Minnesota.	July 3, 3, '63.	Left. Died August 2, 1863.
1858	Wesley, D. F., Corp'l, K, 128th New York.	Oct. 19, 20, '64.	Right. A. Surg. W. H. B. Past, 128th N. Y. Femoral lig. Died Nov. 1, 1864; exhaustion.

[1] LIDELL (J. A.), *Suppurative Osteo-Myelitis (Acute) following Primary Amputation of Left Thigh for Gunshot Injury*, in *United States Sanitary Commission Memoirs*, 1870, *Surgical Volume* I. p. 280.

[2] MCGILL (G. M.), in *Observation Book: Ante-Mortems and Post-Mortems*, Baltimore, 1865–66, page 3.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1859	Weymouth, C., Pt., B, 3d N. H., age 19.	Feb. 11, 11, '65.	Right; circ. Died April 20, 1865; pyæmia.
1860	Wheeland, W. J., Pt., E, 207th Penn., age 32.	April 1, 1, '65.	Left; ant. post. flap. Died April 16, 1865; pyæmia.
1861	Wheeler, S. P., Pt., H, 33d Mass.	May 15, 15, '64.	Left. Died June 14, 1864.
1862 1863	(Whelpley, J., Lieut., D, 1st Maine.	Mar. 25, 25, '65.	Both. Died March 25, 1865.
1864	Whitaker, D., Serg't, A, 88th Penn., age 20.	April 1, 1, '65.	R't; circ.; (fract. left tibia;) fem'l lig. Died April 20, '65; pyæmia.
1865	Whitaker, M., Corp'l, 3d Ohio Battery.	Feb. 5, 5, '64.	Right; circ. Surg. M. Brucker, 23d Indiana. Died Mar. 26, '64.
1866	White, S., Pt., I, 33d Indiana.	July 20, —, '64.	——; (also wound of other leg.) Died July 30, 1864.
1867	White, B. W., Pt., D, 118th Ohio.	May 15, 15, '64.	Right. Died June 12, 1864.
1868	*White, C. D.*, —, 4th Louisiana, age 36.	Dec. 16, 17, '64.	Right; flap. Surg. J. R. Ludlow, U. S. V. Died Jan. 21, 1865.
1869	*White, H. C.*, Pt, H, 1st North Carolina.	July 3, 3, '63.	Right. Surg. J. L. Dunn, 109th Penn. Died July 5, 1863.
1870	White, J. S., Pt., D, 55th Penn., age 40.	May 14, 14, '64.	Right. Died June 14, 1864; exhaustion.
1871	Whiteley, J., Pt., G, 97th New York, age 40.	June 19, 19, '64.	Right; circ. Died July 1, 1864.
1872	Whitman, J. S., Pt., I, 58th Mass.	June 26, 27, '64.	Right. Died July 4, 1864.
1873	Whitney, H. D., Pt., D, 145th Penn.	Dec. 13, 13, '62.	——. Surg. C. S. Wood, 66th N. York. Died Jan. 11, 1863.
1874	Wilcox, D., Serg't, K, 103d Illinois.	Nov. 25, 25, '63.	Right. Surg. E. J. Buck, 18th Wis. Died Dec. 19, 1863.
1875	Wild, W. H., Corp'l, C, 118th Penn., age 31.	Sept. 30, Oct. 1, '64.	Left. Died Oct. 29, '64; pyæmia.
1876	Wiley, A. J., Pt., H, 87th Penn., age 26.	June 1, 2, '64.	Left; circ. Surg. D. F. McKinney, 87th Penn. Gang. Died June 9, 1864: asthenia.
1877	Wilhelm, E., Pt., F, 81st Penn., age 16.	Mar. 25, 26, '65.	Left. Died April 8, 1865.
1878	Wilkes, J., Corp'l, I, 170th New York, age 31.	June 22, 22, '64.	Left. Surg. J. A. Douglass, 11th Mass. Died July 12, 1864.
1879	Wilkon, R., Serg't, C, 1st Louisiana.	June 14, 14, '63.	Right. Died Aug. 10, '63; wound and diarrhœa.
1880	Will, T., Pt., G, 21st Pa. Cavalry, age 39.	June 16, 16, '64.	Right: ant. post. flap. Died July 31, 1864.
1881	Willard, A., Pt., G, 97th New York, age 26.	Sept. 17, 17, '62.	Right. Died October 14, 1862.
1882	Willard, G. W., Corp'l, H, 57th Mass., age 35.	Aug. 19, 20, '64.	R't; circ. Surg. W. V. White, 57th Mass. Died Sept. 16, '64; pyæm.
1883	*Williams, A.*, Pt., —, 13th Miss., age 25.	Sept. 17, 18, '62.	Left; flap. Confed. surg. Died Sept. 21, 1862; pyæmia.
1884	*Williamson, P. G.*, Pt., D, 5th Texas, age 24.	July 3, 3, '63.	Right. Died Sept. 5, 1863; hæmorrhage.
1885	Willis, J., Pt., K, 2d Infantry.	July 3, 4, '63.	Right. Died July 26, 1863.
1886	Wilson, J., Pt., A, 27th Missouri.	Nov. 24, 24, '63.	Right; circ. Surg. B. N. Bond, 27th Missouri. Died.
1887	Wilson, T. A., Capt., B, 146th New York.	April 1, 1, '65.	——. Died April 25, 1865.
1888	*Wimberly, W.*, Pt., D, 46th Tennessee, age 22.	Dec. 16, 17, '64.	Left: lateral flap. Died Dec. 18, 1864; hæmorrhage.
1889	*Winn, J. J.*, Pt., Clynch's Ga. Battery, age 18.	Dec. 13, 14, '64.	Right; flap. Surg. E. Hutchinson, 137th N. Y. Died Jan. 20, '65; pyæmia.
1890	Wood, C., Pt., A, 8th N. Y. H. A., age 20.	June 5, 5, '64.	Right; circ. Dr. A. Garcelon. Died Aug. 1, 1864. *Spec.* 2380.
1891	Woodcock, H., Pt., H, 109th N. York, age 36.	June 17, 18, '64.	Right. Died July 13, '64; shock and irritative fever.
1892	Woolford, J., Pt., G, 19th Col'd Troops, age 27.	July 30, 30, '64.	Left: flap. Surg. F. M. Weld, 27th C. T. Died Aug. 10, 1864; exhaustion.
1893	*Woolford, W. H.*, Pt., A, 4th Virginia, age 24.	May 3, 3, '63.	Right; ant. post. flap; sloughing. Died July 13, 1863.
1894	Wray, T. S., Corp'l, F, 10th Penn. Res., age 33.	May 8, 8, '64.	Right; double flap. Died Sept. 3, 1864.
1895	Wright, G. W., Serg't, G, 3d Vermont.	May 5, 5, '64.	Right. Died May 11, 1864.
1896	Wright, W., Pt., B, 8th Connecticut, age 47.	May 7, 7, '64.	Left. Died June 26, 1864; exhaustion.
1897	Yeagher, F., Corp'l, C, 26th Mich., age 44.	June 17, 17, '64.	Right; circ. Surg. J. W. Wishart, 140th Penn. Hæm.; lig.; gang. Died July 5, '64; see. hæm.
1898	Yockey, P., Pt., D, 29th Ohio, age 29.	July 22, 22, '64.	Right. Sept., 1864, reamp. mid. third. Hæm.; fem. and external iliac art'es ligated. (Also w'nd right arm.) Died April 23, '65; chronic diarrhœa.
1899	Young, M. G., Pt., D, 23d Iowa.	May 17, 17, '63.	Left. Gangrene: diarrhœa. Died August 6, 1863.
1900	Young, W. F., Pt., A, 114th N. York, age 26.	Oct. 19, 19, '64.	Left; lat. flap. Hæm.; inferior perforating artery ligated. Died Nov. 27, 1864; exhaustion.
1901	*Anderson, H.*, Pt., D, 39th Georgia.	Sept. 1, —, '64.	Right; (also w'nd left hip.) Surg. A. C. Messenger, 57th Ohio.
1902	*Barnum, J. C.*, Corp'l, D, 29th Mississippi.	Aug. 31, 31, '64.	Left. Surg. J. A. Lair, 53d Ohio.
1903	*Brockley, W.*, Pt., D, 8th North Carolina.	April 20, 20, '64.	Right; semi-lunar flaps. Surg. C. H. Ladd, C. S. A.
1904	Casner, D., Pt., E, 122d Ohio.	June 1, —, '64.	Left.
1905	Eggleston, A., Pt., D, 111th Penn.	May 15, —, '64.	Right.
1906	*Fender, F. D.*, Pt., G, 1st South Carolina.	Sept. 30, 30, '64.	Left; circular.
1907	Fierhaut, R., Pt., B, 2d P. H. B. Md.	June 17, —, '64.	Right. Not a pensioner.
1908	*Gulledge, J.*, Pt., D, 21st S. Carolina, age 51.	May 16, 17, '64.	——; posterior flap; sloughing.
1909	*Harlien, T.*, Pt., A, 12th Georgia.	June 2, 2, '64.	
1910	McSparrain, J. W., Pt., I, 62d Penn.	May 27, —, '62.	Right. Not on the Pension List.
1911	Nelson, R., Pt., G, 7th Col'd Troops, age 20.	Sept. 29, —, '64.	Left. Not a pensioner.
1912	*Powell, T. F.*, Adj't, 23d North Carolina.	May —, —, '64.	——. Surgeon W. B. Fox, 8th Michigan.
1913	*Price, J. W.*, Pt., I, 30th Georgia.	Sept. 1, 1, '64.	Right; flap. Surgeon J. Pogue, 66th Illinois.
1914	*White, J. K.*, Corp'l, B, 24th N. C.	April 20, 20, '64.	Right; semi-lunar flaps. Surg. C. H. Ladd, C. S. A.

In two of the nineteen hundred and fourteen cases the amputation of the thigh was followed by successful re-amputation at the hip;[2] in five, the opposite limb was amputated either in the leg or in the ankle joint;[3] and in nine, the amputation in the thigh was accompanied by operations in the upper extremities.[4] The seat of fracture was, in the lower third of femur, in four hundred and twenty-six; in the knee joint, in eleven hundred and thirty-three:

[1] Fisher (G. J.), *Report of Fifty-seven Cases of Amputations in the Hospitals near Sharpsburg, Md., after the Battle of Antietam, Sept.* 17, 1862, in *Am. Jour. Med. Sci.*, 1863, Vol. XLV, p. 47.

[2] Case of Private J. Fabry, K, 4th Artillery (Table XXXII, No. 267, p. 248; Case 330, p. 153; and Table XVIII, No. 2, p. 159, *ante*), and case of Private *R. A. Vick*, E, 43d North Carolina (Table XXXII, No. 890, p. 255; Case 334, p. 157; and Table XVIII, No. 6, p. 150).

[3] Sergeant P. Bradley, 16th Michigan (Table XXXII, No. 1071, p. 257), amputation of left thigh and right leg, fatal. Pt. C. L. Johnson, B, 1st Tennessee (Table XXXII, No. 1402, p. 261), amputation left thigh and right leg, fatal; Pt. L. O. Lamphere, G, 21st Connecticut (Table XXXII, No. 1445, p. 262), amputation left thigh and right leg, fatal; Pt. *J. R. Lewis*, H, 53d Georgia (Table XXXII, No. 1469, p. 262), amputation of left thigh and right leg, fatal; Lieut. A. Birmingham, A, 69th New York (Table XXXII, No. 1049, p. 257), amputation of right thigh and left leg at ankle joint, fatal.

[4] Private F. Rose, D, 57th N. Y. (Table XXXII, No. 729, p. 253, *ante*, and *Second Surg. Vol.*, Table LXVIII, No. 892, p. 711), amputation of thigh and arm, recovery; Capt. H. Kircher, E, 12th Mo. (Table XXXII, No. 471, p. 250, and *Second Surg. Vol.*, Table LXX, No. 481, p. 727), amputation of left thigh and right arm, recovery; Pt. J. S. Fay, F, 13th Mass. (Table XXXII, No. 273, p. 248, and *Second Surg. Vol.*, Table CXXXIII, No. 378, p. 972), amputation thigh and forearm, recovery; Corp'l C. Lawrence, E, 90th N. Y. (Table XXXII, No. 503, p. 251, *ante*, and *Second Surg. Vol.*, Table CXXXIII, No. 463, p. 973), amputation of thigh and forearm, recovery; Corp'l T. Costello, E, 93d Ind. (Table XXXII, No. 167, p. 247, *ante*, and *Second Surg. Vol.* Table CXXXIII, No. 679, p. 975), amputation of thigh and forearm, recovery; Corp'l A. Kretzler, D, 162d N. Y. (Table XXXII, No. 487, p. 250, *ante*, and *Second Surg. Vol.*, Table CXXXIII, No. 756, p. 976), amputation of thigh and forearm, recovery; Corp'l G. W. Hays, K, 2d Mich. (Table XXXII, No. 1336, p. 260, *ante*), amputation of left thigh and excision of right knee joint, fatal; Pt. N. W. Henderson, E, 123d Ohio (Table XXXII, No. 1338, p. 260, *ante*, and *Second Surg. Vol.*, Table CXXVII, No. 27, p. 952), amputation of thigh and excision of ulna, fatal; Pt. J. Van Vliet, H, 107th N. Y. (Table XXXII, No. 1833, p. 266, *ante*, and *Second Surg. Vol.*, Table CXXVII, No. 66, p. 952), amputation of thigh and excision of radius, fatal.

in the leg, in three hundred and fifty-three; and in the foot, in two instances. Pyæmia was noted in one hundred and twenty-eight, gangrene in one hundred and twelve, and tetanus in seven instances.

Primary Amputations in the Shaft of the Femur without Indication of the Seat of Incision.—Three hundred and forty-five primary amputations in the thigh were recorded in which the precise seat of the operation was not specified. The cases are well authenticated, but the histories are frequently deficient in detail. In twenty-one the issue as to fatality could not be ascertained. Thirty-nine were successful and two hundred and eighty-five fatal, a mortality of 87.9 per cent. The thirty-nine successful operations were performed on Confederate soldiers; the two hundred and eighty-five fatal operations were performed on two hundred and eighty-one patients, of whom two hundred and thirty-six were Union and forty-five were Confederate soldiers. The operations were on the right side in one hundred and five, on the left in one hundred and seven, and in one hundred and thirty-three instances the side was not indicated. Brief abstracts of the cases will be found in the following table:

TABLE XXXIII.

Summary of Three Hundred and Forty-five Cases of Primary Amputations in the Thigh for Shot Fracture, the Point of Ablation unspecified.

Recoveries, 1—39; Deaths, 40—324; Results unknown, 325—345.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.	No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1	*Allen, J. T.*, Pt., F, 2d Florida.	Aug. 20, 21, '62.	——. Surg. — Thomas, C. S. A. Recovery.	27	*Mullin, T. Q.*, Serg't, E, 11th Mississippi.	May 31, 31, '62.	——. Surg. J. T. Gilmore, C.S.A. Disch'd July 7, 1862.
2	*Ard, G. W.*, Pt., K, 2d Georgia, age 29.	Sept. 17, 17, '62.	Right. Surgs. G. H. Humphreys, 9th N. Y., and T. H. Squire, 89th N. Y. Disch'd May 16, '63.	28	*Pascoe, C. F.*, Pt., D, 21st Mississippi.	May 6, 7, '64.	——. Surg. D. G. Peats, C. S. A. Recovery.
3	*Ashby, D. D.*, Pt., Jeff. Davis Legion.	July 3, 3, '63.	——. Surg. — Stone, C. S. A. Recovery.	29	*Pitman, W. E.*, Lieut., E, 10th Virginia.	Aug. 9, 11, '62.	——. Surg. W. Campbell, C.S.A. Recovery.
4	*Bennett, R. H.*, Serg't, G, 18th Mississippi.	May 6, 7, '64.	——. Surg. P. Griffin, C. S. A. Recovery.	30	*Powe, T. E.*, Captain, C, 8th South Carolina.	July —, —, '63.	Left. Transferred Sept. 14, 1863.
5	*Bones, T. M.*, Serg't, A, 5th Georgia.	Sept. 19, 19, '63.	——. Surg. — Griggs, C. S. A. Recovery.	31	*Raftray, P.*, Pt., C, 21st Mississippi.	May 6, 6, '64.	Left. Surg. D. G. Peats, C. S. A. Recovery.
6	*Booker, J. F.*, Serg't, E, 7th Arkansas.	May 20, 20, '62.	——. Surg. — Headley, C. S. A. Recovery.	32	*Rogers, W.*, Pt., D, 33d Alabama.	Sept. 20, 20, '63.	——. Recovery.
7	*Brown, H. C.*, 1st Georgia.	Sept. 14. 15, '62.	Left. Point Lookout for exch'nge. Dec. 13, 1862.	33	*Smith, G. T.*, Corp'l, D, 35th Mississippi.	June 24, 24, '63.	——. Surg. J. B. Fontaine, C. S. A. Recovery.
8	*Caldwell, J.*, Pt., H, 45th Virginia.	July 18, 18, '64.	——. Recovery.	34	*Smith, S. P.*, Pt., F, 16th Mississippi.	Dec. 13, 13, '62.	——. Surgeon — Snell, C. S. A. Recovery.
9	*Carter, H.*, Pt., A, 6th Virginia.	June 21, 23, '62.	——. Surgeon E. M. Seabrook, C. S. A. Recovery.	35	*Stewart, J. W.*, Pt., F, 44th Alabama.	May 25, 25, '64.	Left. Furloughed July 24, 1864.
10	*Clifton, Y. B.*, Pt., I, 1st North Carolina.	July 2, 2, '63.	——. Surg. J. B. M. Cromwell, P. A. C. S. Recovery.	36	*Walker, L. A.*, Corp'l, Rogue's Battalion.	April 14, 14, '63.	——. Surg. — Foulks, C. S. A. Recovery.
11	*Dukes, A.*, Pt., C, 17th Mississippi.	July —, —, '63.	——. Transferred Oct. 21, 1863.	37	*Wayne, J. J.*, Pt., A, 11th Georgia. age 33.	July 10, 11, '63.	Left. Nov. 19, extr. nec. bone. Gangrene. Exchanged March 3, 1864.
12	*Eden, C. M.*, Serg't, H, 14th Alabama.	June 27, 27, '62.	——. Recovery.	38	*White, D. A.*, Pt., H, 3d Arkansas.	Sept. 19, 20, '63.	——. Surg. — Brown, 3d Ark. Recovery.
13	*Eller, S.*, Pt., H, 23d N. Carolina.	July 1, 1, '63.	——. Surg. — Parson, C. S. A. Recovery.	39	*Williams, E. G.*, Serg't, E, 11th Virginia.	May 16, 16, '64.	——. Recovery.
14	*Etheridge, J. D.*, Pt., G, 14th South Carolina.	Dec. 13, 13, '62.	——. Surg. — Huit, C. S. A. Recovery.	40	Ackerly, H. E., Pt., C, 12th New York.	Dec. 13, 13, '62.	——. Died Dec. 24, 1862.
15	*Garner, F. M.*, Pt., C, 51st North Carolina.	July 14, 14, '63.	——. Surg. J. W. McGee, 51st N. C. Recovery.	41	Alfred, L. S., Corp'l, B, 22d Illinois.	Sept. 19, 19, '63.	Left. Died October 8, 1863.
16	*Golladay, J. T.*, Pt., I, 52d Virginia.	Aug. 29, 29, '62.	——. Surg. — Lewis, C. S. A. Recovery.	42	Allman, H., Pt., H, 38th Ohio.	Sept. 1, 1, '64.	Left. Died Sept. 8, 1864.
17	*Grimes, G. C.*, Pt., C, 14th Alabama.	May 24, 25, '64.	Left. Furloughed July 20, 1864.	43	Anderson, W., Serg't, D, 118th Pennsylvania.	Sept. 17, —, '62.	——. Died September 19, 1862.
18	*Hartley, J.*, Pt., K, 7th Texas.	Sept. 19, 19, '63.	——. Surg. G. G. Roy, C. S. A. Recovery.	44	Armspoker, J., Pt., H, 96th Ohio.	Jan. 11, 11, '63.	Left. Surg. D. W. Henderson, 96th Ohio. Died Jan. 22, 1863.
19	*Herring, J. F.*, Pt., F, 8th N. Carolina, age 42.	Sept. 30, Oct. 1, '64.	Left. Prison Feb. 1, 1865.	45	Austin, A., Lieut., 1st New Jersey Cavalry.	Aug. 9, 9, '62.	Right. Died August 9, 1862.
20	*Hurst, M.*, Pt., C, 12th Tennessee Cavalry.	July 13, 13, '64.	Left. Recovery.	46	Austin, C., Pt, F, 18th Mass., age 26.	Sept. 17, —, '62.	——. Died September 24, 1862.
21	*Jackson, J. T.*, Pt., I, 1st Georgia. age 18.	.....	Right. Exchanged Jan. 16, '65.	47	Bachelor, A., Pt., D, 5th Michigan.	May 5, 5, '62.	——. Died May 5, 1862.
22	*Kiser, J. F.*, Pt., E, 25th Virginia.	June 8, 8, '62.	Left. Surgeon — Opie, C. S. A. Disch'd August 29, 1862.	48	Baker, E., Pt., A, 6th Missouri.	May 15, 15, '64.	Right. Surg. S. P. Bonner, 47th Ohio. Died May 26, 1864.
23	*Kissenger, H. H.*, Pt., F, 24th Virginia.	Sept. 29, 29, '64.	——. Surg. — Hope, C. S. A. Recovery.	49	Baird, R., Pt., C, 3d Iowa.	July 12, —, '63.	Left. Died July 15, 1863.
24	*LeRoy, J.*, Pt., D, 8th Alabama.	Aug. 16, 16, '64.	——. Surg. — Royston, C. S. A. Recovery.	50	*Barger, J. E.*, Pt., G, 2d Virginia, age 40.	May 30, —, '64.	Right. Died June 14, '64; pyæm.
25	*McCray, J. M.*, Pt., F, 28th Georgia, age 30.	Sept. 30, Oct. 1, '64.	Left. Prison February 18, 1865.	51	Baxter, C., Corp'l, C, 9th New York Cavalry.	Aug. 29, 29, '64.	Right. Died Sept. 1. 1864.
26	*Mealor, W. P.*, Pt., Troup Artillery.	April 16, 16, '62.	——. Surg. — White, C. S. A. Recovery.	52	*Benson, A. J.*, Pt., I, 5th Alabama.	May 5, 5, '64.	Right. Died May 28, 1864.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
53	*Bernard, G.*, Lieut., G, 10th North Carolina.	Dec. 17, 17, '62.	——. Surg. H. P. Ritter, 8th N. Carolina. Died Dec. 17, 1862.
54	Beverly, G. H., Pt., C, 3d Cavalry.	Dec. 13, 13, '62.	——. Died December 26, 1862.
55	Bishop, G. T., Pt., I, 141st Pennsylvania.	July 3, 3, '63.	Left. Died July 12, 1863.
56	Blackburn, T., Pt., E, 73d Pennsylvania.	Aug. 30, 30, '62.	——. Died September 19, 1862.
57	Blaisdell, J. H. D., Pt., H, 15th New Hamp.	May 27, 27, '63.	Right. Died May 30, 1863.
58	Blaxham, R., Corp'l, E, 9th New York.	Sept. 17, 17, '62.	——. Died September 28, 1862.
59	Bohor, A., Pt., H, 100th New York.	June 1, 1, '62.	Left; (also wound right thigh;) gangrene. Died June 9, 1862.
60	Bousner, M., Pt., A, 5th Michigan.	May 31, —, '62.	——. Died June 9. 1862.
61	Bower, A., Pt., E, 111th New York.	Mar. 31, 31, '65.	Right. Surg. W. Vasburgh, 111th N. Y. Died March 31, 1865.
62	Boyles, B., Pt., I, 28th Illinois.	July 12, —, '63.	Left. Died July 15, 1863.
63	Broad, L., Pt., C, 5th Michigan.	May 5, 5, '62.	——. Died May 7, 1862.
64	Brown, B. F., Pt., C, 22d Massachusetts, age 23.	May 7, 7, '64.	——; (also w'nds leg and neck.) Died May 17, '64; ulceration of jugular vein. Autopsy.
65	Brown, W. M., Pt., G, 12th Illinois.	May 14, 14, '64.	Right. Died May 14, 1864.
66	Burke, T. A., Lieut., E, 10th Iowa, age 23.	June 15, 15, '64.	Right. Died Sept. 1, '64; pyæm.
67	Bushnell, H. S., Corp'l, I, 17th Michigan.	May 12, 12, '64.	Right. Died May 21, 1864.
68	Cantrell, A. D., Pt., D, 18th Infantry.	Dec. 31, 31, '62.	Left. Died January 2, 1863.
69	Cartwright, H. C., Pt., B, 130th Illinois.	April 8, 8, '64.	Left. Died June 8, 1864.
70	Castar, S., Pt., B, 2d Wisconsin.	July 2, 3, '63.	Right. Died July 30,'63; pyæm.
71	Chapman, B., Corp'l, A, 14th N. Y. H'vy Art.	Feb. 14, 14, '65.	Right. Died February 19, 1865.
72	Chasteen, M., Pt., D, 81st Indiana.	Dec. 15, 15, '64.	——. A. Surg. R. J. Hill, 45th O. Died December 16, 1864.
73	Cherrington, C. H., Pt., K, 36th Ohio.	Oct. 19, 19, '64.	——. Died October 20, 1864.
74	Clark, D. C., Pt., K, 188th Penn.	June 29, 29, '64.	Right. Died July 1, 1864.
75	Clarke, J., Serg't, H, 27th Ohio.	Mar. 13, 13, '62.	——. Died April 7, 1862.
76	*Coleman, D. G.*, Pt., A, 30th North Carolina.	May 3, 3, '63.	Right. Died May 26, 1863.
77	Collins, H., Lieut., D, 29th Missouri.	May 27, 27, '64.	Left. Surg. A. T. Hudson, 26th Iowa. Died June 3, 1864.
78	Collins, R. J., Pt., F, 108th New York.	Dec. 13, 13, '62.	Left. Died December 30, 1862.
79	Connell, P., Corp'l, E, 35th Indiana.	Jan. 2, 3, '63.	——. Died January 3, 1863.
80	Conteil, M. K., Pt., A, 13th Missouri.	Oct. 4, 4, '62.	——. Died.
81	Cook, C. S., Corp'l, I, 25th Connecticut.	April 13, 13, '63.	Left. Died May 29, 1863; chr. diarrhœa.
82	Cooper, H. M., Pt., H, 29th Wisconsin.	April 8, 8, '64.	——. Died April 28, 1864.
83	Cramer, A., Pt., F, 31st Missouri.	June 5, 5, '63.	Left. Surg. B. N. Bond, 27th Mo. June 12, artery sloughed; nec.; reamp. Surg. C. G. Strother, 31st Mo. Died June 22, 1863.
84	Cramer, S., Pt., B, 142d Pennsylvania.	July 1, 1, '63.	Left; (also amp. arm.) Died July 9, 1863.
85	Cronstein, M., Pt., F, 3d Infantry.	July 3, 3, '63.	Right. Died July 6, 1863.
86	*Cuff, W.*, Pt., D, 11th Louisiana C. T.	June 7, —, '63.	Right. Died June 10, 1863.
87	Danforth, H., Pt., H, 123d New York.	July 20, 21, '64.	Left; reamp. Died July 31, '64.
88	Davis, J., Pt., F, 40th Illinois.	April 6, —, '62.	——. Died.
89	*Davis, M.*, Pt., E, 2d N. Carolina Batt.	July —, —, '63.	——. Died July 7, 1863.
90	Davis, T. J., Pt., D, 40th Iowa.	April 30, —, '64.	Left. Died June 9, 1864.
91	Dawson, W. R., Pt., E, 139th Pennsylvania.	May 14, 14, '64.	Left. Died May 23, 1864.
92	Dean, W. C., Serg't, G, 40th Kentucky.	June 12, 12, '64.	Right. Died June 15, 1864.
93	*Deckett, J. M.*, Lieut., H, 2d N. Carolina Battery.	July —, —, '63.	——. Died July 7, 1863.
94	Dereuger, E., Corp'l, E, 73d Pennsylvania.	Aug. 30, 30, '62.	——; circ. A. Surg. J. A. Armstrong, 73d Penn. Died Sept. 22, 1862.
95	Dessart, G., Corp'l, B, 74th New York, age 21.	June 25, 25, '62.	——. Died July 18, 1862.
96	Devas, P., Pt., E, 111th New York.	July 2, 3, '63.	——. Surg. H. M. McAbee, 4th Ohio. Died July 12, 1863.
97	Dooley, J., Corp'l, I, 38th Massachusetts.	June 14, 14, '63.	——. Died June 30, 1863.
98	Doty, W. F., Pt., E, 21st Indiana.	Aug. 5, 5, '62.	——; (also wound of arm.) Died August 6, 1862.
99	Dubindaeb, C., Pt., C, 33d Missouri.	July 14, 14, '64.	Left. Died July 15, 1864.
100	Eddy, A. R., Pt., H, 1st Mich. Engineers.	Oct. 8, 8, '62.	——. Died October 10, 1862.
101	*Edwards, D.*, Pt., B, 61st North Carolina, age 44.	Sept. 30, 30, '64.	Left. Died October 25, 1864; pyæmia.
102	Eikley, G., Serg't, E, 7th Ohio.	Nov. 27, 27, '63.	Right. Died December 11, 1863.
103	*Ellis, A. C.*, Pt., B, 2d Florida.	July 1, 3, '62.	Right. Dr. Crawford. Died July 4, 1862.
104	Ershman, F., Pt., G, 147th N. Y., age 40.	July 1, 2, '63.	——. Died July 2, 1863.
105	Estergreen, F., Pt., H, 89th Illinois.	June 20, 20, '64.	Left. Died July 3, 1864.
106	*Farley, J.*, Lieut., G, 8th Missouri Cavalry.	July 4, 4, '63.	Left. Died December 5, 1863.
107	Fichell, A., Pt., B, 27th Michigan, age 20.	May 10, 10, '64.	Right; circ. Died May 18, 1864.
108	Finlay, J., Pt., C, 52d New York.	Dec. 13, 13, '62.	——. Died December 20, 1862.
109	Finley, M. K., Lieut., F, 162d New York.	April 8, 8, '64.	——. Died April 21, 1864.
110	Fish, E. A., Capt., A, 81st New York, age 42.	Sept. 29, 29, '64.	Left. Died October 1, 1864; exhaustion.
111	Fitzpatrick, J., Corp'l, F, 173d New York.	April 8, 8, '64.	Left. Died April —, 1864.
112	Flomerfield, P., Pt., F, 69th New York.	Sept. 17, 18, '62.	Left. Died Sept. 18, 1862.
113	Flowers, M., Pt., H, 101st New York, age 26.	Aug. 30, 30, '62.	——. Sept. 19, hæm., 40 oz.; lig. femoral. Died Sept. 24, 1862; exhaustion.
114	Folk, J. S., Pt., B, 141st Pennsylvania.	July 3, 3, '63.	Left; (also wound of right hip.) Died July 27, 1863.
115	Fosket, O., Pt., F, 34th N. York, age 19.	Dec. 13, 13, '62.	Left. Died December 31, 1862; pyæmia.
116	Foss, J., Serg't, C, 59th New York.	Sept. 17, 17, '62.	Thigh and leg amputated. Died Sept. 21, 1862.
117	Fouts, M. N., Pt., G, 4th Missouri S. M. C.	Oct. 23, 23, '64.	Right. Died October 25, 1864.
118	Freeman, A., Pt., A, 155th Penn., age 31.	May 15, 15, '64.	Left; stump alive with maggots; bled to death May 26, 1864.
119	Gartland, J., Color Bearer, A, 72d Penn.	Sept. 17, 17, '62.	Right. Died September 25, 1862.
120	Gates, J., Pt., F, 8th Pennsylvania.	Sept. 17, 17, '62.	Left. Died October 14, 1862.
121	Gillen, N., Pt., I, 69th Pennsylvania.	Sept. 17, 17, '62.	Left. Died September 27, 1862.
122	*Gillespie, R. G.*, Pt., F, Phillips' Legion.	July —, —, '63.	——. Died July 8, 1863.
123	Gleasman, C., Pt., H, 117th New York.	Sept. 29, 29, '64.	Left. Died Oct. 1, 1864; hæm.
124	Glover, W. E., Pt., D, 118th New York.	July —, —, '64.	Left. Died July 24, 1864.
125	Godbold, H. L., Lieut., F, 1st Pa. Art., age 23.	Aug. 23, 23, '62.	Left. Died Sept. 27, '62; pyæm.
126	*Golding, J. J.*, Corp'l, A, 3d Battalion S. C.	July —, —, '63.	——. Died July 17, 1863.
127	Goodling, G., Pt., F, 2d Delaware.	Sept. 17, 17, '62.	Right. Died October 21, 1862.
128) 129)	Goodwell, S., Pt., G, 29th Illinois.	Mar. 30, 30, '65.	Both. Surgs. W. D. Murray, 161st N. Y., and J. W. Angell, 23d Wis. Died March 31, 1865.
130	Gordon, J. B., Lieut., C, 1st West Virginia.	June 18, 18, '64.	Left. Died June 19, 1864.
131	Gould, J. M., Pt., G, 81st New York, age 21.	Aug. 6, 6, '64.	Left; circ. Surg. W. H. Rice, 81st N. Y. Died Sept. 3, 1864.
132	Gould, P. H., Pt., H, 8th Wisconsin.	Oct. 4, 4, '62.	Right. Died October 20, 1862.
133	Gregg, J. H., Capt., I, 137th New York.	July 3, 3, '63.	——. Died July 3, 1863; shock.
134	Grunbine, C., Pt., F, 93d Pennsylvania.	May 5, 5, '64.	Right. Died May 5, 1864.
135	*Guy, A.*, Pt., G, 51st N. Carolina, age 44.	Oct. 1, 1, '64.	Right. Died October 19, 1864 pyæmia.
136	*Gwinn, F.*, Pt., F, 30th Louisiana.	July 28, 28, '64.	Left. Died September 6, 1864.
137	Hair, J., Pt., K, 61st Pennsylvania.	June 1, 1, '62.	Left. Died June 11, 1862.
138	Hale, W. H., Pt., F, 152d New York.	May 10, 10, '64.	Left. Died May 12, 1864.
139	Halstead, S. F., Pt., K, 111th New York.	July 3, 3, '63.	Left. Surg. H. M. McAbee, 4th Ohio. Died August 2, 1863.
140	Hamilton, J. S., Serg't, A, 5th West Virginia.	Oct. 19, 19, '64.	——. Died October 20, 1864.
141	Harris, S., Pt., H, 90th Ohio.	Dec. 15, 15, '64.	Left. Died December 16, 1864.
142	Haslette, F. A., Pt., C, 45th Pennsylvania.	May 6, 6, '64.	Right. Died May 17, 1864.
143	Hastings, O., Pt., B, 16th Wisconsin.	July 22, 22, '64.	Left. Surg. H. McKennan, 17th Wis. Died July 22, 1864.
144	*Hawley, R.*, Pt., K, 2d South Carolina.	Oct. 27, 27, '64.	——. Died October 31, 1864.
145	Hewlett, G., Pt., H, 11th Mass., age 19.	May 5, 5, '62.	Left. Died May 10, 1862.
146	Hoffadin, J., Pt., F, 7th New York.	Dec. 13, 13, '62.	Right. Died January 4, 1863; pyæmia.

No.	Name, Military Description, and Age	Dates.	Operations, Operators, Result.
147	Holmes, G., Pt., D, 6th New Jersey.	May 5, —, '62.	——. Died May 10, 1862.
148	Hopson, A., Pt., B, 4th Vermont.	Dec. 13, 13, '62.	Left. Died December 15, 1862.
149	Hubbell, W. W., Major, 52d New York.	June 7, 7, '64.	Right. Died June 7, 1864.
150	Hudson, A., Pt., B, 43d Wisconsin.	Nov. 5, 5, '64.	——. Died November 5, 1864.
151	Hughes, E., Pt., E, 6th Colored Troops.	Sept. 28, —, '64.	Left; (also wound right thigh.) Died Oct. 12, 1864.
152	Hughes, G., Serg't, B, 105th Pennsylvania.	July 3, 3, '63.	Left. Died July 7, 1863.
153	Hughes, J., Pt., G, 15th Massachusetts.	Sept. 17, —, '62.	Left. Died September 28, 1862.
154	Hunter, M., Pt., C, 21st Missouri.	July 14, 14, '64.	——. Died July —, 1864.
155	Irish, A. J., Pt., G, 9th Maine, age 24.	May 20, 20, '64.	Right. Died May 22, 1864; exhaustion and shock.
156	James, W., Pt., I, 122d Ohio, age 29.	May 6, 6, '64.	Right. June 24, pyæmia. Died July 2, 1864; pyæmia.
157	Jasper, A. F., Pt., E, 12th Virginia.	May 15, 15, '64.	Left. Died July 24, 1864.
158	Johnson, J., Pt., A, 111th New York.	April 2, 2, '65.	Right. Died May 15, 1865.
159	Johnson, J. E., Pt., A, 153d Penn., age 22.	July 3, 4, '63.	Right. July 22, hæmorrh. Died July 22, 1863; exhaustion.
160	*Jones, B. M.*, Pt., H, 5th North Carolina.	May —, —, '62.	——. Erysipelas. Died June 3, 1862; pyæmia and hæmorrhage.
161	Jones, R. J., Pt., F, 18th Infantry.	Dec. 31, 31, '62.	——. Died January 10, 1863.
162	[1]*Joyne, D.*, —, —, 1st Louisiana.	——, —, '63.	——. Re-amp. Died of varioli.
163	Keevitt, F., Pt., I, 68th Ohio.	July 22, 22, '64.	Left. Surg. H. McKennan, 17th Wisconsin. Died.
164	Kehoe, T., Pt., C, 107th Pennsylvania.	Sept. 17, 17, '62.	Right. Died September 29, 1862.
165	Kelley, J., Pt., A, 1st Delaware.	Sept. 17, —, '62.	——. Died September 21, 1862.
166	Kelso, M. C., Pt., A, 134th Pennsylvania.	Dec. 13, 13, '62.	Right. Died December 29, 1862.
167	Kelton, I. J., Capt., 21st Massachusetts.	Sept. 1, —, '62.	——. Dr. Miller, C. S. A. Died September 24, 1862.
168	Kennedy, J. B., Capt., D, 1st Michigan.	Dec. 13, 13, '62.	Left. Died December 15, 1862; wounds.
169 170	*Kenner, H.*, Pt., —, 4th Virginia.	July —, —, '63.	Both. Died July 6, 1863.
171	King, J., Pt., A, 7th Infantry.	July 3, 3, '63.	Right. Died July 15, 1863.
172	King, P., Pt., B, 5th Vermont.	May 3, —, '63.	Left. Died May 12, 1863.
173	Kinkle, C., Pt., I, 23d Ohio.	Sept. 19, 19, '64.	Right; (also wound left thigh.) Died October —, 1864.
174	Kline, C. A., Pt., E, 26th Ohio.	Sept. 19, 19, '63.	Right. Died Sept. 20, 1863.
175	Knight, B. F., Pt., I, 9th Iowa.	May 22, 22, '63.	Right; flap. Surg. E. J. McGoorisk, 9th Iowa. Died June 20, '63.
176	Koff, J., Pt., D, 46th Pennsylvania.	May 25, 25, '64.	Left. Surg. W. C. Bennett, U. S. V. Died July 25, 1864.
177	Kohl, J., Pt., E, 26th Connecticut.	May 27, 27, '63.	Right. Died June 7, 1863.
178	Lalone, A., Pt., B, 27th Michigan.	May 6, —, '64.	Right. Died May 11, 1864.
179	Laufair, S. P., Pt., A, 37th Mass., age 40.	May 5, 5, '64.	Right. May 25, 26, hæm.; lig. Died May 26, 1864; exhaustion.
180	Lawrence, G., Pt., C, 5th Michigan.	July 3, 3, '63.	Left. Died July 15, 1863.
181	*Lawrence, J. W.*, Pt., C, 9th Kentucky.	Aug. —, —, '64.	Right. Died August 26, 1864.
182	Lewin, J., Pt., H, 142d New York, age 20.	June 3, 3, '64.	Right. Died June 15, '64; hæm.
183	Lilly, S. W., Pt., E, 6th New Jersey, age 19.	May 5, 5, '62.	Right. Died June 12, 1862.
184	Livingston, A., Pt., A, 2d Sharpshooters.	Sept. 17, 17, '62.	Right. Died Nov. 25, 1862.
185	Loury, M. F., Pt., A, 6th Kentucky.	July 28, 28, '64.	Left. Died September 3, 1864.
186	Lumbard, H., Pt., D, 46th Indiana.	April 8, 8, '64.	——. Died April 16, 1864.
187	*Lumpkin, J. W.*, Pt., H, 1st Texas.	Oct. 7, 7, '64.	Right. Died October 9, 1864.
188	Lynch, P., Pt., D, 73d New York.	July 2, —, '63.	Left. Died July 13, 1863.
189	Mahaffey, D. D., Pt., E, 63d Pennsylvania.	June 18, 18, '64.	——. Died June 19, 1864.
190	Maloney, R., Pt., E, 69th New York.	Sept. 17, 17, '62.	Right. Died September —, 1862.
191	Manley, N. F., Pt., D, 27th Mass., age 39.	May 16, 16, '64.	Left. Died June 3, 1864.
192	Mansir, W. H., Pt., B, 37th Mass., age 19.	May 5, 5, '64.	Right. Died May 22, 1864.
193	Manyfold, J. H., Pt., K, 97th Illinois.	July 12, 12, '63.	Right. Died July 28, 1863.
194	Martial, J., Pt., C, 8th Missouri.	Jan. 11, 11, '63.	——. Died January 14, 1863.
195	Martin, J., Pt., I, 2d Rhode Island.	May 14, 14, '64.	——. Died May 15, 1864.
196	Maxwell, R., Lieut., H, 1st Penn. Rifles.	May 8, 8, '64.	Left. Surg. J. J. Comfort, 1st Pa. Rifles. Died May 12, 1864.
197	McCright, C. M., Corp'l, C, 52d Indiana.	April 9, 9, '65.	——. Died April 10, 1865.
198	McFall, H., Pt., H, 76th New York.	Dec. 13, 13, '62.	——. Died December 13, 1862.
199	McMiller, C., Pt., C, 85th Pennsylvania.	Aug. 16, 16, '64.	Left; sloughing; hæm. Aug. 28, re-amp. up. third. A. Surg. C. Wagner, U. S. A. Died Sept. 4, 1864; hæmorrhage.
200	McNaughton, J. B., Pt., F, 108th New York.	Dec. 13, 13, '62.	Right. Died December 26, 1862.
201	Merrill, W. R., Pt., A, 6th New Hampshire.	Dec. 13, 13, '62.	——. Died December 20, 1862.
202	Merritt, H, Pt., I, 33d New York.	May 3, 3, '63.	Left. Died May 29, 1863.
203	Mertins, H., Pt., H, 17th Iowa.	Nov. 25, 25, '63.	Right. Surg. E. J. Buck, 18th Wis. Died Nov. 27, 1863.
204	Miller, H., Pt., B, 147th New York.	July 2, 4, '63.	Right. Died August 3, 1863.
205	Mills, W. F., Pt., E, 8th N. Y. H. A., age 42.	June 16, 16, '64.	Right; (also int. amp. left thigh.) Surg. S. H. Plumb, 82d N. Y. Died June 23, 1864.
206	Mills, W., Pt., A, 130th Indiana.	Mar. 9, 9, '65.	Left. Surg. V. H. Gregg, 124th Indiana. Died March 9, 1865.
207	Montague, L., Serg't, G, 12th Ohio Cav., age 19.	Oct. 2, —, '64.	Right. Died December 1, 1864.
208	Moore, S., Pt., G, 51st Pennsylvania.	May 12, 12, '64.	Left. Surg. J. S. Ross, 11th N. H. Died May 18, 1864.
209	*Morrow, E. G.*, Capt., G, 28th North Carolina.	July —, —, '63.	——. Died July 27, 1863.
210	Morton, H., Pt., H, 81st New York, age 21.	May 17, 17, '64.	Right; (also wound of cranium.) Died May 26, 1864.
211	Moses, J., Pt., K, 80th Indiana.	Oct. 8, 8, '62.	Right. Died October 14, 1862.
212 213	Myer, C., Pt., F, 30th Missouri.	June 4, 4, '63.	Both. Surg. M. W. Robbins, 4th Iowa. Died June 5, 1863.
214	Nailor, N. A., Pt., B, 4th Colored Troops.	June —, —, '64.	Left. Surg. W. S. Tremaine, 31st Col'd Troops. Died July 8, '64.
215	Needick, A., Serg't, B, 89th New York.	Sept. 17, —, '62.	——. Died September 27, 1862.
216	*Neice, T. F.*, Pt., K, 5th Texas.	July —, —, '63.	——. Died July 10, 1863.
217	*Newsum, W. O.*, Lieut., H, 4th Alabama.	May —, —, '64.	Left. Died May 20, 1864.
218	Nicholas, C., Pt., D, 98th Pennsylvania.	May 3, 3, '63.	Left. Died May 12, 1863.
219	O'Connor, M., Pt., F, 16th Infantry.	Sept. 19, —, '63.	Left. Died September 25, 1863.
220	*Odom, J. C.*, Pt., G, 18th Georgia.	July —, —, '63.	——. Died July 12, 1863.
221	Orr, J. A., Pt., G, 41st Illinois.	July 12, —, '63.	——. Died July 15, 1863.
222	Ostar, P., Pt., I, 7th N. York.	Dec. 13, 13, '62.	Left. Died December 30, 1862.
223	*Owen, A.*, Serg't, G, 1st Confed. Cavalry.	Aug. —, —, '64.	Right. Died August 24, 1864.
224	*Oxley, B. W.*, Pt., B, 24th Virginia.	May —, —, '62.	Right. Died May 31, 1862.
225	Palmer, G., Pt., B, 7th Michigan.	Sept. 17, 19, '62.	——. Died September 25, 1862.
226	Peebles, H. T., Capt., C, 32d Iowa.	April 9, 9, '64.	——. Died April 25, 1864.
227	Perry, D., —, —, 7th Michigan.	May —, —, '64.	Right. Died May 14, 1864.
228	Petrey, J., Corp'l, K, 8th Vermont.	Oct. 19, 19, '64.	——. Died October 20, 1864.
229	Phillips, J., Pt., H, 21st Illinois.	Dec. 31, 31, '62.	——. Died January 10, 1863.
230	Pierce, J., Serg't, E, 43d Ohio.	Mar. 13, 13, '62.	——. Died March 21, 1862.
231	Pierce, F. M., Pt., A, 111th Pennsylvania.	Sept. 17, 17, '62.	——. Died September —, 1862.
232	Pleasure, O., Pt., F, 12th Wisconsin.	Sept. 3, 3, '64.	Right. Surg. E. M. Rogers, 12th Wis. Died Sept. 29, 1864.
233	*Pool, D. J.*, Pt., E, 18th South Carolina.	Oct. —, —, '62.	——. Died October 16, 1862.
234	Porter, J. A., Serg't, K, 74th Indiana.	Sept. 1, 1, '64.	Right. Died September 14, 1864.
235	Prentice, H., Pt., B, 21st New Jersey.	May 3, —, '63.	Right. Died May 27, 1863.
236	Price, J. U., Serg't, A, 14th Indiana.	Oct. 3, 3, '61.	Left. Died October 4, 1861.
237	Prouty, L., Pt., D, 105th Ohio.	Oct. 8, —, '62.	——. Died October 12, 1862.
238	*Pugh, W. C.*, Pt., D, 37th Mississippi.	Oct. 8, 8, '62.	——. Died October 19, 1862.
239	*Rainer, S.*, Pt., F, 61st Georgia.	July —, —, '63.	——. Died July 30, 1863.
240	*Randolph, R.*, Pt., B, 16th Georgia.	July —, —, '63.	——. Died July 6, 1863.

[1] Formento (F.), jr., *Notes and Observations on Army Surgery*, 1863, p. 17.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
241	Rayburn, L. C., Lieut., B, 13th West Virginia.	Sept. 19, 19, '64.	——. Died September 20, 1864.
242	*Redman, T. C.*, Lieut., C, 4th Virginia.	July —, —, '63.	Left. Died August 2, 1863.
243	Reed, L. P., Pt., H, 36th Massachusetts.	May 6, 6, '64.	Right. Died May 12, 1864.
244	Reifsnyder, W., Pt., B, 55th Pennsylvania.	July —, —, '64.	Right. Died July 30, 1864.
245	Renninger, A., Pt., F, 131st Pennsylvania.	Dec. 13, 13, '62.	——. Died January 29, 1863.
246	Reynolds, E., Capt., D, 59th New York.	Dec. 13, 13, '62.	Left. Died December 24, 1862.
247	Roberts, H., Pt., H, 5th Iowa.	Sept. 19, 19, '62.	——. Surg. J. G. F. Holston, U. S. V. Died Sept. 23, 1862.
248	Roberts, W. G., Pt., B, 123d Illinois.	April 9, 9, '65.	——. Died April 14, 1865.
249	Robinson, S. R., Pt., I, 11th Illinois.	Feb. 15, —, '62.	Left. Died March 18, 1862.
250	Rowe, J. L., Serg't, E, 2d Maine.	May 27, —, '62.	——. Died June 6, 1862.
251	Ruby, I. W., Pt., C, 66th Indiana.	June 9, 9, '64.	Right. Surg. J. H. Grove, U.S.V. Died June 14, 1864.
252	*Ruder, N.*, Capt., H, 16th Georgia.	Sept. 14, 15, '62.	——. Sept. 26, hæm. Died Sept. 27, 1862; exhaustion.
253	Ryan, J., Pt., D, 5th Kentucky.	Sept. 19, —, '63.	——. Died September 24, 1863.
254	Scott, L. S., Lieut., B, 19th Maine.	July 1, 2, '63.	Right; (also wound of left thigh.) Surg. G. Chaddock, 7th Mich. Died July 13, 1863.
255	*Scott, C. P.*, Pt., F, Anthony's Regiment.	July 4, 4, '63.	Left. Died July 6, 1863.
256	Sears, W. A., Pt., H, 34th Mass., age 33.	June 18, 18, '64.	Right. Died June 20, 1864.
257	*Shae, J.*, Pt., I, 15th Louisiana.	July —, —, '63.	——. Died August 12, 1863.
258	Shellhart, C., Pt., G, 68th Ohio.	July 28, 28, '64.	Left. Surg. E. M. Rogers, 12th Wis. Died July 30, 1864.
259	Shurman, J. E., Pt., C, 111th New York.	May 5, 5, '64.	——. Died May 5, 1864.
260	Sink, A. J., Pt., A, 33d Indiana.	July 20, 20, '64.	Left. Died July 21, 1864.
261	*Smith, H.*, Pt., F, 8th Alabama.	June 26, —, '62.	Right. Died July 21, 1862.
262	Smith, I., Pt., C, 15th New Hampshire.	May 27, 27, '63.	Left. Died May 27, 1863.
263	Smith, J., Pt., C, 44th Indiana.	Dec. 31, 31, '62.	——. Died.
264	Smith, L., Pt., B, 118th Pennsylvania.	Sept. 17, 17, '62.	——. Died September 17, 1862.
265	Sorrells, W., Pt., H, 27th Illinois.	Nov. 7, 7, '61.	——. Died November 14, 1861.
266	Spencer, S. E., Pt., G, 8th Missouri.	May 8, 9, '62.	Left. Surg. J. R. Bailey, 8th Mo. Died May 24, 1862.
267	Spoth, A., Pt., F, 7th Michigan.	Sept. 17, 17, '62.	Left. Died February 16, 1863.
268	Springer, J., Pt., G, 53d Illinois.	July —, —, '63.	Right. Died July 31, 1863.
269	Stafford, I., Pt., H, 43d New York.	Dec. 13, 13, '62.	Right. Died December 26, 1862; gangrene.
270	Stamm, W., Pt., G, 151st Pennsylvania.	July 1, 1, '63.	Right. Died August 1, 1863.
271	Steele, G. H., Serg't, K, 1st New Hamp. Cav.	Oct. 9, 9, '64.	Right. Died November 12, 1864.
272	Stephens, E., Pt., B, 14th Infantry.	July 3, 5, '63.	Left. Died July 6, 1863.
273	Stevens, R., Pt., A, 11th New Jersey.	Nov. 27, 27, '63.	Right. Died December 8, 1863.
274	*Stine, J.*, Pt., B, 14th Louisiana.	July —, —, '62.	——. Died July 30, 1863.
275	Stowe, J. P., Pt., G, 15th Massachusetts.	Sept. 17, 17, '62.	Right. Died October 1, 1862.
276	Strayhorne, T. A., Pt., E, 21st Illinois.	Dec. 31, 31, '62.	——. Died January 25, 1863.
277	Sullender, H. G., Pt., B, 143d Pennsylvania.	May 2, —, '63.	——. Died May 13, 1863.
278	*Summers, J. G.*, Pt., B, 13th Mississippi.	Dec. 13, 13, '62.	Left. Died December 29, 1862.
279	Swart, A. W., Corp'l, I, 20th N. Y. S. M.	July 3, 3, '63.	Right. Died July 25, 1863.
280	Swinnford, R. M., Pt., B, 25th Iowa.	May 22, 22, '63.	Right; flap. Surg. M. W. Robbins, 4th Iowa. Died July 5, '63.
281	Taft, E., Pt., E, 42d N. York.	Sept. 17, 17, '62.	Right. Died October 7, 1862.
282	Terrell, J., Corp'l, K, 55th Penn., age 22.	June 2, 2, '64.	Left. Died June 17, 1864.
283	*Thorn, T. J.*, Lieut., D, 16th N. C., age 30.	July 3, 4, '63.	Right; (also amp. arm.) Died July 30, 1863; pyæmia.
284	Tibbetts, E. G., Pt., H, 12th Maine.	May 27, 27, '63.	Right. Died July 14, 1863.
285	Tieman, H., Pt., C, 119th New York.	June 21, 21, '64.	Both. Surg. G. P. Oliver, 111th Penn., and J. V. Kendall, 149th N. Y. Died June —, 1864.
286			
287	Tilton, G. A., Pt., C, 11th New Hampshire.	May 12, 12, '64.	——. Surg. W. C. Shurlock, 51st Penn. Died May 29, 1864.
288	Trimble, A., Corp'l, E, 10th Wisconsin.	Oct. 8, —, '62.	——. Died October 11, 1862.
289	Trone A., Pt., H, 3d Penn. Cavalry.	Jan. 7, —, '64.	Left. Died January 18, 1864.
290	*Tucker, R.*, Pt., D, 14th Tennessee, age 34.	Oct. 1, 1, '64	Left; hæmorrh. recurred. Died November 4, 1864.
291	Turants, L., Pt., C, 76th New York.	July 3, 5, '63.	Left. Died July 22, 1863.
292	*Turner, J. K.*, Pt., H, 33d Alabama.	Oct. 8, —, '62.	Right. Died October 11, 1862.
293	Turway, J., Pt., F, 6th Maryland, age 24.	May 6, 6, '64.	Left. Died June 4, 1864.
294	Unknown.	July 3, 3, '63.	Left. Died July 3, 1863.
295	Uttley, W., Serg't, B, 59th N. Y., age 29.	Sept. 17, 19, '62.	Right. Died September 30, 1862.
296	Vanalstein, A., Corp'l, A, 105th New York.	Dec. 13, 13, '62.	——. Died December 14, 1862.
297	Van Outerstorp, J., Corp., F, 4th N. Y. H. A.	June 18, 18, '64.	——. Died June 23, 1864.
298	Voellinger, J., Lieut., A, 27th Illinois.	Sept. 19, 19, '63.	Right. Died October 18, 1863.
299	Walker, J., Pt., G, 35th Illinois.	Sept. 19, 19, '63.	——. Died October 10, 1863.
300	Walters, D. N., Pt., C, 42d Indiana.	May 15, 15, '64.	Right. Died June 3, 1864.
301	*Ward, C. W.*, Pt., H, 6th South Carolina.	Oct. 7, 7, '64.	Right. Died October 9, 1864.
302	Ward, R. F., Serg't, B, 39th Iowa.	May 16, 16, '64.	——. Died May 19, 1864.
303	*Watson, C.*, —, —, 1st Texas.	Sept. 17, —, '62.	——; (also wound of arm.) Died September —, 1862.
304	Watson, H., Pt., B, 4th Colored Troops, age 23.	Sept. 29, 30, '64.	Right. Died November 9, 1864.
305	Webb, A. H., Serg't, E, 7th Mississippi.	July 28, 28, '64.	Right. Died August 4, 1864.
306	Weber, W., Pt., B, 73d New York.	May 5, —, '62.	——. Died May 13, 1862.
307	Weir, J., Corp'l, K, 73d Illinois.	Sept. 19, 19, '63.	Right. Died October 8, 1863.
308	Welch, J. W., Pt., B, 125th Ohio.	Sept. 19, 19, '63.	Right. Died October 14, 1863.
309	*Wells, G. E.*, Pt., B, 35th Georgia.	.....	Left. Died December 29, 1862.
310	Westcott, O., Pt., C, 121st New York.	May 3, —, '63.	Right. Died May 14, 1863.
311	Weston, J., —, B, 2d Infantry.	June 27, 27, '62.	——. Died July 24, 1862.
312	White, W. A., Pt., C, 43d Ohio.	Oct. 4, 4, '62.	——. Died Nov. 19, 1862.
313	Whitman, G. W., Pt., K, 7th Michigan.	May 31, 31, '62.	——. Surg. A. N. Dougherty, U. S. V. Died June 1, 1862.
314	*Williams, F. K.*, Serg't, A, 8th Alabama.	June 26, 26, '62.	Right. Died July 8, 1862.
315	Wilson, J., Pt., 21st N. York Battery.	Mar. 27, 27, '65.	Left; (also amp. arm.) Surg. C. Winne, 77th Ill. Died Mar. 27, '65.
316	Wilson, J. F., Capt., G, 140th Pennsylvania.	Mar. 25, 25, '65.	——. Surg. J. W. Wishart, 140th Penn. Died April 14, 1865.
317	Witty, T. T., Pt., E, 29th Iowa, age 28.	July 4, 4, '63.	Right; hæmorrh.; pyæmia. Died September 7, 1863.
318	Wood, P., Lieut., F, 27th Mass., age 29.	May 9, 9, '64.	Left. Died May 13, 1864; exhaustion.
319	*Wooden, J. W.*, Serg't, D, 27th N. Carolina.	May 5, 5, '64.	Left. Died.
320	Wooll, G., Pt., A, 26th New York.	Dec. 13, 13, '62.	Left. Died January 23, 1863.
321	Wright, R., Pt., E, 93d Ohio.	Nov. 24, 24, '63.	Left. Died November 24, 1863.
322	Yates, W. H., Pt., B, 5th New Hampshire.	Sept. 17, 17, '62.	——. Died September 28, 1862.
323	Young, E. C., Pt., H, 36th Massachusetts.	May 6, —, '64.	Right. Died May —, 1864.
324	Zoller, J., Serg't, F, 16th New York H. Art'y.	Oct. 7, —, '64.	Left. Died October 23, 1864.
325	*Brey, W. H.*, Lieut., E, 53d Virginia.	July 3, —, '63.	
326	Case, A., Pt., C, 8th N. York H'vy Art'y.	June 3, —, '64.	Right. Surg. J. L. Brenton, 8th Ohio. Not a pensioner.
327	*Diggin, D.*, Pt., A, 12th Georgia.	June 2, 3, '64.	Right.
328	*Elrod, W. B.*, Pt., G, 16th Georgia.	July —, —, '63.	
329	Foran, J., Serg't, C, 63d New York.	May 8, 8, '64.	——. Surg. P. E. Hubon, 28th Mass. Not a pensioner.
330	*Gaskin, H.*, —, 18th N. Carolina.	May 27, —, '62.	
331	*Glendy, R. J.*, Lieut., C, 4th Virginia.	July —, —, '63.	
332	*Hagler, C.*, Pt., F, 7th North Carolina.	Dec. 13, —, '62.	Right.
333	*Hambrich, J.*, Pt., A, 24th Georgia.	July —, —, '63.	
334	*Jones, G. W.*, Pt., A, 43d North Carolina.	June 2, 3, '64.	Left.
335	*Kirkland, W. L.*, Pt., K, 4th South Carolina.	May 28, 28, '64.	——. Surg. — Taylor, C. S. A.
336	*Kroupe, T.*, Pt., St. M. 23d C. S. A.	April 23, —, '62.	

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.	No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
337	McCauley, T., Pt., G, 2d Illinois Lt. Art'y.	July 14, —, '64.	Right. Not a pensioner.	342	*Orender, L.*, Pt., I, 2d South Carolina.	July —, —, '63.	
338	*McGehee, W. B.*, Pt., C, 17th Mississippi.	July 3, —, '63.		343	*Overton, H. T.*, Pt., A, 17th Alabama.	Nov. 25, 25, '63.	Right.
339	*Meadows, H. M.*, Pt., A, 34th Alabama.	July 28, 28, '64.	Left.	344	Williams, J., Serg't, D, 2d Ohio Cavalry.	May 31, —, '64.	Left on field. Not a pensioner.
340	*Morris, J. T.*, Pt., B, 34th Alabama.	Aug. 31, 31, '64.	Left. Surg. A. C. Messenger, 57th Ohio.	345	Wina, E., Pt., F, 5th Colored Troops, age 30.	Sept. 29, —, '64.	Left; not doing well. Not a pensioner.
341	*O'Keefe, P.*, Serg't, C. 30th Louisiana.	July 28, 28, '64.	Right.				

In three hundred and forty-one of the cases enumerated in this table the seat of fracture was in the femur; in two, in the knee joint; and in two, in the leg. In four fatal instances both thighs were primarily amputated; and in one, primary amputation of the thigh was performed on the right, and intermediary amputation in the lower third on the left limb.[1] In three cases, an arm, and in one, a leg were simultaneously removed.[2]

INTERMEDIARY AMPUTATIONS IN THE SHAFT OF THE FEMUR FOR SHOT INJURY.—This category comprises thirteen hundred and twenty cases. Four hundred and seventy-nine proved successful and eight hundred and forty-one were fatal.

Intermediary Amputations in the Upper Third of the Femur.—There were one hundred and forty-seven intermediary amputations in the upper third of the femur, with fifty recoveries and ninety-seven deaths. The right limb was implicated in seventy-seven cases, the left in fifty-four, and in sixteen this point was not recorded. The modes of operation are reported as: circular, forty-six; flap, thirty-nine; not stated, sixty-two.

Successful Cases of Intermediary Amputations in the Upper Third of the Femur.—The fifty operations of this group were performed on forty Union and ten Confederate soldiers. Thirty-five of the thirty-eight pensioned Union soldiers were living in 1879. The injuries were caused by shell in five, by grapeshot in one, by solid shot in one, and by small missiles in forty-three instances. In the following case the patient, an employé of the Pension Office, was in excellent health in October, 1879:

FIG. 188.—Appearance of stump eleven years after amputation. [From a photograph.]

CASE 453.—Private Lorenzo E. Dickey, Co. A, 4th Maine, aged 21 years, received a gunshot wound of the right thigh, at Chantilly, September 1, 1862. He was taken to a field hospital in the vicinity of the battle ground, where the limb was amputated at the upper third, on the fourth day after the reception of the injury. On September 8th, the patient arrived at Washington and was admitted to Douglas Hospital. A hæmorrhage from the femoral artery, to the amount of twenty ounces, occurred on October 16th, and was controlled by pressure. After this the case progressed favorably and the wound healed about January 1, 1863. About two months later the patient was transferred to Lincoln Hospital, and subsequently he was sent to St. Elizabeth Hospital, whence he was discharged June 16, 1863, and pensioned. Mr. Dickey was subsequently appointed a clerk at the Pension Office. On January 14, 1873, he visited the Army Medical Museum, being in as good general health as he had been previous to the time of receiving the injury, and suffering no pain from the stump. He stated that his weight then was 192 pounds, while before he was wounded and lost his leg he only weighed 170 pounds. Owing to the shortness of the stump, being only three inches long from the hip joint, he is unable to wear an artificial limb and is obliged to use crutches in walking. A copy of the photograph, taken in 1873, is represented in the wood-cut (FIG. 188). His pension was paid September 4, 1879.

[1] Cases of Pt. S. Goodwell, G, 29th Illinois (No. 128, p. 269), fatal; Pt. *H. Kenner*, 4th Virginia (No. 169, p. 270), fatal; Pt. C. Myer, F, 30th Missouri (No. 212, p. 270), fatal; Pt. H. Tieman, C, 119th New York (No. 285, p. 271), fatal. In the case of Pt. W. F. Mills, E, 8th New York H. A. (No. 205, p. 270), primary amputation in the right thigh, and subsequently intermediary amputation in the left thigh was performed.

[2] An arm was simultaneously removed in the cases of Pt. S. Cramer, B, 142d Pennsylvania (No. 84, p. 269, and *Second Surg. Vol.*, TABLE LXXV, No. 39, p. 751); Lieut. *T. J. Thorn*, D, 16th North Carolina (No. 283, p. 271, and *Second Surg. Vol.*, TABLE LXXV, No. 153, p. 752); and Pt. J. Wilson, 21st New York Battery (No. 315, p. 271, and *Second Surg. Vol.*, TABLE LXXV, No. 167, p. 752). In the case of Serg't J. Foss, C, 59th New York (No. 116, p. 269), the opposite leg was amputated.

The femur was fractured in its upper third in four of the fifty examples of this group, necessitating amputation close to the trochanters:

CASE 454.—Captain John C. Hilton, Co. K, 145th Pennsylvania, aged 22 years, was wounded at Gettysburg, July 2, 1863, by a conoidal ball, which fractured the right femur in its upper third. He was carried to the field hospital of the 1st division of the Second Corps, where Surgeon C. S. Wood, 66th New York, reports: "The bone was extensively comminuted. I amputated the thigh about one inch below the trochanter major. The operation was not performed until eleven days after the receipt of the injury, yet the patient at this date, August 2d, is rapidly improving." The patient entered Camp Letterman hospital August 5th, where Acting Assistant Surgeon B. F. Butcher notes: "He is doing very well; the treatment consists of stimulants and nourishing diet, with water dressings to the stump. August 20th, still improving, all ligatures were removed, the stump healing rapidly. On the 25th, the stump had entirely healed, and on September 1st, he left the hospital on leave of absence." This officer was discharged December 19, 1863, entered the Veteran Reserve Corps February 5, 1864, was mustered out of service June 30, 1866, and pensioned. His pension was paid June 4, 1879.

CASE 455.—Private Alvin Hubbard, Battery M, 5th Artillery, aged 20 years, was wounded at Spottsylvania Court House, May 12, 1864, by a solid shot or a large fragment of shell, which struck both knees, fracturing the patella and opening the joint of the right knee, and inflicting a large flesh wound on the inner side of the left knee. He was taken to the field hospital of the Artillery Brigade, Sixth Corps, and on the 14th sent to Fredericksburg. On May 24th, he was admitted into the Third Division Hospital, Alexandria, from which Surgeon E. Bentley, U. S. V., reports: "The right leg and knee were badly swollen, painful and œdematous, and the soft parts ecchymosed; there was an unhealthy discharge from the wound; the left knee was black and swollen, but the joint was not seriously injured. His constitutional condition was much disturbed, pulse quick and frequent, appetite poor. On the 25th, it was decided to amputate, and, after placing the patient under the influence of chloroform, Surgeon Bentley removed the right thigh just below the trochanter by the circular operation; free incisions were made in the integuments of the left knee. He rallied well from the operation, and the after treatment consisted of stimulants, opiates, and nourishing diet. On October 7th, he was transferred to the First Division Hospital, Alexandria; on February 25, 1865, to the hospital at Fairfax Seminary; and finally discharged at the Judiciary Square Hospital, Washington, May 19, 1865." Examining Surgeon E. H. Wood, of Hersey, Michigan, September 5, 1877, reports: "The stump of the amputated limb is sound. The wound on left knee healed, leaving a large scar, and the patella so dislocated upward that this leg can be only semi-flexed." His pension was paid June 4, 1879.

In the next case the patient died, nearly nine years after the operation, of tubercular disease of the lungs complicated with necrosis of the stump of several years standing:

CASE 456.—Private J. Frederick, Co. D, 15th Massachusetts, aged 35 years, was wounded and captured at Bristoe Station, October 14, 1863. After remaining a prisoner for a month he was paroled and brought to Annapolis, where he entered the First Division Hospital on November 18th. Assistant Surgeon W. S. Ely, U. S. V., contributed the pathological specimen (FIG. 189), with the following description of the injury: "A fragment of a shell entered the left thigh in its middle third posteriorly, and passing directly forward, produced an extensive comminution of the femur and great destruction of muscular tissue. He laid upon the battle field without medical attendance until the afternoon of the following day, when he was conveyed by the enemy to Gordonsville, where he suffered amputation of the injured limb at the junction of the upper and middle third, by the circular method, on October 26th. When admitted here, this soldier gave evidence of having endured a full share of the exposure and neglect to which our captured men, as a general rule, were subjected. His system was found to be excessively reduced: his pulse rapid and feeble; anorexia existing, and an exhausting diarrhœa complained of. At the seat of the operation the parts gave evidence of unhealthy reparation, the wound was open, the skin retracted, and the sawn extremity of the femur protruding beyond the tissues to the extent of one and a half inches. It was thought advisable to leave to nature the removal of the protruding bone, and therefore no operative interference was determined upon. The patient's body was thoroughly cleansed, and an equable temperature maintained in his room, the stump washed twice with alcohol, and lint moistened with diluted alcohol kept applied. Generous diet was enjoined, and six ounces of spiritus fermenti was given daily. For the diarrhœa a prescription was ordered consisting of one grain of sulphate of morphia, ten grains of quinine, one and a half drachms of diluted sulphuric acid, and one ounce of water, to be given in doses of a teaspoonful three times a day. By December 1st, the patient was slowly improving, the diarrhœa being no longer troublesome, and his appetite good, though his pulse still continued rapid. The stump under the action of the alcohol applied locally, combined with the constitutional measures employed, now presented a granulating surface, and the granulations were slowly extending towards the extremity of the bone, one inch of which was still exposed. His treatment was yet continued with the exception of the prescription for the diarrhœa, for which a mixture of twenty grains of quinine, one and a half drachms of muriated tincture of iron, and ten drachms of simple syrup was substituted, to be given in teaspoonfuls one hour before meals. On January 6th, the applications of alcohol to the stump were discontinued; the patient still doing well and no marked change having occurred. January 29th, by seizing the protruding extremity of the femur between the fingers it became perceptible that a slight movement of rotation could be made. February 4th, necrosis going on certain but slow; considerable movement now attainable, causing great pain to the patient; muscles of affected limb apparently becoming hypertrophied; general health of patient continuing good. February 26th, protruding bone a little more mobile; discharge increasing in amount and becoming offensive. It was not yet deemed advisable to interfere with the natural process going on, a portion of the fragment not being sufficiently separated and liable to break off if extraction was attempted, thus retarding the subsequent reparative process. On April 1st, interference was deemed proper, the fragment appearing to be very free. Sensibility being too great to operate without the use of anæsthetics, chloroform was administered, the extremity

FIG. 189.—Tubular sequestrum of nearly 5 ins. removed six months after amputation. *Spec.* 2232.

seized with a large forceps by Surgeon B. A. Vanderkieft, U. S. V., and by a combined motion of traction and rotation the separated portion, measuring five inches in length, was removed entire. The patient recovered rapidly from the anæsthetic and felt great relief. He progressed finely and the stump closed rapidly, and the result of waiting upon nature in this case proved very satisfactory, though it would be interesting to know whether a second operation performed at the time of the patient's admission would have prevented necrosis to the depth at which it was found to exist." The patient was discharged from service May 24, 1864, and supplied with an artificial limb by B. F. Palmer, of Philadelphia, five months afterwards. He died March 13, 1872, Dr. J. Hyndman, of Boston, certifying that his death was caused by "tubercular disease of the lungs, complicated with necrosis of the bone of the amputated limb" of several years' standing, etc.

Fatal Cases of Intermediary Amputation in the Upper Third of the Thigh.—The ninety-seven operations of this category were performed on eighty-one Union and sixteen Confederate soldiers. A case, in which the amputation had been preceded by primary excision in the upper third of the femur, has been detailed on page 205, *ante* (CASE 418, Corporal J. W. Soule, D, 6th Michigan Cavalry); a second case will here be cited:

CASE 457.—Private J. Kelly, Co. F, 1st New York Cavalry, aged 21 years, was wounded near Hagerstown, July 7, 1863, and admitted to hospital at Frederick on the following day. Acting Assistant Surgeon J. H. Bartholf contributed the specimen (No. 3875, *Surgical Section*, A. M. M.), with the following history: "While acting as a scout the man had his left thigh fractured by a cavalry pistol conoidal shot, at a point a little above the junction of the middle and lower thirds. The ball, much battered, was removed from under the skin on the inner side of the limb, three inches above the edge of the condyle. When admitted into hospital, Smith's anterior splints were applied and continued till July 16th, when Buck's extension apparatus was substituted, with sand bags to the side of the limb. Much fœtid pus was found to be confined in the limb, which was let out by enlarging the opening. The patient having all the signs of pneumonia of the left lung, an oiled silk jacket was applied around the thorax. July 18th, patient more comfortable with the change of appliance to the limb; six ounces of milk punch given daily, and nourishing diet. 19th, rusty colored sputa continuing, with but little cough; double friction sound over heart; heart's action somewhat turbulent. 21st, pulse 120; brown, moist fur on tongue; feeling of great oppression in chest, but friction sound over heart nearly gone; some diarrhœa; suppuration from limb very free and somewhat offensive. Applied oakum dressings and gave pills of camphor and opium. 22d, pulse smaller; cough increasing; pain and tenderness to pressure of limb now extending up to groin and becoming more acute from pus burrowing up among the muscles; diarrhœa continuing at intervals. Increased the milk punch to one pint per day. 23d, patient very feeble and in a very critical state; thoracic symptoms diminishing. 27th, all chest symptoms gone; thigh in bad condition; pus burrowed among the muscles in front nearly to groin; has two troublesome bedsores. 29th, sleeps tolerably well now; vomited once after tea, but has no chills. 31st, pulse still 120; erysipelatous inflammation about the wound. The best of diet and half a pint of milk punch is given daily. August 5th, the patient's general condition, strength, and appetite has somewhat improved during the last few days. The diarrhœa continues, however, the bedsores are very troublesome, and the fractured bone is a good deal necrosed, and abscesses are extensive in the thigh. 6th, amputation was performed by Assistant Surgeon R. F. Weir, U. S. A., at 4 P. M., as low down as the wound would permit; method: Flaps of skin and circular of muscles. Two and a half inches of the upper fragment of the bone were removed, when, the medullary canal and periosteum being still found dead, one and a half inches more of the shaft were taken off, thus getting a line or two above the necrosis. Four fragments were found, all being more or less attached by periosteum or muscle, but all partially denuded of periosteum and necrosed. One large lower fragment embraced the greater part of the lower third of the femur and was considerably denuded and necrosing, showing scarcely any effort at repair. A sinus on the outer and front aspect of the thigh, found at the amputation to reach nearly up to Poupart's ligament, had a counter opening then made in its upper extremity. Reaction did not take place, in spite of all efforts, until 11 P. M., and not decidedly then, vomiting occurring at intervals and some delirium. Patient was placed on a water-bed at 11 P. M. 7th, pulse 150 and a mere thread; condition very precarious indeed. At 9 A. M., patient rallied somewhat, then fell asleep and slept the greater part of the day. Administered beef tea and milk punch alternately throughout the day. 8th, pulse 116 and much fuller; flaps sloughy and fœtid. Applied the strong nitric acid, and after that injected a mixture of hydrochloric acid, one ounce; laudanum, two ounces; and water, fourteen ounces, between the flaps and into the sinus, after which oakum dressing, wet with the same wash, was applied. All the sutures were removed but one, and extension was applied to flaps, to prevent retraction, by adhesive strips, string, pully, and weight. Patient has considerable diarrhœa, and takes camphor and opium pills; is also ordered ten grains of tartrate of iron and potassa three times a day. 9th, pulse 136; suppuration from stump healthy and not fœtid; diarrhœa ceased during night but recurred this morning. Patient has aphthæ on the tongue and lips; has some little relish for food. Opium is continued, and tincture of chloride of iron is substituted for the tartrate of iron and potassa. 10th, pulse 120; diarrhœa a little better; ordered Hope's mixture for it, also ten grains of chlorate of potassa four times a day for stomatitis. Stump not sloughy; good flaps. Patient has some little appetite and is ordered good food, with one pint of milk punch daily. 11th, stump in good condition; diarrhœa worse. Gave one grain of opium every two hours and continued other medicine. 12th, stomatitis and diarrhœa ceased. 13th, stomatitis and diarrhœa returned. Patient losing strength and wasting in flesh; pulse 126; pus from stump healthy. 14th, pulse 128; had nausea last evening and vomiting this morning; no chill; diarrhœa slight; granulations weak and pale. Discontinued the tincture of iron, and prescribed extract of nux vomica, four grains, and pulverized iron, twenty grains, to be made into sixteen pills, and administered one three times a day. 15th, pulse 130; some nausea; stomatitis very bad; diarrhœa troublesome; bedsores painful. Treatment continued and brandy mixture ordered. 17th, subsultus tendinum. 18th, patient died. *Sectio cadaveris* seventeen hours after death: Body much emaciated. On examining the stump found sinuses up the thigh in various directions, and just behind the trochanter major a circumscribed abscess containing about an ounce of pus; another similar one near the trochanter minor; hip joint intact; tissues of stump very unhealthy, and wound of stump pale and flabby and presenting scarcely any granulations. On opening the chest found the right lung healthy and

weighing twelve ounces; left lung, upper lobe healthy; lower lobe in a state of red hepitization through nearly its entire extent, and permeable to air here and there; weight one pound and two ounces. Pleura healthy. The heart was contracted and firm, clots in both sides of it, especially in the left; valves healthy; no evidence of endocarditis; recent pericarditis well marked; pericardium throughout adherent by new false membrane becoming organized, susceptible of being torn off by little force; weight of heart ten ounces. Liver moderately contracted, with cirrhosis and a little hobnailed; weight three pounds and two ounces."

TABLE XXXIV.

Summary of One Hundred and Forty-seven Cases of Intermediary Amputations in the Upper Third of the Femur for Shot Injury.

[Recoveries, 1—50; Deaths, 51—147.]

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	[1]*Anderson, S.*, Pt., B, 20th Alabama.	Sept. 19, 22, '63.	——; erysipelas; gangrene. Recovery.
2	Beckart, A., Pt., A, 74th New York, age 22.	Aug. 29, Sep.8.'62.	Left; circ. A. Surg. G. M. McGill, U. S. A. Dis'd May 22,'63.
3	*Bray, J. A.*, Pt., K, 3d Virginia.	June 27, 30, '62.	Left. Surg. A. Y. P. Garnett, P. A. C. S. Recovery.
4	*Briscoe, L. N.*, Pt., K, 7th South Carolina.	July 21, 29,'61.	Left. Surg. — Jennings, C. S. A. Recovery.
5	Cain, J., Corp'l, I, 104th New York.	July 1, 5, '63.	Left; circ. Surg. E. G. Chase, 104th N. Y. Disch'd Nov. 3, 1864. *Spec.* 3022.
6	Calder, J., Lieut., G, 2d Kentucky Cav., age 28.	Sept. 20, 27, '63.	Right. Surg. W. Varian, U. S. V. Disch'd March 1, 1864.
7	*Cunningham, E. H.*, Sgt, E, 9th Louisiana.	Aug. 9, 14, '62.	Right. Surg. — Davis, C. S. A. Recovery.
8	Dalton, T. W., Pt., G, 82d New York, age 18.	Dec. 13, 16, '62.	Left; ant. post. flap; gangrene. V. R. C. June 21, 1863.
9	Darlington, W. B., Maj., 18th Penn. Cav., age 35.	May 5, 9, '64.	Right; circ. Confed. surgeon. Disch'd October 30, 1864.
10	Dickey, L. E., Pt., A, 4th Maine, age 25.	Sept. 1, 5, '62.	Right; hæm. from femoral artery. Disch'd April 27, 1863.
11	Dunlap, J. H., Pt., F, 3d N. Y. Artillery.	De.14,'62, Ja. 11,'63.	Right; circ. Surg. C. A. Cowgill, U. S. V. Disch'd April 15, 1863.
12	[2]*Dwyer, L.*, Pt., F, 14th Louisiana.	June 30, J'y 8, '62.	Right; circ. Surg. F. Formento, jr, C. S. A. Recovery.
13	Eagan, L. W., Pt., —, 22d New York.	Aug. 30, Sep.3,'62.	Right. Ass't Surg. B. Howard, U. S. A.
14	Frederick, J., Pt., D, 15th Massachusetts, age 35.	Oct. 14, 26, '63.	Left; flap. Confed. surg. Five ins. nec. seq. removed. Disch'd May 24, 1864. *Spec.* 2232. Died March 13, 1872; tuberculosis.
15	Hamlin, W. H., Corp'l, L, 7th Missouri Cav.	Oct. 18, No.18,'61.	Left; flap. Surg. N. S. Hamlin, 7th Mo. Cav. Disch'd May 5,'62.
16	Hervey, R., Pt., C, 83d Pennsylvania.	July 1, —, '62.	Left. Surg. C. Page, U. S. A. Disch'd Oct. 6, 1863.
17	Hilton, J. C., Capt., K, 145th Penn., age 22.	July 2, 12, '63.	Right. Surg. C. S. Wood, 66th N. Y. Disch'd Dec. 19, 1863.
18	*Hobbs, L. H.*, Pt., H, 27th Georgia, age 33.	Aug. 27, Se. 17,'64.	Right; circ. Transferred Sept. 22, 1864.
19	Hubbard, A., Pt., Bat'ry M, 5th U. S. Art., age 20.	May 12, 25,'64.	Right; circ. Surg. E. Bentley, U. S. V. Disch'd May 19, 1865.
20	Hugot, J., Pt., H, 5th N. Jersey, age 30.	May 5, 8, '62.	Left; circ.; hyperostosis. Disch'd July 7, 1863. *Spec.* 1256.
21	Iffla, A. G., Pt., C, 83d New York.	Sept. 17, Oct.7, '62.	Right. Surg. W. T. Thurston, U. S. V. Disch'd Dec. 12, 1862.
22	James, T., Pt, E, 147th New York, age 37.	Feb. 6, 10, '65.	Left; flap. Disch'd Sept. 6, '65.
23	Jennings, T., Pt., —, 24th New York.	Aug. 30, Sep.5,'62.	Right. Ass't Surg. B. Howard, U. S. A.
24	Kane, J., Serg't, D, 2d Michigan, age 23.	May 6, 12,'64.	Left. Disch'd March 27, 1865.
25	Keenan, J., Pt., B, 36th Illinois, age 34.	Nov. 30, De. 5,'64.	Right (gang.); ant. post. flap. Dr. Rainey, Franklin, Tenn. Disch'd June 12, 1865.
26	King, E. S., Pt., E, 23d Colored Troops.	July 30, Au. 12,'64	Left; flap. Surg. E. Bentley, U. S. V. Disch'd June 8, 1865.
27	Kirn, P., Pt., A, 69th Indiana.	Aug. 30, Sep.4,'62.	Right; circ. Disch'd Nov. 23,'62.
28	Kniffens, C., Serg't, D, 20th New York S. M., age 29.	July 1, 7, '63.	Right; circ. Surg. R. Longhran, 20th N. Y. S. M. Nec. Disch'd August 9, 1864. *Spec.* 4300.
29	Kreger, J., Pt., C, 142d Pennsylvania.	Dec. 13, 21, '62.	Right. Disch'd April 22, 1864.
30	Linehan, T., Pt., D, 37th New York, age 19.	May 31, Je. 27,'62.	Right; flap. A. A. Surg. G. H. Dare. Hæm.; lig. fem. artery. Disch'd Sept. 26, 1862. Died July 15, 1876.
31	Manghermar, J. G., Pt., K, 87th Indiana.	Sept. 19, 24, '63.	Right; flap. Surg. H. J. Herrick, 17th Ohio. Disch'd May 7, '64.
32	Masterson, J., Pt., B, 106th Penn.	Sept. 17, 21, '62.	Right; circ. Disch'd Jan. 13,'63.
33	Miller, J. H., Pt., E, 33d Iowa.	April 30, M'y 3,'64.	Right; flap. Confed. surgeon. Discharged, 1865.
34	Neal, W. H., Pt., H, 9th Illinois, age 20.	May 27, 30, '63.	Right; circ. Disch'd Feb. 5, '64.
35	Nehemiah, C. S., Pt., K, 26th Indiana, age 32.	Dec. 7, 31, '62.	Right. Surg. B. O. Reynolds, 3d Wis. Cav. Disch'd June 9, '63.
36	Ochs, H. G., Pt., H, 54th Penn., age 26.	May 15, 23, '64.	Right; circ. Disch'd Jan. 31,'65.
37	O'Connor, J., Pt., G, 28th Pennsylvania.	Sept. 17, Oct. 9,'62.	Right; flap. Disch'd June 27,'63. Died April 13, 1867.
38	*Page, G. L.*, Corp'l, B, 18th Texas.	Sept. 19, 26, '63.	Right. Surg. Bakeman, C. S. A. Retired Feb. 10, 1865.
39	Perkins, G., Pt., G, 2d Kentucky.	Jan. 1, 5, '63.	Left; flap. A. Surg. W. T. Mendenhall, 57th Ind. Discharged March 30, 1863.
40	Peters, J., Pt., A, 69th N. York, age 28.	July 21, Aug. 12, 1861.	Right. Surg. — Walker, C. S. A. Disch'd Jan. 25, 1862. Died April 8, 1871.
41	Porter, C., Citizen of Russellville, Ky., age 17.	July 11, 21, '64.	Right (gang.; aneurism); lateral flaps. Dr. J. R. Bailey, of Russellville. Recovery.
42	*Roberts, T.*, Guerilla, age 31.	Feb. 10, Mar.4,'64.	Left; ant. post. flap. A. A. Surg. P. Gilroy. Prison June 26, '64.
43	Royston, W. H., Pt., C, 2d Iowa, age 24.	Feb. 15, Mar.6,'62.	Left; flap. Disch'd Nov. 8, '62.
44	Schmidt, H., Pt., G, 57th Illinois.	Oct. 4, 28, '62.	Right; flap. Surg. J. R. Zearing, 57th Illinois. (Amp. arm.) Disch'd Dec. 18, 1863.
45	Seiter, J., Serg't, I, 7th New York.	Sept. 17, 27, '62.	Right. Disch'd Dec. 15, 1862.
46	Spear, W. A., Pt., I, 112th New York, age 35.	Sept. 29, Oct. 2,'64.	Right; Confed. surgeon. Disch'd June 13, 1865.
47	Velzy, G., Corp'l, K, 94th New York, age 21.	July 1, 8, '63.	Left; circ. Surg. R. Loughran, 20th N. Y. S. M. Disch'd July 19, 1864.
48	*Vick, E. R.*, Pt., I, 30th North Carolina.	July 1, 17,'62.	——. Surg. — Sacherell, C.S.A. Recovery.
49	Whitacre, J. R., Pt., E, 69th Indiana.	Aug. 30, Sep.6,'62.	Left; circ. A. Surg. D. W. Voyles, 66th Ind. Disch'd Nov. 22, '62.
50	Woodhouse, J., Pt., I, 20th Wisconsin, age 28.	Dec. 7, 11, '62.	Right; circ. Surg. P. Harvey, 19th Iowa. Bone remo'd. Recovery.
51	Acker, D., Pt., D, 148th Pennsylvania.	May 3, 18, '63.	Right. Died June 3, 1863.
52	Allen, H. H., Pt., F, 100th Penn., age 35.	May 12, 28, '64.	Right; circ. Surg. A. F. Sheldon, U.S.V. Died June 4,'64; exh'n.
53	*Allen, L. M.*, Pt., E, 10th Arkansas.	April 6, M'y 6,'62.	—— (erysipelas; hæm.) Died May 6, 1862.
54	Anderson, W. G., Pt, G, 114th Penn., age 16.	Dec. 13, 1862, Ja. 11,'63.	Right; flap. Jan. 13, 15, 17, hæm.; lig. mus. branch. Died Jan. 17, 1863; exhaustion.
55	Balcom, M. S., Pt., B, 12th Conn.	May 17, Je. —,'64.	Right (pyæmia; diarrhœa); circ. A. A. Surg. W. S. Ward. Died June 23, 1864; shock.
56	Barr, R. G., Capt., B, 49th Penn., age 24.	May 10, 24, '64.	Right (gang.); circ. A. A. Surg. M. C. Mulford; slough. Died July 27, 1864; diarrhœa.
57	Becht, J., Pt., B, 7th Maryland, age 38.	Mar. 31, Ap.12,'65.	Right (prim. exc. fem.); ant. post. flap. A. A. Surg. J. Tyson. Died April 12, 1865; shock.
58	Belden, H., Pt., H, 171st Ohio, age 18.	June 12, 26, '64.	Right (hæm.); circ. Surg A. M. Speer, U. S. V. Died June 27, 1864; shock.
59	*Blantin, A.*, Pt., K, 15th South Carolina, age 37.	Sept. 14, 26, '62.	—— (frag's removed); oval flap; slough. Died Oct. 1, '62; pyæm.
60	*Brinkley, J. H.*, Pt., A, 28th N. Carolina.	June —, J'y 12,'62.	Left. Surg. — Eads, C. S. A. Died August 4, 1862.
61	Bryan, E. G., Pt., E, 3d Mass., age 22.	Oct. 19, 24, '64.	Left (mortification). Died Nov. 9, 1864; exhaustion.
62	Bueson, T., Pt., A, 142d New York.	Jan. 15, 19, '65.	——. Surg. J. W. Mitchell, 4th C. T. Died Jan. 19, 1865.
63	Bushnell, E., Serg't, G, 29th Indiana.	De.31,'62, Ja. 28,'63.	Left. Died Jan. 28, '63; shock.
64	Carney, J., Pt., B, 66th New York, age 20.	Sept. 17, 27, '62.	——. Surg. C. S. Wood, 66th N. Y. Died Sept. 30, 1862.
65	Chase, G. L., Pt., D, 36th Mass., age 25.	May 5, 29, '64.	Right; ant. post. flap. Surg. A. F. Sheldon, U. S. V. Died June 10, 1864; exhaustion.
66	*Clinch, T.*, Lieut., A, Palmetto S. S.	May 31, Je. 5,'62.	——; flap. Died June 8, 1862; shock.

[1] HINKLEY (H.), *Treatment of Hospital Gangrene*, in *Confed. States Med. and Surg. Jour.*, 1864, Vol. I, p. 132.

[2] FORMENTO (F.), *Notes and Observations on Army Surgery*, New Orleans, 1863, p. 20.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
67	*Clayborne, J. B.*, Pt., H, 22d N. Carolina, age 23.	July 3, 19, '63.	Right (slough.; hæm): circ. A. Surg. B. Stone, U. S. V. Died July 22,'63; exh'n. *Spec.* 2056.
68	Clodius, C., Pt., A, 125th Pennsylvania.	May 3, 17, '63.	Left. A. Surg. C. H. Lord, 102d N. Y. *Spec.* 1153.
69	Conrad, F., Pt., E, 26th New York, age 43.	Dec. 13, 25, '62.	Right. Died January 12, 1863; pyæmia.
70	Conway, A., Pt., G, 34th Ohio.	Sept. 10, 14, '62.	Right. Died Sept. 16, 1862; tetanus.
71	Cowan, J., Pt., H, 155th Penn., age 32.	June 26, J'y 11,'64.	Left; ant. post. flap. A. A. Surg. A. W. R. Andrews. Died July 11, 1864; syncope. *Spec.* 3345. Autopsy.
72	[1]Curtis, G. F., Corp'l, C, 10th N. Jersey, age 22.	May 31, Je. 5,'64.	Right; circ. A. Surg. G. A. Mursick, U. S. V. Died June 7,'64; exhaustion. Autopsy.
73	[2]Davis, H. C., Pt., I, 40th Indiana.	May 1, 10, '63.	Right (hæm.); circ. A. A. Surg. L. Dyer. Died May 18, 1863.
74	Dawson, B., Pt., D, 100th Penn., age 18.	May 30, Je. 5,'64.	Left; circ. A. Surg. W. Thomson, U. S. A. Died June 7,'64; shock. *Spec.* 3547.
75	Deal, J., Pt., K, 81st Penn., age 35.	May 8, 27,'64.	Right; circ. A. A. Surg. J. Newcombe. Died June 6, 1864.
76	De Frend, J., Pt., M, 4th Artillery, age 21.	Nov. 30, De. 3,'64.	Right; circ. Surg. S. E. Fuller, U. S. V. Died Dec. 4, 1864; hæmorrhage and shock.
77	Dibble, H., Pt., F, 198th Penn., age 20.	Mar. 31, Ap. 6,'65.	Right (ball extr.); flap. Surg. N. R. Moseley, U.S.V. Died April 12,'65; nerv. exh'n. *Spec.* 4067.
78	Doane, H. H., Pt., I, 1st Maine H. Art'y, age 23.	May 21, 29, '64.	Right (mortification); circ. A. A. Surg. J. H. Thompson. Died June 1, 1864; pyæmia.
79	Dougherty, J. J., Pt., C, 1st Me. H. Art., age 32.	May 18, 22, '64.	Right. A.A. Surg. W. C. Dixon. Died May 25, 1864.
80	Ellsworth, J., Pt., C, 1st Minnesota.	July 3, –, '63.	Left. Surg. C. S. Wood, 66th N. Y. Died July 20, 1863.
81	Fellows, C. B., Serg't, H, 115th N. Y., age 26.	Sept. 29, Oct. 2,'64.	Right: anterior post. double flap. Confed. surgeon. Died Nov. 11, 1864; congestion of lungs.
82	Fenner, T., Pt., G, 142d Pennsylvania.	Dec. 13, 16, '62.	Left; circ. Surg. J. A. Phillips, 9th Penn. Res. Died Jan. 12, 1863; wound.
83	Fisher, H., Serg't, A, 10th N. Jersey, age 21.	Oct. 19, 22, '64.	Right; lat. skin flap; circ. muse. Surg. C. H. Andrus, 176th N. Y. Died Nov. 12,'64; exh'n. Autop.
84	Frazier, J. H., Pt., A, 56th New York, age 25.	Dec. 6, 11, '64.	Left; ant. post. flap. A. A. Surg. W. Balser. Died Dec. 13, 1864; exhaustion.
85	Gaw, R. P., Pt., B, 23d Penn., age 52.	June 1, 9, '64.	Left. A. Surg. B. Stone, U.S.V. Died June 13, 1864. *Spec.* 1407.
86	*Hite, H. S.*, Pt., A, 17th Virginia.	May 5, 8, '62.	——: flap. Surg. D. Prince, U. S. V. Died May 9, '62; shock.
87	Hoffman, C., Pt., A, 1st Cavalry, age 24.	Aug. 1, 8, '63.	Right (hæm.); don. oval skin flap. A. Surg. W. Thomson, U. S. A. Died Aug. 8,'63; shock. *Spec.* 1679. Autopsy.
88	Hostetter, A., Corp'l, K, 45th Penn., age 23.	May 9, 26, '64.	Right; ant. post. flap. Surg. A.F. Sheldon, U. S. V. Died May 28, 1864: exhaustion.
89	Howell, J., Serg't, K, 110th Ohio, age 37.	July 9, 12, '64.	Left; amp. mid. third; reamp. up. third while on table. A.A.Surg. W. S. Adams. Died July 12, 1864; shock.
90	[3]Hutchings, J. B., Pt., G, 6th New York H. Art., age 22.	May 30, Je. 5,'64.	Left; circ. Surg. J. A. Lidell, U. S. V. Died June 10, 1864; exhaustion. Autopsy.
91	Jackson, C., Corp'l, G, 2d Michigan.	June 25, 28, '64.	Left. (June 25, exc. fib.) Surg. A. F. Whelan, 1st Mich. S. S. Died July 2, 1864.
92	Johnson, J., Pt., A, 153d New York, age 21.	Oct. 19, No. 9, '64.	Right (hæm.); circ. A.A.Surg. J. Neff. Died Nov. 17,'64; pyæmia.
93	*Jones*, T., Pt., H, 11th Virginia.	June —, J'y 10,'62.	Right. Surg. — Ward, C. S. A. Died July 16, 1862.
94	Jourman, R., Pt., E, 35th Colored Troops.	Feb. 20, 26, '64.	R't; flap. Surg. — Hallyfield, C. S. A. Died June 5,'65; consump.
95	Kelly, J., Pt, F, 1st N. York Cavalry, age 21.	July 7, Au. 6, '63.	Left (ball extr.). A. Surg. R. F. Weir, U.S.A. Erysipelas. Died Aug. 18,'63. *Spec.* 3895. Autop.
96	*Kerr, R. D.*, Pt., F, 5th N. Carolina Cavalry.	May 6, 23, '64.	—— (hæm.); ant. post. flap. A. Surg. W. F. Richardson, C. S. A. Died May 23, 1864.
97	*Kisner, G. W.*, Pt., E, 19th Mississippi.	June —, J'y 13,'62.	Right. Surg. — Ward, C. S. A. Died July 14, 1862.
98	Knox, T. T., Pt., B, 1st Maine, age 40.	Oct. 19, 22, '64.	Left (mortification); lat. skin flap; circ. sect. muse. Surg. C. H. Andrus, 176th N. Y. Died Nov. 10, 1864; pyæmia.
99	Labrie, O., Pt., H, 126th Ohio, age 23.	July 9, 12, '64.	Left; circ. A.A. Surg. J. C. Shimer. Hæm. from branch of prof. art.; lig. Died July 23, 1864. Autopsy.
100	Laughery, J., Pt., C, 26th Pennsylvania, age 27.	July 2, 7, '63.	Left; hæm. from femoral artery. Died July 19, 1863; exhaustion.
101	Lochner, J., Pt., I, 13th Illinois.	Nov. 27, 30, '63.	Left. Died November 30, 1863.
102	[4]Loehterhand, E., Pt., H, 37th Wisconsin, age 34.	June 17, J'y 3,'64.	Left; circ. A. Surg. G. A. Mursick, U. S. V. Died July 9,'64; pyæmia. *Spec.* 2738. Autopsy.
103	Lounsbeck, G., Pt., G, 64th New York, age 28.	May 12, 18, '64.	Right (hæm.), flap. A. A. Surg. H. D. Vosburg Died May 18, 1864; exhaustion from hæm.
104	Lutz, J., Pt., B, 1st Penn. Reserves.	Dec. 13, 20, '62.	Left; hæmorrhage, lig. femoral artery. Died Dec. 22, 1862; exhaustion.
105	Mackay, M., Pt., D, 26th New York.	Aug. 29, Sept. 12, 1862.	Left. Surg. O. A. Judson, U.S.V. Died Sept. 17, 1862; hæmorrhage. *Spec.* 4280.
106	*Macon, J. M.*, Capt., A, 19th Miss., age 30.	May 5, 8, '62.	——. Surg. D. Prince, U. S. V. Died May 8, 1862.
107	Mapes, E. A., Pt., C, 10th N. Y. Cavalry, age 22.	June 11, 23, '64.	Right (slough.); circ A. A. Surg. J. P. Nagle. Died June 30,'64.
108	Markins, G., Pt., H, 2d W. Virginia M. I.	Sept. 24, 29, '63.	Right. Died September 29, 1863.
109	McAllister, D., Pt., G, 3d Maryland, age 57.	July 9, 12, '64.	Right; flap; skin circ. muscles. Died July 13, 1864; shock.
110	McAtee, G., Pt., E, 12th Virginia, age 19.	July 18, 28, '64.	Right; double flap. A. Surg. J. Willard, 1st Md. P. H. B. Died July 29, 1864.
111	[5]McLaughlin, G., Pt., A, 84th New York, age 25.	Aug. 27, Sept. 2, 1862.	——; ant. post. flap. A. Surg. C. A. McCall, U. S. A. Died before operation was completed.
112	*McMullen, M.*, Pt., G, Virginia Grays.	Feb. 25, —, '63.	Right. Dr. P. H. Johnson, Richmond. Died eight days after operation. *Spec.* 3016.
113	McNiece, S., Pt., C, 19th Indiana.	Aug. 30, Sept. 22, 1862.	Right; circ. A. A. Surg. B. F. Bowles. Died Sept. 25, 1862. *Spec.* 75.
114	Merritt, C. S., Corp'l, D, 40th Illinois.	April 6, –, '62.	——; double flap. Surg. E. C. Franklin, U. S. V. Died April 28, 1862.
115	Murit, B., Pt., H, 17th New York.	Aug. 30, —, '62.	——. Died September 14, 1862.
116	*Murphy, J. M.*, Pt., E, 27th Georgia, age 22.	Sept. 17, Oct. 10, 1862.	R't; circ. A. A. Surg. A. North, Died Oct. 21, 1862; exhaustion. *Specs.* 779, 871.
117	Musser, J., Capt., A, 46th Illinois.	April —, —, '62.	Left. Died April 24, '62; shock.
118	Noonan, F., Pt., F, 18th New York.	Sept. 17, Oct. 1,'62.	Right. A. Surg. H. A. Dubois, U. S. A. Died Aug. 8, 1863; tuberculous disease. *Spec.* 3886.
119	Nugent, P., Pt., I, 5th Artillery.	July 2, 5, '63.	Left; circ. A. Surg. B. Howard, U. S. A. Died July 8, 1863. *Spec.* 1380.
120	*Parrish, P. B.*, Serg't, D, 31st N. C., age 22.	Sept. 29, Oct. 7,'64.	Right. A.A.Surg. E. K. Decmy. Died October 9, 1864.
121	Patten, J., Pt., I, 3d Wisconsin, age 21.	May 25, Je. 7,'64.	Right; circ. A. A. Surg. H. S. Kilbourne. Died July 22, 1864; exhaustion. *Spec.* 3396.
122	Pierce, T. M., Pt., B, 1st Maine Art'y, age 16.	May 19, 25, '64.	Right; circ. Died May 31, '64; asthenia. *Spec.* 2617.
123	Province, S., Pt., I, 90th Pennsylvania.	Aug. 31, Se. —,'62.	——. Died September 21, 1862.
124	Radford, V., Pt., K, 71st Penn., age 29.	May 12, 19, '64.	Left; circ. A. A. Surg. J. H. Thompson. Died May 25, 1864; pyæmia.
125	Razette, V., Corp'l, G, 57th Mass., age 33.	May 5, 9, '64.	Right. Died June 1, 1864; pyæmia.
126	Robbins, A., Pt., G, 48th Colored Troops.	July 4, 7, '64.	Left. Died July 9, 1864.
127	Rowell, A., Pt., F, 94th New York.	Aug. 31, Se. —,'62.	——. Died September 10, 1862.
128	Rowland, R., Pt., 1st N. York Ind. Bat., age 31.	June 19, 27, '64.	Left; circ. A. A. Surg. W. C. Pryer. Died June 27,'64; exh'n.
129	Ryder, S., Pt., F, 1st Mass. H. Art'y, age 39.	May 31, Je. 5,'64.	Left. A. Surg. A. Ingram, U.S.A. Died June 12, 1864; exhaustion. *Spec.* 2824.
130	Smith, —, —, 14th New York S. M.	July 21, 27, '61.	——. Surg. — Darby, Hampton's Legion. Died July 27, 1861.
131	Soule, J. W., Corp'l, D, 6th Michigan Cavalry, age 27.	July 8, 29, '63.	Right (July 8, exc.; hæm. from sciatic artery); ant. post. flap. Died July 29, 1863. *Spec.* 3854. Autopsy.
132	*Stanford, G.*, Pt., A, 12th Georgia, age 30.	July 9, 13, '64.	Left; circular. Died same day; never rallied.

[1] LIDELL (J. A.), *On the Secondary Traumatic Lesions of Bone*, etc., in *U. S. San. Com. Memoirs*, Surg. Vol. I, 1870, p. 383.

[2] BRYAN, (J.), *Brief Description of Sixteen Cases of Amputations Treated in the Mary Ann Hospital, Grand Gulf, Miss.*, in *Am. Med. Times*, Vol. VII, 1863, page 5, case XIII.

[3] LIDELL (J. A.), *On the Secondary Traumatic Lesions of Bone*, etc., in *U. S. San. Com. Memoirs*, Surg. Vol. I, 1870, p. 413.

[4] LIDELL (J. A.), *On the Secondary Traumatic Lesions of Bone*, etc., in *U. S. San. Com. Memoirs*, Surg. Vol. I, 1870, p. 409.

[5] COUES (E.), *Report of some Cases of Amputations and Resections, from Gunshot Wounds, performed at the Mount Pleasant U. S. A. General Hospital, by C. A. McCall, M. D., U. S. A.*, in *Med. and Surg. Reporter*, 1862–3, Vol. 9, p. 194.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.	No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
133	Stiff, D. D., Serg't, A, 2d Michigan Cavalry.	June 10, 13, '63.	Right (ball and bone extracted). Died one hour after. *Spec.* 659. Autopsy.	140	Vose, E., Pt., I, 5th New Hampshire.	Dec. 13, 22, '62.	Left. Surg. C. S. Wood, 66th N. Y. Died Dec. 23, 1862.
134	Still, C. B., Pt., B, 22d Indiana.	Sept. 1, –, '64.	Left. Died September 13, 1864.	141	Warren, C., Serg't, I, 15th Massachusetts.	Sept. 17, Oct. 2, '62.	Left (gang.); flap. Surg. A. N. Dougherty, U. S. V. Died Oct. 2, 1862; shock. *Spec.* 379.
135	Tetard, J., Serg't, F, 6th Infantry.	July 1, 4, '63.	Left; double skin flap. A. Surg. B. Howard, U.S.A. Died July 13, 1863. Hæm. *Spec.* 1381.	142	*Wheedon, R. A.*, Corp'l, K, 47th N. C., age 24.	July 3, 7, '63.	Left; hæm. from muscul. branch. Died July 23, 1863; pyæmia.
136	Thomas, W. C., Pt., G, 7th Connecticut.	Oct. 22, No. 9, '62.	Right; circ. Died Nov. 9, 1862.	143	Whitbeck, W., Pt., E, 111th New York.	July —, —, '63.	Right. Surg. C. S. Wood, 66th N. Y. Died July 14, 1863.
137	Tompkins, G., Pt., G, 1st New York Bat'y, age 40.	July 3, 17, '63.	Right (July 4, amp. leg.; gang.); amp. thigh to get rid of putrid mass; hæm.; lig. fem'l artery. Died July 26, 1863; pyæmia.	144	Williams, W., Pt., B, 24th Michigan.	July 1, 6, '63.	Left. Died July 20, 1863.
138	Underwood, T., Pt., G, 1st Mich., age 30.	June 27, J'y 9, '62.	Right. Surg. W. Faulkner, 83d Penn. Erysipelas; gang. Died August 11, 1862.	145	Winchell, G., Pt., D, 14th New York Art'y, age 18.	May 12, 29, '64.	Right; circ. Surg. A. Delaney, U. S. V. Died June 2, 1864; congestion of lungs.
139	Verner, J., Pt., I, 99th New York.	Aug. 28, Se. 18, '62.	Left. Died September 21, 1862; pyæmia.	146	*Woodward, J. T.*, Pt., D, 26th Mississippi.	June 3, 23, '64.	——; circ. Surg. C. B. Herndon, C. S. A. Anorexia; bed sores; diarr. Died July 15, '64; exh'n.
				147	Worchester, S. W., Pt., B, 9th N. Y. H. Art'y.	Sept. 19, 23, '64.	Left; flap. Surg. W. A. Barry, 98th Penn. Died; exhaustion.

In one hundred and thirteen of the above cases the femur had been fractured—in eighteen, in the upper; in fifty, in the middle; in fifteen, in the lower third; and in thirty, without indication of the precise location. In twenty-nine instances the seat of fracture was in the knee joint, and in five in the leg. In one case, primary amputation in the upper third of right arm, in three instances excision in the thigh or bones of the leg, and in one, amputation in the upper third of the same leg had preceded the amputation in the thigh.[1]

Intermediary Amputations in the Middle Third of the Thigh.—The four hundred and seventy-one intermediary amputations in the middle third of the thigh furnished two hundred and sixty-six deaths, a mortality rate of 56.4, or nearly 10 per cent. less than the intermediary upper third amputations. Seventy-two of the four hundred and seventy-one operations were performed on Confederate soldiers. The right limb was removed in two hundred and nine, and the left in two hundred and thirty-five instances, and in twenty-seven the side was not indicated. The circular and the flap methods were each employed in one hundred and sixty-three cases; in one hundred and forty-five the mode of operation was not stated.

Successful Cases of Intermediary Amputations in the Middle Third.—One hundred and sixty-seven of the two hundred and five operations of this group were performed on Union soldiers. All but seven were living in October, 1879. Two had undergone antecedent operations; one an excision at the knee joint, and one an amputation in the upper third of the leg.[2] Sequestra were removed in twelve, and fragments or protrusions of bone in thirty-one instances:

Case 458.—Sergeant H. Clark, Co. E, 125th New York, aged 22 years, was wounded at the Wilderness, May 6, 1864, and entered the Third Division Hospital, Alexandria, eight days afterwards. Surgeon E. Bentley, U. S. V., reported: "The patient was admitted with a shot injury of the left knee joint, caused by a conical ball. His physical state was good, but the condition of the wounded limb was such as to give no hope of recovery without resorting to amputation. The operation was performed by antero-posterior flaps, at the junction of the middle and lower thirds, on May 17th, chloroform being used as the anæsthetic. The patient did not rally well, and fears were entertained of his immediate death. He had chills at intervals for a week or ten days. By June 10th, the stump was doing well and partly closed by first intention, though there was profuse suppuration. The treatment consisted of stimulants, beef tea, iron, and quinine, and cold-water dressings. With the exception of the excessive suppuration the patient did well until June 20th, when he had a severe chill, and stimulants were ordered to

[1] Private H. Schmidt, G, 57th Illinois (Table XXXIV, No. 44, p. 275, and *Second Surg. Vol.*, Table LXVIII, No. 920, p. 711), amputation right thigh and right arm in upper thirds, recovery; Corp'l J. W. Soule, D, 6th Michigan Cavalry (Table XXXIV, No. 131, p. 276, and Table XXIII, No. 51, p. 206, *ante*), primary excision of femur in upper third and amputation of thigh, fatal; Pt. J. Becht, B, 7th Maryland (Table XXXIV, No. 57, p. 275, and Table XXIII, No. 3, p. 206, *ante*), primary excision in middle third of femur and amputation of thigh, fatal; Corp'l C. Jackson, 2d Michigan (Table XXXIV, No. 91, p. 276), excision of upper part of fibula and subsequent amputation of thigh, fatal; Pt. G. Tompkins, G, 1st New York Battery (Table XXXIV, No. 137, p. 277), amputation of upper third of leg followed by amputation in thigh, fatal.

[2] Private W. M. Constable, H, 1st Cavalry, wounded March 31, 1865; primary excision of knee joint March 31, 1865, amputation of thigh April 5, 1865 (Table XXXV, No. 43, p. 280); Pt. A. J. Cheever, H, 16th Massachusetts, wounded July 2, 1863, amputation of leg July 4th, and amputation of thigh July 18, 1863 (Table XXXV, No. 35, p. 280).

be used freely, and quinine was given in large doses. The secretion having become watery and offensive, the dressings were changed frequently. No repetition of the chill occurred, and by June 25th the patient's countenance had changed very much for the better, being now clear instead of the yellow hue. The treatment was continued, and the patient steadily improved, his appetite being good and his bowels regular. On July 1st, the stump had closed with the exception of one opening, which was still discharging a large quantity of pus, healthy in color and odor, however. On July 7th, the patient complained of pain just below the great trochanter, caused by tumefaction and great heat of the skin, for which tincture of iodine was applied, followed by a tight bandage, and morphia was administered. On July 10th, an abscess was opened in the region of the great trochanter and followed by a thin watery discharge. A tent was then introduced, and the whole stump being much swollen, it was painted with tincture of iodine, and a bandage was applied tightly. On July 15th, another abscess was forming on the posterior aspect; the stump, though much reduced in size, was still discharging quite freely. On July 20th, the patient was suffering from a severe diarrhœa, and his diet was restricted, and lead and opium prescribed. By July 30th, the diarrhœa was checked; the abscess on the posterior aspect of the thigh, having formed a track and opened at the end of the stump, evacuated half a pint of healthy pus. The stump still continuing to discharge large amounts of pus, the bandage was kept tightly applied. Diluted creasote was also used locally, and iron and quinine was continued internally. On August 7th, a new abscess was opened just below the great trochanter. On August 13th, the stump still suppurating freely, an injection of solution of chloride of zinc was commenced, the bandage being continued, and the patient freely stimulated by the use of whiskey. After this date several abscesses formed on different parts of the thigh, which were opened and discharged large quantities of pus. By proper bandaging the limb was finally reduced to near its natural size, but one opening remaining at the end of the stump and discharging a limited quantity of pus. By the use of stimulants and nourishing diet the patient's general health improved so as to enable him to be transferred to hospital at Albany, near his home, on November 11th." The description of two subsequent operations was contributed by Assistant Surgeon J. H. Armsby, U. S. V., in charge of Ira Harris Hospital: "At the time of the patient's admission his constitutional condition was bad, being pale, weak, and emaciated. The stump was swollen and inflamed, and there were several small fistulous ulcers. On February 6, 1865, a sequestrum (FIG. 190) was removed through an incision about five inches in length by Acting Assistant Surgeon H. Pearce. After this operation the stump began to heal, and continued to do well up to September 4, 1865, when the patient was discharged from service. On December 9th, following, he applied for admission into the Albany City Hospital. The stump was then healed with the exception of a small fistulous ulcer, which was discharging moderately. There was but little swelling and pain, but, on examination with the probe, naked and carious bone could be discovered. The patient having been placed under the influence of chloroform, two elliptical incisions were made on the extremity of the stump, including the ulcer, and the tissues were removed down to the bone, thus leaving lateral flaps. A chain saw was then introduced and the bone cut through an inch and a half higher up, after which the flaps were brought together and secured by sutures. Cold-water dressings were applied after the operation." A cast of the stump (FIG. 191) was also contributed to the Museum by Dr. Armsby, and constitutes *Specimen* 294 of the Surgical Section. Fourteen months after the last operation the patient was supplied with an artificial limb by E. D. Hudson, of New York City. Examiner A. P. Cook reported, May 14, 1873: "He is unable to wear an artificial limb. The femur is about three inches shorter than the fleshy stump. The stump is atrophied, the muscles are soft, and there is a deep cicatrization at the end, which is very tender." The pensioner was paid June 4, 1879.

FIG. 190.—Sequestrum, 4½ ins. long, remov'd nine months after amputation. *Spec.* 666.

FIG. 191.—Cast of stump of left thigh, nineteen months after amputation. *Spec.* 294.

FIG. 192.—Amputation of left thigh at middle third. [From a photograph.]

CASE 459.—Lieutenant-Colonel George R. Maxwell, 1st Michigan Cavalry, aged 22 years, was wounded at Five Forks, Virginia, April 1, 1865. He was taken to the field hospital of the Cavalry Corps and remained there until April 15th, when he was sent to Washington on the hospital steamer Connecticut, and admitted to the Armory Square Hospital on the 16th. Acting Assistant Surgeon C. A. Leale,[1] in a special report of the case, furnishes the following particulars: "The left knee joint was opened by a conoidal ball, which had entered opposite the head of the fibula and was extracted at point of entrance. He was very anæmic and in a generally unfavorable condition; extensive suppuration had taken place, the leg had become infiltrated with serum, the knee joint was filled with pus, and the muscles of the thigh had been separated by extensive abscesses extending as high as the apex of Scarpa's triangle. April 17th, no change in his condition; he was placed under the influence of ether, and the thigh amputated by the circular operation, at the middle third, by Surgeon D. W. Bliss, U. S. V.; the stump was dressed with water, and the patient placed in bed. April 18th, although twelve ligatures had been applied, hæmorrhage continued to take place (he being apparently of a hæmorrhagic diathesis), and altogether about eight ounces of blood was lost. Applied liquor ferri persulphas by a camel's hair brush to the whole of the surface of the wound, which had been left open and exposed to the air for about fifteen minutes; this, with the styptic, entirely checked all oozing. April 20th, the granulations had become healthy; about two drachms of pus discharged daily. On the 30th the stump had nearly closed. June 23d, a piece of necrosed femur of a conical shape, and about four inches in length, was removed. August 8th, he was mustered out of service; his stump (FIG. 192) was solid and in good condition." The pensioner was paid June 4, 1879.

[1] LEALE (C. A.), *Intermediary Hæmorrhage, Parenchymatous in Character, following Secondary Amputation of Thigh; Recovery*, in *United States Sanitary Commission Memoirs*, Surgical Volume 1, p. 176.

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CASE 460.—Private O. Vezina, Co. B, 9th New Hampshire, aged 24 years, was wounded at Tolopotomy Creek, May 31, 1864, and admitted to the field hospital of the 2d division, Ninth Corps, where Surgeon J. Harris, 7th Rhode Island, noted: "Shot wound of right leg by minié ball." Four days after the reception of the injury the man was transferred to Douglas Hospital, Washington, where the limb was amputated. Assistant Surgeon W. Thomson, U. S. A., who performed the operation, described the case as follows: "The missile entered over the anterior surface of the tibia at about the junction of the lower thirds, passed obliquely upward and inward, fracturing the bone in several pieces and lodging beneath the integuments, whence it was extracted on the field. The fibula was not injured. On admission, the leg was erysipelatous and abscesses were burrowing above and below, one of which was opened below the internal malleolus. Poultices were applied, and several sloughs of the integuments came away, leaving the muscles and tendons exposed. The patient suffered constitutional irritation from continual pain and was anxious for amputation, which was performed on June 11th, by the antero-posterior flap method, at the lower part of the middle third. The stump was dressed with equal parts of tincture of opium and tincture of camphor, and poultices were applied until June 18th, when the sloughs had entirely separated. After this, cold-water dressings were used and the stump progressed finely. By September 1st, it had been healed for some time, with the exception of a fistulous opening leading to necrosed bone. On October 13th, the patient having for some days suffered from great pain and consequent inability to rest, a sequestrum, six inches long and of a nearly entire circumference, was, with great difficulty, removed by Acting Assistant Surgeon H. Gibbons. A large formation of new bone was discovered around the cavity thus left in the stump. After the operation the pain ceased, and the patient again became cheerful and his appetite good. On December 25th, the opening had almost entirely closed." The upper portion of the tibia of the amputated limb, showing eccentric splintering by the missile, and necrosis adjacent to the seat of the fracture, was contributed by the operator, and is represented in the wood-cut (FIG. 193).

FIG. 193.—Upper portion of right tibia with eccentric splintering. *Spec.* 3558.

FIG. 194.—Tubular sequestrum, 6 ins. long, removed from right femur four months after amputation. *Spec.* 3599.

The sequestrum, shown opposite (FIG. 194), was contributed by Assistant Surgeon W. F. Norris, U. S. A. The patient was discharged from service June 14, 1865, and furnished with an artificial limb one month afterwards by B. F. Palmer, of Philadelphia. The pensioner was paid June 4, 1878.

In the following instance the officer remained in active service until 1870, when he was retired. He died in 1879:

CASE 461.—Brigadier-General T. W. Sherman, U. S. V., Colonel 3d U. S. Artillery, was wounded, during the assault on Port Hudson, May 27, 1863, by a conoidal musket ball passing through his right leg and causing a fracture of the tibia and fibula at the upper third. When conveyed to New Orleans, three or four days after the injury, the wound, which was extensive and greatly lacerated, was found to have been very tightly sewed up with one continuous suture, the cutting out of which gave exit to a large discharge of decomposing coagula, pus, and bone splinters. His constitutional symptoms had assumed a most aggravated character, and the patient remained in a very discouraging condition for nearly two weeks, when amputation through the middle third of the thigh, though only offering the slightest hope of success, was performed by Professor Warren Stone with favorable result. The injured tibia and fibula (*Spec.* 3504), many of the missing fragments of which were discharged from day to day before the amputation, were contributed to the Army Medical Museum by Professor F. Bacon, of New Haven, late Surgeon U. S. V. General Sherman was mustered out of the volunteer service April 30, 1866, and retired from active service December 31, 1870. He died at his home in Newport, R. I., March 16, 1879. (See *Circular* No. 6, War Department, S. G. O., 1865, p. 38.)

Fifteen of the patients survived ulterior operations—one a re-amputation at the hip joint,[1] ten, re-amputation of the thigh, one an amputation of the opposite arm and leg in consequence of an accident, and three, ligations of the femoral artery. Consecutive bleeding was observed in nine, pyæmia in two, and gangrene in fourteen of the cases of this group.

Fatal Cases of Intermediary Amputation in the Middle Third of the Thigh.—Two hundred and sixty-six cases belong to this group. Thirty-four of the operations were practised on Confederate, and two hundred and thirty-two on Union soldiers. Pyæmia was noted in forty-two, gangrene in thirty-three, tetanus in four, erysipelas in four, and hæmorrhage in sixty-nine instances. The Museum possesses specimens in eighty-nine of the two hundred and sixty-six cases:

CASE 462.—Corporal Clark Chase, Co. B, 120th New York, aged 23 years, was wounded at Cold Harbor, Virginia, May 31, 1864. Surgeon O. Evarts, 20th Indiana, reported the admission of the patient into the hospital of the 3d division, Second Corps, with a "shot wound of the left thigh, flesh; simple dressings." He was transferred to Washington, and admitted into Douglas Hospital on June 4th. Assistant Surgeon William Thomson, U. S. A., reported: "Shot fracture of right femur, lower part of middle third. The patient's condition was apparently good, his pulse full and strong. The bone was much comminuted. There was no inflammatory action. June 5th, Assistant Surgeon W. Thomson administered ether, and amputated the left thigh in the upper part of the middle third by the circular method. 8th, pyæmia developed, ushered in by a chill. 10th, chill; conjunc-

[1] Sergeant E. D. Ulmer, G, 15th New Jersey. (See CASE 333, p. 156, and TABLE XVIII, No. 5, p. 159, *ante*, and TABLE XXXV, No. 183, p. 282.)

tiva slightly yellow. 11th, hæmorrhage, to the extent of four ounces, from a muscular branch, which ceased spontaneously and did not recur. The discharge from the stump was very dirty and offensive, and breath sweetish. He died June 12, 1864. The autopsy revealed pyæmic patches in the lungs, phlebitis of femoral veins, and osteomyelitis of the femur." Dr. Thomson contributed the pathological preparation of the femoral artery to the Army Medical Museum, numbered 2509, and the lower two-thirds of the femur, numbered 3548, of the Surgical Section. He also forwarded the upper extremity of the femur (*Spec.* 6715, *Surg. Sect.*), removed *post-mortem*. A longitudinal section of the specimen, showing osteomyelitis, was drawn by Hospital Steward E. Stauch, and is copied in the chromo-lithograph (PLATE XXVI) opposite p. 278.

CASE 463.—Brigadier-General E. Kirby, U. S. V., First Lieutenant, U. S. Artillery, was wounded at Chancellorsville, May 3, 1863. He was admitted to the Artillery Brigade Hospital, Second Corps, whence Surgeon J. H. Merrill, 1st Rhode Island Artillery, reported: "Wound in lower third of left thigh by two bullets from a spherical case shot. Patient sent immediately to Washington." Surgeon B. Norris, U. S. A., under whose care the patient came to Washington, reported the following description and result of the injury: "Two round balls entered the thigh about two inches above the condyles, producing a comminuted fracture of the lower third of the femur. The case came under my treatment on May 5th, and amputation at the middle third by the circular method was performed on May 10th. The tourniquet was used, and chloroform employed as the anæsthetic. One ball was found embedded in the medullary canal of the femur, and the other in the vastus externus muscle. The operation was followed by increase of fever, which rapidly assumed the typhoid type. This brave young officer survived the operation eighteen days, and died of pyæmia May 28, 1863." The amputated portion of the femur was contributed to the Museum by the operator (*Cat. Surg. Sect.*, 1866, p. 290, *Spec.* 1076), and is represented in PLATE XLII, opposite.

TABLE XXXV.

Summary of Four Hundred and Seventy-one Cases of Intermediary Amputation in the Middle Third of the Femur for Shot Injury.

[Cases of recovery, 1—205; fatal cases, 206—471.]

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	Albert, J., Pt., D, 46th Penn., age 26.	Aug. 9, 14, '62.	Left. Surg. D. O. Perry, 10th Me. Necrosed. Disc'd Jan. 4, '64.
2	Alexander, J. D., Pt., A, 8th Maryland, age 20.	May 8, 12, '64.	Right; circ. Confed. surgeon. Disch'd June 20, 1865.
3	Allhouse, L., Pt., H, 63d Penn., age 20.	May 5, 27, '64.	Left; circ. A. A. Surg. M. F. Price. Seq. removed. Disch'd May 24, 1865. *Spec.* 2908.
4	Baker, G., Teamster.	Aug. —, —, '64.	Right; flap. Recovery.
5	Baker, J. T., Pt., B, 72d New York.	July 1, 5, '62.	Left. Surg. — Russell, C. S. A. Disch'd Aug. 22, 1865.
6	[1] *Barker, C. R.*, Pt., D, 7th Louisiana, age 23.	July 21, Aug. 9, 1861.	Right. Surg. — Ford, C. S. A. Necro.; dead bone, seven and a half ins. in length, extracted. Retired Jan. 5, 1865.
7	Barleon, G., Pt., C, 33d Ohio.	Jan. 3, 10, '63.	Left; flap. Disch'd April 27, '63.
8	Bartmess, G. J., Serg't, G, 36th Ohio.	Sept. 14, 17, '62.	Left; flap. Disch'd Jan. 5, 1863. Died Aug. 9, 1866; consumpt'n.
9	Bell, C. E., Serg't, C, 74th New York.	Aug. 27, Sept. 4, 1862.	Right; doub. flap. A. A. Surg. R. Reyburn. Six and a half ins. bone removed. Disch'd Jan. 23, 1863. *Spec.* 323.
10	Bennett, D., Pt., K, 1st W. Virginia, age 19.	Mar. 23, 27, '62.	Left; flap. Disch'd June 18, '62.
11	*Blazier, T. F.*, Pt., C, 1st Texas.	July 7, 15, '63.	Left. Recovery.
12	Blodgett, E. F., Pt., D, 4th Vermont, age 34.	May 5, 12, '64.	Right; flap. Disch'd August 22, 1864.
13	*Bodge, G. E.*, Pt., A, 5th Louisiana, age 25.	Sept. 19, Oct. 10, 1864.	Right; ant. post. flap. A. Surg. — Dorsey, 1st Md. Cav. C. S. A. Exchanged Feb. 16, 1865.
14	Boscroe, S., Pt., M, 4th Cavalry, age 21.	Feb. 22, 25, '64.	Right; circ. Confed. surgeon. Disch'd July 15, 1865.
15	Boss, E. P., Pt., K, 44th New York.	June 27, 30, '62.	Right. Disch'd Feb. 28, 1863.
16	Boucher, G., Pt., A, 76th New York.	July 1, 6, '63.	Right; circ. Surg. J. M. Farley, 84th N. Y. Disch'd Feb. 23, '64.
17	Bowen, J. H., Corp'l, C, 19th Indiana, age 23.	July 1, 18, '63.	Left (gang.); circ. Disch'd Dec. 19, 1863.
18	Boyle, M., Pt., F, 5th Ohio.	Aug. 9, 13, '62.	Left; flap. Disch'd Nov. 21, '62.
19	Brassell, W., Pt., M, 72d Penn., age 18.	Sept. 17, Oct 7, '62.	Left; lat. flap. A. A. Surg. J. H. Bartholf. Disch'd Dec. 29, '62. *Spec.* 771. Died Jan. 20, 1865; consumption.
20	Brown, J., Pt., H, 100th New York, age 21.	July 27, Au. 1, '64.	Right; circ. A. A. Surg. W. L. Welles. M. O. Feb. 9, 1865.
21	Bruce, J., Pt., B, 49th Penn., age 21.	May 10, 14, '64.	Right; circ. Confed. surgeon. Seq. rem'd. Prison (sentence G. C. M.) July 3, 1865.
22	*Buffington, J. D.*, Pt., A, Huger's Battery.	Sept. 17, 21, '62.	Right. Surg. — Gray, C. S. A. Furloughed.
23	Buffum, T. J., Corp'l, K, 100th New York.	July 18, 23, '63.	Right (mortificat'n); ant. post. flap. Disch'd Feb. 14, '64. *Spec.* 37.
24	*Burgess, D. M.*, Pt., Massier's Battery.	Nov. 3, 7, '63.	Right. Surg. — Browne, C. S. A. Recovery.
25	Campbell, W., Pt., C, 69th Penn.	Sept. 17, 21, '62.	Right; circ. Nec. bone excised. Disch'd July 29, '63. *Spec.* 3822.
26	*Campbell, W. P.*, Capt., D, 1st Arkansas.	De. 31, '62, Ja. 27, '63.	Right. Surg. J. Avents, C. S. A. Furloughed Oct. 1, 1863.
27	Campbell, W. B., Pt., C, 1st Me. H. Art., age 20.	May 9, Je. 1, '64.	Left; circ. Surg. D. W. Bliss, U. S. V. Disch'd Feb. 16, 1865.
28	Carey, J. G., Pt., D, 106th Pennsylvania.	May 14, 26, '64.	Right; circ. A. A. Surg. J. H. Thompson. Disch'd May 27, '65.
29	*Carey, W.*, Pt., B, 13th Arkansas.	April 7, 24, '62.	Right. Surg. C. H. Mastin, C. S. A. Recovery.
30	Carl, M., Pt., G, 107th Pennsylvania.	Sept. 17, —, '62.	Left; flap. Disch'd Feb. 17, '63.
31	Case, J. E., Pt., E, 16th Conn., age 22.	Sept. 17, Oc.—, '62.	Left; circ. Dr. P. W. Ellsworth, Hartford, Conn. Seq. remov'd. Disch'd Oct. 16, '63. *Spec.* 2859.
32	Castor, T., Pt., I, 5th Mich., age 26.	May 6, 11, '64.	Left; circular. Confed. surgeon. Disch'd Jan. 27, 1865.
33	Champens, W., Corp'l, C, 76th Penn., age 20.	July 11, 15, '63.	Left; flap. Confederate surgeon. Disch'd Aug. 24, 1864.
34	Chase, P. E., Pt., C, 7th Col'd Troops, age 25.	Aug. 14, 19, '64.	Right; circ. A. A. Surg. H. B. White. Fragments removed. Disch'd May 26, 1865.
35	Cheever, A. J., Pt., H, 16th Mass., age 35.	July 2, 18, '63.	Left (July 14, amp. leg). Disch'd January 27, 1864.
36	Christ, A. L., Corp'l, A, 5th Penn., age 21.	Jan. 30, Fe. 4, '64.	Right; circ. Surg. E. Bentley, U. S. V. Gangrene. Mustered out Dec. 23, 1864.
37	Clark, F., Corp'l, F, 4th Michigan, age 21.	July 2, 16, '63.	Left; flap. Surgs. Ramsour and Patterson, C. S. A. Carious bone rem'd. Disch'd June 14, 1864.
38	Clark, H., Serg't, E, 125th New York, age 22.	May 6, 17, '64.	Left; ant. post. flap. Surg. E. Bentley, U. S. V. Seq. four and a half ins. long rem'd. Disch'd Sept. 4, '65. *Specs.* 294, 602, 666.
39	Clark, M. D., Pt., D, 6th Ohio Cav., age 18.	Mar. 31, Ap. 5, '65.	Left; circ. Surg. D. W. Bliss, U. S. V. Disch'd July 18, 1865. *Spec.* 4058.
40	Clune, J., Pt., F, 14th Infantry.	Aug. 30, Se. 5, '62.	Right (hæm.); flap. Disch'd Jan. 2, 1863.
41	Collins, M., Pt., K, 13th Kansas, age 26.	Dec. 7, 10, '62.	Left; flap. Surg. A. J. Ritchie, 2d Kansas. Dec. 25, hæm.; lig. fem. art. Disch'd May 13, 1864.
42	Conners, W. B., Pt., C, 28th Illinois.	Oct. 5, 19, '62.	Right; circ. Surg. W. F. West, 28th Ill. Disch'd April 4, 1863.
43	Constable, W. M., Pt., H, 1st Cavalry, age 26.	Mar. 31, Ap. 5, '65.	Right (Mar. 31, exc. knee j't); circ. A. A. Surg. F. H. Colton. Seq. rem'd. Disch'd Nov. 18, 1865.
44	Cook, J. M., Lieut., E, 119th Penn., age 30.	May 3, 11, '63.	Left. A. A. Surg. H. W. Ducachet. Disch'd Aug. 19, 1863. Died July 28, 1865; sunstroke. *Spec.* 1119.
45	Cooper, A., Corp'l, F, 101st New York.	Aug. 30, Se. 8, '62.	Left; flap. Disch'd Dec. 11, '62.

[1] JONES (J.), *Investigations upon the Nature, Causes, and Treatment of Hospital Gangrene as it prevailed in the Confederate Armies*, 1861–1865, in *U. S. San. Com. Memoirs*, 1871, Surgical Volume II, p. 267.

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No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
46	Cortelyou, W., Pt., B, 9th New York.	April 19, 23, '62.	Right. Two Confed. surgeons. Bone taken away. Recovery.
47	Cronk, E., Pt., F, 21st Missouri.	April 6, 15, '62.	Left; flap. Surg. E. C. Franklin, U. S. V. Disch'd Aug. 29, '62.
48	*Crosson, B. F.*, Pt., E, 28th Georgia.	June 29, J'y 5, '64.	Left. Surg. R. A. Lewis, P. A. C. S. Recovery.
49	*Cunningham, J. H.*, Pt., I, 2d Missouri.	Oct. 4, 8, '62.	Left. Surg. — Palmer, C. S. A. Recovery.
50	Cutsinger, S., Pt., C, 27th Indiana.	Sept. 17, 21, '62.	Right. Disch'd Jan. 10, 1863.
51	Daverio, C., Pt., E, 3d Maryland, age 26.	Aug. 9, 12, '62.	Left. Sept. 2, re-amp.: gang.: nec. bone rem'd; large vessels secured. Disch'd April 16, '63.
52	*Davis, D. D.*, Pt., K, 28th North Carolina, age 21.	July 3, 8, '63.	Left. Exchanged March 17, '64.
53	Denton, E., Serg't, H, 112th N. Y., age 42.	Sept. 29, Oct. 2, '64.	Left; short ant., long post. flap; nec. Disch'd Oct. 17, 1865.
54	Dodge, B. C., Serg't, M. 2d Indiana Cavalry.	Aug. 22, 31, '62.	Left; flap. Dr. Haggarty. Discharged Feb. —, 1863.
55	Donahoe, P., Pt., C, 9th Illinois, age 18.	Jan. 11, Fe. 2, '63.	Right; circ. Surg. W. Dickenson, U. S. V. Dis'd July 19, '63.
56	*Donahue, A.*, Pt., O'Harris's Battery.	April 6, 18, '62.	Right. Surg. C. H. Mastin, C. S. A. Recovered.
57	Donovan, F., Serg't, I, 90th Illinois, age 46.	Nov. 25, De. 13, '63.	Left; ant. post. flap. Surg. H. Strong. 90th Illinois. Disch'd Feb. 24, 1865.
58	Dumass, M. A., Pt., C, 44th New York.	May 27, Je. 17, '62.	Right; circ. Disch'd Oct. 16, '62.
59	*Dunlap, J.*, Pt., A, 14th Louisiana, age 29.	May 5, 30, '62.	Left; circ. A. Surg. J. S. Billings, U. S. A. Prison May 1, 1863. *Spec.* 32.
60	Dwyer, J. M., Corp'l, B, 20th Indiana.	May 5, 9, '64.	Left; flap. Surg. I. H. Thompson, 124th N. Y. Disch'd Sept. 1, 1864.
61	Easterly, A. N., Pt., B, 24th Iowa, age 20.	April 6, 10, '64.	Right (gang.); circ. Surg. W. J. McKim, 15th Ill. Disch'd Oct. 5, 1864.
62	Farnum, G. W., Pt., E, 11th Vermont, age 20.	June 1, 13, '64.	Right; flap. Surg. D. W. Bliss, U. S. V. Disch'd Aug. 15, 1865.
63	Farrell, J., Pt., I, 119th New York, age 35.	July 1, 9, '63.	Right; flap. Disch'd March 21, 1864.
64	Fellsburg, C., Corp'l, D, 119th N. Y., age 23.	July 1, 5, '63.	Left; flap. July 16, re-amp. up. third. A. Surg. W. H. H. Ginkinger. 27th Penn. Disch'd Dec. 9, 1864.
65	Fifield, L. B., Pt., A, 16th Mass., age 24.	Aug. 30, Sept. 26, 1862.	Right; circ. A. Surg. M. F. Bowes. 12th Penn. Cav. Exfol. Disch'd Sept. 16, 1863
66	Fletcher, W., Pt., H, 11th Massachusetts.	July 21, Au. 15, '61.	Left; flap. Surg. — Walker, C. S. A. Disch'd March 28, 1862.
67	Flippo, J., Unassigned Recruit, age 25.	Mar. 26, Ap. 4, '64.	Right; circ. A. A. Surg. D. S. Booth. Returned to his home June 3, 1864.
68	Flockhart, D. S., Corp'l, D, 119th Penn., age 31.	Nov. 7, 15, '63.	Right; circ. A. Surg. P. C. Davis, U. S. A. Jan. 13, '64, protrud'g bone sawn off. Disch'd June 15, 1865.
69	Foreman, J. W., Pt., H, 13th Infantry, age 20.	Oct. 9, 13, '63.	Left; circ. A. A. Surg. C. H. Wade. Nov. 25, '63, three ins. of bone rem'd. Disc'd Sept. 20, '64.
70	*Givens, J. F.*, Pt., C, 24th Virginia.	May 5, 30, '62.	Right. Recovery.
71	Goebel, J., Pt., E, 151st New York, age 39.	June 3, 8, '64.	Left; circ. Disch'd Oct. 7, 1864.
72	*Gordon, W. F.*, Serg't, A, 15th Texas.	July 22, 27, '64.	——. Surg. T. E. Chaille, C. S. A. Recovery.
73	Gowan, J., Corp'l, B, 82d Colored Troops.	De. 17, '64. Ja. 12, '65.	Left; flap. A. Surg. J. T. Brown, U. S. V. Disch'd June 24, '65.
74	*Graham, F.*, Pt., A, 2d S. Carolina, age 37.	Oct. 19, 23, '64.	Left; circ. Furloughed March 16, 1865.
75	Gray, W., Serg't, G, 1st West Virginia.	Mar. 25. Ap. 4, '62.	Left; circ. A. Surg. H. Pinkney. 83d N. Y. Disch'd Oct. 2, '62.
76	*Gunold, J.*, Serg't, E. 45th Virginia, age 22.	Oct. 19, 23, '64.	Right; flap. Dr. Duball. Released April 1, 1865.
77	*Hagerman, J. T.*, Pt., K, 18th Virginia, age 21.	July 3, 6, '63.	Left; flap; Furloughed Nov. 21, 1863.
78	Hamilton, J. H., Pt., M, 15th N Y. H. A., age 21.	Aug. 6, 9, '64.	Left; flap; slough. Discharged May 17, 1865.
79	Harney, F. W., Pt., B, 8th N. Jersey, age 18.	Oct. 27, 30, '64.	Right; circ. Surg. — Pope, C. S. A. Disch'd June 18, 1865.
80	*Harnnock, J.*, Pt., A, 8th Alabama.	May 5, 19, '62.	Right; circ. A. Surg. J. S. Billings, U. S. A. Prison June 27, 1862. *Spec.* 30.
81	Harting, L., Lieut., B, 7th New York.	July 1, 5, '62.	Left; flap. A. A. Surg. J. Swinburne. M. O. May 8, 1863.
82	Hays, J., Pt., A, 1st Texas Cav., age 22.	Sept. 1, 10, '63.	Left (extravasation, mortification, and synovitis); circ. Surg. J. Bockee. U. S. V. Discharged Nov. 3, 1864. *Spec.* 460.
83	Haywood, J., Pt., D, 8th Colored Troops.	Feb. 20, Ma. 1, '64.	Left; circ. Surg. — Holmes, C. S. A. Disch'd Oct. 3, 1865.
84	Hearler, B., Pt., G, 42d Illinois.	De. 31, '62, Jan. 4, '63.	Right; flap. Disch'd August 9, 1864.
85	Heffner, J., Pt., C, 31st Ohio, age 24.	Sept. 19, 24, '63.	Right; circ. Surg. S. J. Young, 79th Ill. Disch'd July 5, 1864.
86	*Henderson, N. G. B.*, Pt., H, 3d Texas.	Oct. 2, 8, '62.	Left. Recovery.
87	Hill, J., Pt., I, 3d Wisconsin.	Sept. 17, 20, '62.	Right; flap. Disch'd Jan. 13, '63.
88	Hinsey, A., Pt., F, 85th Illinois, age 17.	July 19, 25, '64.	Left; flap. Surg. E. Batwell. 14th Mich. Disch'd June 15, '65.
89	Hoffacker, W., Corp'l, H, 3d Maryland, age 22.	May 11, 27, '64.	Right; ant. post. flap. Surg. R. B. Bontecou, U. S. V. Furlough'd July 19, '64. *Spec.* 2663.
90	Howard, W. H., Corp'l, E, 147th N. Y., age 23.	June 18, J'y 6, '64.	Left; circ. A. Surg. A. Delaney, U. S. V. Disch'd June 23, '65. *Spec.* 2805.
91	[1] Irens, J. S., Pt., I, 61st New York.	Dec. 13, 16, '62.	Right; circ. Surg. C. S. Wood, 66th N. Y. Nec.: resec. of stump; bone and necro. bone removed; osteomyelitis Dis'd July 7, '63.
92	*Ivens, T. S.*, Confederate conscript.	Oct. 23, No. 11, '64.	Left. A. A. Surg. F. A. Bushey. Prison March 3, 1865.
93	James, J., Pt., I, 2d Iowa Cavalry, age 20.	Nov. 19, 28, '64.	Left; circ. A. Surg. J. A. Freeman, U. S. V. Hæmorrhage; lig. Disch'd April 29, '65. *Spec.* 3753.
94	Jordan, J., Pt., H, 1st Maryland, age 19.	July 6, 12, '63.	Right; end of bone rem'd. Duty Nov. 29, 1864.
95	Keever, J. L., Pt., E, 91st Penn., age 19.	May 12, 19, '64.	Left; circ. Surg. D. W. Bliss, U. S. V. April 6, '65, seq. rem'd. M. O. Nov. 17, 1865.
96	Kelly, P., Pt., E, 37th New York.	May 3, 18, '63.	Left. M. O. June 22, 1863. Died June 13, '64; general debility, result of injury.
97	Kenny, D., Pt., A, 16th Infantry, age 40.	De. 31, '62, Jan. 3, '63.	Left; ant. post. flap. Duty Nov. 28, 1864.
98	Kerrigan, J., Pt., K, 5th New York, age 20.	Aug. 30, Sep. 7, '62.	Right; flap. Surg. J. C. Dorr, U. S. V. Hæm.; exfol. Disch'd July 26, 1863.
99	[2] Kimm, J., Pt., E, 152d New York, age 21.	May 31, J'ne 6, '64.	Left; double flap. Surg. J. A. Lidell, U. S. V. Disch'd Jan. 16, 1865.
100	Kinnie, A., Pt., H, 14th New York.	June 27, J'y 1, '62.	Left; flap. Disch'd December 13, 1862.
101	Knott, E., Pt., D, 3d New Jersey.	June 27, 30, '62.	Right; ant. post flap. Disch'd Sept. 30, 1862.
102	*Lanthrup, J. E.*, Pt., C, 59th Virginia.	Feb. 9, 12, '64.	Left. Recovery.
103	La Page, J., Pt., I, 147th New York, age 40.	July 2, 6, '63.	Right; flap. Disch'd March 4, 1864.
104	Lehr, W., Corp'l, K, 7th Ohio, age 25.	Mar. 23, 26, '62.	Left; flap. A. Surg. C. E. Denig, 7th Ohio. Disch'd July 3, 1862.
105	Les, J., Pt., D, 6th Connecticut, age 34.	May 10, J'ne 1, '64.	Right; circ. July 15, 1865, seq. rem'd. Disch'd Oct. 28, 1865. *Spec.* 1557.
106	Linn, M., Pt., A, 122d Ohio.	May 6, 27, '64.	Left; circ. Surg. C. Page, U. S. A. Disch'd March 4, 1865.
107	Locke, J. C., Pt., E, 100th Pennsylvania.	Aug. 30, Se. 20, '62.	Left; circ. Disch'd June 29, '63.
108	Loeb, L., Pt., I, 3d New Jersey.	June 27, J'y 2, '62.	Left. Surg. W. H. White, U. S. V. Disch'd Oct. 1, 1862.
109	*Lofton, E.*, Pt., F, 23d N. Carolina, age 22.	July 2, 5, '63.	Left (erysipelas). Exch'd April 27, 1864.
110	Lynch, T., Pt., D, 40th New York, age 22.	Sept. 1, 5, '62.	Right; circ. July 3, '64, two ins. of femur sawn off and seq. rem'd. Duty Oct. 25, 1864.
111	Lyon, A. E., Pt., E, 37th Iowa, age 23.	Aug. 8, 12, '64.	Right; flap. A. A. Surg. J. Prieto. Hæm.; lig. fem. art. Disch'd Aug. 15, 1865.
112	Lyons, R., Pt., D, 176th New York, age 42.	Sept. 22, 27, '64.	Right (gangrene); ant. post. flap. Disch'd April 2, 1866.
113	Machamer, D., Pt., G, 90th Penn., age 22.	May 10, 14, '64.	Left; circ. Surg. G. W. Thornhill, P. A. C. S. Sept. 15, '64, seq. rem'd. Disch'd Dec. 5, '64.
114	Mackin, J., Pt., H, 24th Massachusetts.	Dec. 13, —, '62.	Right; circ. Surg. F. G. Snelling, U. S. V. Disch'd June 25, 1863. *Spec.* 1620.
115	Madden, F., Pt., H, 40th New York, age 18.	July 2, 7, '63.	Left; flap. Jan. 29, 1864, large bulbous mass of bone removed. Disch'd April 23, 1864.
116	Malloy, M., Pt., H, 69th New York.	Sept. 17, 27, '62.	Right; ant. post. flap. Surg. M. C. Rowland, 61st N. Y. Oct. 4 hæm.; lig. fem art. Jan. 15, '63, rem'd seq. Disch'd March 4, 1863. *Spec.* 2057.
117	Maroney, P., Pt., G, 63d New York.	Sept. 17, 27, '62.	Left; flap. Feb. 14, 1863, rem'd seq. Disch'd March 6, 1863.
118	Marsh, S., Corp'l, B, 1st Mass. Cav., age 27.	Nov. 27, De. 10, '63.	Right; circ. Surg. E. Bentley, U. S. V. Pyæmia. Dec. 30, '64, 5 ins. seq. rem'd. Disch'd July 12, 1865.
119	Martin, P., Pt., H, 39th N. York, age 45.	Feb. 6, 11, '64.	Left; circ. flap. Surg. J. Aiken, 71st Penn. Exf. Disch'd Dec. 5, 1864. *Spec.* 2039.
120	Mason, J. H., Corp'l, E, 149th Penn., age 31.	July 1, 8, '63.	Right; circ. flap. Disch'd Jan. 29, 1864.

[1] LIDELL (J. A.), *On the Secondary Traumatic Lesions of Bone, etc.*, in *U. S. San. Com. Memoirs*, 1870, Surgical Volume I, p. 385.

[2] LIDELL (J. A.), *On Contusion and Contused Wounds of Bone, with an Account of Thirteen Cases*, in *Am. Jour. Med. Sci.*, N. S., 1865, Vol. L, p. 20.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
121	[1]Maxwell, G. R., Lieut. Col., 1st Mich. Cavalry, age 22.	April 1, 17, '65.	Left; circ. Surg. D. W. Bliss, U. S. V. Hæm.; nec. bone removed. M. O. Aug. 8, 1865.
122	McCambridge, S., Pt., F, 95th Penn., age 17.	May 3, 28, '63.	Left; flap. A. A. Surg. F. Hinkle, Gangrene. Disch'd July 4, '64.
123	McCoy, J., Pt., B. 3d New Jersey, age 32.	May 10, 13, '64.	Right; flap. Confed. surgeon. Slough'g. Disch'd Sept. 2, '65.
124	[2]McCreary, S. C., Pt., F. 100th Penn.	Sept. 1, 14, '62.	Right; flap. Disch'd Dec. 4, '62.
125	McDonald, J., Fireman, U. S. Steamer Dragon.	Mar. 9, 12, '62.	Right. Surgs. Macomber and Bragg, U. S. N. Disch'd Jan. 13, 1863.
126	McFarland, W. H., Pt., B, 5th Wis., age 19.	May 4, 7, '63.	Right. Confed. surgeon. May 14, amp. upper third. Disch'd March 21, 1864.
127	McGary, E., Pt., B, 17th Illinois Cav., age 20.	Dec. 20, 23, '64.	Left; flap. A. A. Surg. R. T. Sill. M. O. Dec. 15, '65. Subsequently lost the other leg and one arm by accident. Died Jan. 15, '69.
128	McGrath, J., Pt., I, 4th Artillery, age 33.	April 16, May 9, '65.	Left; ant. post. flap. Surg. — Board, C. S. A. Nec. bone rem'd. Disch'd Nov. 11, '65. *Spec.* 1408.
129	McKenzie, J., Serg't, I, 79th New York.	July 21, 30, '61.	Right; flap. Surgs. Peachy and Gibson, C. S. A. Disch'd Oct. 22, 1861.
130	*McLaughlin, J.*, Pt., A, 3d Alabama, age 35.	May 2, 7, '63.	Right; circ. Surgs. Black and Wilkerson, C. S. A. Recovery.
131	*McNairy, T. W.*, Pt., B, 27th North Carolina.	Oct. 14, 24, '63.	Left. Furloughed Jan. 22, 1864.
132	*McVey, W.*, Pt., F, 5th Texas.	Sept. 19, 23, '63.	Left. Surg. — Roberts, C. S. A. Disch'd Oct. 16, 1863.
133	Merrifield, W., Pt., H, 14th W. Va., age 18.	Aug. 22, 28, '64.	Left; circ.; nec. bone removed. Disch'd July 19, 1865.
134	Miller, E., Pt., D. 61st New York, age 27.	June 3, 8, '64.	Right; circ. Disch'd July 21, 1865.
135	Miller, J. H., Pt., A, 118th Penn., age 21.	Dec. 13, 18, '62.	Left; ant. post. flap. A. A. Surg. A. E. Carothers. Nec. Disch'd March 21, 1864.
136	Müller, E., Pt., F, 29th New York, age 31.	Aug. 29, Se. 5, '62.	Left; circ. Disch'd June 9, '63.
137	Mullins, P., Pt., K, 2d Wisconsin, age 20.	Aug. 28, Se. 12, '62.	Right; circ. A. A. Surg. S. R. Skillern. Nec. bone sawn off. May, 1863, reamp. upper third. Disch'd July 2, '64. *Spec.* 1227.
138	*Munn, D. A.*, Pt., K, 31th North Carolina.	June 27, J'y 13, '62.	Right. Surg. — Hoyt, C. S. A. Disch'd Sept. 28, 1862.
139	Nicholas, G. J., Corp'l, H, 73d Pennsylvania.	May 3, 18, '63.	Left. Oct. 20, 1863, flap re-amp. up. third. Disch'd Feb. 10, '65.
140	Norris, J., Pt., I, 37th Mass., age 36.	Aug. 21, 26, '64.	Left; ant. post. flap. Surg. Z. E. Bliss, U. S. V. Sloughing; hæm. Sept. 24, re-amp.; nec. Disch'd Aug. 7, 1865.
141	Oatis, J., Pt., H, 24th New York, age 20.	Aug. 30, Sep. 9, '62.	Right; dou. flap. A. A. Surg. C. M. Ford. Disch'd Mar. 24, '65.
142	Paddock, J., Corp'l, D, 43d Indiana.	April 25, My 15, '64.	Right; flap. Surg. — Keller, C. S. A. Disch'd Aug. 23, 1864.
143	Page, C. W., Serg't, D, 3d Wisconsin.	Sept. 17, 20, '62.	Left. Disch'd Feb. 9, 1863.
144	Perkins, N. B., Pt., 5th Maine Battery.	May 3, 23, '63.	Right. A. Surg. A. Ingram, U. S. A. Disch'd Dec. 7, 1863. *Spec.* 1156.
145	Pitcher, J., Pt., K, 94th New York.	Aug. 30, Sep. 6, '62.	Right; lat. flap; mortification. Sept. 13, re-amp.; exfol. Disch'd Aug. 16, '63. *Spec.* 1225.
146	Pollock, J., Pt., K, 84th Illinois, age 42.	Sept. 2, 6, '64.	Right; ant. post. flap. Sept. 12, hæm. Disch'd May 6, 1865.
147	Postles, W. R., Corp'l, A, 1st Del., age 24.	Dec. 13, 25, '62.	Left; circ. Surg. T. Antisell, U. S. V. Disch'd Dec. 24, 1863. *Spec.* 990.
148	Potter, L., Pt., A, 56th Penn., age 26.	July 1, 4, '63.	Left; flap. Surg. J. H. Brinton, U. S. V. July 26, re-amp. Disc'd June 18, 1865. *Spec.* 1495.
149	Power, J. H., Pt., B, 36th Indiana.	Sept. 20, 27, '63.	Right; circ. Disch'd Jan. 24, 1864.
150	Preitling, C., Hospital Steward, 39th N. York, age 24.	May 10, 17, '64.	Right (gangrene); ant. post. flap. Surgeon E. Bentley, U. S. V. Duty Sept. 19, 1864.
151	Pyle, J., Serg't, B, 105th Indiana, age 36.	July 14, 24, '63.	Left. Ass't Surg. W. B. Witt, 69th Ind. (M. O. July 18, '63.)
152	*Quate, R.*, Pt., C, 45th N. Carolina, age 31.	July –, 6, '63.	Left. Provost Marshal September 10, 1863.
153	Radley, A., Pt., B, 44th New York, age 21.	May 8, 15, '64.	Left; ant. post. flap. Ass't Surg. S. B. Ward, U. S. V. Disch'd Nov. 8, 1864.
154	*Ray, J.*, Pt., B, 57th Virginia, age 20.	July 3, 6, '63.	Left (gangrene). Exch'd March 7, 1864.
155	*Redding, J. M.*, Pt., A, 5th Georgia.	Sept. 19, Oct. 2, '63.	Left. Surg. H. M. Lawson, C. S. A. Recovery.
156	Reveur, J., Pt., E, 47th New York, age 36.	Feb. 20, 25, '64.	Left; flap. Surg. — Harrington, C. S. A. Disch'd May 1, 1865.
157	*Rice, T. H.*, Pt., I, 31st Tennessee.	June 5, J'y 1, '64.	Left. Surg. — Dorsey, C. S. A. Recovery.
158	Rich, H. C., Seaman, U. S. N., age 22.	Mar. 22, Ap. 8, '62.	Left. Surg. S. Moody, C. S. A. Piece of bone rem'd. Disch'd Dec. 1, 1862.
159	Richards, J. F., Pt., D, 15th Indiana.	Sept. 11, 16, '61.	Right; flap. Surg. R. C. Bond, 15th Ind. Disch'd May 24, '62.
160	Rickard, H. C., Pt., M, 11th Vermont, age 23.	Sept. 19, Oc. 19, '64.	Left; circ. A. Surg. J. G. Thompson, 77th N. Y. Hæm. Disch'd June 19, 1865.
161	Robbins, O. P., Pt., H, 10th Pennsylvania.	June 27, J'y 23, '62.	Right; ant. post. flap. Surg. D. McRuer, U. S. V. Disch'd Feb. 27, 1864. Died April 15, 1867. *Specs.* 1129, 2377.
162	Ross, J., Pt., C, 123d Illinois.	Oct. 7, 18, '63.	R't; flap. Dr. D. Swain, Shelbyville, Tenn. Disch'd Feb. 4, '64.
163	*Rudy, P. H.*, Lieut., B, 2d Kentucky Battery.	Sept. 30, Oc. 13, '64.	——. Surg. — Montague, C. S. A. Recovery.
164	Sackett, V. B., Pt., G, 42d Pennsylvania.	Aug. 9, 12, '62.	Right. Disch'd Nov. 12, 1862.
165	Sadler, J., Pt., M, 100th Pennsylvania.	Aug. 29, Se. 15, '62.	Left; circ. flap. Surg. E. Bentley, U. S. V. Disch'd June 6, '63.
166	Schlotterback, J., Pt., I, 75th Ohio.	Aug. 30, Se. 25, '62.	Left; flap. Disch'd Dec. 27, '62. *Spec.* 83.
167	Scott, J., Serg't, D, 34th Ohio, age 27.	May 10, 20, '64.	Right; circ.; two ins. bone rem'd. Disch'd May 3, 1865.
168	*Scraggs, J. A.*, Pt., G, 11th Virginia Cavalry, age 32.	May 9, 15, '64.	Left; ant. post. flap. Surg. E. Bentley, U. S. V. Gangrene. Prison March 1, 1865.
169	Shepherd, E., Pt., F, 1st Michigan.	July 21, Au. 1, '61.	Right; flap. Confed. surgeon. Discharged.
170	Sherman, T. W., Brigadier General, U. S. V.	May 27, J'e –, '63.	Right. Prof. W. Stone. Retired. *Spec.* 3604. Died March 16, '79; pneumonia.
171	Shubert, P., Pt., G, 15th Massachusetts.	Oct. 21, No.—, '61.	Right; circ. Surg. T. R. Crosby, U. S. V. Disch'd Feb. 14, '62.
172	Smith, B., Pt., C, 88th Pennsylvania, age 21.	May 8, 26, '64.	Left; ant. post. flap. Surgeon J. Carroll, C. S. A. Necrosed bone rem'd. M. O. Jan. 15, 1866.
173	Smith, J., Pt., G, 73d New York.	June 15, 25, '62.	Left; flap. Disch'd Sept. 3, 1862.
174	Snackenberg, H., Pt., A, Mo. Home Guards.	June 19, 22, '61.	Right; flap. Dr. E. Evans. Mustered out 1861.
175	Spielman, S., Pt., D, 24th Iowa, age 28.	Sept. 19, 22, '64.	Left; circ.; flaps. Disch'd Aug. 23, 1865. *Spec.* 4220.
176	Stone, C. H., Pt., F, 5th New Hamp., age 21.	June 3, 22, '64.	Left; circ. Surg. C. Page, U. S. A. Gang. Dec. 18, re-amp mid. third. Disch'd June 9, 1865.
177	Sweatt, W., Pt., K, 6th New Hampshire.	Aug. 29, Se. 15, '62.	Left; circ. A. Surg. B. A. Clements, U. S. A. Disch'd May 19, 1863.
178	Taylor, W., Pt., H, 42d Illinois, age 24.	Nov. 30, De. 4, '64.	Left (gang.); circ. Dr. Raney, Franklin, Tenn. Disch'd June 29, 1865.
179	Tomy, E. H., Pt., C, 27th Indiana.	Sept. 17, 20, '62.	Right; flap. Disch'd Dec. 19, 1862.
180	Tonsing, F. H., Pt., B, 107th Ohio, age 21.	July 1, 6, '63.	Right; flap. Disch'd July 15, 1864.
181	Trainer, J., Pt., C, 4th New Jersey.	June 27, 30, '62.	Left. Disch'd Oct. 15, 1862.
182	Tricketts, E., Pt., C, 14th W. Va., age 20.	Oct. 19, 22, '64.	Right; circ. Disch'd Feb. 13, 1865.
183	[3]Ulmer, E. D., Serg't, G, 15th N. Jersey, age 22.	Oct. 19, No. 14, '64.	Left. (Hæm., gang.) A. A. Surg. E. G. Waters. March 8, 1865, exfoliation rem'd. Disch'd May 29, 1865. Feb. 17, '66, amp. hip j'nt. Recovery. *Specs.* 107, 3734.
184	Vezina, O., Pt., B, 9th New Hamp., age 24.	May 31, J'e 11, '64.	Right (erysipelatous inflam.); ant. post. flap. A. Surg. W. Thomson, U. S. A. Oct. 15, 1864, nec. seq. rem'd. Disch'd June 14, 1865. *Specs.* 3558, 3599.
185	Vogelsang, D., Pt., A, 1st Minnesota.	Sept. 17, 20, '62.	Left; flap. Disch'd Nov. 25, '62.
186	Walker, G. W., Pt., D, 12th Pennsylvania.	Aug. 30, Se. 21, '62.	Right. Surg. E. Bentley, U. S. V. Disch'd June 18, 1864.
187	Warren, J. A., Pt., C, 28th Illinois.	Oct. 5, 28, '62.	Right; flap. Surg. W. F. West, 28th Ill. Disch'd Mar. 20, '63.
188	*Waux, J.*, Pt., E, 1st Louisiana, age 21.	July 2, 5, '63.	Right. Surg. P. F. Whitehead, P. A. C. S. Retired Jan. 30, 1865.
189	*Weatherly, L. H.*, Corp'l, F, 10th Ala., age 20.	May 12, J'e 3, '64.	Right; flap. Retired Dec. 9, '64.
190	Wheeler, J., Pt., F, 16th Kansas Cav., age 30.	Oct. 28, Nov. 1, 1864.	Right; flap. Surg. J. P. Erickson, 16th Kansas Cav. Disch'd April 25, 1865.
191	Wilekens, H., Pt., K, 17th Infantry, age 25.	May 10, J'e 8, '64.	Left; ant. post. flap. A. A. Surg. S. D. J. Evans. May 1, '65, nec. bone rem'd. Disch'd Aug. 26, 1866. *Spec.* 4347.

[1] LIDELL (J. A.), *On the Wounds of Blood-vessels, Traumatic Hæmorrhage, Traumatic Aneurism, and Traumatic Gangrene*, in *U. S. San. Com. Memoirs*, 1870, Surgical Volume I, p. 176.

[2] LIDELL (J. A.), *On the Wounds of Blood-vessels, Traumatic Hæmorrhage, Traumatic Aneurism, and Traumatic Gangrene*, in *U. S. San. Com. Memoirs*, 1870, Surgical Volume I, p. 57.

[3] LIDELL (J. A.), *On the Secondary Traumatic Lesions of Bone, etc.*, in *U. S. San. Com. Memoirs*, 1870, Surgical Volume I, p. 440. MORTON (T. G.), *On Amputation at the Hip Joint, etc.*, in *Am. Jour. Med. Sci.*, N. S., 1866, Vol. LII, p. 17. *Circular* 7, S. G. O., 1867, pp. 51, 65.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
192	Willard, L. C., Pt., A, 64th Illinois, age 20.	July 28, Aug. 23, 1864.	Right (gang.); circ. flap. Surg. J. C. Denise, 27th Ohio. Disch'd July 6, 1865.
193	Williams, L., Serg't, C, 2d Batt. Cav. Mo. S. M.	Aug. 16, 19, '62.	Right; flap. Dr. Raylin. Discharged.
194	*Williams, W. S.*, Pt., Morgan's Cavalry.	.....	Left. Dr. V. B. Thornton. Recovery. *Spec.* 406.
195	Williamson, W. H., Pt., D, 114th N. Y., age 24.	Oct. 19, 23, '64.	Right; circ. A. Surg. J. Homans, jr., U. S. A. Disch'd May 13, '65.
196	Willis, N. P., Pt., U. S. Signal Corps, age 23.	Feb. 3, 10, '65.	Left; circ. Surg. B. N. Bond, 27th Mo. Seq. rem'd. Disch'd Sept. 3, 1865.
197	Willson, J. P., Pt., K, 123d Illinois.	Oct. 7, 11, '63.	Right; circ. Disch'd Feb. 2, '64.
198	*Wilson, G.*, Serg't, D, 7th Louisiana, age 26.	Sept. 17, 28, '62.	Left. Retired September 22, '64.
199	Wilson, W., Pt., B, 2d Colored Troops.	Nov. 21, De. 15, '63.	Right; flap. A. A. Surg. W. P. Powell. Disch'd June 16, 1864.
200	*Wingo, T.*, 8th Ky. Mt'd Infantry, age 20.	July 19, Au. 4, '63.	Left; circ. Surg. W. H. Gobrecht, U. S. V. Pro. Mar. Dec. 19, '63.
201	Wooden, L. W., Corp'l, K, 3d New York Cav.	Oct. 2, 14, '62.	Right. Nov. 1, re-amp. Surg. S. A. Green, 24th Mass. Disch'd Feb. 17, 1863.
202	Woodward, O. S., Col., 83d Penn., age 27.	May 5, 15, '64.	Right. Surg. D. W. Bliss, U. S. V. M. O. Sept. 20, 1864. *Spec.* 2269.
203	Worthington, A. S., Pt., D, 98th Ohio, age 21.	June 27. J'y 16, '64.	Left (gang.); circ. A. A. Surg. T. H. Hammond. Discharged.
204	[1] *Young, J. W.*, Pt., D, 13th Miss., age 22.	Sept. 17, 20, '62.	Left; circ. Furloughed November 20, 1862.
205	Zahns, J., Pt., A, 3d Wisconsin.	Aug. 9, 14, '62.	Left; flap. Disch'd Dec. 21, '62.
206	Ackerman, G., Pt., L, 6th N. Y. H'vy Art'y, age 33.	May 19, 25, '64.	Left; flap. Surg. E. Bentley, U. S. V. Died June 9, '64; pyæmia. *Spec.* 2659.
207	Addy, G., Pt., C, 7th Iowa.	Nov. 7, –, '61.	Right. Surg. E. C. Franklin, U. S. V. Died Dec. 12, '61; pneum.
208	Allen, E. H., Pt., A, 2d Massachusetts Cav'lry, age 24.	July 12, 31, '64.	Left; circ. A. A. Surg. W. H. Randolph. Died Aug. 16, 1864; exhaustion.
209	Anderson, G. W., Corp'l, B, 72d N. York, age 23.	July 2, 6, '63.	——; hæmorrhage. Died July 19, 1863.
210	Anderson, W., Pt., F, 6th New York H. Artillery, age 24.	June 18, J'y 5, '64.	Right; ant. post. flap. Surg. E. Bentley, U. S. V. Died July 17, 1864; exhaustion. *Spec.* 2831.
211	Atkins, W. H., Pt., I, 10th Massachusetts, age 20.	July 1, 6, '62.	Right; flap. July 26, bone rem'd; slough.; hæm.; lig. fem. art'ry. Died Aug. 12, '62; exhaustion.
212	Atkinson, J. M., Pt., A, 3d Indiana Cav., age 23.	May 12, J'e 2, '64.	Right. (Hæm.; May 25, lig. fem. art'ry.) A. A. Surg. T. Liebold. Died June 7, 1864; pyæmia.
213	Baily, J. E., Lieut., A, 7th Maine, age 38.	July 12, 29, '64.	Right; skin flap; circ. sect. mus. Surg. H. W. Ducachet, U. S. V. Died July 31, '64; prostration.
214	Baily, W., Pt., E, 7th N. York, age 23.	June 2, 25, '64.	Left; ant. post. flap. Surg. R. B. Bontecou, U. S. V. Hæm. from fem. art. Died July 6, '64; exhaustion. *Spec.* 3037.
215	Baker, L. D., Pt., G, 4th Iowa.	De. 29, '62, Ja. 20, '63.	Left. Died January 25, '63; exhaustion.
216	Barnes, L., Pt., I, 34th New York, age 19.	June 30. J'y 21, '62.	Right (July 3. ball ext.); circ. Surg. R. B. Bontecou, U. S. V. Died July 28, '62; deeply jaundiced.
217	[2] Barrett, G. Y., Pt., F, 5th New Hampshire, age 20.	Dec. 13, 25, '62.	Right. (Dec. 16, osteo-plast. oper. at knee joint. A. Surg. J. W. S. Gouley, U. S. A. Slough; gang.; hæm.) Surg. J. P. Prince, 36th Mass. Died Dec. 28, '62. *Spec.* 536.
218	[3] Bause, J., Pt., B, 42d Indiana, age 24.	De. 31, '62, Jan. 8, '63.	——; lat. flap. Surg. J. Shrady, jr., U. S. V. Diarrhœa. Died January 15, 1863.
219	Bell, L. H., Lieut., B, 113th Ohio.	Sept. 20, 30, '63.	Left. Surgeon I. Moses, U. S. V. Died October 10, 1863.
220	Benton, H. S., Serg't, C, 7th Mass., age 21.	May 6, 25, '64.	Left; dou. flap. Surg. E. Bentley, U. S. V. Died June 17, 1864; pyæmia. *Spec.* 2657.
221	Berkey, C., Pt., A, 10th Penn. Reserves, age 24.	Aug. 30, Se. 18, '62.	Left (Sep. 11, hæm.; 13, 14, hæm.; lig. fem.; Sept. 17, hæm.); circ. Died Sept. 18, 1862. Autopsy.
222	Berns, J. F., Pt., F, 5th Ohio, age 19.	June 9, 23, '62.	Left; ant. post. flap. A. Surg. J. S. Billings, U. S. A. Hæm. Died July 2, '62. Autopsy. *Spec.* 23.
223	Biehl, N., Pt., I, 155th Pennsylvania, age 27.	June 19, J'y 19, '64.	Right (June 21, exc. tibia; gang.); circ. Surg. E. Bentley, U. S. V. Gang.; ulcer'n of artery. Died July 21, '64; exh'n. Autopsy. *Spec.* 3337.
224	Blanchard, A., Serg't, E, 92d New York.	May 31, J'e 11, '62.	Right; flap. A. A. Surg. W. K. Cleveland. Died June 13, 1862; exhaustion.
225	Blockle, M., Pt., A, 46th Iowa, age 20.	June 30, J'y 6, '64.	Right; lat. flap. Surg. J. G. Keenon, U. S. V. Died July 17, '64.
226	Bodman, C., Pt., G, 11th Infantry, age 24.	July —, 10, '63.	Right. Died August 15, 1863.
227	Bovard, F., Pt., K, 1st Massachusetts.	June 25, J'y 2, '62.	—— (gangrane). Died July 3, 1862.
228	Boyd, J., Pt., C, 19th Ohio.	Jan. 2, –, '63.	Left. Died January 13, 1863.
229	Bradley, J., Pt., F, 48th Pennsylvania, age 21.	June 3, 8, '64.	Right (mortification; hæm.); circ. A. Surg. H. Allen, U. S. A. Died June 9, '64; shock, etc. *Spec.* 2931.
230	Brannagan, J., Pt., I, 69th Pennsylvania.	June 3, –, '64.	Left; flap. Surg. F. F. Burmeister, 69th Penn. Died June 14, 1864. *Spec.* 1501.
231	*Britton, C.*, Pt., C, 12th Kentucky, age 40.	Nov. 30. De. 30, '64.	Left (carious); lat. flap. A. A. Surg. J. E. Patterson. Died Jan. 6, 1865.
232	Brizzee, W. J., Pt., G, 46th Pennsylvania.	June 22, —, '64.	Right. Died July 4, 1864.
233	Brown, T., Pt., K, 5th Col'd Troops, age 21.	Sept. 29, Oc. 18, '64.	Left; circ. A. A. Surgeon H. B. White. Died Oct. 26, 1864.
234	*Bryant, N. B.*, Pt., K, 19th Miss., age 25.	May 5, 19, '62.	Left; ant. post. flap. A. Surg. J. S. Billings, U. S. A. Gangrene. Died May 26, '62. Aut. *Spec.* 31.
235	Buckey, J. E., Pt., E, 7th Maryland, age 30.	June 5, 10, '64.	Left; ant. post. flap. Died June 20, 1864.
236	Burditt, W. C., Pt., I, 4th West Virginia.	May 19, 26, '63.	Left; circ. A. A. Surg. L. Darling, jr. Died May 31, 1863. *Spec.* 1625.
237	Burke, W., Pt., G, 69th New York.	Sept. 17, 24, '62.	Right. Died September 27, 1862.
238	Burroughs, J., Serg't, B, 3d Kentucky.	Sept. 20, —, '63.	Right. (Sept. 28, excis. femur.) Died October 10, 1863.
239	Cady, T. P. T., Pt., C, 12th Illinois, age 22.	Oct. 3, No. 1, '62.	Right. Surg. J. F. Hogden, U. S. V. Died Nov. 8, 1862; pyæmia. *Spec.* 469.
240	Carpenter, H. W., Pt., K, 3d Michigan, age 33.	Nov. 27. De. 13, '63.	Right; circ. Surg. E. Bentley, U. S. V. Died Jan. 11, '64; pyæmia. Autop. *Specs.* 2011, 2012.
241	Carpenter, J. H., Pt., E, 110th Ohio, age 40.	June 22, J'y 5, '64.	Left (exc. fib.); circ. A. A. Surg. J. F. Thompson. Died July 16, '64; pyæmia. *Spec.* 2759.
242	Carr, G. W., Serg't, G, 1st Maine H. Artillery, age 42.	June 18, J'y 3, '64.	Right; circ. Surg. A. F. Sheldon, U. S. V. Died July 10, 1864; exhaustion. *Spec.* 2764.
243	Casey, M., Pt., K, 108th New York.	Sept. 17, 27, '62.	Left. Died Oct. 3, '62. *Spec.* 380.
244	Chamberlain, R., Serg't, I, 16th Conn., age 43.	Sept. 17, Oc. 15, '62.	Right. A. Surg. J. Oliver, 21st Mass. Died October 29, 1862. *Spec.* 274.
245	*Chandoin, B. P.*, Pt., A, 4th Texas, age 20.	Sept. 17, 24, '62.	Left. Surg. A. N. Dougherty, U. S. V. Died Sept. 29, '62. *Spec.* 127.
246	Chase, C., Corporal, B, 120th N. York, age 23.	June 1, 5, '64.	Right; circ. A. Surg. W. Thomson, U. S. A. Hæm. Died July 12, 1864; pyæmia. Autopsy. *Specs.* 3548, 2509, 6715.
247	Christy, W. J., Pt., E, 19th Mass., nge 23.	Aug. 16, Sep. 8, '64.	Right; circ. A. A. Surg. D. Kennedy. Died Sept. 22, 1864; exhaustion. *Spec.* 3643.
248	*Coe, W. W.*, Serg't, H, 23d N. Carolina, age 23.	July 2, 15, '63.	Right; circ.; slough. Died Sept. 19, 1863.
249	Cole, C. M., Pt., B, 48th New York.	July 19, Au. 1, '63.	Left. Died August 3, 1863.
250	Coleman, C., Pt., G, 1st Penn. Reserves.	Sept. 14, 23, '62.	Right. Surg. H. S. Hewit, U. S. V. Died, Sept. 23, '62, on operating table.
251	Collins, J. F., Pt., F, 2d Kentucky.	Sept. 20, 23, '63.	Right. Surg. A. W. Heise, 100th Ill. Died Oct. 5, '63; exh'n.
252	Connors, J., Pt., H, 7th N. Y. H'vy Art., age 37.	June 16, 26, '64.	Right; circ. Died June 26, '64.
253	Conrad, H., Pt., I, 24th Michigan, age 21.	May 6, 22, '64.	Left (May 19, excis. fib.; gang.); circ. Surg. O. A. Judson, U. S. V. Died May 27, 1864; pyæmia. *Spec.* 3653.
254	Conway, P., Pt., M, 1st New Hampshire Cav.	Nov. 14, 22, '64.	Left (gang.); circ A. A. Surg. M. Durrach. Died Dec. 18, '64; pyæmia.
255	Cooke, A. E., Serg't, G, 11th Infantry, age 20.	July 2, Au. 1, '63.	Left; flaps sloughed. Died Aug. 6, 1863.
256	Creighton, M., Serg't, B, 9th Mass., age 20.	May 12, 26, '64.	Left; circ. A. A. Surg. T. W. Miller. Died June 9, 1864; pyæmia and tetanus. *Spec.* 2818.
257	Culbertson, D. J., Serg't, A, 69th Ohio, age 25.	June 1, 16, '64.	Right (nec.); circ. A. A. Surg. J. W. Digbey. Died June 18, 1864. *Spec.* 3399.
258	Dareey, W. H., Pt., D, 6th Maryland, age 23.	May 31, J'ne 9, '64.	Left; circ. A. A. Surg. J. Phillips. Died June 24, '64; exh'n.
259	*Davis, H. A.*, Pt., D, 12th N. Carolina, age 30.	April 7, 14, '65.	Right; lat. flap. A. Staff Surg. W. J. Burr, U. S. A. Died April 24, 1865.
260	Day, J. W., Corp'l, H, 91st Ohio.	July 20, 23, '64.	Right. Surg. J. B. Warwick, 91st Ohio. Died July 23, '64; exh'n.
261	Dean, S., Pt., I, 111th New York.	July 3, –, '63.	Left. Surg. O. Munson, 108th N. Y. Died August 9, 1863.

[1] Fisher (G. J.), *Report of Fifty-seven Cases of Amputations in the Hospitals near Sharpsburg, Md., etc.*, in *Am. Jour. Med. Sci.*, N. S., 1863, Vol. XLV, p. 47.

[2] Prince (J. P.), *Surgical Cases*, in *Boston Med. and Surg. Jour.*, 1863, Vol. LXVIII, p. 69.

[3] Shrady, jr. (J.), *Cases in Military Surgery*, in *American Medical Times*, 1863, Vol. VI, p. 113.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
262	Delaney, J., Pt., G, 67th New York, age 20.	May 6, 27, '64.	Left; ant. post. flap. A. A. Surg. J.A.Bates. Hæm.; lig. fem. art. Died July 10, 1864; pyæmia.
263	*Demasters, A.*, Pt., F, 7th Florida, age 24.	Dec. 7, 11, '64.	Right (gang.); circ. Surg. S. D. Turney, U. S.V. Died Dec. 14, 1864; gangrene.
264	Dennison, H., Pt., E, 123d Ohio.	June 15, —, '63.	Right. Died June 26, 1863.
265	Dick, T., Pt., B, 6th N. Hamp., age 23.	May 8, 11, '64.	Left; circ.; sloughing. Died June 12, 1864; pyæmia.
266	Dillon, J., Pt., D, 34th New York, age 19.	June 1, 13, '62.	Left; flap. A. A. Surg. G. W. Edwards. Died July 13, 1862; exhaustion.
267	*Dobey, E.*, Pt., D, 14th North Carolina.	Sept. 19, Oct. 4, '64.	——; circ. Surg. J. W. Lawson, C. S. A. Hæm. Died October 18, 1864; exhaustion.
268	Donnelly, J., Pt., B, 198th Penn., age 22.	Mar. 29, Ap. 7, '65.	Right; ant. post. flap. Surg. N. R. Moseley, U. S.V. Died April 11, 1865; exhaust'n. *Spec.* 4069.
269	Douglas, A. J., Pt., M, 1st Maine H'vy Art'y, age 21.	May 19, 31, '64.	Right (hæm.); lat. flap. A. A. Surg. W. H. Ensign. Died May 31, 1864. *Spec.* 2388.
270	Dovers, C., Pt., D, 148th Pennsylvania.	May 3, 17, '63.	Left (gang.). Surg. C. S. Wood, 66th N. Y. Died May 19, 1863. *Spec.* 1171.
271	Drake, J. B., Pt., H, 62d Penn., age 22.	July 1, 27, '62.	Right; circ. A. A. Surg. W. K. Cleveland. Died August 2, '62; exhaustion.
272	Durgin, P. G., Pt., H, 6th New Hamp., age 19.	Aug 30, Se. 19, '64.	Left. A. A. Surg. W. K. Cleveland. Died Sept. 20, 1864.
273	Eaton, J. A., Lieut., D, 10th N. Hamp., age 24.	May 10, 21, '64.	Left (sloughing). A. A. Surg. J. Coloosdian. Died May 27, '64.
274	*Edson, W.*, Pt., I, 5th N. Carolina, age 22.	May 12, 20, '64.	Left; circ. A. A. Surg. J. Phillips. Hæm.; lig. fem. artery. Died May 25, '64; hæmorrhage.
275	*Elliott, P.*, Pt., B, 18th Georgia Bat'ry, age 24.	April 6, 16, '65.	Left; ant. post. flap. A. Surg. W. Carroll, U. S. V. Died May 20, 1865; exhaustion. *Spec.* 4163.
276	Elliott, P. M., Pt., G, 96th Ohio, age 20.	Nov. 3, 30, '63.	Right (ven. hæm.; diarr.); circ. A. Surg. P. S. Conner, U. S. A. Died Nov. 30, 1863.
277	Evans, S. B., Corp'l, D, 140th Penn.	June 2, 9, '64.	Left; circ. Surg. J. W. Wishart, 140th Penn. Died June 13, '64.
278	*Evans, W. E.*, Pt., G, 37th Georgia, age 28.	Dec. 16, 20, '64.	Right (hæm.); lat. flap. A. A. Surg. B.L. McClure. Died Dec. 24, 1864; exhaustion.
279	Fanning, H. C., Pt., D, 8th Conn., age 18.	Sept. 17, Oc. 17, '62.	Right. A. Surg. J. Oliver, 21st Mass. Died October 29, 1862. *Spec.* 287.
280	Fitzpatrick, T., Pt., A, 10th Infantry.	May 6, 14, '64.	Left; ant. post. flap. Died June 3, 1864; exhaustion.
281	Frakes, W., Pt., B, 26th Indiana, age 19.	Dec. 7, 12, '62.	——; circ. Surg. T. W. Florer, 26th Ind. Died Dec. 26, 1862; pyæmia and pneumonia.
282	Furlong, P., —, E, 4th New York.	Sept. 17, Oct. 1, '62.	——; flap. Died October 1, '62; exhaustion and shock.
283	Galiger, M., Serg't, G, 73d New York, age 22.	July 2, 5, '63.	Left (hæm.); lig. prof. art. Died July 8, 1863; exhaustion.
284	Gibbs, C. E., Pt., E, 19th Iowa, age 21.	Dec. 7, 30, '62.	Left; ant. post. flap. A. Surg. J. J. Sanders, 1st Iowa Cav. Died Jan. 22, 1863.
285	Gilbert, J., Pt., G, 119th New York, age 38.	July 2, 6, '63.	Right; flap; hæm.; gang. Died August 13, 1863; pyæmia.
286	Gittens, T., Pt., G, 12th Mass., age 48.	Dec. 13, 21, '62.	Left; circ. Surg. E. Bentley, U. S. V. Hæm. Died Jan. 1, 1863. Autopsy. *Spec.* 595.
287	*Glenn, J. R.*, Pt., E, 32d Alabama.	Nov. 27, De. 1, '63.	——. Surg. J. C. Morgan, 29th Mo. Gang. Died Dec. 5, 1863.
288	Goddard, W. A., Pt., F, 9th Maine, age 35.	May 20, J'ne 5, '64.	Left; flap. A. Surg. A. P. Frick, 103d Penn. Died June 5, 1864.
289	*Godwin, C.*, Pt., E, 48th North Carolina, age 33.	Dec. 13, 17, '62.	Left (gang'ns); circ. Died Jan. 13, 1863.
290	*Going, J. B.*, Pt., G, 60th Georgia.	Sept. 19, 22, '64.	Left; circ. Surg. D. Orsay, C. S. A. Gangrene. Died Oct. 6, '64; exhaustion.
291	Gordon, S. I., Serg't, B, 1st Alabama Cavalry.	Nov. 25, —, '64.	Right. Died December 27, 1864.
292	*Gray, N.*, Pt., H, 33d N. Carolina, age 26.	May 3, 10, '63.	Left (gang.); circ. May 14, hæm. Died May 15, 1863.
293	Gray, W. A., Pt., K, 13th New Hamp., age 25.	June 1, 13, '64.	Right; ant. post. flap. A. Surg. S. B. Ward, U.S.V. Gang. Died June 25, '64. Autop. *Spec.* 2709.
294	Greene, A., Pt., E, 93d Penn., age 34.	May 9, 29, '64.	Right; circ. Surg. E. Bentley, U. S. V. Died June 2, 1864; hæmorrhage. *Spec.* 2661.
295	Grey, C. C., Lieut., I, 4th Maine, age 28.	May 6, 20, '64.	Left; circ. Prof. F. H. Hamilton. Died May 29, 1864; pyæmia.
296	Grovendyke, A., Lieut., F, 124th Ind., age 34.	Nov. 30, De. 25, '64.	Right; ant. post. flap. A. Surg. W. B. Trull, U. S.V. Died Dec. 27, 1864; exhaustion.
297	Gump, H., Pt., D, 61st Penn., age 45.	May 5, 15, '64.	Left; circ. Died June 9, 1864; pyæmia. Autopsy.
298	Hack, C., Pt., D, 15th Connecticut, age 21.	Mar. 8, —, '65.	Left. Died April 18, 1865.
299	Hale, J. L., Pt., C, 31st Iowa.	Nov. 24, De. 3, '63.	Left; lat. flap. Surg. J. C. Morgan, 29th Mo. Died Dec. 3, '63.
300	Hall, J., Pt., A, 12th Pennsylvania, age 22.	May 10, 28, '64.	Left; ant. post. flap. Surg. R. B. Bontecou, U. S. V. Died May 31, 1864; exhaustion.
301	*Hall, P.*, Pt., D, 42d Virginia.	July 3, 8, '63.	——. Died July 15, 1863.
302	Hammond, C., Pt., H, 11th Massachusetts.	Aug. 29, Se. 18, '62.	Right; circ. A. Surg. J. C. McKee, U. S. A. Died Sept. 28, 1862. *Spec.* 63.
303	Hankins, J., Pt., D, 4th New Jersey.	Sept. 19, 23, '64.	Right; modified flap. A. Surg. J.G.Thompson, 77th New York. Slough. Died Oct. 10, 1864; typhoid fever.
304	*Hargrow, J. H.*, Pt., D, 12th North Carolina.	Sept. 17, Oct. 7, '62.	Right. Surg. H. S. Hewit, U. S.V. Died October 9, 1862. *Spec.* 365.
305	Harman, B., Pt., A, 50th Penn., age 24.	Sept. 30, Oc. 14, '64.	Left; circ. Surg. G. S. Palmer, U.S.V. Died Oct. 17, '64; exh'n.
306	Harris, D., Pt., F, 59th Col'd Troops, age 22.	July 15, 24, '64.	Right; flap. A.A.Surg. J. Prieto. Died July 25, 1864; tetanus.
307	Harris, J., Pt., A, 38th Col'd Troops, age 21.	Sept. 29, Oc. 22, '64.	Left; flap. A.A.Surg. A. B. Chapin. Died October 24, 1864.
308	*Harris, R. E. H.*, Pt., F, 57th N. C., age 27.	May 4, 30, '63.	Left; circ. Surg. C.D.Rice, C.S.A. Gang. Died June 7, 1863.
309	*Hartley, W.*, —, C, 6th Georgia.	Sept. 17, Oct. 3, '62.	Right. A. Surg. R. F. Weir, U.S. A. Pyæmia. Died Oct. 24, '62. *Spec.* 872.
310	Hayden, G., Corp'l, B, 1st Md. Battery, age 22.	July 3, 8, '63.	Left (hæm.); lig. femoral artery. Died Sept. 25, 1863; exhaust'n.
311	Hayer, G., Pt., K, 6th N. Y. H. Art'y, age 27.	May 19, Je. 16, '64.	Left; circ. A. Surg. W. F. Norris, U. S. A. Hæm.; lig. Died June 29, 1864; pyæmia. Autopsy.
312	Hedder, W., Pt., C, 56th New York.	June 1, 13, '62.	—— (amp. knee j't, June 1); hæm. Died July 3, 1862. *Spec.* 4933.
313	Henery, J. F., Adjutant, 157th N. Y., age 24.	July 2, 20, '63.	Right. Died July 24, 1863; pyæmia.
314	Hennely, P., Pt., K, 48th Pennsylvania.	Aug. 29, Se. 12, '62.	Right. Surg. O. A. Judson, U.S.V. Died October 25, 1862; pyæmia. *Spec.* 184.
315	Hezeltine, L., Pt., D, 86th New York, age 19.	May 8, 17, '64.	Left; circ. Surg. O. A. Judson, U.S.V. Hæm. Died June 9, '64; pyæmia.
316	*Highsmith, D.*, Pt., D, 24th Georgia.	Sept. 19, 23, '64.	Left; circ. Died Oct. 20, 1864; exhaustion.
317	Hill, S. W., Corp'l, H, 36th Wis., age 36.	May 26, J'ne 9, '64.	Right; circ. A. A. Surg. H. M. Dean. Died June 16, 1864; exhaustion. *Spec.* 2490.
318	Hollenback, H. W., Pt., A, 46th Illinois.	April 6, —, '62.	——. Surg. E. C. Franklin, U.S. V. Died April 27, 1862.
319	Honan, M., Pt., B, 10th Vermont, age 24.	April 2, 7, '65.	Right; ant. post. flap. Surg. E. Bentley, U. S. V. Died April 10, 1865; exhaustion.
320	Hoysington, A., Pt., A, 8th Michigan, age 25.	June 26, J'y 4, '64.	Left; circ. A. A. Surg. J. H. Thompson. Died July 29, '64; pyæmia. *Spec.* 2760.
321	Hughes, J. O., Pt., A, 1st Maine H. Art'y, age 29.	May 19, 22, '64.	Right; oval flap; circ. of muscles. Surg. N. R. Moseley, U. S. V. Died May 27, 1864. *Spec.* 2308.
322	Irwin, F. H., Corp'l, E, 93d Penn., age 22.	Mar. 25, Ap. 14, '65.	Left; circ. Surg. D. W. Bliss, U. S. V. Died May 2, '65; pyæmia. *Spec.* 4077.
323	Janvrin, G. A., Pt., B, 12th N. H., age 20.	June 3, 8, '64.	Right; ant. post. flap. Surg. R. B. Bontecou, U. S.V. Hæm. Died June 11, '64; exh'n. *Spec.* 3070.
324	Jenkins, F., Pt., D, 1st New York.	Aug. 31, —, '62.	——. Died October 2, 1862.
325	Jenkins, J., Pt., D, 20th Wisconsin, age 22.	Dec. 7, 22, '62.	——; circ. Surg. T. W. Florer, 26th Ind. Died Dec. 26, 1862; hæmorrhage.
326	Johnson, I., Pt., C, 57th Indiana, age 27.	Nov. 30, De. 28, '64.	Left; lat. flap. A.A. Surg. H. C. May. Died Jan. 1. 1865; exh'n. *Spec.* 3757.
327	*Jones, A.*, Lieut., Texas Regiment.	Feb. 15, Mar. 7, '62.	Right; circ. 18th, hæm. from fem. Died March 18, 1862; hæm.
328	Jones, A. D., Pt., B, 12th New Hamp., age 20.	June 3, 8, '64.	Right; ant. post. flap. Surg. R. B. Bonteeou, U. S.V. 9th, hæm. Died June 11, 1864; exhaust'n. *Spec.* 3062.
329	Jones, W. R., Pt., H, 32d Ohio, age 25.	June 27, J'y 10, '64.	Right; circ. Surg. E. M. Powers, 7th Mo. Died July 13, '64; shock.
330	Keefe, J. A., Pt., H, 63d New York.	Sept. 17, Oc. 10, '62.	Right. A. Surg. L. H. Searle, 26th N. Y. Died Oct. 19, 1862; exh'n. *Spec.* 813.
331	Keeley, E., Serg't, A, 15th Infantry, age 21.	Aug. 7, 12, '64.	Left; circ. Died Nov. 28, 1864; chronic diarrhœa.
332	Kelly, W. D., Pt., I, 13th Ohio.	Jan. 2, 6, '63.	—. Surg. C. J. Walton, 21st Ky. Died Jan. 9, 1863.
333	Kielt, J., Serg't, C, 69th New York, age 20.	Sept. 17, Oc. 10, '62.	Left; lat. flap. Died Oct. 25, '62; pyæm. Autop. *Specs.* 799, 873.
334	Kirby, E., Brig.-General, U. S. V.	May 3, 10, '63.	Left. Surg. B. Norris, U. S. A. Died May 28, 1863; pyæmia. *Spec.* 1076.
335	Koerner, J., Corp'l, E, 10th N.Y.H.A., age 28.	April 2, 15, '65.	Right; circ. Surg. E. Griswold, U. S. V. Died April 24, 1865.
336	Kopp, S. S., Pt., E, 10th Penn. Res., age 21.	Aug. 28, Se. 20, '62.	Right. Surg. C. Page, U. S. A. Died Sept. 22, 1862. *Spec.* 76.
337	Ladd, G. W., Pt., B, 2d New Hamp., age 21.	Aug. 29, Se. 19, '62.	Right. A. A. Surg. H.C.Heilner. Died Sept. 25, 1862. *Spec.* 118.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
338	*Landman, J.*, Pt., —, 6th Georgia.	Sept. 17, Oct. 6,'62.	Left (ulcer'n of post. tib. artery; hæm.); flap. Ass't Surg. R. F. Weir, U. S.A. Died Oct. 14,'62; pneumonia. *Specs.* 789, 875.
339	Lane, T., Pt., F, 6th N. Y. H'vy Art'y, age 50.	May 19, 25, '64.	Right; circ. Surg. E. Bentley, U. S. V. Died May 28, 1864; gangrene. *Spec.* 2658.
340	*Langford, J.*, Pt., E, 60th Georgia, age 36.	July 1, 18, '63.	Left; flap of skin and circ. of musc. Died August 10, 1863; pyæmia. *Specs.* 3856, 3968, 3987, 3988.
341	Lasley, L. C., Pt., H, 124th Ind., age 19.	Mar. 19, Ap. 1,'65.	Right; circ. A.A. Surg. D. Sheppard. Died April 4, '65; shock and exhaustion.
342	Lawson, L. B., Pt., F, 128th New York.	Sept. 19, 26, '64.	Left; modified flap. A. Surg. J. G. Thompson, 77th N.Y. Hæm.; lig. fem. art. Died Oct. 4, 1864; exhaustion.
343	Lebroke, H. F., Pt., A, 6th Maine, age 24.	May 3, 17, '63.	Left. (hæm.). Died May 29, 1863; exhaustion.
344	Lehman, C., Lieut., D, 20th New York S. M.	Sept. 13, Oct. 4,'62.	Right. Died Oct. 9, 1862; prostration. *Spec.* 141.
345	Libbey, J., Pt., G, 69th New York.	Sept. 17, Oct. 8,'62.	Left. Dr. Green. Died Dec. 11, 1862; exh'n. Autop. *Spec.* 1099.
346	Long, J., Pt., E, 148th Penn., age 29.	May 10, J'ne 4,'64.	Right; circ. A. A. Surg. F. H. Colton. Died June 4, '64; shock.
347	Loomis, J., Pt., G, 109th New York, age 31.	May 12, J'ne 2,'64.	Right; circ. Surg. A. F. Sheldon, U. S. V. Gang.; diarrh. Died June 19, 1864; exhaustion.
348	Lontz, J., Pt., D, 94th New York, age 17.	April 2, —, '65.	Left. A.A.Surg. J. Tyson. Hæm.; slough.; lig. fem. art. Died May 26, 1865; exhaustion.
349	Loveland, J., Pt., C, 16th Connecticut.	Sept. 17, Oct. 7,'62.	Left. Surg. T. H. Squire, 89th N.Y. Died Oct. 16, 1862; hæm. *Spec.* 3576.
350	Luce, D. A., Pt., C, 17th Vermont, age 42.	Sept. 30, Oc.17,'64.	Left; circ. Surg. J. T. Kilby, P. A. C. S. Died Dec. 9, 1864.
351	Luherman, C., Corp'l, D, 9th Ohio.	Sept. 19, Oct. 7,'63.	Right; circ. Surg. F. Irish, 77th Penn. Died Oct. 7, 1863.
352	Lunceford, T. J., Serg't, E, 2d West Virginia Cavalry, age 24.	Dec. 21, 1864, Jan. 9,'65.	Left; oval flap; circ. sect. musc. A. Surg. R. F. Weir, U. S. A. Died Jan. 17, 1865; pyæmia. Autopsy. *Spec.* 3811.
353	Lynch, C., Pt., A, 95th New York, age 22.	Mar. 31, Apr. 7,'65.	Left; lat. flap. Surg. N. R. Moseley, U. S.V. Died June 24, '65; exhaustion. *Spec.* 4071.
354	Lyon, S., Pt., C, 84th Indiana, age 23.	Sept. 19, Oct. 6,'63.	Right (erysip.; rec't hæm.; lig.; gangrene). Died Oct. 8, 1863.
355	Mallet, J. H., Pt., E, 19th Iowa, age 30.	Dec. 7, 28, '62.	Left; ant. post. flap. A. Surg. J. J. Sanders, 1st Iowa Cavalry. Died Dec. 30, '62; hæmorrhage.
356	Mallott, F., Pt., A, 92d New York, age 21.	Sept. 29, Oc.15,'64.	Left. A.A.Surg. B. N. McCleery. Died October 27, 1864.
357	Marquardt, J., Pt., G, 11th Wisconsin, age 22.	May 22, J'ne 8,'63.	Right. Surg. E. M. Powers, 7th Mo. Died June 16, 1863; phlebitis and pyæmia.
358	*Marquis, H. M.*, Corp'l, B, 23d N. Carolina.	Sept. 17, Oct. 8,'62.	Left. Surg. H. S. Hewit, U. S.V. Died Oct. 18, '62. *Spec.* 369.
359	Marston, G., Pt., H, 4th Vermont, age 29.	Aug. 29, Se. 15,'64.	Right (mortification); circ. A. A. Surg. J. C. Shimer. Died Sept. 15,'64; shock. Autop. *Spec.* 3831.
360	Martin, H., Pt., H, 26th Ohio.	Sept. 19, 25, '63.	Right. Died Sept. 30, 1863.
361	*Mask, M.*, Pt., A, 23d N. Carolina, age 24.	Sept. 14, 20, '62.	Right. Oct. 6, 8, 9, hæm.; lig. fem. art.; slough. Died Oct. 9, 1862; exhaustion.
362	Maurer, H., Corp'l, K, 7th Maryland, age 24.	Mar. 31. Ap. 6,'65.	Left; flap. Surg. N. R. Moseley, U. S. V. Died April 9, 1865; nerv. exh'n and hæm. *Spec.* 4070.
363	Mayer, J., Pt., H, 44th New York.	Dec. 13, 24, '62.	Left. Died Dec. 29, 1862. *Spec.* 4154.
364	*Mayo, G. W.*, Serg't, A, 43d Alabama.	May 10, 13, '64.	——; ant. post. flap. Surg. C. B. Gibson, C. S. A. Died May 16, 1864; exhaustion.
365	McAvory, W., Pt., G, 73d New York, age 20.	July 2, 8, '63.	Left (hæm.). Died July 11,'63; exhaustion.
366	McCarty, J., Pt., I, 61st Pennsylvania.	June 1, 7, '62.	Left; flap; pyæmia. Died June 11, 1862.
367	McCormick, J. E., Pt., E, 26th Indiana, age 22.	Dec. 7, 12, '62.	Right; ant. post. flap. A. Surg. E. A. Clark, 37th Ill. Died Dec. 24, 1862; hæmorrhage.
368	McCoy, J., Pt., B, 140th Penn., age 17.	May 12, J'ne 3,'64.	Right; ant. post. flap. Surg. R. B. Bontecou, U. S.V. Hæm. Died June 8, '64; exh'n. *Spec.* 3058.
369	McKee, T., Pt., I, 123d Ohio.	June 15, —, '63.	——. Died July 15, 1863.
370	McKenna, P., Pt., I, 67th New York, age 30.	June 1, 16, '62.	——. Died June 18, 1862; exh'n.
371	McLaughlin, R., Pt., H, 142d Penn., age 21.	May 10, 23, '64.	Left; ant. post. flap. Surg. E. Bentley, U. S.V. Gang.; pyæ. Died June 7,'64; asthenia. Autopsy. *Spec.* 2553.
372	McMahon, J., Pt., A, 61st New York.	Sept. 17, —, '62.	Left (hæm.). Oct. 2, fem. art. lig. Died Oct. 16, 1862.
373	McMicken, N., Pt., A, 151st Penn., age 24.	July 2, Au. 1,'63.	Right (sloughing). Died August 12, 1863.
374	McPherson, D., Pt., E, 5th Mich., age 24.	June 2, 14, '64.	Right; circ. A. A. Surg. P. C. Porter. Died June 20,'64; exh'n and pyæmia. *Spec.* 2555.
375	*McPherson, W. H.*, Pt., D, 50th Georgia.	Sept. 14, 24, '62.	Right. Surg. — Boyle, C. S. A. Died Oct. 27,'62. *Specs.* 834, 874.
376	McVeay, J., Pt., E, 23d Penn., age 25.	May 31, J'ne 7,'62.	Right; don. flap. Surg. R. B. Bontecou, U. S. V. Died June 8, '62.
377	Medgley, A. W., Lieut., H, 10th Massachusetts.	May 5, 10, '64.	Left (gang.). Surg G. T. Stevens, 77th N. Y. Died May 11, 1864.
378	Meeker, A., Pt., D, 15th New Jersey.	Oct. 19, 24, '64.	Left (gang.); oval flap. A. Surg. E. B. Nims, 1st Vt. Cavalry. Died Nov. 6, 1864; exhaustion.
379	Melhan, W., Lieut., C, 188th N. Y., age 21.	Mar. 31, Ap. 17,'65.	Left; circ. Surg. D. W. Bliss, U. S. V. Died April 18,'65; exh'n.
380	Melman, C., Pt., B, 1st New Jersey, age 17.	Sept. 17, Oc. 16,'62.	Right. A. Surg. W. M. Notson, U. S. A. Died Oct. 28, 1862. *Spec.* 936.
381	[1]Mensh, C., Pt., H, 33d New York.	May 5, 31, '62.	——; don. flap. Surg. A. B. Mott, U.S.V. Died June 7,'62; gang.
382	Metzer, W., Serg't, E, 1st Louisiana, age 26.	April 23, 29, '64.	Left. A. Surg. G. F. Thompson, 38th Mass. Hæm.; lig. fem. art. Died May 15,'64; exhaustion.
383	Mires, E., Pt., A, 23d Michigan, age 23.	Nov. 30, De. 19,'64.	——; circ. Surg. J. R. Ludlow, U. S. V. Died Dec. 20,'64; hæm.
384	Mohre, A., Pt., K, 104th Pennsylvania.	June 1, 9, '62.	Left. Hæm.; lig. fem. art. Died June 19, 1862. Autopsy.
385	Moore, W., Serg't, I, 33d Missouri, age 44.	July 14, 22, '64.	Left; lat. flap. Surg. J. G. Keenon, U.S.V. Died July 27,'64; exh'n.
386	Morgan, W. E., Corp'l, B, 57th Illinois.	April 6, —, '62.	——. Surg. E. C. Franklin, U. S. V. Died April 26, 1862.
387	Morris, C., Corp'l, F, 19th Iowa, age 48.	Dec. 7, 26, '62.	Right; ant. post. flap. Surg. H. S. Churchman, U. S. V. Died Dec. 26, 1862; shock.
388	Morrison, W. E. L., Pt., I, 29th Conn., age 21.	Oct. 27, Nov. 10, 1864.	Left (Oct. 27, exc. knee j't); circ. A.A.Surg. J. Pitkin. Died Nov. 12, 1864; exhaustion.
389	*Morriton, T. P.*, Pt., E, 1st Miss., age 26.	Nov. 30, Dec. 28, 1864.	Left; ant. post. flap. A. Surg. J. H. Cruthers, 8th Ohio. Died Jan. 2, 1865; hæm.
390	Morse, L. O., Pt., I, 17th Vermont, age 17.	May 9, 27, '64.	Left (slough'g); circ. A.A.Surg. T.W. Carroll. Flaps slough'g; gang. Died May 31, 1864.
391	Murphy, D., Pt., F, 62d Penn., age 18.	Dec. 13, 27, '62.	Right; circ. Surg. O. A. Judson, U. S. V. Jan. 4, '63, hæm.; lig. fem. art. Died Jan. 4,'63; exh'n. *Spec.* 637.
392	Noble, S., Pt., I, 71st Pennsylvania.	Sept. 17, Oct. 9,'62.	Left. A. Surg. W. M. Notson, U. S. A. Died Oct. 28, 1862.
393	Nolf, J., Pt., A, 155th Penn., age 23.	Mar. 25, Ap. 7,'65.	Left; circ. A.A. Surg. L. J. Draper. Hæm. Died April 22, '65. Autopsy. *Spec.* 186.
394	O'Brien, J., Pt., F, 1st Ohio.	Nov. 25, —, '63.	Left. Died December 16, 1863.
395	Osborne, W. P., Serg't, A, 31st Ind., age 26.	April 6, 13, '62.	Right. Hæmorrhage. Died April 15, 1862.
396	*Page, J. M.*, Pt., B, 27th Georgia, age 37.	Aug. 19, 22, '64.	Right; circ. Surg. T. F. Oakes, 56th Mass. Diarrhœa. Died Sept. 16, '64; exh'n. Autopsy.
397	*Patterson, T. A.*, Serg't, A, 43d Alabama.	May 10, 13, '64.	——; ant. post. flap. Surg. C. B. Gibson, C. S. A. Died May 16, 1864; exhaustion.
398	Pearl, S., Pt., F, 97th N. York, age 34.	May 6, 23, '64.	Right. A. A. Surg. P. C. Porter. Died May 31, 1864; exhaust'n.
399	Peasly, J.E., Com. Serg't, F, 6th N. Y. H. Art'y, age 38.	May 31, June 16, 1864.	Left (gang.); circ. A. A. Surg. J. H. Thompson. Died July 18, 1864; exhaustion.
400	Peters, J., Pt., H, 8th Penn. Reserves.	Sept. 17, 27, '62.	Right. Surg. H. S. Hewit, U.S.V. Died October 2, 1862.
401	Piersol, C., Pt., G, 145th Penn., age 19.	June 3, J'y 2,'64.	Left (gang.; diarrhœa). A. Surg. W. F. Norris, U. S. A. Died July 12, 1864; pyæmia.
402	Pinckney, J. C., Pt., I, 7th Minnesota, age 31.	July 19, 23, '64.	Left (gang.); circ. A. A. Surg. W. M. Dowan. Died July 24, 1864, while chloroformed. Autopsy.
403	Pitcher, De W., Pt., K, 2d N. Y. H. A., age 20.	April 7, 13, '65.	——: ant. post. flap. A. Staff Surg. W. J. Burr, U. S. A. Died May 4, 1865.
404	Platt, F., Pt., E, 72d N. York, age 40.	July 2, 5, '63.	Left (hæm.). Died July 8, 1863; exhaustion.
405	Pool, S., Pt., H, 23d N. Jersey.	Dec. 13, 25, '62.	Left. Died December 29, 1862.
406	Porter, W., Pt., H, 16th Connecticut.	Sept. 17, Oct. 8,'62.	Left. Surg. T. H. Squire, 89th N. Y. Died Oct. 10, 1862.
407	Potter, C. H., Pt., C, 31st Maine, age 16.	May 18, 29, '64.	Right; ant. post. flap. A.A.Surg. C. T. Trautman. Hæm. Died June 3, 1864; exhaustion.
408	*Raynor, G. W.*, Pt., G, 12th Alabama, age 18.	April 6, 17, '65.	Right; ant. post. flap. A. Surg. W. Carroll, U. S. V. Hæm.; fem. art. lig. Died May 6, '65; exh'n. *Spec.* 4164.
409	Reigle, J., Pt., H, 88th Penn., age 23.	May 8, 28, '64.	Right; ant. post. flap. Surg. R. B. Bontecou, U. S. V. June 8, 12, hæm.; lig. fem. art. 16, 24, recurrent hæm.; re-lig. Died June 24, 1864; hæmorrhage.

[1] PURDY (E. M.), *Cases of Gunshot Wound*, in *American Medical Times*, 1863, Vol. VI, p. 66.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
410	Reed, W., Pt., G, 39th New York, age 30.	Feb. 6, 11, '64.	Right. Surg. J. Aiken, 71st Penn. Died March 1, 1864; tetanus.
411	*Rentz, J. W.*, Lieut., 13th Alabama, age 21.	Sept. 17, Oct. 7,'62.	Right; flap. A. Surg. C. P. Russell, U. S. A. Diarrhœa. Died Oct. 11, 1862. *Spec.* 800.
412	Rice, S. H., Corp'l, E, 50th Penn., age 29.	May 13, 19, '64.	Right; circ. Died June 7, 1864; pyæmia.
413	Ricker, J., Pt., K, 2d N. Hampshire, age 24.	May 5, 8, '62.	Right; circ. Surg. R. B. Bontecou, U. S. V. Died Sept. 21, 1862.
414	Riggs, I., Pt., I, 8th Penn. Reserves.	Dec. 13, 29, '62.	Left. Surg. J. E. Summers, U. S. A. Died Jan. 10, '63; pyæ. *Spec.* 661.
415	*Roberts, W. P.*, Pt., I, 42d Mississippi.	July 1, 24, '63.	Right; circ. A. A. Surg. J. L. Whitaker. Diarr. Died Aug. 5, 1863; exhaust'n. *Spec.* 2057.
416	Robertson, G., Pt., A, 63d New York, age 42.	Sept. 17, Oc. 17, '62.	Right; flap. A. A. Surg. A. V. Cherbonnier. Died October 21, 1862. *Spec.* 360.
417	Robinson, Mary, wife of Colored soldier.	April 12, 21, '64.	Right; ant. post. flap. Surg. H. Wardner, U. S. V. Died April 26, 1864; exh'n. *Spec.* 3315.
418	Robinson, W. B., Pt., B, 2d E. Tennessee.	Nov. 6, –, '63.	Left (hæm.). Died Nov. 12, '63.
419	*Robison, W. R.*, Pt., D, 29th Alabama, age 23.	May 15, J'ne 7, '64.	Left; circ. A. A. Surg. R. L. McClure. Died June 22, 1864; exhaustion. *Spec.* 3372.
420	Rodden, M. L., Serg't, D, 96th New York, age 25.	May 31, J'e 12, '62	Left; flap. A. A. Surg. W. K. Cleveland. Died June 17, 1862.
421	Rolland, J. G., Serg't, F, 7th New York Artil'ry, age 21.	May 19, 26, '64.	Right; circ. A. A. Surg. W. C. Mulford. Gang. Died June 2, 1864; pyæmia. *Spec.* 2381.
422	Sargent, C. H., Pt., I, 6th N. Hampshire, age 25.	Dec. 13, 1862, Jan. 1, '63.	Right. Died Jan. 7, 1863; shock and suppuration.
423	Scanlan, P., Pt., G, 63d New York, age 34.	Dec. 14, 26, '62.	Right. A. Surg. G. M. McGill, U. S. A. Hæm.; lig. fem. art.; hæm. rec'd. Died Jan. 14, 1863; hæm. Autopsy.
424	Scanlon, J., Pt., A, 3d Maryland.	Aug. 9, 15, '62.	Left; circ. A. Surg. P. Adolphus. U. S. A. Died Aug. 20, 1862. *Spec.* 42.
425	Schadot, J., —, G, 30th Ohio, age 40.	Sept. 17, Oct. 8, '62.	Right. Died October 12, 1862.
426	Schock, W., Corp'l, K, 40th Pennsylvania.	Aug. 9, 16, '62.	Left; ant. post. flap. A. Surg. J. B. Brinton, U. S. A. Hæm.; lig. Died Sept. 2, 1862. *Spec.* 50.
427	Schuyler, W. S., A. D. C. and Capt., 155th N. Y., age 21.	June 3, 16, '64.	Left; circ. A. Surg. W. Thomson, U. S. A. Died June 20, '64; exhaustion. *Spec.* 3560.
428	Secord, J., Pt., B, 43d New York.	May 5, 10, '64.	Left (gangrene). Surg. G. T. Stevens, 77th N. Y. Died May, 1864; gangrene.
429	Sharon, P., Pt., I, 153d New York.	Sept. 19, Oc. 18, '64.	Right (nearly moribund from hæm. Oct. 12, lig. pop'l art.); lat. flap. Ass't Surg. C. H. Allen, 8th Vt. Died Oct. 18, 1864; exhaustion.
430	Shields, H., Pt., C, 61st Pennsylvania.	May 31, J'e —, '62.	Right. Died July 3, 1862; pyæmia. *Spec.* 4940.
431	Shire, J., Pt., B, 5th Ill. Cavalry, age 25.	Feb. 11, Mar. 6, 1863.	——; ant. post. flap. A. Surg. J. B. Ensey, 5th Illinois Cavalry. Died March 6, 1863.
432	Shultz, B., Pt., H, 1st Penn. Artillery, age 21.	May 31, J'ne 9, '62.	——; flap. Died June 15, 1862; pyæmia.
433	Singer, W. H., Pt., C, 7th Virginia, age 22.	Nov. 27, Dc. 15, '63.	Left; circ. A. A. Surg. J. Cass. Dec. 22, hæm. Died Jan. 6, '64. *Specs.* 2006, 2007, 2008.
434	Smith, H. E., Pt., E, 80th New York, age 17.	May 12, 28, '64.	Right (re'nt hæm.); circ. Surg. D. W. Bliss, U. S. V. Died June 2, 1864. *Spec.* 2371.
435	Smith, W., Corp'l, I, 1st N. Y. Dragoons, age 28.	June 11, J'y 6, '64.	Left; circ. A. A. Surg. D. H. King. Died July 17, 1864; asthenia.
436	Spencer, J., Pt., G, 48th Penn., age 19.	May 9, 16, '64.	Right; oval flap. Surg. E. Bentley, U. S. V. Hæm.; lig. Died May 31, 1864; exhaustion.
437	Sproule, L., Pt., E, 37th Illinois, age 23.	De. 7, '62, Jan. 3, '63.	Right; lateral flap. Surg. H. S. Churchman, U. S. V. Died Jan. 9, 1863; pyæmia.
438	Squires, L., Pt., D, 29th Ohio.	Aug. 9, 15, '62.	Left; ant. post. double flap. A. A. Surg. J. B. Bellanger. Died Sept. 5, 1862; exh'n. *Spec.* 52.
439	Stevens, J., Pt., E, 3d Missouri Cavalry.	April 4, 12, '64.	Left. Surg. J. E. Lynch, 1st Mo. Cav. Died one hour after.
440	Stewart, E., Pt., B, 13th W. Virginia, age 25.	July 24, 28, '61.	Left; flap. A. Surg. J. Willard, 1st Md. P. H. B. Died Aug. 5, '64.
441	Stewart, J., Pt., C, 26th Indiana, age 22.	Dec. 7, 11, '62.	Left (gang.); circ. Surg. T. W. Florer, 26th Ind. Died Dec. 24, 1862; hæmorrhage.
442	Stone, B., Capt., —, 11th Massachusetts.	Aug. 30, Sep. 4, '62.	Right. A. Surg. B. Howard, U. S. A. Died Sept. 10, 1862.
443	Stroup, W., Seaman.	Feb. 12, —, '62.	——; double flap. Surg. E. C. Franklin, U. S. V. Died March 5, 1862.
444	Strunk, W. C., Pt., G, 56th Mass., age 26.	July 30, Au. 12, '64.	Left (slough.); circ. A. A. Surg. E. Seyffarth. Died Aug. 12, '64.
445	Sturdevant, J. H., Pt., C, 5th Vermont, age 20.	May 12, 24, '64.	Left. A. Surg. M. J. Hyde, 2d Vt. Necrosed. Aug. 20, hæm.; re-amp. Died Aug. 21, 1864.
446	*Swink, J.*, Pt., K, 5th Virginia, age 18.	May 3, 12, '63.	Right; circ. Died June —, 1863.
447	Taylor, T. L., Pt., C, 82d Ohio.	Aug. 31, —, '62.	——. Died October 9, 1862.
448	Thompson, A., Corp'l, A, 98th Penn., age 29.	April 2, 25, '65.	Right (erysip.; hæm.). Surg. D. W. Bliss, U. S. V. Died May 23, 1865. *Spec.* 4096.
449	Thornbury, L., Pt., C, 97th Penn., age 20.	July 25, Au. 1, '64.	Right; circ. A. A. Surg. W. L. Welles. Died Sept. 13, 1864; irritative fever.
450	Tournier, I., Pt., A, 147th New York, age 42.	May 5, 9, '64	Left; ant. post. flap. Died Aug. 15, 1864.
451	Unknown.	Dec. 7, 11, '62.	Left. Surg. J. P. Root, 2d Kansas Cavalry. Died Dec. 13, 1862.
452	Vanderhoof, N. P., S'g't, B, 146th N. Y., age 21.	May 1, 5, '63.	Left (hæm.); circ. Died May 16, 1863. Autopsy.
453	Walker, J., Serg't, F, 2d Maryland, age 21.	June 16, J'y 6, '64.	Left (J'y 2, hæm. recur'd; gang.); circ. A. A. Surg. J. Winslow. Died July 6, 1864; asthenia.
454	Walker, P., Pt., C, 37th Wisconsin, age 38.	June 3, 20, '64.	Right; circ. Surg. S. S. French, 20th Mich. Exf. bone extracted. Died Aug. 22, 1864. *Spec.* 3128.
455	Watts, J. H., Serg't, K, 110th Penn., age 24.	Mar. 26, Ap. 2, '65.	Left; circ. Diarrhœa. Died April 22, 1865; exhaustion.
456	Weaver, J., Pt., G, 103d Penn., age 31.	May 31, J'ne 4, '62.	Left; flap. Died June, 1862.
457	Welch, E., Pt., I, 14th Indiana.	July 3, –, '63.	Right; ant. post. flap. Surg. H. M. McAbee, 4th Ohio. Died July —, 1863.
458	Wells, F. M., Lieut., D, 132d Pennsylvania.	May 2, 6, '63.	Left. Died June 2, 1863. *Spec.* 1064.
459	Westlake, W. W., Corp'l, A, 17th Conn., age 18.	July 2, 14, '63.	Right. Died July 25, 1863; tetanus.
460	Whitcher, O. B., Corp'l, M, 8th New York H'vy Artillery.	June 1, 13, '64.	Left; ant. post. flap. Surg. E. Bentley, U. S. V. Hæm. Died June 18, 1864; hæmorrhage.
461	Wilber, N., Pt., C, 185th New York, age 31.	Mar. 29, Apr. 2, '65.	Left; circ. Surg. D. W. Bliss, U. S. V. Died April 18, '65; fract. of cranium. *Spec.* 4041.
462	Wilbur, W. F., Corp'l, I, 29th Ohio, age 24.	May 3, 8, '63.	Left; circ. May 15, hæm., lig. fem. art., recur'd, prof. ligated. Died May 17, 1863.
463	Williams, H. P., Pt., G, 53d Penn., age 17.	May 5, 20, '64.	Right; ant. post. flap. Surg. R. B. Bontecou, U. S. V. Died June 14, 1864; pyæmia. *Spec.* 3059.
464	[1] Williams, R., Pt., C, 28th Penn.	Sept. 16, 30, '62.	Right; flap. A. Surg. C. A. McCall, U. S. A. Died October 2, 1862. *Spec.* 59.
465	Wilson, W., Pt., I, 2d New York Cavalry.	April 9, 16, '64.	Right; circ. Surg. F. Bacon, U. S. V. Died April 28, 1864.
466	Witman, J., Pt., A, 16th Michigan, age 23.	May 10, 25, '64.	Left; ant. post. mus. flap. Surg. A. F. Sheldon, U. S. V. Died May 27, 1864; exhaustion.
467	Wolford, J. R., Serg't, B, 30th Indiana.	Sept. 19, Oc. 19, '63.	Right. (hæm.). Died Nov. 13, '63.
468	Wynne, W. G., Pt., F, 66th New York.	Sept. 17, Oc. 16, '62.	Left; flap. A. Surg. P. Adolphus, U. S. A. Oct. 25, hæm.; lig. fem. art. Died Nov. 3, '62. Autopsy. *Spec.* 746.
469	Wyzuski, C., Pt., B, 3d Md. Cavalry, age 26.	May 18, 29, '64.	Left; circ. A. A. Surg. R. W. W. Carroll. Died May 31, 1864; pyæmia.
470	Yearby, J., Waiter, C, 12th N. Hamp., age 25.	Aug. 7, 12, '64.	Left; flap. A. A. Surg. H. B. White. Died August 20, 1864; exh'n.
471	Young, G. W., Pt., F, 114th Pennsylvania.	May 3, 8, '63.	——. A. Surg. B. Howard, U. S. A. Died May —, 1863.

The seat of fracture in the cases enumerated in the foregoing table was in the middle third of the femur in seventeen; in the lower third, in ninety-four; in the femur, without specification of third, in sixty-six; in the knee joint, in two hundred and thirty-four; in the leg, in fifty-six; and in the ankle joint or foot in four instances.

[1] Coues (E.), *Cases of Amputations and Resections, from Gunshot Wounds, performed by Assistant Surg. C. A. McCall, U. S. A.*, in *Medical and Surg. Reporter*, 1862–3, Vol. IX, p. 195.

Intermediary Amputations in the Lower Third of the Thigh.—There were six hundred and seventy-six of these operations. Two hundred and seventeen were successful and four hundred and fifty-nine terminated in death—a mortality of 67.9 per cent.,—exceeding the fatality of the intermediary amputations in the upper third by 1.9 per cent. and the same operations in the middle third by 11.5 per cent.

Successful Cases of Intermediary Amputations in the Lower Third of the Thigh.—Of the series of six hundred and seventy-six intermediary amputations in the lower third two hundred and seventeen had favorable results, comprising thirty-one Confederate and one hundred and eighty-six Union soldiers. Of the latter, one hundred and eighty-four were pensioned and one retired, and eight have died since the close of the war in 1865. Of fifty-three of these cases pathological specimens are preserved in the Army Medical Museum.

CASE 464.—Private W. Vannatta, Co. D, 4th Pennsylvania Cavalry, aged 24 years, was wounded at Upperville, June 21, 1863, and entered Stanton Hospital, Washington, three days afterwards. Surgeon J. A. Lidell, U. S. V., reported: "The patient, a man of sound constitution, had received a wound of the right knee by a carbine ball. The missile entered the limb on its anterior inner face a short distance below the joint, passed backward and upward, and escaped through the popliteal space, apparently without opening the joint. From the course and direction of the wound the upper part of the tibia was supposed to be injured. At the time of admission the patient's condition was good, there being no pain, heat, or swelling about the injured knee. He was directed to refrain from using it by remaining quietly in bed, to have ice applied to the wound constantly so as to lessen the danger of inflammatory action, and to be supported by nutritious diet. Under this treatment his case progressed without an untoward symptom until July 5th. At inspection, on this day, I especially noticed his condition as very promising, the anterior orifice of the wound being nearly healed. But, about the middle of the following night, he was seized with great pain and distress in the injured knee, and full doses of morphia were administered without producing much relief. On the following morning the knee was found to be greatly swollen, hot, and exceedingly tender, the patient complaining of intense gnawing pain in it, and crying out from agony occasioned by it. Although his pupils were markedly contracted from the large quantities of anodynes taken, his countenance was expressive of great distress; pulse frequent, quick, and irritable; skin hot and dry; he was also thirsty, had a coated tongue, and had had a slight chill. Free abstraction of blood from the neighborhood of the knee by cups was ordered, also ten grains of calomel, and anodynes as required. On July 7th, the patient's condition had not materially changed. Seeing that the arthritis was secondary to the wound, and believing that it was associated with fracture and comminution of the upper end of the tibia, amputation appeared to be the proper remedy. The operation was accordingly performed by Assistant Surgeon P. C. Davis, U. S. A., in the lower third of the thigh, by the circular method, about midday—thirty-six hours after the attack. Anæsthesia was produced by sulphuric ether. The patient bore the operation well. On examining the amputated limb the inner part of the head of the tibia was found to be extensively injured by the bullet, a deep groove having been made in the bone, associated with much comminution, and some of the broken fragments connected directly with the joint. The cavity of the knee joint was found to contain about four ounces of dirty-brown colored viscid liquid, in which yellowish shining globules (synovia), looking like oil, floated. The lining membrane of the joint was stained with a dull red hue throughout its whole extent and had entirely lost its polished and shining appearance. The internal semilunar cartilage completely covered the opening in the head of the tibia. On July 10th, the patient was progressing pretty well." On October 2d, he was transferred to Turner's Lane Hospital, Philadelphia, where a second operation was performed by Acting Assistant Surgeon C. B. King, who described it as follows: "When admitted, the femur was protruding about half an inch, and appeared to be dead as far up as could be felt with the probe, a ring of new bone being thrown around it. The discharge was very profuse. On October 5th, the patient having been placed under the influence of ether, an oval incision was made around the end of the bone and through the cicatrix and some unhealthy granulations, when, after dissecting the muscles for a short distance, the vitality of the new bone was found to be small, and lateral incisions were made and the flaps dissected up for about four inches, where the new bone seemed to be more healthy, and was sawn off. About four inches of the remaining dead bone, which I judged as reaching up as far as the great trochanter, was extracted with the forceps. The femoral artery was avoided by making the internal lateral incision below the vessel, and the patient lost but little blood. Three or four small arteries were ligated, and the wound was closed with iron wire and adhesive straps. The patient, being very weak from suppuration and the shock of the operation, was rallied with difficulty. Cold-water dressings were applied and stimulants administered. On the following day the patient was still very weak, had a slight fever and coated tongue, and the stump was very much inflamed and swollen. The sutures were removed and the straps loosened, and milk punch, beef tea, and generous diet were ordered. On October 12th, the inflammation was somewhat reduced, the discharge free but very offensive, and the patient was gaining strength slowly and his appetite improving. The ligatures were now removed. On October 18th, the bands were removed, union having taken place in the stump. On November 4th, the wound had closed with an abundance of flap, and the patient was going about on crutches. On November 16th, he was transferred to Haddington Hospital for the purpose of getting an artificial limb." Acting Assistant Surgeon J. R. Levis, in charge of the latter hospital, recorded the following result of the case: "At date of admission a fistulous opening existed in the stump, and on examination by the probe the whole wall of this sinus was found to have an osseous fell leading directly to the end of the femur, where loose spiculæ of bone were clearly perceived. A small pledget of sponge tent was applied, and on November, 20th the orifice was well dilated, and, with the dressing forceps, several pieces of bony formation were removed, which crumbled readily under pressure; also a good sized spicula from the sawed surface of the femur. Some inflammation followed this operation, for which lead and opium lotion was applied; perfect quiet

was enjoined, and anodynes given at bedtime. On November 23d, the inflammation was still continuing and the patient suffering intense pain in the stump, but two days afterwards both were subsiding. On December 1st, another examination was made by the probe and another small piece of bone was extracted. By December 10th, his health had improved, the discharge had much lessened, and the stump was doing well, the patient stating that it felt better than at any previous time. In January, 1864, the patient went to his home on furlough, and in the following month, when he returned, the discharge had almost ceased. On March 1st, the sinus had closed and the stump was apparently sound." The patient was subsequently transferred to Christian Street Hospital, and was discharged from service June 7, 1864, and pensioned. Examiner J. Walker, of Bethany, Missouri, certified, May 2, 1874: "I find him unable to wear an artificial limb on account of tenderness and shortness of the stump. He is unable to raise the stump in walking, and wears a wooden peg with a leather socket, buckled around his waist. He is also unable to raise the peg, but moves it by moving the side of his body. The stump chafes so easily that he can wear the socket but a short time, and then has to use a crutch." The pensioner was paid June 4, 1879. The bones comprising the knee of the amputated limb were transmitted to the Museum by Surgeon Lidell, and the involucrum and sequestrum, removed at the second operation, together with a cast of the stump, were contributed by the operator. (*Cat. Surg. Sect.*, 1866, pp. 341, 309, and 555, *Specs.* 1336, 2602, and 1529.) *Specimen* 2602 is represented in FIG. 1 of PLATE LXX, opposite p. 242.

CASE 465.—Corporal H. H. Ellis, Co. I, 16th New York, aged 23 years, was wounded in the left knee, at Fredericksburg, May 3, 1863. Five days after the injury he was admitted into Douglas Hospital, Washington, whence the following history was received: "On examining the wound it was found that a conical ball had fractured the patella so extensively as to involve the joint. On May 13th, there were symptoms of synovitis, and the thigh was amputated at the lower third, by the circular method, by Acting Assistant Surgeon J. E. Smith. Portions of clothing were removed from the amputated knee, and an examination showed that the patella had been broken into numerous fragments, that a fissure extended through the inner cartilaginous face of the bone, and that synovitis had been developed. The patient was broken down with diarrhœa. The stump was dressed with alcohol, and stimulants, quinine, and nutrients were given as largely as possible. The general condition of the patient was so unfavorable that no effort at repair was perceptible in the stump for many days. On May 20th, a hæmorrhage of several ounces occurred and was controlled by pressure. During the following night the bleeding recurred so freely as to render a ligation of the femoral artery necessary, which was performed below the profunda on May 21st. The patient was so prostrated from the loss of blood that he almost died from the effects of the ether. The most careful administration of whiskey, ammonia, valerian, and morphia alone sustained his life during the next forty-eight hours. There was no recurrence of hæmorrhage after the ligation, nor did this ligature of the main artery produce the slightest perceptible effect upon the appearance of the stump. The usual changes were resorted to in the various astringents given for the diarrhœa, nitrate of silver, opium, tannin, and sulphuric acid, all proving at first beneficial and then losing their effect. Lemon juice was given, as the patient's stomach would bear it, with evident benefit as an antiscorbutic. For weeks the patient hung between life and death. His whole thigh was much swollen and very tender on pressure; the incisions were healthy in appearance, the discharge moderate, and the granulations very tedious. Under a careful treatment he gradually grew stronger, his diarrhœa ceased, and the stump, though yet greatly swollen, became closed excepting at the inner extremity, where the end of the femur protruded, the flaps from the first having been insufficient. On August 9th, Dr. Smith was ordered to remove the exfoliating end of the bone, which was loose, and, to his surprise, proved to be a very extensive sequestrum ten inches in length. Considerable hæmorrhage supervened, but after the operation convalescence was very rapid, and the stump, no shorter than before, soon closed entirely, being firm and in every way satisfactory. A formation of new bone could be plainly felt in it. The patient regained his flesh and strength, and left the hospital October 26, 1863, his term of service having expired May 22d." The history, with the sequestrum, represented in FIG. 1 of PLATE LXIX, opposite p. 224, and the bones of the amputated knee, were contributed to the Museum by Assistant Surgeon W. Thomson, U. S. A., in charge of Douglas Hospital. A ligamentous preparation of the latter specimen constitutes No. 1852 of the Surgical Section. The patient was subsequently an inmate of the Post Hospital at Albany, and afterwards entered Central Park Hospital, New York City, to be fitted with an artificial limb by Dr. E. D. Hudson. He left for his home June 6, 1864. His pension was paid June 4, 1879. (See wood-cut 64, p. 63, *Circular* 6, S. G. O., Washington, Nov. 1, 1865.)

CASE 466.—Private J. Nash, Co. G, 143d Pennsylvania, aged 21 years, was wounded at North Anna, May 22, 1864. He was admitted to the field hospital of the 4th division, Fifth Corps, where Surgeon C. W. Chamberlain, U. S. V., recorded: "Severe shot wound of right knee joint by musket ball." From the field hospital the wounded man was conveyed to Port Royal, and thence by steamer to Washington. Surgeon D. W. Bliss, U. S. V., reported that "the patient entered Armory Square Hospital May 29th, having undergone circular amputation of wounded limb at the lower third of the thigh the day previous to his admission, while on board of the hospital transport." On July 22d, the patient left for his home on furlough, whence he returned several months afterwards, and subsequently he was transferred to Judiciary Square Hospital. Surgeon E. Griswold, U. S. V., in charge of the latter, reported that the presence of necrosed bone in the stump having been indicated by suppuration, a tubular sequestrum, eight and three-fourths inches long, was removed on April 9, 1865, by Acting Assistant Surgeon F. H. Hill. On June 22, 1865, the patient was discharged from service and pensioned, having been previously supplied with an artificial limb by the Jewett Patent Leg Company of Washington, D. C. His pension was paid March 4, 1879. The sequestrum (*Cat. Surg. Sect.*, 1866, p. 308, *Spec.* 144) is shown in FIG. 2 of PLATE LXIX, opposite p. 224.

Eight of the patients who recovered after intermediary amputation in the lower third have died since the close of the war. In the following instances the pensioners survived the operation three and nine years respectively:

CASE 467.—Private J. Glassie, Co. B, 63d New York, aged 22 years, was wounded at Cold Harbor, June 3, 1864, and admitted to the field hospital of the 1st division, Second Corps. Surgeon W. S. Cooper, 125th New York, noted: "Shot wound of left leg; amputation at lower third by Surgeon P. E. Hubon, 28th Massachusetts." One week after the reception of the injury the man was admitted to Emory Hospital, Washington, where Surgeon N. R. Moseley, U. S. V., recorded that the limb was

re-amputated above the knee on June 20th, also that abscesses formed subsequently, and that the stump of the femur became hypertrophied. On March 10, 1865, the patient was transferred to Central Park Hospital, New York City, whence Surgeon B. A. Clements, U. S. A., reported the following: "When admitted, the end of the stump was red and inflamed, and there were three sinuses leading to necrosed bone. On March 19th, chloroform was administered, and a sequestrum about eight inches long was removed by Acting Assistant Surgeon S. Teats. The patient did well after the operation. By July 15th, the stump had entirely healed, and one month later he was discharged from service." The man subsequently became a pensioner. He died at Brooklyn, New York, November 12, 1867. The removed fragment was contributed to the Museum by the operator, and constitutes *Specimen* 3100 of the Surgical Section. A representation of it appears in FIG. 3 of PLATE LXIX, opposite p. 224.

CASE 468.—Private Alexander McConkey, Co. D, 63d Pennsylvania, aged 48 years, was wounded at the Wilderness, May 5, 1864, by a conoidal ball, which entered on the inner condyle of the left knee, passed through the joint, and made its exit on the opposite side. He was conveyed to Washington, and admitted into the Harewood Hospital on May 14th. Surgeon R. B. Bontecou, U. S. V., furnishes the following notes of the case: "An examination of the injury was immediately made; the soft parts around the wound were found much inflamed and the joint œdematous. His general condition being good, it was decided to amputate without delay, and the patient being chloroformed, Surgeon Bontecou removed the thigh in the lower third by the lateral flap operation. The stump healed favorably, the ligatures came away on the eighth day, and the patient progressed well on a supporting diet until, July 29th, he had so far recovered as to be about on crutches, when he accidentally fell, injuring the stump, which became inflamed; alcohol and water dressings were applied. On August 4th, an abscess was opened, which discharged about four ounces of pus. 5th, he had a severe attack of diarrhœa, which was checked by proper treatment. 30th, condition very good; a small sinus still exists, owing to some necrosed bone." He was transferred to Pittsburg, April 3, 1865, and admitted into hospital there. The wound had entirely healed, and he was discharged May 19, 1865. He was pensioned, and died May 15, 1873; the cause of death is not satisfactorily given. The pathological specimen, showing the bones of the left knee, with the articular extremity of the femur shattered (No. 3066, *Sect.* I, A. M. M., *Cat.*, 1866, p. 338), was contributed by the operator, who also furnished a photograph of the stump, which is copied in the adjoining wood-cut, FIG. 195.

FIG. 195.—Appearance of thigh stump after lateral flap operation. [From a photograph.]

Fatal Cases of Intermediary Amputation in the Lower Third of the Femur.—This group comprises four hundred and fifty-nine operations performed on four hundred and fifty-seven patients, in two instances intermediary amputations in the lower thirds of both thighs having been performed:

CASE 469.—Private W. Sailor, Co. E, 119th Pennsylvania, aged 40 years, was wounded in the left leg by a conical bullet, at Rappahannock Station, November 7, 1863. Two days afterwards he was admitted to Stanton Hospital, Washington, whence Surgeon J. A. Lidell, U. S. V., made the following report: "On examination, it was found that the injured leg was much swollen and dark colored on its anterior surface, that there was no pulsation in the anterior tibial artery, and that both the tibia and fibula were extensively comminuted, with much laceration of the soft parts. His pulse was frequent and irritable, and he had a good deal of constitutional disturbance and fever of an irritative type. On November 14th, the fever had abated, and the general condition much improved; pulse fuller and less irritable; appetite better; wound suppurating; discharge thin, dark colored, and offensive; leg not improved. There being manifestly no hope of saving it, the bones being broken and the soft parts inflamed nearly up to the knee joint, and comminution very extensive, the limb was amputated in the lower third of the thigh. The operation was performed by the circular method by Assistant Surgeon G. A. Mursick, U. S. V., under sulphuric ether. A dissection of the amputated limb showed that the bones were extensively comminuted as high up as the head of the fibula. The anterior tibial artery was found to be divided by the bullet a little below where it passes through the interosseous membrane, the ends being separated from each other about one inch and retracted within the sheath, also closely contracted. The cardiac end was plugged up by a firm coagulum about an inch in length. The distal end was also plugged up by a small coagulum. The anterior tibial muscles were pale yellow in color, soft and greasy to the touch (fatty degeneration). The patient bore the operation well. The stump was dressed with lead sutures and adhesive plaster, and a full dose of morphine was administered. He had a good night's rest after the operation, and, on the following day, expressed a desire for food, his pulse being full, frequent, and quick; bowels confined, for which a dose of rochelle salts was ordered. On November 17th, suppuration commenced, but little of the stump being united by adhesion; general condition good. Prescribed moderate stimulation, with whiskey. 18th, edge of posterior flap looked sloughy; ordered diluted Labarraque's solution to the stump, and twenty drops of muriated tincture of iron every six hours internally. 20th, had a chill in the morning, followed by fever and sweat; skin sallow looking; granulations in stump looking well, except on the posterior flap, a small portion of which was sloughing. Ordered five grains of quinine every six hours, twenty drops of muriated tincture of iron every four hours, and one ounce of whiskey every three hours. 21st, had a chill in the afternoon; sallow appearance of skin deepened; pulse irritable; slight subsultus; bowels not moved for two days. Ordered ten grains of aloes and twenty grains of rhubarb to be given at once, and continued other treatment. 22d, had chills again in the afternoon, with slight delirium. Ordered one-twelfth of a grain of corrosive sublimate, with three grains of iodide of potassa, every four hours, and continued the whiskey. 23d, patient vomited in the morning, had also a good deal of fever. Applied sinapism to epigastrium. 24th, rigors, etc., in the morning; treatment

continued. 25th, rigors, fever, and delirium; skin very yellow. 28th, rigors, etc.; urine passed involuntary; bedsores on sacrum. Ordered a water bed. Patient died, exhausted, on December 1, 1863, the seventeenth day after the amputation and the eleventh day after the advent of the purulent infection. Autopsy twelve hours after death: Rigor mortis well marked; skin yellow; some emaciation; stump swollen and œdematous; femoral artery well plugged up in stump; end of femoral vein well sealed up in stump; femoral vein empty and collapsed from the end up to the valve at the first anastomosing branch, a distance of about six inches; the vein in this situation about as large as the artery; the walls of the vein also much thickened, being about as thick as those of the artery; the lining membrane looking velvety, wrinkled, and dirty gray in color; no pus in vein. From the valve above mentioned up to the mouth of the vena profunda, a distance of about two and a half inches, the femoral vein was filled to distension with fetid broken down liquefied blood, its lining membrane dirty gray colored in this situation, and its walls somewhat thicker than natural; no pus revealed in this locality by the microscope. At the mouth of the vena profunda the femoral vein was plugged up with yellowish white fibrine; vena profunda and many of its branches filled and knotted with recent coagulum; femoral vein also filled with recent coagulum above the mouth of the profunda to a distance of about two and a half inches; the lining membrane of the profunda and part of the femoral vein last mentioned stained dark red, and the walls of the vessels somewhat thickened in same locality. A thin dark colored recent coagulum, not filling the calibre of the vein, extended the whole length of the external iliac. The end of the femur in the stump (FIG. 2, PLATE XLIII, opposite) was necrosed to the extent of nearly half an inch, and here the periosteum was thickened, varying from a line to one-third of an inch, detached and gangrenous; underlying bone white in color; medullary membrane at end of bone gangrenous and dirty grayish green in color to the depth of about one-third of an inch; medullary membrane elsewhere more vascular than natural, which was well shown by splitting the bone lengthwise with a saw (FIG. 1 of PLATE XLIII, opposite). Three or four small superficial abscesses were formed about the right extremity of the spleen; the rest of that organ was contracted and indurated. Five or six small superficial abscesses were discovered in the lungs, the pulmonary tissue surrounding each of them being consolidated by inflammatory action. The other organs were natural, and the blood did not exhibit any abnormity." The femoral artery (*Spec.* 1887) and the femoral vein (*Spec.* 1888), together with three inches of bone from the stump (*Spec.* 1890), and the section of the spleen containing the metastatic abscesses (*Spec.* 1889, shown in FIG. 3, PLATE XLIII, opposite), were contributed to the Museum by Dr. Lidell.

In the following instance a shot injury of the inner condyle of the right femur was followed by severe secondary arthritis, which necessitated amputation. The autopsy revealed suppurative osteo-myelitis:

CASE 470.—Private *J. N. Saxon*,[1] Co. D, 9th Louisiana, aged 27 years, was wounded in the right knee, at Rappahannock Station, November 7, 1863, and suffered amputation at the Stanton Hospital, Washington. Surgeon J. A. Lidell, U. S. V., who performed the operation, described the case as follows: "A conical bullet entered the knee about three inches above the patella, on a line with its inner margin, passed backward, downward, and a little inward, and escaped at the inner posterior side, about six inches below the joint. The inner condyle of the femur was fractured by the missile passing through it, but without opening the cavity of the joint. The patient stated that his knee was bent at the time of the infliction of the wound. He was admitted two days after the injury and did well, having good spirits, good appetite, and but little pain or swelling of the parts until the night of November 16th, when he had a severe chill, accompanied with great pain in and about the knee, and the injured parts became hot and swollen. On the following morning he exhibited great constitutional disturbances: skin hot; tongue coated white; pulse very rapid, gaseous, and weak. The injured knee was much swollen and exquisitely tender, and he complained of intense pain in it; the anterior orifice of the wound presented a gelatinous appearance, with elevated and everted edges. The patient appeared so feeble that I thought he would not then bear the shock of an amputation, and ordered him to take whiskey freely with anodynes. The next day, November 18th, his general condition appeared unchanged with the exception of his pulse, which was stronger and not gaseous, being 120 by the watch. He had not slept during the night, and complained of great pain in the knee, which was rather more swelled, and the tumefaction was extending up the thigh. The wound presented the same gelatinous appearance as the day before, and the skin over the saphenous veins looked purple colored, but the veins did not exhibit any induration. The thigh was amputated at the lower third, by the flap method, at 1 P. M., about thirty-six hours subsequent to the accession of the secondary arthritis. The patient was under sulphuric ether and bore the operation well. Examination of the amputated member showed the inner condyle of the femur to be extensively comminuted. There was a layer of yellowish gray colored plastic exudation on the articulating surfaces of the fragments in the joint, and the cavity of the joint contained about three ounces of reddish brown colored liquid, in which shining globules floated resembling oil in appearance. The synovial membrane was reddened, especially the pouches of it in relation with the quadriceps extensor cruris. The subcutaneous areolar tissue was infiltrated with a yellowish serum. The bullet was ascertained to have passed behind the joint. On the day following the operation the patient's tongue was coated and his appetite poor; he had also moderate diarrhœa, the evacuations being very offensive. Five grains of blue mass was given at night, and free stimulation with whiskey. On the 20th, the patient was comfortable and the stump looked well. The diarrhœa was unchanged, but during the following several days it gradually abated and the patient progressed well in every respect. 28th, patient cheerful; tongue clean; appetite good; bowels regular; stump but little swollen; granulations healthy; suppuration moderate in quantity and laudable in quality. 30th, patient appeared to be doing well, but complained a good deal of pain in and about the stump. December 1st, patient restless and complaining of increased pain in the stump, especially about the end of the bone; no preternatural swelling, redness or heat in the stump. Prescribed one-fourth of a grain of sulphate of morphia and one drachm of Hoffman's anodyne every four hours. 2d, patient more restless, appearing much agitated and very nervous, having slept but little, and complaining of agonizing pain about end of bone and end of femoral artery. There were exacerbations in the pain and sometimes the whole stump ached, but there was no febrile excitement and nothing untoward in the appearance or feel of the stump; neither was it

[1] LIDELL (J. A.), in *Surgical Memoirs, * * by the United States Sanitary Commission*, New York, 1870, Vol. I, p. 358, gives a detailed account of this case.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5

PLATE XLIII.—RESULT OF OSTEOMYELITIS

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swelled, red, or hot. 3d, patient had a bad night, and complained much of sickening pain in end of stump and in bowels. About 7 A. M. the ligature separated and a most profuse hæmorrhage occurred, the blood pouring out in a stream as large as the calibre of the artery. It was finally stopped by digital compression, but, in the meantime, he had lost more than six pounds of blood, which brought him very low. He was stimulated as freely as possible with whiskey and carbonate of ammonia, but did not rally, and died about 3 P. M. Autopsy twenty-three hours after death: Surface of body very pale and waxy (exsanguinated); rigor mortis strong; superficial lymphatic ganglia lying along the vena saphena magna of amputated thigh all enlarged and exhibiting a faint reddish hue on section; deep ganglia not affected; stump not œdematous and no part sloughy; stump healed throughout except in the track of the ligatures and at the end of the bone. The femoral ligature had come away and the end of the vessel was patulous, uncontracted, and unobstructed. The c ats of the artery were infiltrated with blood (recent) at its end and for about half an inch above it. A branch of considerable size was given off from the artery about three-fourths of an inch above its end, which had apparently interfered with the formation of a suitable clot for the permanent plugging up of the vessel; there had been but little effort towards occlusion. No other abnormity existed in the artery. The end of the femoral vein was well sealed up, the vein itself diminished in size up to the nearest valve, a distance of about an inch, and its walls thickened in same locality so as to equal those of the femoral artery; lining membrane not stained with blood; no emboli and no thrombi found anywhere, and no vein presenting any abnormity, the vena profunda not being overlooked. A remarkable osteophyte was found in relation with the femoral artery and vein at their respective ends in the stump. It was developed from (connected with) the linea aspera, a little above the end of the femur, and thence passed horizontally inward, separating or forking into distinct plates, toward the ends of which the one laid in front of and was closely adherent to that side of the artery at and near its end; the other laid behind and was adherent to the vein at and near its end. This osteophyte was about seven-eighths of an inch wide where broadest, and about one-fourth of an inch thick. It was of recent formation. The lower part of the femur in the stump was moderately enlarged by deposit (laminated) of new bone beneath the periosteum (hyper-nutrition); this membrane was detached for about one-fourth of an inch above the line of the saw all the way round the bone, which presented a dull white color in that locality. The medullary membrane was noticed to bulge out a good deal at the end of the bone and to present a dark red or reddish brown color. It was also strong and tough (flesh like). On sawing through the lower part of the femur lengthwise and cleaning off the bone dust the medullary membrane was seen to be more vascular than natural; the medullary tissue exhibited about a dozen small milk-colored abscesses on the surface of the section, showing pus under the microscope, and varying in size from that of a split pea to a mustard seed. The osseous tissue outside of the medullary canal was more compact and heavier than natural in the same locality. The periosteum was thickened to the extent of from one to three lines and more vascular than natural, the thickening being greatest where it had been detached from the bone. There was also a small abscess, flattened in shape, and holding about an ounce of cream-like pus, in the quadriceps extensor cruris muscle, and the red muscular tissue in immediate relation with it was changed to a dark brown color, which, however, did not extend to any depth. The spleen was enlarged, and the other organs all exsanguinated but presenting no other abnormity." The bones of the knee of the amputated limb (*Spec.* 1819), the femoral vein and artery (*Spec.* 1892), with portion of the osteophyte attached, and a longitudinal half section of the lower end of the stump of the femur (*Spec.* 1860, shown in FIG. 4 of PLATE XLIII, opposite p. 290) four and one-fourth inches long, were contributed to the Museum by the operator.

Gangrene of the thigh stump was reported in forty-seven instances, and, in the following instance, tetanus, which appeared on the tenth day after the amputation, hastened the fatal issue:

CASE 471.—Captain *W. E. Davis*, Co. B, 30th North Carolina, aged 25 years, was wounded in the skirmish at Kelly's Ford, Virginia, November 7, 1863. He was conveyed to the hospital of the Third Corps, and, November 10th, was transferred to Washington and admitted into Douglas Hospital. Acting Assistant Surgeon Carlos Carvallo reported that the ball entered the anterior external aspect of the right leg about two and a half inches below the inferior edge of the patella, one and a half inches external to the median line of the leg, and one and a quarter inches below the head of the fibula, where it fractured the bone, and descending downward, inward, and backward, emerged in the posterior internal aspect of the leg, midway between the inferior edge of the patella and the internal malleolus, internal to the bulk of the gastrocnemius muscle. The right foot was cold, of a purple hue, and entirely senseless; the leg, from knee to upper portion of lower third, was swollen and emphysematous, and the middle third was of a yellow and dark green, intermixed with a brown-purple hue. Diagnosis: Gangrene of the foot and leg from gunshot wound of leg, with, most probably, injury and obliteration of the main arteries. Amputation was the sole treatment indicated, the foot and lower portion of the leg being completely mortified. Assistant Surgeon W. Thomson amputated the thigh at the lower third by the circular method. The femoral was secured by digital compression and the tourniquet. Very little arterial blood was lost. A grain of morphia was administered in a half ounce of whiskey immediately after the operation, he having readily revived from the ether narcosis, and he stated that he had slept undisturbed during the operation, without dreaming, and was now entirely free of pain. The cut surface of the stump showed the tissues infiltrated and of an unhealthy appearance. Stimulants were administered. The stump was dressed with dry charpie. At night the pulse was 130, tongue moist, skin dry. The stump was boggy and crepitant to pressure, and a dark discoloration was visible on the external aspect extending to the tensor fascia lata. November 12th, towards evening a line of demarcation was visible of a large slough in external side of skin flap, no discharge from stump; tension of the skin caused by three sutures, which were removed, followed by gaping of the flap. About 9 P. M., the pulse became frequent (145), and there was great paleness of the conjunctiva and skin. The extensive sloughing, weak pulse, and anæmic appearance presented a hopeless prognosis. Late in the evening, a strong solution of bromine was directly applied to the surface of the stump by means of charpie. The application was at first painless, but, after penetrating the mortified tissues and coming in contact with sensitive parts, it caused such pain that the patient was fortified during the operation by a half ounce of sherry wine in powdered ice and one-half grain morphia. 13th, Dr. Holly touched the line of demarcation (which was very well marked, and extended to the whole circumference of the stump) with pure bromine, by means of a flattened stick, in order to facilitate and hasten the efforts of nature. He also applied Dr.

Thomson's solution of bromine (composed of one drachm of pure bromine, three drachms of bromide of potassium, and three ounces of water), by means of a glass pipette, to all the sinuses beneath the mortified integuments and the sinuses near the arteries; besides this application, after carefully washing the stump with "blue wash" (solution of permanganate of potassa), and protecting the integuments outside with castor oil and the surface of the stump with a thin muslin rag, the vapor of bromine was administered by pouring an ounce of solution of bromine on charpie; this was applied to the face of the stump and covered with simple cerate spread on sheet lint and inclosed by oil-cloth and a bandage. The application of bromine was repeated at 1 and 7 P. M., and the nourishing food and stimulants continued. An injection of soap and water caused the first passage since the date of the injury and gave great relief. 14th, the effects of the bromine yesterday had hermetically sealed the surface of the stump, covering it with a yellowish gray matter, which was removed as much as possible, a large amount of mortified integuments being cut away and three loose ligatures removed. Decubitus of gluteal region, somewhat to right of sacral bone; bedsore the size of the palm of the hand, with a yellow greenish slough, which was partly removed with the assistance of a scissors. India-rubber rings employed, and ointment of cinchona bark. Bromine was freely applied four times during the day. There was an abundant discharge of thin unhealthy pus, and the removal of a great quantity of slough discovered a red granulating surface. 15th, wound dressed with bromine at 9 A. M. and 4 P. M. Doing very well; slough removed in large pieces. 17th, large quantity of sphacelated integuments removed and vapor of bromine applied. The stump was exposed for an hour to a painter's view. 18th, the decubitus is becoming the most painful and prominent feature of his complaint. For the first time he had a free passage without adjuvants; slept on his belly. On the 19th, he was put on a water bed, on which he lay much easier. An extensive slough was removed from the inferior portion of the flap, as also from the decubitus, which discharges healthy pus in large quantity; could see an artery pulsating. Bromine applied to bedsore. Patient felt bright, and eat a hearty dinner. In the evening, he complained of a little pain in his throat resembling tonsilitis. 20th, on examining the patient's throat, it was found that he could only open his jaws enough to show the tip of his tongue. Tetanus diagnosticated. Nutritious diet and stimulants were given as usual. At 4 P. M., a laxative was administered. The decubitus was dressed with pulverized cinchona. The stump, which had a beautiful red granulating surface, with one single ligature, was dressed at night with castor oil. He had had contractions and jerking of the stump once in the morning, but had not paid any attention to it until 6 P. M., at which time it became more frequent, recurring nearly every half hour; three ounces of brandy and a half grain of morphia were ordered at 10 and 12 P. M. and 2 and 4 A. M. 21st, trismus well confirmed. Contractions of glottis muscles and fits of suffocation after taking fluids, though administered in small quantities and through a pipette. There was rigidity of the masseters and sterno-cleido-mastoid muscles, and of the muscles of the back of the neck, which were quite hard. The head inclined backward and to the left side; difficulty of articulation. The difficulty of swallowing increased and only fluid nourishment could be taken. He gradually sank, and died November 22, 1863, of asthenia. A *post-mortem* examination of the stump was made November 24th. There was a natural clot of blood at the distal end of the femoral artery. The neurilemma of the sciatic nerve appeared thickened, and the fibres of the nerve more gross and coarse than usual. The ends of several nerves were strongly attached to the external surface of the stump. The body and spine were not opened. A drawing, by Hospital Steward E. Stauch, of the gangrenous stump, is copied in the chromo-lithograph, PLATE XXI, opposite.

CASE 472.—Sergeant D. A. Barnett, Co. B, 99th Pennsylvania, aged 22 years, was wounded at Kelly's Ford, November 7, 1863. Surgeon J. W. Lyman, U. S. V., recorded his admission to the field hospital of the 1st division, Third Corps, with "shot wound of left knee joint." Two days after the reception of the injury the wounded man was transferred to Douglas Hospital, Washington, whence Assistant Surgeon W. Thomson, U. S. A., reported the following history: "The patient was anæmic when admitted, and stated that very free hæmorrhage took place the moment he was wounded. He was struck by a bullet, which entered the leg at the lower border of the patella, and was removed through an incision at the median line posteriorly, four inches above the joint. An examination showed the probable obliteration of the main vessel, since there was no circulation in the foot, which, with the leg half way to the knee, was cold and purple or tallow colored, and in the early stages of traumatic sphacelus. This, added to the direct wound of the knee joint, rendered an operation necessary, which was performed on November 10th. Ether was given, and the limb was removed by Acting Assistant Surgeon P. R. Holly, at the lower third of the thigh, by the circular method, with a straight cut from the wound of exit to the point of the circular incision. The operation was well borne and there was no serious loss of blood. On examining the amputated leg, I found that the ball had comminuted the patella and passed through the femur, entering at the outer margin of the inner condyle and dividing the popliteal artery. The popliteal space contained a large quantity of coagulated blood, and the ends of the vessel were surrounded by a mass of pink-colored and semi-organized clot, sufficiently firm to prevent hæmorrhage. The patient's tongue was very pallid and his whole appearance anæmic. His leg soon became swollen though perfectly white, resembling a case of phlegmasia alba dolens. The skin was smooth and blanched; there was tenderness along the line of the bone and no vigorous effort at repair, the edges of the incision being pale. The discharge consisted of dark colored ill-looking pus, and the whole appearance of the stump was unfavorable; the edges gaped widely apart. On November 20th, a slight slough appeared on the posterior lip of the stump, and two days afterwards the patient had a severe chill, followed by profuse perspiration in the night and succeeded by a light cough. During the night of the 23d there was another severe chill, and the next day respiration was increased in frequency and accompanied by pain in the right side. There was no perceptible dullness on percussion, but on auscultation it was found that inspiration was deep and a little labored, while the expiration over both lungs anteriorly was prolonged almost as in phthisis. There was no rale, but the expiratory sound seemed to indicate that the whole lung had lost some of its elasticity and returned upon itself after dilatation with apparent difficulty. Expectoration was slight, very tough and viscid; the pulse rapid and feeble; the skin relaxed. The pulse became still weaker, and the respiration more hurried until almost sighing; the nervous depression increased. The breath had the sweet sickening smell resembling the odor of fermentation, which denotes pyæmia. Death occurred at 8 A. M. on November 26, 1863. The *post-mortem* examination was made six hours afterwards. On opening the right pleural cavity we found the lung coated with soft greenish colored lymph, and there was an effusion amounting to six ounces of yellow pus and serum, separating into two strata, the upper serum, the lower pus, and having (under the microscope) the usual pus corpuscles floating in a fluid with an abundance of unrecognizable debris. There seemed to be also a thin

layer of pus beneath the pleura anteriorly, giving that portion of the lung a yellowish color. The upper lobe was apparently normal; the lower lobe posteriorly was congested, dark in color, and, on division, revealed nodules of tissue of various sizes in all stages of pathological changes from acute congestion to thorough hepatization and yellow softening. The diseased spots were in dimension from the size of half an English walnut to that of a split pea, the large ones having in the center a space white or yellow in color, and probably breaking down rapidly. The outline of these solidified portions, on section, suggested the idea of embolism, since they were somewhat triangular in shape, with the base at the pleural surface and the apex at the deepest portion of the lung, giving the impression that a circumscribed area of lung nourished by a single vessel had been destroyed by its occlusion. There was no recent effusion in the left pleural cavity, but changes in the parenchyma similar to those on the right side were discovered. An examination of the vessels of the stump revealed the existence of inflammation of the artery and veins. Both the femoral artery and vein at the point of their escape from the pelvis were normal. The femoral vein at the entrance of the saphena was filled with a semi-organized clot, which extended through the saphena and femoral to a point two inches from the cut ends of these vessels, where they had been divided on the face of the stump. (See left-hand figure of PLATE XX, opposite p. 294.) These vessels, as will be seen, are now hard and firm dark-red cords, of course entirely impervious. The artery from the origin of the profunda to a point two inches from its cut termination was also reddened, and its inner coat softened and easily removable. The phlebitis, with its occlusion of the main venous trunks, accounted for the swollen and white condition of the stump, compared above to the condition known as phlegmasia alba dolens. In making this dissection it was observed that the inflammation, apparent in the artery and to some extent circumscribed (since its lower extremity yet contained the clot formed on the application of the ligature and was normal both in color and firmness, as well as that which occluded the veins), had extended through the coats of these vessels from without. No pus was found in the veins, and no evidence of inflammation except the marked redness of the coats and the firm and clotted coagulation of the blood within." Wet preparations of the femoral and profunda arteries (*Spec.* 2246), the femoral and saphena veins (*Spec.* 3991), and the popliteal artery and vein (*Spec.* 2247), saved from the stump, were contributed to the Museum by Assistant Surgeon Thomson. Drawings of the specimens 3991 and 2246 were prepared by Hospital Steward Stauch, and are represented, the former on the left and the latter on the right side of PLATE XX, opposite p. 294.

CASE 473.—Corporal *L. C. Griffin*, Co. D, 8th North Carolina, was wounded in the left knee by a piece of shell, at Winchester, July 19, 1864. He was conveyed to hospital at Richmond, where the limb was amputated at the lower third of the femur by Dr. Joseph Jones. The patient died in February, 1865. The specimen, a portion of the stump four and a half inches long, was contributed to the Museum by Acting Assistant Surgeon F. Schafhirt. It constitutes number 3141 of the Surgical Section, and exhibits a prodigious involucrum. The bone is exceedingly hyperostosed, measuring three and a half inches in diameter at the extremity. The extremity and central portions are carious, and a slight sequestrum is contained. A representation of the specimen will be found in FIG. 4 of PLATE LXX, opposite p. 242.

TABLE XXXVI.

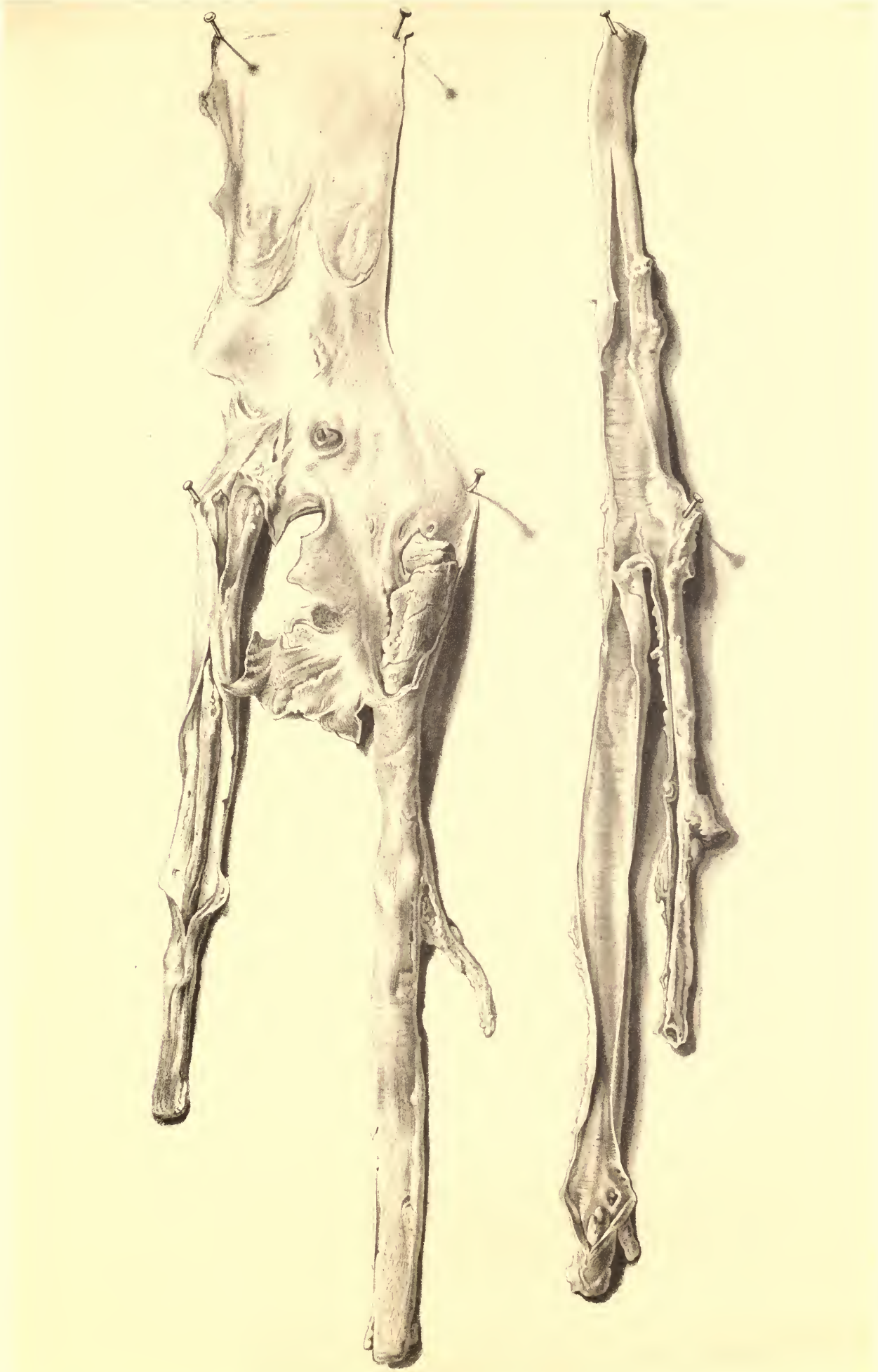
Summary of Six Hundred and Seventy-six Cases of Intermediary Amputations in the Lower Third of the Femur for Shot Fracture.

[Recoveries, 1—217; Deaths, 218—676.]

NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	Anderson, J., Serg't, I, 54th New York, age 32.	July 3, 8, '63.	Left; ant. post. flap; slough.; nec. Aug. 2, flap, mid. third. Surg. C.W. Hägen, 54th N.Y. Hæm.; necro. bone removed. Disch'd Aug. 25, 1864. *Spec.* 4358.
2	Askey, J., Pt., F, 200th Pennsylvania, age 18.	Mar. 25, 28, '65.	Right; circ. Surg.W. G. Hunter, 211th Penn. April 11, hæm.; lig. fem. art. Disch'd July 28, 1865. *Spec.* 3997.
3	Austin, G. H., Pt., D, 106th New York.	April 29, May 22, 1863.	Left (erysipelas). A. A. Surg. R. W. Hazlett. Hæm.; lig. femoral art.; rec'd. Disch'd Aug. 23,'63.
4	Bassett, W., Pt., E, 4th New Jersey, age 20.	June 27, J'y 1, '62.	Right; flap. Disch'd January 7, 1863.
5	Bathurst, J. B., Pt., D, 45th Penn., age 19.	June 4, 16, '64.	Left; circ. A.A. Surg. J. C. Nelson. June 28, nec. bone rem'd. Disch'd Nov. 20,'65. *Spec.* 2584.
6	Bauers, P., Musician, D, 74th Pennsylvania.	April 1, 6, '62.	Left; circ. Surg. J. McL. Hayward, 12th Mass. Erysipelas. Disch'd Aug. 23, 1862.
7	Becker, A., Pt., F, 3d Missouri.	May 10, 19, '61.	Right; flap. Drs. Fellerer and Comstock, St. Louis. Disch'd.
8	Beers, L. R., Corp'l, E, 188th Penn., age 19.	Sept. 29, Oc.29,'64.	Right (gangrenous slough.); circ. A. Surg. S. H. Orton, U. S. A. Gang. Disch'd Nov. 9, 1865. *Spec.* 3682.
9	Bennett, P. L.,Pt., F, 1st Maine Cavalry, age 24.	Aug. 23, 30, '64.	Left; lat. flap. Surg. N. R. Moseley,U. S.V. Nec. Disch'd Aug. 12, 1865.
10	Beverlin, G., Pt., B, 11th West Virginia.	June 17, J'y 5,'64.	Right; circ. Surg. L. R. Stone, U. S. V. M. O. Nov. 11, 1864.
11	Biddle, W. B., Pt., K, 138th Penn., age 27.	Oct. 19, 27, '64.	Left; circ. A.A.Surg.B.B. Miles. Exfol. rem'd. Disch'd July 18, 1865. *Specs.* 109, 3425.
12	Bloomer, S., Serg't, B, 1st Minnesota, age 24.	Sept. 17, 20, '62.	Right. A. Surg. E. G. Pugsley, 1st Minn. Disch'd Dec. 6, '62.
13	Boebel, H., Lieut.-Col., 26th Wisconsin.	July 1, 4, '63.	Right. Disch'd May 28, 1864.
14	Bonhomme, E., Pt., E, 73d Col'd Troops, age 27.	April 10, 24, '65.	Left (April 10, amp.leg.; slough.); circ. Surg. F. E. Piquette, 86th C. T. Disch'd June 17, 1865. Died June 3, 1867; marasmus.
15	Bosworth, C. W., Pt., I, 1st Maine H'vy Art., age 23.	May 19, 24, '64.	Left; flap. Surg. D. W. Bliss, U. S.V. Nec. Disch'd April 10, 1865. Jan. 9,'68, flap, mid. third.
16	Brown, J. T., Corp'l, C, 10th Illinois, age 21.	June 27, J'y 2, '64.	Left (gang.); circ. A. Surg.C.W. Burke, 46th Penn. Gangrene; end of bone rem'd. Mustered out August 31, 1864.
17	Buehler, J., Pt., C, 41st New York.	May 2, 8, '63.	Right thigh; circular operation. Disch'd Nov. 28,1864.
18	Bulmer. B., Pt., A, 71st Pennsylvania.	Sept. 17, 20, '62.	Right. Discharged Dec. 12, '62.
19	Bürle, J., Corp'l, K, 61st New York, age 52.	Aug. 25, Sept. 15, 1864.	Right; double flap. Surg. W. O'Meagher, 37th N.Y. Re-amp. upper third. Disch'd May 30, 1865. Died July 16, 1868.
20	Burwell, T. J., Pt., H, 81st Ohio, age 23.	Mar. 21, Ap. 2,'65.	Right; circ. Surg. A. F. Marsh, 56th Ill. Disch'd Sept. 11, '65.
21	Butler, C. H., Pt., H, 2d Conn. H. Art'y, age 20.	Oct. 19, 22, '64.	Right; flap. A.Surg. J. J. Meigs, 11th Vt. Disch'd Aug. 17, '65.
22	Carlin, J., Pt., I, 3d Vt., age 20.	May 5, 9, '64.	Left; flap. Surg. E. Phillips, 6th Vt. M. O. March 18, 1865.
23	Carpenter, H., Pt., A, 121st N. York, age 24.	May 3, 6, '63.	Left. Confed. surgeon. Disch'd June 15, 1864.
24	Casebolt, T. D., Pt., E, 3d Iowa, age 21.	April 6, 9, '62.	Left; flap. Disch'd Oct. 19, '62.
25	Causdell, J.A.,Corp'l,B, 10th Minnesota, age 27.	Dec. 15, 19, '64.	Left; flap. A.A.Surg. J. H. McIntire. Slough'g. Disch'd May 29, 1865.
26	Claden, M., Pt., I, 108th Ohio, age 31.	May 14, 22, '64.	Right; circ. A.Surg.J.M.Brown, U. S. A. Disch'd May 11, '65.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
27	Clarey, P., Pt., I, 24th Michigan, age 18.	July 2, 10, '63.	Left (mortification); circ. Surg. A. J. Ward, 2d Wis. Rem'd nec. bone; gang. Disch'd Feb. 26, 1864.
28	Clark, S. A., Pt., E, 1st Sharpshooters.	Aug. 30, Se. 22, '62	Right; flap. Surg. D. W. Bliss, U. S. V. Disch'd Jan. 29. 1863.
29	Cleggett, T., Pt., D, 76th Colored Troops, age 45.	April 2, 24, '65.	Right; ant. post. skin flap; circ. of muse. Surg. F. E. Piquette, 86th C. T. Hæm.; lig. femoral art. Disch'd July 22, 1865.
30	Cliff, H., Serg't, F, 76th New York, age 34.	July 1, 5, '63.	Left; circ. Disch'd Nov. 28, '63.
31	*Cocheran, F.*, Pt., G, 9th Louisiana, age 19.	July 9, 14, '64.	Right: circ. Fort Monroe, Sept. 20, 1864.
32	*Cochran, P.*, Serg't, A, 19th Tennessee, age 25.	Dec. 16, 29, '64.	Left; ant. post. flap. Ass't Surg. J. H. Cruthers, 88th Ohio. Provost Marshal May 6, 1865.
33	Cooley, G. W., Corp'l, E, 75th Ohio.	May 2, 12, '63.	Right. May 27, amp. mid. third. Disch'd Jan. 22, 1864.
34	Corcoran, P., Pt., C, 100th New York.	July 18, 21, '63.	Right; flap. Disch'd Aug. 25, 1864. Died Jan. 28, 1868.
35	*Crawford, A. N.*, Corp'l, G, 32d Tenn., age 28.	May 16, 19, '64.	Left; circ. A. Surg. H. E. Goodman, U. S. V. Provost Marshal October 21, 1864.
36	*Critse, P. L.*, Serg't, C, 21st Georgia, age 44.	Aug. 21, 29, '64.	Right. Surg. — Edwards, C.S.A. Prison Nov. 22, 1864.
37	Curie, H., Pt., F, 7th Connecticut.	Aug. 16, 19, '64.	Left (August 17, amp. leg); circ. Disch'd June 10, 1865.
38	Curren, T. S., Pt., E, 7th Ohio.	Aug. 26, Sept. 1, 1861.	Right; flap. Surgs. Gleaves, McDonald, and Scarout, C. S. A. Disch'd July 17, 1862.
39	Darling, R. A., Pt., H, 67th New York.	May 31, Je. 3, '62.	Right; flap. Surg. D. Prince, U. S. V. Hæm.; lig. fem. artery. Disch'd August 9, 1862.
40	Darraugh, J. C., Lieut., D, 9th Mich. Cav., age 19.	Oct. 1, 17, '64.	Right; lat. flap. Surg. A. Nash, 9th Mich. Cav. Mustered out.
41	Davis, L., Pt., A, 9th W. Virginia, age 18.	Aug. 26, 29, '64.	Left; circ. A. A. Surg. T. J. Dunott. Sept. 3, hæm. Disch'd Oct. 26, '65. *Specs.* 1423, 1072.
42	Debold, C. A., Pt., H, 21st N. Y. Cavalry, age 21.	July 24, 28, '64.	Left; circ. A. A. Surg. W. S. Adams. Disch'd Dec. 17, 1864.
43	Deery, P., Pt., C, 170th New York, age 55.	Aug. 26, Sep. 7, '64.	Left; ant. post. flap. Surg. A. Heger, U. S. A. Disch'd Aug. 15, 1865.
44	De La Barr, G., Pt., C, 13th Mich., age 16.	Mar. 19, 27, '65.	Left; double flap. Surg. D. S. Young, 21st Ohio. Disch'd Oct. 21, 1865.
45	Devine, J., Lieut., F, 32d Iowa, age 43.	April 8, 12, '64.	Left; flap. Disch'd August 30, 1864.
46	Dilley, J. L., Musician, G, 62d Ohio, age 24.	April 2, 6, '65.	Right; circ. Surg. J. S. Taylor, 23d Ill. Disch'd July 15, 1865.
47	Dillon, G., Pt., F, 40th New York.	Sept. 1, 10, '62.	Left. Disch'd March 14, 1863. Died May 25, 1870.
48	Dimmick, L. L., Pt., G, 10th Wisconsin.	Oct. 8, 24, '62.	Left; circ. A. A. Surg. J. Sloan. Rem'd end of bone. Disch'd April 16, 1863.
49	*Dunlap, R. K.*, Pt., 14th Virginia.	May 3, 7, '63.	——. Surgeons Stroth and Sawyer, C. S. A. Recovered.
50	Ellis, A., Pt., F, 114th New York, age 21.	Oct. 19, No. 7, '64.	Left. A. A. Surg. E. G. Waters. Disch'd May 31, '65. *Spec.* 3423.
51	Ellis, H. H., Corp'l, I, 16th New York, age 23.	May 3, 13, '63.	Left; circ. A. A. Surg. J. E. Smith. Hæm.; lig. fem. artery. Removed exfol. bone. Disch'd from hospital June 6, '64. *Specs.* 1852, 1853.
52	Emigh, B. F., Lieut., F, 2d Penn. H'vy Artil'ry, age 24.	June 17, 25, '64.	Left; circ. A. A. Surg. F. H. Colton. Sloughing; seq. extracted. Disch'd May 10, '65. *Spec.* 3598.
53	Emmert, G. S., Corp'l, H, 37th Illinois, age 23.	Dec. 7, 14, '62.	Right; flap. Surg. P. Harvey, 19th Iowa. Bone rem'd. Disch'd.
54	Everett, D., Pt., L, 15th Kansas Cav., age 18.	June 15, 20, '64.	Right (mortification; 17th, amp. leg; gangrene); ant. post. flap. Disch'd Aug. 19, 1864.
55	Falconer, D. G., Lieut., B, 79th N. Y., age 25.	Sept. 17, Oct. 9, '62.	Right; ant. post. flap. A. Surg. J. B. Brinton, U. S. A. V. R. C. July 20, 1863. *Spec.* 453.
56	*Farthing, G. W.*, Pt., D, 5th Tennessee.	July 2, 7, '63.	Left. Recovery.
57	Fish, R. M., Pt., I, 24th Michigan, age 22.	July 1, 6, '63.	Right; circ. Nov. 4, 2½ inches end of bone rem'd; erysip. Disch'd April 19, '65. *Specs.* 1589, 2624.
58	Fitzmorris, E., Pt., K, 12th New York, age 24.	Aug. 30, Sep. 8, '62.	Right; circ. Oct. —, seq. rem'd. Mustered out. *Spec.* 1051.
59	Fletcher, D. C., Serg't, H, 40th New York.	Sept. 1, 18, '62.	Right; circ. Surg. H. Bryant, U. S. V. Recovery.
60	Frum, P., Corp'l, F, 3d West Virginia, age 28.	Aug. 29, Se. 21, '62.	Left (Aug. 29, amp. leg; gang.); gang. Aug. 6, '63, seq. rem'd. Disch'd July 7, '64. *Spec.* 1665.
61	Fuller, P., Serg't, G, 1st Missouri H. G., age 41.	Aug. 5, 19, '61.	Right. Surg. O. B. Payne, 10th Mo. Two subsequent amput'ns. Disch'd Oct. 25, 1865.
62	Gallana, P., Pt., C, 11th Penn. Cav., age 35.	April 1, 7, '65.	Left (gang.); circ. A. A. Surg. Z. P. Dennler. M. O. Jan. 17, 1866. *Spec.* 4045.
63	Gardener, J., Corp'l, I, 72d Penn., age 21.	Sept. 17, 21, '62.	Left; flap. Surg. M. Rizer, 72d Penn. Gang. Disch'd August 4, 1863.
64	Gardner, J., Pt., —, 73d Ohio.	Aug. 30, Sep. 5, '62.	Right. Ass't Surg. B. Howard, U. S. A.
65	Gayman, S., Pt., B, 69th Indiana.	Aug. 30, Sep. 3, '62.	Left; flap. A. Surg. W. B. Witt, 69th Ind. Disch'd April 29, '63.
66	George, E. L., Serg't, G, 73d Col. Troops, age 30.	April 10, 23, '65.	Right; circ. Surg. F. E. Piquette, 86th C. T. Disch'd June 17, '65.
67	Gibson, G. S., Pt., H, 10th Missouri, age 19.	Oct. 12, No. 10, '64.	Right (necrosis; gang.); circ. A. A. Surg. J. J. Bell. Disch'd June 10, 1865.
68	Glassie, J., Pt., B, 63d New York, age 22.	June 3, 20, '64.	Left (June 3, amp. leg; gang.); bilat. flap. Surg. N. R. Moseley, U. S. V. Necrosed bone rem'd. Disch'd Aug. 15, '65. Died Nov. 12, '67. *Spec.* 3100.
69	Golden, P., Pt., H, 28th Massachusetts, age 38.	Aug. 30, Sep. 9, '62.	Left; dou. flap. A. A. Surg. J. O. French. June 30, 1863, re-amp. mid. third. Disch'd Jan. 5, '64. *Spec.* 147.
70	Green, H., Pt., K, 17th Maine, age 24.	May 23, Je. 10, '64.	Right; flap. Surg. D. W. Bliss, U. S. V. July 4, hæm. Disch'd Nov. 21, 1864. *Spec.* 2498.
71	Greene, A. H., Serg't, B, 12th New York.	June 27, 30, '62.	Left. Surg. A. D. Palmer, 9th Maine. Disch'd Feb. 24, 1863.
72	*Grubbs, H. B.*, Pt., Carter's Battery.	Sept. 14, 18, '62.	Right. Surg. — Roberson, C.S.A. Furloughed Sept. 21, 1864.
73	Halderman, C., Pt., H, 11th Penn., age 28.	July 2, 25, '63.	Right; flap. Surg. H. Palmer, U. S. V. Rem'd bone. Disch'd October 6, 1863.
74	Hamilton, J., Pt., C, 45th Pennsylvania.	Sept. 14, 17, '62.	Right. Disch'd Dec. 30, 1862.
75	Hand, C., Pt., B, 15th N. Jersey, age 33.	May 12, 16, '64.	Right; circ. Disch'd June 17, 1865.
76	Hannon, M., Pt., K, 76th New York, age 24.	Sept. 14, 18, '62.	Right; circ. Gang.; bone rem'd. Sept. 12, '63, re-amp., circ, mid. third; hæm. Disch'd June 24, '64. Died June 22, 1870. *Spec.* 4324.
77	*Harris, C. W.*, Pt., G, 11th Miss., age 20.	July 3, 15, '63.	Left; circ. Surg. — Clark, C.S.A. Necrosed bone rem'd. Exch'd Nov. 12, 1863.
78	Hart, B. B., Scout, H, 24th New York, age 33.	Aug. 28, Se. 16, '62.	Right. Surg. A. Wynkoop, U.S.V. Disch'd Nov. 15, 1863.
79	Hawkins, W. W., Serg't, I, 93d N. York, age 20.	May 5, 16, '64.	Right (May 6, amp. leg, Teale's method). April, 1865, carious bone rem'd. Disch'd July 12, 1865. *Spec.* 4497.
80	Hayes, J. W., Corp'l, D, 60th Ohio, age 19.	May 9, 27, '64.	Rght; circ. A. A. Surg. T. W. Carroll. Disch'd April 17, '65.
81	Henning, B. D., Lieut., F, 3d Penn. Res., age 29.	May 9, 14, '64.	Right. Surg. N. F. Graham, 12th Ohio. M. O. Sept. 26, 1864.
82	Henderson, J., Serg't, A, 126th N. York, age 29.	May 10, 30, '64.	Right; circ. A. A. Surg. F. G. H. Bradford. Disch'd Aug. 1, '65.
83	Herron, J., Pt., I, 8th Penn. Cav., age 18.	Mar. 31, Ap. 5, '65.	Right; ant. post. flap. A. A. Surg. F. H. Hill. Disch'd Sept. 30, '65. *Spec.* 4044.
84	Hess, R., Pt., G, 153d Pennsylvania.	July 1, 5, '63.	Left; ant. post. flap. Mustered out July 24, 1863.
85	Hewitt, W. E., Pt., I, 8th Wisconsin.	Oct. 3, 8, '62.	Left. Surg. J. E. Murta, 8th Wis. Disch'd Nov. 24, 1862.
86	Hodgman, O., Pt., K, 1st Wis. Cav., age 19.	Sept. 5, 25, '64.	Right; flap. A. A. Surg. C. C. Joslin. Disch'd July 4, 1865.
87	Hoon, E. L., Pt., H, 102d Pennsylvania, age 23.	Sept. 19, 28, '64.	Right; lat. flap. A. A. Surg. W. S. Adams. Tub. seq. removed. Disch'd Mar. 18, '65. *Spec.* 3860.
88	Hope, G. W., Serg't, A, 6th New York Cavalry, age 30.	Nov. 24, De. 3, '63.	Right; circ. flap. A. Surg. A. Ingram, U. S. A. Mar. 4, 1864, rem'd nec. end. Duty Nov. 11, '64.
89	Horner, D. J., Pt. C, 142d Pennsylvania.	Dec. 13, 21, '62.	Left. Subsequent operat'n. Discharged Feb. 19, 1864.
90	Hosmer, O. M., Pt., F, 106th N. Y., age 20.	Sept. 19. Oc. 16, '64.	Left. A. A. Surg. E. G. Waters. Disch'd May 30, '65. *Spec.* 3424.
91	Honsley, H., Cook, F, 33d Wis., age 20.	April 2, 11, '65.	Right; ant. post. flap; circ. of mus. (amp. left leg). Surg. F. E. Piquette, 86th C. T. Recovered.
92	Howell, A., Corp'l, K, 1st N. Y. Cavalry, age 21.	April 1, 7, '64.	Right; flap, skin; circ. muscles A. A. Surg. A. R. Gray. Slough. Disch'd, June 20, '64. *Spec.* 3947.
93	[1] Huber, J., Pt., A, 1st Ky. Battery, age 25.	Oct. 8, 12, '62.	Left; circ.; gangrene. Disch'd June 23, 1864.
94	Huffman, F. M., Pt., D, 3d W. Virginia, age 26.	Aug. 29, Sept. 15, 1862.	Left; circ. A. A. Surg. H. C. Heilner. Hæm. Disch'd Feb. 13, 1863. *Spec.* 120.
95	Hutchings, S., Lieut., G, 5th Maine, age 22.	May 10, 18, '64.	Right; double flap. Surg. G. E. Brickett, 21st Maine. M. O. July 27, 1864.
96	Johnson, G. H., Pt., F, 8th Colored Troops.	Feb. 20, 25, '64.	Left (gangrene); circ. Surg. — Holmes, C. S. A. Disch'd Oct. 3, 1865.
97	*Jones, J. P.*, Pt., K, 52d N. Carolina, age 21.	July 1, 14, '63.	Right. Gangrene. Exchanged March 17, 1864.
98	Joy, A., Serg't, C, 24th Michigan.	July 1, 7, '63.	Left; circ. Surg. J. H. Beech, 24th Mich. Disch'd Oct. 18, '63.

[1] STANFORD (R. L.), *Bromine in Hospital Gangrene*, in *American Medical Times*, 1863, Vol. VII, p. 24.



Stauch del.

PLATE XX FEMORAL ARTERY AND FEMORAL VEIN AFTER AMPUTATION

UNIVERSITY
CALIFORNIA

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
99	Keefer, C., Pt., E, 16th Mich., age 46.	Aug. 30, Sept. 12, 1862.	Left; flap. Surg. J. C. Dorr, U. S. V. Disch'd October 5, 1865. *Spec.* 4546.
100	Kemp, S. P., Pt., I, 7th Ohio.	Aug. 9, 14, '62.	Right; double flap. A. Surg. T. G. Mackenzie, U. S. A. Disch'd Oct. 20, 1862. *Specs.* 51, 4477.
101	Kent, W. E., Pt., C, 6th Ohio Cavalry, age 22.	Oct. 1, 15, '64.	Left (pyæm. symptoms); flap. A. Surg. P. C. Davis, U. S. A. Disch'd May 4, 1865.
102	*Krider, C. C.*, Lieut., C, 49th N. C., age 38.	Mar. 25, 28, '65.	Left; circ. Surg. J. H. Kimball, 31st Me. Released June 15, '65.
103	Kuhns, J. W., Pt., C, 11th Pennsylvania.	Dec. 13, 16, '62.	Left; circ. Disch'd Nov. 14, '63.
104	Kuoni, C., Serg't, C, 9th Wisconsin.	April 30, M'y10, '64.	Right; flap. Disch'd March 16, 1865.
105	Larck, J., Pt., A, 5th W. Virginia, age 22.	July 24, 27, '64.	Left; lateral flap. Disch'd Jan. 10, 1865.
106	Large, W. G., Pt., K, 90th Pennsylvania, age 21.	April 29, May 15, 1863.	Right; flap. Surg. A. W. Whitney, 13th Mass. Mustered out Dec. 13, 1864.
107	Lauer, J. S., Pt., B, 5th New Jersey.	May 3, 7, '63.	Left; circ. Surg. J. Dwinelle, 100th Penn. Disch'd Mar. 28, '64.
108	Leonard, J., Pt., E, 2d N. Y. S. M., age 30.	July 2, 5, '63.	Left; circ. Nov. 7, seven inches end of bone rem'd. Sent to Insane Asylum June 6, '64. *Spec.* 2152.
109	Lewis, J., Pt., K, 47th Colored Troops, age 20.	April 3, 18, '65.	Right (gang.); ant. post. skin flap; circ. mus. Surg. F. E. Piquette, 86th C. T. Disch'd July 22, '65.
110	Little, T., Pt., I, 19th Maine, age 28.	July 2, 6, '63.	Right; lateral flap. Discharged August 1, 1864.
111	Lothrop, J. H., Pt., F, 16th Infantry, age 21.	Sept. 19, 24, '63.	Left; circ. Confed. surgeon. Re-amput'n middle third. Disch'd Nov. 18, 1864.
112	Lowe, H. B., Serg't, F, 5th Wisconsin, age 34.	May 3, 6, '63.	Left. Ass't Surg. J. S. Ewing, 5th Wis. Disch'd June 21, '64.
113	Lynch, J., Pt., C, 47th New York, age 30.	July 30, Au. 3, '64.	Right; circ. A. A. Surg. S. J. Holley. Necrosed bone rem'd. Disch'd May 25, 1865.
114	Maedel, C., Pt., C, 9th Ill.	Oct. 3, 13, '62.	Left; flap. Surg. E. Guelick, 9th Ill. Disch'd Sept. 22, 1863.
115	Maron, P., Pt., E, 2d Mass., age 27.	May 3, 9, '63.	Right; circ. Disch'd August 21, 1863.
116	Martz, C., Pt., G, 64th New York, age 26.	Mar. 25, 30, '65.	Right (mort'n); circ.; nec. Sept. 26, re-amp. mid. third A. Surg. J. H. Armsby, U. S. V. Disch'd Oct. 4, '65. *Specs.* 2853, 3195.
117	Matthews, I. W., Pt., K, 23d Ohio, age 24.	July 24, Au. 4, '64.	Right. Ass't Surg. L. D. Miller, 1st N. J. Disch'd Aug. 18, 1865.
118	Maurer, A. J., Pt., B, 53d Ohio.	May 2, Je. 1, '63.	Left; flap. Disch'd July 27, '64.
119	Mayes, S., Pt., F, 1st Penn. Cavalry, age 20.	Oct. 1, 12, '64.	Right; flap. A. Surg. P. C. Davis, U. S. A. Disch'd May 6, 1865.
120	McAllister, W. H. H., Serg't, G, 4th Vermont, age 27.	Dec. 13, 23, '62.	Right; circ. A. A. Surg. C. W. Filmore. Bone extracted. Dis. Sept. 19, 1864. *Spec.* 200.
121	McCombs, S., Pt., A, 28th Illinois, age 18.	April 6, –, '62.	Right; double flap. Surg. E. C. Franklin, U. S. V. Discharged April 7, 1863.
122	McConky, A., Pt., D, 63d Pennsylvania, age 48.	May 5, 14, '64.	Left; lat. flap. Surg. R. B. Bontecou, U. S. V. Disch'd May 19, '65. Died May 15, '73. *Spec.* 3066.
123	McCormick, M., Serg't, F, 2d Cavalry, age 36.	Sept. 19, 26, '64.	Left; flap. A. A. Surg. J. R. Uhler. Disch'd June 15, 1865.
124	McCray, A. F., Pt., E, 6th Missouri Cavalry.	Aug. 16, 19, '62.	Left; flap. A. Surg. W. H. H. Cundiff, 2d Mo. S. M. C. Disch'd.
125	McGarraghan, H., Pt., E, 24th Ohio, age 20.	De. 31, '62, Jan. 4, '63.	Right; circ. A. A. Surg. J. M. Henderson. Disch'd May 14, '63.
126	McGinley, E., Corp'l, I, 23d Wisconsin, age 30.	Nov. 3, 13, '63.	Right (Nov. 11, hæm.); circular. Ass't Surg. S. McClellan, 13th Conn. Disch'd March 10, '64.
127	McGlone, H. W., Pt., F, 55th Ohio.	May 3, 12, '63.	Right; circ. Surg. H. S. Potter, 105th Ill. Disch'd Aug. 5, '63.
128	McGrogan, J., Pt., H, 62d Pennsylvania.	July 1, 5, '62.	Left; flap. Disch'd September 15, 1862.
129	*McMullen, H. P.*, Pt., G, 61st Georgia, age 23.	July 9, 25, '64.	Left; circ. Surg. — Todd, 6th Va. (C. S. A.). Exch'd. *Specs.* 2692, 3871.
130	*McMullen, R. J.*, Pt., I, 4th Georgia, age 20.	May 3, 23, '63.	—— (May 4, amput'n knee joint.) Surg. — Philpot, C. S. A. Hæm.; lig. fem. art. Furl'd Aug. 4, '63.
131	McWhinnie, J., Serg't, A, 20th Conn., age 24.	May 3, 26, '63.	Left; circ. Surg. H. E. Goodman, 28th Penn. Necro. bone rem'd. Disch'd May 4, '64. *Spec.* 1284.
132	Mickle, C., Pt., E, 83d Penn., age 19.	July 1, 25, '62.	Right. Re-amp. by Dr. Waters, April, '63, seq. rem'd. Disch'd June 27, 1863.
133	Miller, C., Pt., B, 8th Illinois.	April 6, –, '62.	——. Surg. E. C. Franklin, U. S. V. Hæm. Recovery.
134	*Miller, G. W.*, Pt., I, 61st Georgia, age 19.	July 1, 15, '63.	Right; flap, skin; circ. muscles. A. Surg. R. F. Weir, U. S. A. Necrosis. Paroled Nov. 12, '63. *Spec.* 3908.
135	Miller, J., Pt., 1st Ky. Battery, age 22.	Nov. 30, De. 7, '64.	Right (gang.; caries); circ. A. A. Surg. S. T. Williams. Disch'd March 11, 1865.
136	*Millican, G. F.*, Corp'l, H, 26th Miss., age 35.	Aug. 19, 29, '64.	Right; ant. post. flap. Surg. — Clark, C. S. A. Trans. Nov. 2, '65.
137	Minehan, A., Corp'l, F, 27th Mich., age 31.	Aug. 21, Se. 10, '64.	Right; circ. Surg. O. A. Judson, U. S. V. Hæm.; lig. fem. artery. Oct. 19, re-amp. Disch'd May 19, 1865. *Spec.* 3272.
138	Mitchell, W., Pt., A, 122d Ohio, age 21.	Sept. 19, 23, '64.	Left, Teale's method. A. Surg. J. G. Thompson, 77th N. Y. Bony tumor, and seq. rem'd. Disch'd Jan. 19, 1865.
139	Moore, J. L., Lieut., K, 10th Penn. Res., age 26.	June 27, J'y24, '62.	Left (aneurism); dou. flap. Surg. R. B. Bontecou, U. S. V. Hæm.; lig. fem. art. Res'd Jan. 21, '63.
140	Morton, W. G., Pt., F, 4th Ohio, age 20.	Nov. 27, Dec. 3, 1863.	Right; flap. Surg. A. N. Dougherty, U. S. V. Disch'd July 8, 1864. *Spec.* 182.
141	Mulligan, P., Pt., A, 125th New York, age 44.	June 17, J'y13, '64.	Left; circ. Ass't Surg. A. Ingram, U. S. A. Necrosed bone rem'd. *Spec.* 2866.
142	*Musselman, W.*, Pt., H, 49th Virginia, age 40.	Sept. 19, Oc. 25, '64.	Left; circ. Surg. —Blair, C. S. A. To Fort McHenry Feb. 10, 1865.
143	Myers, G., Pt., I, 24th N. York, age 19.	Mar. 31, Ap. 6, '65.	Left; circ. Dr. J. H. Thompson. Disch'd July 6, '65. *Spec.* 4063.
144	Nash, J., Pt., G, 143d Penn., age 21.	May 22, 28, '64.	Right; flap. April 9, 1865, seq. removed. Disch'd June 22, '65. *Spec.* 144.
145	Peabody, A., Pt., G, 43d Missouri.	Feb. 21, March 15, 1865.	Left; flap. A. A. Surg. J. F. Bruner. Disch'd June 30, 1865.
146	Perrott, G. W., Corp'l, G, 21st New Jersey.	May 3, 10, '63.	Right; circular. Confed. surgeon. Nec. Dec. 3, re-amp. Dr. Olcott, Jersey City. Recovery.
147	*Petters, T. T.*, Capt., B, 34th Virginia, age 33.	April 6, 11, '65.	Left; ant. post. flap. Released August 10, 1865.
148	Phillips, W. M., Corp'l, D, 121st N. Y., age 28.	Oct. 19, Nov. 18, 1864.	Right; circ. Surg. R. W. Pease, U. S. V. Hæm. Disch'd Jan. 12, 1865.
149	Pitts, E. W., Pt., B, 69th New York, age 19.	Jan. 30, Feb. 2, '63.	Left. Surg. J. Dwyer, 69th N. Y. Disch'd Jan. 12, 1864.
150	Pixley, P., Pt., A, 55th Ohio.	May 2, 7, '63.	Left; circ. Disch'd December 9, 1864.
151	Place, S. W., Pt., G, 1st Rhode Island Artil'ry, age 28.	Oct. 19, Nov. 10, 1864.	Left; ant. post. flap. A. A. Surg. B. B. Miles. Exfol'n removed. Disch'd May 7, '65. *Spec.* 106.
152	Powell, J., Pt., B, 29th Iowa, age 21.	April 30, May 4, 1864.	Left; circ. Feb. 28, '65, necrosed bone came away. Disch'd May 22, 1865. *Spec.* 228.
153	Priest, C., Pt., H, 8th N. Hampshire, age 20.	Oct. 27, Nov. 26, 1862.	Right; circ. Disch'd April 9, 1863.
154	Pullen, W. H., Serg't, I, 5th Michigan, age 24.	July 2, 7, '63.	Left; flap. Disch'd September 14, 1864.
155	Rial, J., Pt., B, 4th Ohio, age 22.	June 3, 15, '64.	Right; ant. post. flap. A. Surg. W. Thomson, U. S. A. Hæm. Disch'd July 8, 1865. *Specs.* 3562, 3570.
156	Rice, A. D., Pt., F, 45th Penn., age 23.	Sept. 17, Oct. 15, 1862.	Left; circ. A. Surg. J. A. Bigelow, 8th Conn. Erysip. Disch'd April 2, 1863.
157	Roberts, C., Pt., E, 1st W. Tenn. Cavalry.	April 28, My12, '63.	Left; flap. Surg. N. Gay, U. S. V. Discharged.
158	*Roberts, C. W.*, Pt., B, 12th Mississippi.	June 4, 7, '64.	Left. Surg. — Craft, C. S. A. Disch'd Jan. 15, 1865.
159	Robinson, E. P., Pt., H, 122d Penn., age 18.	May 3, 8, '63.	Left. Surg. G. P. Oliver, 111th Penn. Nec. bone rem'd. M. O.
160	Robinson, J. C., Brig. General U. S. V.	May 8, 15, '64.	Left; circ. Surg. B. Norris, U. S. A. Retired May 6, '69. *Spec.* 2268.
161	Robisho, J., Pt., D, 76th Illinois, age 23.	April 9, M'y 8, '65.	Right (slough'g); doub. lat. flap. A. Surg. A. Hartsuff, U. S. A. Disch'd Aug. 9, 1865. Re-amp.
162	Rose, P. B., Ass't Surg. 5th Michigan, age 30.	Oct. 27, Nov. 6, '64.	Left; circ. Surg. D. W. Bliss, U. S. V. Disch'd Mar. 28, 1865.
163	Russell, Z. B., Serg't, B, 7th Wisconsin.	Sept. 14, 17, '62.	Right; flap. Discharged.
164	Sansom, S. B., Pt., I, 14th Indiana.	May 3, 15, '63.	Right; sloughing. Rem'd end of bone. Disch'd Feb. 11, 1864.
165	Schondan, J., Pt., K, 95th New York.	July 1, 15, '63.	Left; flap. Surg. G. M. Ramsay, 95th N. Y. Bone rem'd. Disch'd Feb. 9, 1864.
166	Schrabaskie, M., Pt., B, 183d Penn., age 46.	April 1, 8, '65.	Right; circ. A. A. Surg. D. L. Haight. Seq. rem'd. June 7, '66, nec. bone rem'd; musc. art. lig. Disch'd Oct. 15, '66. *Specs.* 2452, 1484, 4956.
167	*Scroggs, A.*, Pt., C, 48th North Carolina, age 19.	Sept. 17, 20, '62.	Right. (Dec. 10, end bone rem'd.) Disch'd from hosp't Feb. 9, '63.
168	Sedgewick, P., Pt., E, 125th N. York, age 23.	July 2, 6, '63.	Right; circ. Surg. W. S. Cooper, 125th N. York. Bone extracted. Disch'd Sept. —, 1864.
169	Seiders, J. Y., Serg't, K, 151st Penn., age 30.	July 1, 8, '63.	Left (gang.). A. Surg. C. A. Hamilton, 76th N. Y. Recovery.
170	Shackelford, F. W., Pt., E, 15th Ohio.	De. 31, '62, Ja. 26, '63.	Right; flap. Disch'd April 11, 1863.
171	Shea, J. A., Pt., 1st Me. Battery, age 21.	Oct. 19, 25, '64.	Right; ant. post. flap. A. A. Surg. E. G. Waters. Disch'd April 3, 1865. *Spec.* 3427.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
172	Shea, J., Pt., C, 5th N. York Cavalry, age 30.	Oct. 11, 16, '63.	Left. Amp. near ankle j't; tissue unhealthy; re-amp., flap. Surg. D. W. Bliss, U. S. V. Disch'd July 27, '64. *Spec.* 1736.
173	Shepherd, R., Pt., F, 89th Indiana, age 21.	May 18, 21, '64.	Left; flap. A. Surg. J. A. Meeks, 89th Ind. Disch'd Mar. 17, '65.
174	Sheward, H., Pt., F, 65th New York, age 20.	Oct. 19, No. 1, '64.	Right (gang.); flap. A. A. Surg. C. H. Jones. Disch'd Apr. 22, '65.
175	Shonio, A. B., Pt., G, 6th Vermont.	May 4, 9, '63.	Left; circ. Disch'd Oct. 17, 1863.
176	Simpson, E. A., Serg't, B, 30th Mass., age 34.	Oct. 19, 26, '64.	Left (Oct. 21, amp. leg); ant. post. flap. A. A. Surg. G. W. Fay Necrosed; re-amput's. Disch'd Oct. 16, 1865.
177	Sisson, J., Pt., H, 5th N. Hampshire, age 17.	June 16, 21, '64.	Right; circ. Disch'd May 30, '65.
178	*Sladd, A. A.*, Pt., D, 42d Virginia, age 23.	Sept. 19, 23, '64.	Right; circ. Surg. — Orsay, C. S. A. Provost Mar. April 8, '65.
179	[1]Smith, E. E., Pt., A, 11th Maine, age 19.	Aug. 16, Sept. 14, 1864.	Right; circ. A. A. Surg. J. C. Morton. Hæm.; lig. fem. art'ry. Nov. 10, bone rem'd; nec. Jan. 19, '65, amp. hip j't.; hæm.; lig. ex. iliac art. Disch'd May 27, 1865. *Specs.* 81, 3709.
180	Smith, W., Corp'l, Bat'y H, 3d N. Y. Artillery.	Sept. 6, 9, '62.	Right; circ. Surg. G. Derby, 23d Mass. Disch'd Feb. 1, 1863.
181	Snyder, W. J., Pt., I, 42d Pennsylvania, age 25.	Dec. 13, 28, '62.	Left. Surg. H. Bryant, U. S. V. Hæm. Disch'd Aug. 27, 1863. Died Oct. 25, 1865; general anæmia. *Spec.* 585
182	*Stanly, J.*, —, A, 4th Florida.	Jan. 2, 5, '63.	Left. Surg. C. J. Walton, 21st Ky. Erysipelas. Recovery.
183	*Stewart, J. E.*, Serg't, H, 4th Texas, age 21.	July 2, 5, '63.	Right. Aug. 28, spic. removed. Exch'd Nov. 12, 1863.
184	Stevens, F. L., Serg't, E, 120th N. York, age 19.	Oct. 27, 30, '64.	Right; ant. post. flap. Confed. surgeon. Disch'd May 25, '65.
185	Surface, W. J., Pt., F, 7th Indiana.	Aug. 9, 15, '62.	Left; ant. post. flap. Surg. J. E. Summers, U. S. A. Seq. rem'd. Nov. 18, hæm.; lig. fem. artery. Disc'd Oct. 27, '63. *Specs.* 40, 706.
186	*Sweeten, R. F.*, Pt., E, 1st Arkansas, age 26.	July 21, 25, '64.	Right; ant. post. flap; gangrene; sloughing. Recovery.
187	*Taylor, M. H.*, Pt., B, 47th Alabama.	May 12, 23, '64.	Left. Surg. J. G. Dudley, P. A. C. S. Recovery.
188	Tedrow, D. W., Pt., D, 75th Ohio.	May 2, 14, '63.	Right; circ. Surg. L. G. Meyers, 25th Ohio. Disch'd June 6, '64.
189	Thrasher, G. M., Pt., C, 5th Ohio.	Sept. 17, 20, '62.	Left; circ. Surg. A. Ball, 5th Ohio. October, 1862, re-amp. Disch'd Dec. 20, 1862.
190	Tourtellotte, T. I., Pt., H, 57th Mass., age 27.	Mar. 25, 28, '65.	Left; circ. Surg. W. O. McDonald, U. S. V. Disch'd Oct. 20, '65. *Spec.* 4135.
191	*Tracy, M. O.*, Capt., A, 13th Louisiana.	De. 31, '62, Ja. 11, '63.	Right. Surg. R. P. Bateman, P. A. C. S. Recovery.
192	Trumbaurer, P. S., Pt., H, 205th Penn., age 20.	Mar. 10, 15, '65.	Left; circ.; flap. Ass't Surg. W. Carroll, U. S. V. Disch'd June 9, 1865.
193	Tully, M., Pt., C, 10th New Jersey, age 35.	June 3, 8, '64.	Left; circ. Surg. D. F. McKinney, 87th Penn. Necro. bone rem'd. Disch'd June 9, 1865.
194	Turner, J., Pt., E, 5th Colored Troops, age 24.	Sept. 29, Oc. 18, '64.	Left; flap. A. A. Surg. H. B. White. Disch'd April 14, 1865.
195	Urquhart, M. J., Capt., D, 98th Ohio.	Sept. 20, Oc. 20, '63.	Right (gang.); circ. A. Surg. S. M. McClure, 37th Ind. (Also wound of breast and eye.) Discharged March 1, 1864.
196	Vaden, W. B., Pt., C, 29th Illinois, age 19.	May 7, 27, '63.	Right. Surg. — McNutt, U. S. N. Re-amp.; circ.; exfol. bone ext. Disch'd Nov. 15, 1864.
197	Vanderhoof, W. M., Pt., D, 26th New Jersey.	May 4, 9, '63.	Right; circ. Hæm. Disch'd Feb. 4, 1864.
198	Vannetta, W., Pt., D, 4th Penn. Cavalry, age 24.	June 21, J'y 7, '63.	Right; circ. A. Surg. P. C. Davis, U. S. A. Oct. 5, re-amp. middle third. Disch'd June 7, '64. *Specs.* 2602. 1336, 1529.
199	Voorhees, J. K., Pt., G, 107th N. York, age 18.	May 3. 10, '63.	Left; flap. Hæm. Disch'd Oct. 7, 1863.
200	*Walker, N. J.*, Pt., C, 43d N. Carolina, age 30.	July 12, 16, '64.	Right; circ. Surg. A. F. Sheldon, U. S. V. Released July 5, 1865. *Spec.* 2879.
201	*Walls, D.*, Pt., —, 18th Florida.	Jan. 3, 6, '63.	Left. Surg. C. J. Walton, 21st Kentucky. Recovered.
202	Walsh, P., Pt., A, 69th New York, age 29.	June 3, 9, '64.	Left (June 3, exc. tib.); ant. post. flap. A. A. Surg. Riter. Nec. bone rem'd. Disc'd Sept. 20, '65.
203	Waman, G. W., Pt., E, 47th Ohio, age 23.	Mar. 26, 29, '65.	Right; circ. Disch'd July 15, 1865.
204	Ward, G. B., Capt., K, 14th Indiana.	May 3, 30, '63.	Left. Surg. H. W. Ducachet, U. S. V. Disch'd Aug. 17, 1863. *Spec.* 1191.
205	*Ward, J. H.*, —, B, Gobb's Georgia Legion.	Sept. 14, Oc. 14, '62.	Left; flap. Transferred December 5, 1862.
206	*Ware, J. W.*, Pt., H, 2d Mississippi, age 23.	July 1, 9, '63.	—; circ. Furloughed October 7, 1863.
207	Waters, A. S., Pt., E, 157th N. York, age 36.	July 1, 6, '63.	Right; circ.; sloughing; exfol. Disch'd June 12, 1865.
208	Weaver, L., Pt., K, 153d Pennsylvania, age 20.	July 1, 7, '63.	Left; circ.; sloughing. Mustered out May 16, 1864.
209	*Weir, T. P.*, Pt., B, 5th Georgia.	Sept. 20, 23, '63.	Right; ant. post. flap. Recovery.
210	*Welch, J.*, Pt., D, 13th Arkansas.	Nov. 7, 24, '61.	Right. Surg. — Fermer, C. S. A. Recovery.
211	Werneck, F. J., Capt., D, 54th New York.	Aug. 29, Se. 3, '62.	Right; flap. A. A. Surg. W. B. Crain. To V. R. C.
212	*Whitehead, W. J.*, S'g't. C, 44th Georgia.	May 5, 8, '64.	Left. Retired Feb. 20, 1865.
213	Wickline, J., Serg't, D, 63d Penn., age 25.	May 5, 15, '64.	Left; ant. post. flap. Surg. E. Bentley, U. S. V. Disch'd June 4, 1865.
214	Winkler, J., Pt., C, 4th Penn. Reserves.	Aug. 30, Sep. 5, '62.	Right. A. Surg. B. Howard, U. S. A. Disch'd Feb. 22, 1863.
215	Worden, W. H., Pt., F, Purnell's Legion, age 27.	May 30, Je. 9, '64.	Left; circ. A. Surg. J. B. Baxter, 16th Maine. Disch'd May 9, '65. *Spec.* 3176.
216	Worley, R. M., Serg't, E, 22d Kentucky.	Aug. 5, 26, '62.	Left. Disch'd Nov. 27, '62. Jan. —, 1863, re-amp., flap, middle third. Surg. H. Manfred, 22d Ky.
217	Youlls, G. W., Pt., F, 149th Penn., age 22.	July 1, 8, '63.	Left; circ. flap; exfol. Disch'd Jan. 30, 1864.
218	*Adams, A. J.*, Corp'l, A, 4th Batt. Georgia S. S., age 25.	Dec. 18, 22, '64.	Left. (Vermale's method.) A. Surg. W. B. Trull, U. S. V. Died Dec. 25, '64; irritative fever.
219	Adams, J. W., Pt., I, 2d Vermont, age 23.	June 1, 10, '64.	Left; ant. post. flap. Surg. E. Bentley, U. S. V. (Gang.) Died June 10, '64; asthenia. *Spec.* 2547.
220	Akeman, M., Serg't, I, 13th Ind. Cav., age 32.	Dec. 4, 14, '64.	Right; flap. Surg. H. B. Johnson, 115th Ohio. Died Dec. 19, 1864; ichorhæmia. Autopsy.
221	*Albright, G. M.*, Capt., F, 53d N. C., age 36.	July 3, 11, '63.	Right; flap, skin; cir. mus. Died July 16, 1863. *Specs.* 3966, 3977.
222	*Allen, —* Lieut., 13th Louisiana.	April 6, 18, '62.	—. A. Surg. B. Howard, U. S. A. Died April 26, 1862.
223	Allen, A., Pt., H, 5th Artillery.	April 6, —, '62.	—. Surg. E. C. Franklin, U. S. V. (April 9, excis. tib. and fib.; mortification.) Died May 11, 1862.
224	Allen, A. T., Capt., H, 11th Conn., age 24.	June 3, 15, '64.	Left; circ. A. A. Surg. F. H. Colton. Died July 6, 64; pyæmia. Autopsy. *Spec.* 3561.
225	*Allen, W.*, Pt., G, 8th Va. Cavalry, age 23.	July 14, 27, '64.	Right; circ. A. A. Surg. T. E. Mitchell. Died Aug. 10, 1864; pyæmia. Autopsy. *Spec.* 3817.
226	Applegate, H., Pt., K, 64th Ohio.	De. 31, '62, Ja. 21, '63.	Left thigh. Died January 29, 1863.
227	Arkwith, J., Pt., D, 83d New York.	Dec. 13, 28, '62.	Right thigh. Died January 4, 1863.
228	Ashley, H. J., Pt., K, 87th Indiana.	Sept. 19, —, '63.	Left; circ. Died Oct. 21, 1863; pyæmia.
229	Ashton, T. G., Pt., F, 51st Penn., age 34.	May 6, Je. 1, '64.	Left; diarrhœa. Died June 10, 1864; pyæmia.
230	Atwood, N. H., Pt., C, 6th Vermont, age 22.	April 2, 13, '65.	Right; circ. A. A. Surg. F. H. Colton. (Excis. fibula.) Died May 23, '65; pyæmia.
231	Badger, O., Pt., E, 126th Ohio, age 23.	July 9. 12, '64.	Left; circ. A. A. Surg. A. R. Gray. Died July 20, 1864; exhaustion.
232	*Baldwin, D. W.*, Pt, G, 2d North Carolina.	Sept. 19, Oc. 19, '64.	—; circ. Surg. E. A. Brevard, P. A. C. S. Gang. Died Oct. 22, 1864; exhaustion.
233	Barnett, D. A., Serg't, B, 99th Penn., age 22.	Nov. 7, 10, '63.	Left; circ. A. A. Surg. P. R. Holly. (Gang.) Died Nov. 26, 1863; pyæmia. *Specs.* 2246, 2247, 3991.
234	Barnhersel, M. J., Pt., C, 2d Wisconsin, age 21.	Aug. 28, Se. 21, '62.	Right. Surg. C. Page, U. S. A. Died Oct. 7, 1862. *Spec.* 77.
235	Barry, J., Pt., D, 2d N. Hampshire, age 20.	May 16, 25, '64.	Right; flap. A. A. Surg. J. S. Hill. (May 16, amp. leg; slough.; hæm.) Died May 30, '64; exh'n.
236	Bassheart, W., Pt., C, 116th Pennsylvania.	May 22, 26, '63.	Left; circ. A. Surg. H. M. Sprague, U. S. A. Died June 1, '63. *Spec.* 1624.
237	Baxter, S., Serg't, I, 68th Col'd Troops, age 23.	April 1, 12, '65.	Right; circ. skin flap and circ. of mus. Surg. F. E. Piquette, 80th C. T. Hæm.; lig. fem. artery. Died June 2, '65; exhaustion.
238	Bearley, J. H., Serg't, I, 101st Ohio.	Sept. 1, 8, '64.	Right. Surg. W. H. Matchett, 40th Ohio. Hæm.; lig. femoral artery. Died Oct. 31, 1864.
239	Bechtel, W. H., Corp'l, A, 23d Iowa, age 23.	Oct. 19, Nov. 3, '64.	Right; double flap. Surg. R. W. Pease, U. S. V. Died Nov. 12, '64.
240	Bennett, H., Corp'l, G, 6th Maine, age 20.	May 7, 14, '64.	Right; flap. Surg. D. W. Bliss, U. S. V. Pyæmia. Died June 4, 1864. *Spec.* 2272.
241	Bettler, P., Pt., H, 9th Wisconsin.	April 30, M'y 3, '64.	Left. May 22, re-amp. Died June 21, 1864.
242	Bishop, C. C., Pt., M, 8th N. Y. H. Art'y, age 17.	June 3. 6, '64.	Left; ant. post. flap. Died June 26, 1864; exhaustion.

[1] Wagner (C.), *Report of Interesting Surgical Operations, etc.*, p. 15. Morton (T. G.), *On Amputation at the Hip Joint, etc.*, in *Am. Jour. of the Med. Sciences, N. S.*, 1866, Vol. LII, p. 32. Packard (J. H.), *On Amputation at the Hip Joint*, in *New York Med. Journal*, 1866, Vol. II, p. 161. *Circular* 6, S. G. O., 1865, pp. 49, 50. *Circular* 7, S. G. O., 1867, pp. 49, 65

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
243	Bissell, A. E., Corp'l, I, 9th N. Hamp., age 23.	July 23, 26, '64.	Right. (Spiculæ rem'd.) Died October 8, '64; amputation
244	Blackburn, J., Corp'l, K, 20th Wis., age 22.	Dec. 7, 11, '62.	Right; ant. post. flap. A. Surg. J. F. Bruner, 7th Mo. Cavalry. Died Dec. 18, '62; hæmorrhage.
245	Blackmer, C. H., Pt., A, 21st Mass., age 20.	June 16, 22, '64.	Left; circ. A. A. Surg M. F. Prince. Died July 1, '64; asthen.
246	Bloomer, J., Pt., K, 170th New York, age 44.	Aug. 25, Se. 18, '64.	Right; flap. Surg. N. R. Moseley, U. S. V. (Gang. Sept. 12 ex. fib.; lig. post. tib.; hæm.; lig. femoral.) Died Sept 21, 1864; cons'l irritab'y. *Specs.* 2250 3269.
247	*Bowers, J. A.*, Pt., C, 15th S. Carolina, age 18.	Sept. 14. 20, '62.	——; circ.; gang.; flaps sloughed. Died Nov. 9, 1862 pyæmia.
248	Bowker. J., Pt., B, 45th Penn., age 25.	June 3, 8, '64.	Right; ant. post. flap. Surg. R. B. Bontecou, U. S. V. Died June 12, 1864; exhaustion.
249	Bowser, J. F., Pt., B. 11th Penn., age 18.	Mar. 30, April 11, 1865.	Right; circ. A. A. Surg. Geo. P. Hanawalt. Hæm. recurred; lig. fem. art. Died May 21, '65; pyæmia. Autopsy. *Spec.* 1426.
250	Bowyer, H. L., Capt., H. 31st Illinois.	May 16, 23, '63.	Right (abscesses). Died June 13, 1863. Hæmorrhage. *Spec.* 1486.
251	*Brandon, E. C.*, Pt., K. 14th Virginia, age 23.	May 10, 19, '64.	Right; circ.; hæm.; lig tem. art. Died June 24, '64; exhaustion.
252	Brasier, J. P., Pt., C. 75th Ohio.	Aug. 30, Se. —, '62.	Right. A. A. Surg. H. J. Bigelow. Necro. Died Dec. 12, '62; exh'n.
253	Brassington, J., Pt., H. 96th Penn., age 33.	May 13, 30, '64.	Left; circ. A. Surg. W. F. Norris, U. S. A. Recurrent hæm. Died June 7, '64; exh'n. *Spec.* 3539.
254	*Brennan, J.*, Capt., A, 16th Virginia, age 29.	Oct. 27 Nov. 25, 1864.	Right, Teale's method. A. A. Surg. C. Eberhardt. Died Nov. 25, '64. Autopsy. *Spec.* 3438.
255	Brenning, C. F., Corp'l, F, 49th Ind., age 25.	Oct. 14, 21, '64.	Left; bi-lat. flap. A. A. Surg. F. Hassenburg. (Erysip.) Died three hours after; exhaustion. Autopsy. *Spec.* 3740.
256	Briscoe, M., Pt., G, 155th New York, age 42.	June 3, 8, '64.	Left. Surg. Gen. A. Garcelon, of Maine. Hæm.; lig. fem. artery. Died June 16, 1864; hæmorrh.
257	Brooks, E., Pt., B, 188th Penn., age 21.	June 3, 13, '64.	Right; circ. Surg. O. A. Judson, U. S. V. Died June 23, 1864; pyæmia. Autopsy. *Spec.* 2941.
258	*Brown, N.*, Pt., E, 56th Virginia.	July 3, 9, '63.	——. July 10, hæm. Died July 11, 1863; loss of blood.
259	Bruen, L. B., Major, 12th Infantry, age 42.	May 13, 22, '64.	Left; circ. A. Surg. W. Thomson, U. S. A. May 25, erysip. Died June 21, '64; pyæm. *Spec.* 3594.
260	Bubier, F., Pt., G, 11th Maine, age 20.	Aug. 14, 21, '64.	Left; circ. A. A. Surg. R. O. Sidney. Died Sept. 13, '64; irritative fever.
261	Bunnell, J., Pt., D, 9th Indiana, age 20.	June 16, —, '64.	Right. Died June 30, 1864.
262	Burdick, W. C., Pt., G, 7th Rhode Island.	Dec. 13, 21, '62.	Left. Surg. C. S. Wood, 66th N. Y. Died Dec. 26, 1862.
263	Burke, P., Pt., G, 10th Infantry.	Aug. 30, Se. 11, '62.	Right; hæm.; lig. femoral artery. Died Sept. 14, '62; exhaustion.
264	Burnett, C., Pt., C, 66th New York.	July 2, 7, '63.	——. Surg. C. S. Wood, 66th N. York. Died July 10, 1863.
265	*Burnham, W.*, Serg't, G, 8th Louisiana, age 35.	Oct. 19, Nov. 5, 1864.	Right; flap. Surg. A. Chapel, U.S.V. (Gang.; hæm; lig. popliteal art.) Died Nov. 14, 1864; exhaustion.
266	Burrell, J., Captain, A, 121st New York.	Oct. 19, 22, '64.	Right; circ. A. Surg. J. G. Thompson, 77th N.Y. Hæm. Died Oct. 30, '64; exhaustion. *Spec.* 3784.
267	Butcher, J. S., Pt., F. 100th Illinois, age 30.	Dec. 15, 20, '64.	Left thigh. Died January 9, '65.
268	Butler, P., Pt., I, 7th Col'd Troops, age 23.	Oct. 27, No. 11, '64.	Left. A. Surg. J. H. Kinsman, U. S. A. Died Nov. 15, 1864.
269	Call, J., Pt., E, 3d Michigan.	Aug. 30, Sep. 2, '62.	Left; ant. post. dou. flap. Ass't Surg. T. G. Mackenzie, U. S. A. Died Sept. 8, 1862.
270	Carlton, C. C., Pt., B, 1st Massachusetts, age 35.	May 7, 22, '64.	Left; circ. Surg. N. R. Moseley, U. S. V. Hæm.; lig. prof. art'y; recurrent hæm. Died May 30, 1864; hæmorrhage.
271	Carney, C., Pt., C, 1st Pennsylvania Res.	Sept. 14, 26, '62.	Right. Surg. H. S. Hewit, U.S.V. Died Oct. 17, '62. *Spec.* 376.
272	Carrier, M. H., Serg't, E, 25th Connecticut.	May 27. Je. 12, '63.	Left. (June 8, excis. humerus.) Died June 15, '63. *Spec.* 1311.
273	Carter, J., Pt., H, 1st W. Virginia Cav., age 20.	June 18. J'y 4, '64.	Right; circ. A. A. Surg. W. H. Phillips. Died July 9, 1864; exhaustion.
274	Christian, S. J., Pt., I, 26th Indiana, age 20.	Dec. 7. 12, '62.	Left; ant. post. flap. A. Surg. J. F. Bruner, 7th Missouri Cav'ry. Died Dec. 16, 1862.
275	Claflin, W. N., Pt., G, 6th Vermont.	May 3. 18, '63.	Right. Died May 20, 1863.
276	Cleaver, A. R., Pt., A, 188th Penn., age 18.	June 1, 19, '64.	Right; ant. post. flap. Surg. R. B. Bontecou, U. S. V. Died June 26, 1864; typ. fever. *Spec.* 3060.
277	Clinton, G., Pt., G, 2d Conn. Artillery, age 19.	Sept. 19 24, '64.	Right; skin flap; circ. muscles. Surg. W. A. Barry, 98th Penn. (Erysipelas); sloughing. Died Nov. 15, 1864. Autopsy.
278	Clutz, G. W., Pt., G, 83d Penn., age 23.	May 5, 19, '64.	Left; circ. A. A. Surg. C. T. Trautman. Died May 25, '64; exh'n. *Spec.* 3044.
279	Clyde, C., Pt., I, 150th Pennsylvania.	July 1, 15, '63.	Right. Surg. P. A. Quinan, 150th Pa. Died July 17, '63. *Spec.* 1481.
280	Cole, B. W., Corp'l, K, 16th Maine.	Dec. 13, 21, '62.	Left; circ. Surg. E. Bentley, U. S. V. Died Dec. 27, '62; pyæm. *Spec.* 609.
281	*Collins, A. D.*, —, H, 17th South Carolina	Sept. 14, 27, '62.	Left. Dr. Halsey. Died Oct. 2, 1862. *Spec.* 816.
282	Conner, W., Pt., B, 11th Pennsylvania Res.	Dec. 13, 19, '62.	Left; flap. Surg. J. S. DeBenneville, 11th Penn. Reserves. Died Jan. 2, 1863.
283	Conroy, D., Pt., D, 62d New York, age 23.	June 1, 6, '64.	Right; circ. (mortification). A. A. Surg. J. H. Thompson. Died June 22, 1864; pyæmia.
284	Conway, T., Pt., I, 33d New York.	May 3, —, '63.	Left. Died June 4, 1863.
285	*Coot, J.*, Lieut., F, 10th Alabama, age 26.	May 5, 20, '62.	Left; flap. Ass't Surg. J. S. Billings, U. S. A. Diarrh.; hæm.; lig. Died May 25, '62; diarrh.
286	Corey, O. M., Pt., H, 114th N. Y., age 21.	Oct. 19, 29, '64.	Right; ant. post. flap. A. A. Surg. W. Kempster. (Oct. 19, amp. leg.; hæm.); sloughing. Died Nov. 11, 1864.
287	Correll, L., Pt., G, 67th Penn., age 19.	Sept. 19, 27, '64.	Left; modified flaps. A. Surg. J. G. Thompson, 77th N.Y. (Gangrenous.) Died Sept. 27, 1864; exhaustion.
288	Cox, W. T., Pt., G, 8th Illinois, age 40.	April 9, 14, '65.	Right; circ. A. Surg. A. Hartsuff, U. S. A. (Gang.) Died May 5, 1865; profuse hæmorrhage.
289	Crassen, L. M., Pt., L, 7th N.Y. H. A., age 22.	June 6, 10, '64.	Left; circ. Died August 15, '64.
290	Crawford, J. J. S., Pt., D, 91st New York, age 23.	April 1, 8, '65.	Right; circ. A. Surg. W. F. Norris, U. S. A. Died April 14, '65; exhaustion. *Spec.* 2963.
291	*Crawford, W. E.*, Pt., I, 5th N. Carolina, age 32.	May 12, 23, '64.	Left; circ. Surg. N. R. Moseley, U. S. V. Three ins. of fem. rem'd. Died June 17, '64. *Specs.* 2563, 4761.
292	Crocraft, S., Pt., B, 121st Col'd Troops, age 18.	Mar. 13, 24, '65.	Right; flap. Surg. N. Gray, U. S. V. Died April 6, 1865.
293	Cronin, P., Pt., K, 20th Massachusetts.	June 30, J'y 22, '62.	——; lat. flap. Surg. R. B. Bontecou, U. S. V. Died July 24, '62.
294	Crossan, A., Pt., E, 34th Ohio, age 32.	July 24, Aug. 3, 1864.	Left; circ. A. A. Surg. G. M. Paullin. Died Aug. 24, '64; pyæmia. Autopsy.
295	Crowley, P., Serg't, G, 1st Mass. Heavy Artillery, age 23.	June 20, July 11, 1864.	Left; flap. A. A. Surg. F. H. Getchell. (Erysipelas.) Died July 11, 1864. *Spec.* 3662.
296	Cummins, A. H., Pt., K, 34th N. York, age 25.	Dec. 13, 26, '62.	Right. Surg. H. Bryant, U. S. V. Hæm.; lig. fem. art. Died Jan. 25, '63; exh'n. Autop. *Spec.* 589.
297	*Cunningham, J.*, Pt, I, 13th Georgia, age 26.	May 12, 15, '64.	Left; ant. post. flap; hæmorrhage. Died June 14, 1864; exhaust'n.
298	Cupp. W., Pt., A, 44th New York.	Aug. 31, Se. —, '62.	——. Died September 30, 1862.
299	Daggett, S. W., Capt., B, 1st Me. H. A., age 32.	June 18, 27, '64.	Right; ant. post. flap; circ. sect. muscles. A. Surg. W. Webster, U. S. A. Died July 1, 1864; exhaustion. *Spec.* 2261.
300	Daily, T., Serg't, A, 63d New York.	Sept. 17, Oct. 3, '62.	Left. Surg. H. S. Hewit, U. S. V. Died Oct. 8, 1862. *Spec.* 448.
301	Dall, J. H., Pt., H, 77th Penn., age 23.	Sept. 1, 15, '64.	Right; circ. A. A. Surg. D. H. Bell. Recurrent hæmorrhage. Died Sept. 26, 1864.
302	Davidson, J., Pt., G, 1st Mich. Cavalry, age 21.	Mar. 31, Apr. 7, '65.	Left. Surg. E. Griswold, U. S. V. Died April 8, 1865.
303	Davis, L. T., Pt., B, 3d W. Virginia Cavalry, age 21.	Aug. 19, 29, '64.	Right; double flap. A. A. Surg. E. K. Deemy. (Necrosis.) Died October 4, 1864; exhaustion.
304	*Davis, T.*, Pt., F, 25th South Carolina.	Jan. 15, Feb. 2, 1865.	Right; post. flap. A. Surg. J. Vansant, U. S. A. Died Feb. 9, 1865; pyæmia.
305	*Davis, W. E.*, Capt., B, 30th North Carolina, age 25.	Nov. 7, 10, '63.	Right; circ. A. Surg. W. Thomson, U. S. A. (Gang.) Died Nov. 22, '63; trism. Autop. *Spec.* 2236.
306	Dawson, F., Bugler, I, 1st Cavalry, age 24.	Oct. 19, 22, '64.	Left; flap, skin; circ. muscles. Surg. W. A. Barry, 98th Penn. Hæm. recur'd; slough'g. Died Nov. 9, '64; exh'n from hæm.
307	Decker, N., Pt., C, 125th Penn., age 45.	Sept. 17, Oct. 6, '62.	Right. Died October 17, 1862. *Spec.* 4827.
308	DeCourcey, G., Pt., F, 101st Indiana.	Mar. 20, —, '63.	Right (gangrene). Died April 24, 1863.
309	Dener, C., Pt., D, 6th Conn., age 32.	June 3, 14, '64.	Right (June 12, hæm.; lig. ant. tib. art.; 13, ex. piece shell); circ. A. A. Surg. S. Colossdian. Died June 18, 1864; exhaustion.
310	Dickey, L. W., Pt., G, 40th N. Y., age 28.	June 21, 29, '64.	Right; circ. Surg. A. F. Sheldon, U. S. V. Died July 8, 1864; pyæmia.
311	Donnelly, R., Pt., A, 25th Ohio.	Aug. 30, Sept. 5, 1862.	Right; flap. Surg. J. E. Summers, U. S. A. Died Oct. 20, '62; osteomyelitis. *Spec.* 319.

No.	Name, Military Description and Age.	Dates.	Operations, Operators, Result.
312	Doty, N., Pt., E, 102d Penn., age 23.	Sept. 19, 28, '64.	Left; oval flap. A. A. Surg. T. J. Dunott. Pyæmic chills. Died Nov. 7, 1864. Autopsy. *Specs.* 1562, 3944.
313	Dougherty, J. H., Pt., G, 66th N. York, age 35.	June 6, 9, '64.	Right. Surg. W. Watson, 105th Penn. June 20, hæm.; 21st, recurred; lig. fem. art. Died June 29, 1864; pyæmia.
314	Dougherty, M., Pt., E, 49th Penn., age 35.	Sept. 19, 26, '64.	Left; ant. post. flap. A. Surg. J. G. Thompson, 77th N. Y. Nov. 4, bone rem'd; hæm.; lig. fem. art. March 19,'65, lig. fem. art.; 25, lig. ex. iliac art. Died April 8, 1865. Autopsy.
315	Douw, J. D. P., Capt., K, 121st New York.	Oct. 19, 22, '64.	Right; semi-lunar flaps. A. Surg. W. G. Bryant, 122d Ohio. Died Oct. 26, 1864; exhaustion.
316	Doverspike, H., Pt., I, 82d Penn., age 33.	June 1, 8, '64.	Right. A. A. Surg. C. Carvallo. Died June 13, 1864. *Spec.* 201.
317	Dow, J. M., Pt., E, 12th New Hamp., age 20.	June 3, 20, '64.	Right; lat. flaps. Surg. N. R. Moseley, U. S. V. Died July 7, 1864.
318	Doyle, E., Pt., F, 3d Vt., age 28.	May 10, 15, '64.	Right; ant. post. flaps. A. Surg. A. Delaney, U.S.V. Died May 17, 1864; exhaustion.
319	Driscoll, C., Bugler, 14th N. Y. Cavalry, age 17.	Mar. 12, 22, '65.	Right (sloughing; hæm.); bi-lat. flaps. A. A. Surg. F. Barnes. Died April 3, 1865; pyæmia.
320	Duffin, M., Sergeant, D, 29th Col'd Troops.	July 30, Aug. 21, 1864.	Right; oval flap. Surg. C. Page, U.S.A. Died Aug. 31,'64; loss of blood and dise. of lung. Auto.
321	*Dunn, J.*, Pt., Georgia Sharpshooters.	Sept. 20, 23, '63.	——; circ. Died Nov. 1, 1863; exhaustion.
322	Dunsmore, D. F., Serg't, G, 147th N. Y., age 20.	May 5, 31, '64.	Right; circ. Died Oct. 1, 1864.
323	Durkee, M. B., Corp'l, E, 185th N. York, age 22.	Mar. 29, April 3, 1865.	Left; circ. A. A. Surg. J. Winslow. Died May 5, 1865; pyæm. Autopsy. *Spec.* 162.
324	Eaton, C. A., Pt., K, 39th Mass., age 40.	May 9, 17, '64.	Right (May 12, exc. fibula; 17th, hæm.); ant. post. flap. Surg. A. F. Sheldon, U. S. V. Died May 29, 1864; exhaustion.
325	Edwards, B., Pt., D, 17th Vermont, age 22.	May 5, 30, '64.	Left; ant. post. flap. A. A. Surg. C. Eberhardt. Gang.; slough'g. Died June 13, '64; pyæmia.
326	*Edwards, C. H.*, Pt., C, 24th Virginia, age 25.	May 16, 20, '64.	Right; double flap. Surg. C. B. Gibson, C. S. A. Died May 31, 1864; gangrene.
327	Eldred, H., Pt., E, 2d Sharpshooters, age 27.	June 18, J'y 1,'64.	Left (June 18, amp. leg.; gang.); ant. post. flap. Surg. R. B. Bontecou, U. S. V. Died July 6, 1864; tetanus.
328	Ells, J., Pt., C, 51st Illinois, age 19.	Nov. 30, Dec. 19, 1864.	Left; circ. Surg. J. R. Ludlow, U. S. V. Hæm. Died Dec. 19, 1864; synovitis and pneumonia.
329	Ellsworth, C. W., Serg't, B, 17th Vt., age 33.	April 2, 6, '65.	Left; circ. Died May 18, 1865; exhaustion.
330	Emerson, H. S., Corp'l, M, 1st Maine H'vy Artillery, age 32.	May 19, 31, '64.	Left; circ. A. A. Surg. J. C. Nelson. Died May 31, '64; exh'n. *Spec.* 2469.
331	Evans, W., Pt., I, 10th Connecticut, age 21.	July 27, Au. 1,'64.	Left; circ. A. A. Surg C. T. Bullen. Died Aug. 18, '64; exh'n.
332	Evy, R., Pt., B, 1st Mich. Sharpshooters, age 28.	May 12, 27, '64.	Right (hæm.); circ. A. A. Surg. L. C. Dodge. Died June 6,'64; pyæmia. *Spec.* 2357.
333	Ewing, T. C., Pt., E, 31st Ohio, age 18.	June 22, July 18, 1864.	Right (bone rem'd; hæm.); circ. A. Surg. J. M. Brown, U. S. A. Died Au. 1,'64; exh'n. *Spec.* 3389.
334	Exnor, C., —, C, 1st New Jersey.	Sept. 14, 17, '62.	——; circ.; flaps sloughed. Died October 17, 1862.
335	F——, E., Private.	Feb. 16, 26, '62.	——; circ.; erysipelas · three ins. stump rem'd. Died March 5, 1862; exhaustion.
336	Fairchilds, J. O., Corp'l, K, 77th New York.	Sept. 19, 23, '64.	Left; flap. Surg. W. A. Barry, 98th Penn. Died Sept. —, 1864.
337	Farrar, G. P., Pt., K, 185th N. Y., age 20.	Mar. 29, April 5, 1865.	Right; ant. post. flap. Surg. N. R. Moseley, U.S.V. Died April 10, '65; exhaustion. *Spec.* 4040.
338	*Farron, A. W.*, Lieut., 8th Georgia.	July 3, 21, '63.	Left. Died July 21, 1863; shock of operation. *Spec.* 2048.
339	Fayshon, J., Pt., A, 57th Mass., age 23.	May 5, 25, '64.	Right; circ. Surg. E. Bentley, U. S. V. Died May 30, 1864; exhaustion.
340	Firth, R. E., Pt., A, 157th New York, age 23.	Dec. 6, 10, '64.	Left; ant. post. flap. A. A. Surg. H. Leaman. Flaps sloughed; hæm. Died Dec. 29, 1864; pyæmia. Autopsy.
341	Fisher, G. A., Pt., K, 8th New York H'vy Art., age 19.	June 2, 15, '64.	Right; circ. A. Surg. W. F. Norris, U.S.A. Hæm.; lig. Died June 23,'64; pyæ. Autop. *Spec.* 3563.
342	Fitch, P., Pt., E, 61st New York, age 34.	April 7, 18, '65.	Left; ant. oval skin flap. A. Surg. W. S. Ely, U. S. V. Slough'g; pyæmia. Died April 26, 1865. *Spec.* 4099.
343	Flammer, T., Pt., A, 12th Penn. Cav., age 50.	July 9, 24, '64.	Right; circ. A. A. Surg. W. S. Adams. Hæm. recur'd. Died Aug. 3, 1864; exh'n. Autopsy. *Specs.* 3812, 3958.
344	Flanders, A., Pt., 4th New Jersey Artillery, age 43.	Aug. 16, Sept. 12, 1864.	Left (slough'g; necrosis). A. A. Surg. G. A. Chesley. Died Sept. 15, 1864; hæmorrhage.
345	Fliegi, H., Corp'l, F, 7th Michigan.	Sept. 17, Oct. 9,'62.	Right. Hæm. Oct. 11. lig. fem. art. Died Oct. 18, 1862.
346	Flynn, M., Pt., L, 21st N. York Cav., age 19.	July 16, Aug. 2, 1864.	Right; circ. A. A. Surg. A. R. Gray. Sloughing. Died Aug. 18, 1864; pyæmia. Autopsy. *Specs.* 3835, 3967.
347	Folansbee, C. M., Pt., B, 157th N. York, age 16.	Dec. 6, 9, '64.	Right; ant. post. flap. A. A. Surg. W. Balser. Sloughed; hæm. Died Dec. 26, '64; hectic fever.
348	*Fworhee, W. F.*, Pt., I, 14th North Carolina, age 22.	May 19, Je. 1,'64.	Left (gangrene); circ. A. A. Surg. H. M. Dean. Died June 17,'64; exhaustion.
349	Forrester, S., Corp'l, E, 67th New York, age 37.	Sept. 19, 24, '64.	Left; modified flaps. A. Surg. J. G. Thompson, 77th N.Y. Phlebitis. Died Oct. 13,'64; pyæm. Autopsy. *Spec.* 3273.
350	Foster, R., Capt., E, 1st New Jersey, age 39.	May 12, 27, '64.	Left; circ. A. A. Surg. F. H. Colton. Hæm.; lig.; slough'g. Died June 14, '64; exh'n. *Spec.* 3956.
351	France, J., Serg't, A, 20th Wisconsin, age 25.	Dec. 7, 10, '62.	Left; flap. A. Surg. J. J. Sanders, 1st Iowa Cav. Sloughed. Died Dec. 21, 1862; hæmorrhage.
352	*Galaway, E.*, Pt., B, 2d South Carolina, age 22.	May 16, 23, '64.	—— (gangrene); circ. Died June 15, 1864; pyæmia. Autopsy.
353	Gallaher, E., Pt., A, 119th New York, age 17.	May 3, 27, '63.	Right; circ. Surg. R. Reyburn, U. S. V. Died June 20, 1863; pyæmia. *Spec.* 1601.
354	Gans, E., Serg't, E, 46th New York, age 20.	Aug. 19, 31, '64.	Left; circ. A. A. Surg. E. P. Fitch. Died Oct. 1, '64; hectic fever.
355	Garble, C., Pt., G, 3d Maryland, age 21.	June 17, 24, '64.	Right; oval flap. A. A. Surg. W. H. Ensign. Died June 25, 1864. *Spec.* 2392.
356	Gardiner, P., Serg't, K, 21st Penn., age 21.	Oct. 27, No. 26,'64.	Right thigh. Died December 4, 1864.
357	Gay, E., Corp'l, H, 18th Wisconsin.	April 6, —, '62.	—— (excision); don. flap. Surg. E. C. Franklin, U. S. V. Died April 22, 1862; pyæmia.
358	Geist, L., Pt., E, 3d Md., age 21.	May 13, Je. 5,'64.	Left. A. A. Surg. F. G. H. Bradford. Died June 22, '64; exh'n. *Spec.* 2504.
359	Geller, M., Pt., D, 48th New York, age 37.	June 30, J'y 4,'64.	Left; ant. post. flap. A. A. Surg. T. Liebold. Sloughing; hæm.; lig. Died Aug. 29,'64; dinrrhœa.
360	[1] *Gibson, J. A.*, —, F, 7th Virginia.	June 27, J'y 3,'62.	——; circular. Died.
361	*Gilbert, N. H.*, Serg't, F, 58th Virginia, age 21.	July 20, 23, '64.	Left; ant. post. flap. A. A. Surg. C. H. Ohr. Died Aug. 8, 1864. *Spec.* 4272.
362	*Gilkerson, W.*, Pt., B, 60th Virginia.	Sept. 19, Oct. 18, 1864.	Left; circ. Surg. E. A. Brevard, P. A. C. S. Died Oct. 18, 1864; shock of operation.
363	Gill, B. F., Pt., E, 7th Ohio.	Aug. 9, 15, '62.	Left; double flap. Surg. J. E. Summers, U. S. A. Died Aug. 29, 1862. *Spec.* 39.
364	Gillinger, J., Pt., K, 46th Penn., age 29.	Aug. 9, 15, '62.	Right; ant. post. flap. Surg. J. E. Summers, U. S. A. Died Sept. 15, 1862. *Spec.* 48.
365	Gilmore, M., Pt., D, 54th Massachusetts.	July 18, 27, '63.	Left. (23d, excision tib. and fib.; mortificat'n.) Died July 27,'63.
366	Glazier, A., Corp'l, B, 1st Minnesota, age 29.	Aug. 25, 29, '64.	Left (Aug. 25, patella rem'd); circ. A. A. Surg. D. C. Van Slyck. Died Sept. 2, 1864; gangrene.
367	Glinney, J., Pt., H, 81st Pennsylvania.	De. 13,'62, Ja. 1,'63.	Right. (Dec. 13, amp. leg.) Died Jan. 2, 1863; shock and exh'n.
368	*Golden, O. P.*, —, G, 1st South Carolina Cav.	Sept. 20, Oc. 19,'63.	Right. (Hæmorrhage.) Died in ten hours.
369	Gowan, N. P., Pt., C, 150th Penn., age 26.	July 1, 15, '63.	Right. Died Sept. 25, 1863; diarrhœa.
370	Graves, L. W., Pt., D, 1st R. Island, age 19.	Oct. 29, Nov. 7, 1864.	Right. A. A. Surg. E. G. Waters. Died Dec. 22, 1864; exhaustion. *Spec.* 3430.
371	Green, J., Pt., H, 82d Ohio.	June 1, —, '64.	Left. Died June 23, 1864.
372	Green, J. P., Corp'l, D, 14th Infantry, age 25.	May 6, 26, '64.	Right (hæm.: tourniquet obstructing ven's circulat'n); ant. post. flap. Surg. A. F. Sheldon, U.S.V. Died May 29, 1864; exhaustion.
373	Green, W. H., Serg't, E, 26th Ohio.	Sept. 20, —, '63.	Left. Died October 21, 1863.
374	*Griffin, L. C.*, Corp'l, D, 8th North Carolina.	July 19, 22, '64.	Left. Dr. J. Jones, of Richmond. Died Feb. —, 1865. Autopsy. *Spec.* 3141.
375	Grubbs, D. A., Serg't, H, 95th Penn.	May 3, —, '63.	Left. A. Surg. E. J. Marsh, U.S.A. Died May 31, 1863. *Spec.* 1078.
376	Gujun, E., Pt., B, 138th Penn., age 21.	July 9, 12, '64.	Left; circ.; hæm.; poplit'l artery lig. Died July 22, '64; pyæm.

[1] SMITH (E. H.), *Report of Cases of Compound Comminuted Fracture of Femur, etc.*, in *Confed. States Med. and Surg. Jour.*, 1864, Vol. I, p. 24.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
377	*Haden, E. R.*, Pt., F, 4th Virginia Cavalry, age 22.	May 10, 18, '64.	Left; circ. A. A. Surg. C. P. Bigelow. Died May 25, '64. *Spec.* 2289.
378	[1] Haggerty, F., Pt., G, 14th Indiana, age 35.	Dec. 13, 27, '62.	Right; flap. Died Dec. 30, 1862; exhaustion.
379	*Haldron, J. W.*, Pt., A, 17th Va. Cavalry,	Nov. 9, 13, '64.	——; circ. Died Nov. 21, 1864; gangrene.
380	Hammond, A., Pt., H, 111th N. York, age 47.	April 2, 6, '65.	Left; circ. A.Surg.W. F. Norris, U. S.A. Hæm.; lig. Died April 16,'65; pyæm. Autop. *Spec.*2652.
381	[2] Hang, G., Pt., G, 2d Artillery, age 27.	May 31, June 14, 1864.	Right; circ. A. A. Surg. C. H. Osborne. Hæm. Died June 21, 1864; pyæmia.
382	Harding, W., Pt., B, 58th Pennsylvania, age 22.	Sept. 29, Oct. 6, '64.	Right; flap. A.A. Surg.T. Hopkins. Died Oct. 6, 1864; shock of operation.
383	Harouff, J., Pt., D, 56th Penn., age 27.	Mar. 30, Ap.25,'65.	Right; circ. Died April 29, '65; exhaustion. *Spec.* 4106.
384	Harris, W. H., Pt., A, 12th New Jersey.	May 3, 8, '63.	Left. Died May 14, 1863.
385	Harvey, B., Pt., A, 3d Kentucky	Sept. 20, Oct. –,'63.	Right; circ. Died Oct. 21, 1863.
386	Haskell, J. L., Pt., D, 7th Maine.	May 3, –, '63.	Left. A.Surg.E.J.Marsh, U.S.A. Died June 3, 1863. *Spec.* 1077.
387	Haskins, W. H., Pt., K, 39th Mass., age 23.	May 10, 18, '64.	Left (May 14, 16, hæm.); circ. A. Surg. W. Thomson, U. S. A. May 24, hæm.; lig. May 31, hæm.; lig. fem. art. Died May 31, 1864; exh'n. *Spec.* 3522.
388	Hays, A. H., Pt., B, 142d Penn., age 23.	Dec. 13, 25, '62.	Left. Surg. H. Bryant, U. S. V. Hæm.; lig. Died Jan. 10, 1863; exhaustion. *Spec.* 2558.
389	Heafey, J., Pt., F, 24th Mass., age 30.	Aug. 14, 22, '64.	Right; circ. A. A. Surg. W. L. Welles. Died Sept. 14, 1864; irritative fever.
390	Heath, L., Serg't, D, 2d Michigan, age 22.	June 18, July 7, 1864.	Right (excision tibia); circ. A.A. Surg. J. H. Thompson. Hæm. July 12, lig. fem. art. Died July 28, '64; pyæmia. *Spec.* 2867.
391	Hector, O., Pt., K, 56th New York.	May 31, J'e 8, '62.	——. Died June 13, 1862; pyæmia.
392	Hendrix, J., Pt.,C, 110th Ohio, age 27.	July 9, 14, '64.	Right; circ. A. A. Surg. G. M. Paullin. Died Aug. 11, 1864; pyæmia. Autopsy. *Spec.* 3842.
393	Henefin, G., Pt., F, 5th New Hampshire.	May 2, 8, '63.	Left. Surg. G. P. Oliver, 111th Penn. Died May 13, 1863.
394	Henry, J., Serg't, E, 11th Infantry, age 24.	May 12, 21, '64.	Left; ant. post. double flap. A. Surg. G. A. Mursick, U. S. V. Died May 25 '64; exh'n. Autop.
395	Hess, D., Pt., K, 56th Penn., age 30.	May 8, 16, '64.	Left (gang.); circ. Surg. E. Bentley, U. S.V. Gang.; sloughing. Died June 19, 1864; asthenia. Autopsy.
396	Hill, J. J., Pt., G, 47th Pennsylvania.	Oct. 22, 25, '62.	Left; circ. Died Nov. 2, 1862. *Spec.* 731.
397	Hindman, McC., Pt., B, 78th Penn., age 19.	May 27, J'e 1,'64.	Left; flap. Died July 29, 1864; pyæmia. Autopsy.
398	Hine, F. T., Lieut., I, 144th N. York, age 34.	Nov. 30, De.20,'64.	Left. Surg. A. P. Dalrymple, U. S. V. Died Dec. 20, 1864.
399	Hoffman, M., Pt., F, 39th New York, age 35.	Mar. 31, Apr.3,'65.	Right; circ. A.Surg.W. B. Hartman, 116th Penn. Abscesses; diarrh. Died May 24,'65; pyæm.
400	Holmes, G., Pt., F, 2d Penn. Art'y, age 20.	June 30, —, '64.	Left. (Spiculæ removed.) Died July 12, 1864; exhaustion.
401	*Holmes, G. J.*, Pt., A, 26th Georgia, age 24.	May 5, 30, '64.	Left; lat. flap. A. A. Surg. M. Sheffield. Died June 6, 1864; exhaustion.
402	Horton, E., Pt., A, 9th New York H'vy Art., age 31.	May 9, 30, '64.	Left; ant. post. flap. Surg. A. F. Sheldon, U. S. V. Died June 3, 1864; shock.
403	[3] *Howell, T. R.*, —, C, 4th Alabama.	June 27, J'y 2,'62.	Left; circ. Died July 4, 1862; tetanus.
404	Hubbard, J. H., Lieut., D, 145th Penn.	Dec. 13, 17, '62.	Left. Died December 19, 1862.
405	Hubbs, J. B., Pt., B, 142d Penn., age 20.	Dec. 13, 26, '62.	Right. (Hæm., recur'd; lig. fem. art.) Died Jan. 12, 1863; exhaustion. *Spec.* 652.
406	Hug, G., Drum Major, 30th Missouri.	May 21, 26, '63.	Left. A. A. Surg. L. Darling. Gangrene. Died May 31, 1863. *Spec.* 1626.
407	Hughbanks, J. H., Corp'l, E, 17th Ill. Cav., age 20.	Nov. 20, 26, '64.	Left. Died Nov. 26, 1864, during operation.
408	Huntingdon, S., Serg't, B, 101st Ohio.	Dec. 31, Ja. —,'63.	Right. Died January 19, 1863.
409	Hyam, D., Pt., C, 5th New Hamp., age 21.	April 7, 27, '65.	Right (hæm.); circ. Surg. O. A. Judson, U. S.V. Died May 14, 1865; pyæm. Autop. *Spec.* 4228.
410	Hynes, J., Pt., F, 18th Infantry.	May 25, June 16, 1864.	Right. (Gang.) A. Surg. C.W. Lawrence, 22d Mich. June 19, gang.; bone rem'd. Died June 22, 1864.
411	Irvin, R., Capt., B, 77th Illinois.	Jan. 11, 15, '63.	Left. Surg. A. H. Hoff, U. S. V. Died Jan. 17, 1863. *Spec.* 1490.
412	Jay, J. C., Pt., K, 19th Iowa, age 18.	Dec. 7, 11, '62.	Left; circ. Surg. T. W. Florer, 26th Ind. Flap sloughed. Died June 11, 1863; pyæmia.
413	Jenkins, J. H., Serg't, B, 89th Ohio, age 24.	Feb. 25, 29, '64.	Left; circ. Surg. F. Salter, U. S. V. Sloughed. Mar. 12, hæm.; lig. profunda artery. Died Mar. 16, 1864; pyæmia.
414	Johnson, A., Pt., G, 91st New York, age 27.	April 1, 9, '65.	Left; circ. A.A. Surg. T. O. Bannister. Died April 27, 1865; pyæmia. *Spec.* 4050.
415	Johnson, F., Pt., A, 10th New York, age 45.	Aug. 25, 30, '64.	Right; lat. flap. Surg.N.R.Moseley, U. S. V. Died Jan. 23, '65; exhaustion. *Spec.* 1991.
416	Johnson, L., Pt., B, 99th Penn., age 21.	May 12, 20, '64.	Left; circ. A. A. Surg. F. G. H. Bradford. Died May 25, 1864.
417	*Johnson, P. L.*, Pt., D, 25th Virginia, age 22.	May 3, 23, '63.	Right (abscesses); circ.; slough'g; femoral art. lig. May 27, bone rem'd. Died June 2, 1863.
418	Johnston, D., Pt.,B, 40th Mass., age 21.	June 1, 30, '64.	Right; circ. A. A. Surg. T. F. Belton. Died July 1, 1864.
419	Johnston, J., Pt., B, 27th Connecticut.	Dec. 13, 23, '62.	Right. Hæm.; lig. fem. artery; anæmi. Died Jan.5,'63. *Spec.*982.
420	Johnston, T. H., Corp'l, D, 34th Ohio.	May 16, 28, '62.	Right. (Gangrene.) Died May 28, 1862.
421	Jones, G.W., Pt., C, 14th New York, age 26.	Oct. 19, 30, '64.	Right; double flap. A. A. Surg. J. R. Uhler. Died Nov. 9,'64.
422	Jones, H., Pt., C, 1st N. York Dragoons, age 20.	May 19, June 7, 1864.	Right (gangrene); ant. post. flap. Surg. A. F. Sheldon, U. S. V. Died June 7,'64; shock and hæm.
423	Jones, J., Serg't, I, 65th Ohio.	Sept. 20, Oc.—,'63.	Right. Died October 18, 1863; hæmorrhage.
424	[4] Jones, L., Pt., E, 25th Indiana, age 20.	July 11, 23, '63.	Right; double flap. Died Sept. 16, 1863.
425	Kane, G. H., Pt., E, 1st Col'd Troops, age 17.	Oct. 27, Nov. 10, 1864.	Left (slough'g); circ. A. A. Surg. J. Pitkin. Died Nov. 10, 1864; exhaustion.
426	Keeth, C. B., Pt.,G, 26th Massachusetts.	Sept. 19, 23, '64.	Left. Died Sept. 24, 1864.
427	Kelly, J., Pt., B, 2d Infantry.	Sept. 17, Oc.16,'62.	Left. Died Oct. 21, 1862. *Spec.* 2496.
428	*Kelly, J.*, Pt., D, 11th Virginia, age 24.	May 6, J'e 15,'64.	Right; circ; diarrhœa; slough'g. Died June 27, 1864; exhaust'n.
429	Kelly, P., Pt., D, 102d Pennsylvania.	June 1, 7, '64.	Right. (Hæmorr.) Died June 8, 1864.
430	Kelly, T., Pt., F, 20th Massachusetts.	Dec. 13, 26, '62.	Left. Died January 5, 1863.
431	Keniston, S. E., Pt., H, 4th Maine, age 36.	May 23, June 17, 1864.	Right (necrosis); lat. flap. A. A. Surg. H. M. Dean. Died June 22,'64; exh'n. *Spec.* 2575.
432	Kennedy, M., Pt.,G,24th New York.	June 1, 10, '62.	Left; ant. post. flap. A. A. Surg. W. Hunt. Died June 16, 1862; exhaustion.
433	Kent, R. H., Serg't, F, 141st Penn.	May 3, 8, '63.	Right. Surg. G. P. Oliver,111th Penn. Died May 15, 1863.
434	Kerr, H., Pt., E, 139th Penn., age 33.	July 12, Aug. 11, 1864.	Left; circ. A.A. Surg. F. S. Barbarin. Died Sept. 20,'64; pyæm. *Spec.* 3004.
435	Kimball, F., Pt., E, 5th New York, age 20.	Aug. 30, Se. 20,'62.	Right. Died Oct. 7,'62; pyæmia.
436	[5] King, T., Corp'l, H, 2d Cavalry, age 24.	May 7, 14, '64.	Right (aneurism); circ. A. Surg. W. Thomson, U. S. A. Slough. Died June 4,'64; pyæmia. Autopsy. *Specs.* 3545, 3529, 3579.
437	*King, W. S.*, —, K, 28th Virginia, age 32.	May 5, 17, '62.	Left; circ. A.Surg. J.S. Billings, U. S. A. Died May 18, 1862.
438	Kinney, B., Pt., G, 2d Connecticut, age 43.	Oct. 19, Nov. 7, 1864.	Left; ant. post. flap. A. A. Surg. J. J. Cockrell. Died Nov. 12, 1864; hæmorrhage.
439	Kinney, J. H., Serg't, F, 84th Illinois.	Sept. 19, Oc.—,'63.	Left. Died October 21, 1863.
440	Kirby, R., Pt., H, 12th New Jersey.	May 3, 16, '63.	Right. Died May 18, 1863.
441	Kirsherman, J. J., Pt., K, 118th Penn.	Sept. 20, Oc.10,'62.	——. Surg. T. H. Squire, 89th N.Y. Hæm. Died Oct. 18, '62.
442	Kitt, J., Corp'l, F, 54th Ohio.	April 6, –, '62.	——. Surg. E. C. Franklin, U.S. V. Died May 18, 1862.
443	[6] Klumpeter, H., Pt., I, 8th New York.	Aug. 29, Se. 17,'62.	——. Surg. D. P. Smith, U. S. V. Died Sept. 21, 1862. Autopsy.
444	Knapp, C. A., Pt., B, 6th Vermont, age 20.	May 10, 29, '64.	Left; ant. post. flap. Surg. R. B. Bontecou, U. S. V. Hæm.; lig. fem. art. Died June 4,'64; exh'n.

[1] LIDELL (J. A.), *On the Major Amputations, for Injuries in both Civil and Mil'ry Practice*, in *Am. Jour. Med. Sci's*, N. S., 1864, Vol. XLVII, p. 367.

[2] LIDELL (J. A.), *On the Wounds of Blood-vessels, Traumatic Hæmorrhage, Traumatic Aneurism, and Traumatic Gangrene*, in *U. S. Sanitary Commission Memoirs*, 1870, Surgical Volume I, p. 198.

[3] SMITH (E. H.), *Report of Cases of Compound Comminuted Fracture of Femur, etc.*, in *Confed. States Med. and Surg. Jour.*, 1864, Vol. I, p. 24.

[4] BRYAN (J.), *Amputations from the Armies of the Southwest*, in *Am. Med. Times*, 1863, Vol. VII, p. 288.

[5] LIDELL (J. A.), *U. S. Sanitary Commission Memoirs*, 1870, Surgical Volume I, p 141.

[6] DUCACHET H. W.), *Cases of Military Surgery*, in *Am. Med. Times*, 1863, Vol. VI, p. 137.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
445	Knight, B., Pt., E, 110th Col'd Troops, age 24.	May 25, J'e 1,'65.	Right: circ. A. A. Surg. R. H. Blandry. Died June 15, 1865; pyæmia.
446	*Knight, W. T.*, Corp'l, C, 54th N. Carolina.	Mar. 25, Ap. 7,'65.	Right; circ. Surg. W. L. Baylor, C. S. A. Died April 18, 1865.
447	Langenderser, M., Pt., A, 189th Ohio, age 18.	Mar. 11, 14, '65.	Right; oblique anterior post. flap. A.A. Surg. J. J. Cockrell. Bone rem'd. Died April 15, 1865.
448	Laurier, T., Lieut., K, 71st New York.	June 1, 8, '62.	Right. (Gangrene.) Died in two hours after operation.
449	Lawton, C. M., Pt., H, 58th Penn., age 30.	June 3, 8, '64.	——; ant. post. flap. Surg. R. B. Bontecou, U. S. V. Hæm. Died June 11, '64; shock. *Spec.* 3057.
450	Leach, W. B., Pt., K, 2d Conn. H. A., age 37.	June 1, 16, '64.	Left; ant. post. flap. Surg. R. B. Bontecou, U. S. V. Died June 19, 1864; pyæmia. *Spec.* 3032.
451	Lee, P., Pt., C, 142d Penn., age 20.	May 12, 24, '64.	Right; ant. post. flap. A. Surg. A. Ingram, U.S.A. Sloughing. Died May 27, 1864.
452	Leedy, D., Pt., F, 26th Illinois.	Aug. 8. 14, '64.	——; flap. Surg. J. H. Hutchison, 15th Mich. Died Aug. 14, 1864.
453	Leslie, W., Pt., B, 16th Infantry.	De.31,'62, Jan. 4,'63.	Right (gang.; mortificat'n); gangrene. Died Jan. 9, 1863.
454	Lindsay, F., Pt., C, 11th Penn., age 22.	Dec. 13, 29, '62.	Left. Surg. H. Bryant, U. S. V. Died January 4, 1863; pyæmia. *Spec.* 570.
455	Linsenberger, W.R., Pt., B, 139th Penn., age 22.	May 5, 29, '64.	Left; ant. post. flap. Surg. R. B. Bontecou, U. S. V. Died June 7, 1864; exhaustion. *Spec.* 3041.
456	*Livingston, L. A.*, Capt., F, 8th Alabama, age 23.	July 2, 14, '63.	Left. (July 3, amp. leg; erysip.) Hæm. Aug. 4, bone excised. Died Sept. 27, '63; exhaustion.
457	Llewellyn, J. T., Corp'l, C, 13th Ohio Cavalry, age 21.	Mar. 31, April 11, 1865.	Left; circ. A.A.Surg.Z.P.Dermler. Died May 6, '65; pyæmia. *Spec.* 4052.
458	Lobden, S., Pt., I, 2d Conn. H'vy Artillery, age 22.	Oct. 19, No. 2,'64.	Right; ant. post. flap. A.A.Surg. C. H. Jones. Died Nov. 16,'64; exhaustion.
459	Lohr, E. J., Pt., B, 54th Penn., age 24.	July 18, 29, '64.	Left, circ. A.A.Surg.J.H.Coover. Died Aug.8, '64; pl.-pneumonia.
460	Lord, W. H., Pt., B, 2d New York H'vy Art., age 26.	April 6, 25, '65.	Right; circ. Surg. O. A. Judson, U. S.V. Phagedæn. Died May 6, 1865; exhaustion.
461	*Love, H. T.*, Pt., C, 41st Alabama, age 30.	July 20, 31, '64.	Left; circ. Died Aug. 1, 1864.
462	Loveland, W. H., Capt., B, 4th Mich., age 35.	May 5, 20, '64.	Left; circ. Med. Ins. F. H. Hamilton, U. S. A. Hæm. Died May 31, '64; exh'n. *Spec.* 2287.
463	Luedick, W., Pt., C, 37th Ohio.	Nov. 24, De.16,'63.	Right. Died January 4, 1864.
464	Lynch, A. D., Pt., B, 2d New York H'vy Art., age 41.	June 2, 8, '64.	Left; circ. Surg. J. W. Wishart, 140th Penn. Died July 4, 1864; pyæmia.
465	Lyons, C. H., Pt., K, 5th Ohio.	May 3, —, '63.	Right. Surg. G. P. Oliver, 111th Penn. Died May 13, 1863.
466	Madden, C., Pt., 3d S. Carolina Art'y, age 17.	Sept. 17, Oct. 2,'62.	Right; circ. A.Surg.A.H. Smith, U. S.A. Hæm.; lig. fem. Died Oct. 8, 1862; exh'n. Autopsy. *Specs.* 777. 833.
467	Mallett, C., Serg't, F, 57th New York.	Dec. 13, 28, '62.	Left. Died Jan. 2, 1863. Hæm. *Spec.* 2451.
468	Marion, G. S., Pt., C, 45th Penn., age 21.	May 6. 15, '64.	Left; lat. flap. Surg. R. B. Bontecou, U. S. V. Died May 19,'64; pyæmia. *Spec.* 3055.
469	Mark, J., Pt., K, 110th Ohio, age 42.	Mar. 25, Ap. 3,'65.	Left; circ. A. Surg. H. Allen, U. S. A. Died April 23, 1865; pyæmia. Autopsy. *Spec.* 158.
470	Markle, H., Pt., C, 148th Pennsylvania.	May 3, —, '63.	——. Surg. C. S. Wood, 66th N. Y. Died June 7,'63. *Spec.* 1172.
471	Mars, H., Pt., G, 5th New York, age 24.	Mar. 31, Ap. 9,'65.	Right; circ. A. Surg.W. F. Norris, U. S. A. Died April 22,'65; pyæmia. Autopsy. *Spec.* 3237.
472	*Marsh, H. F.*, Pt., City Batt'n, Petersburg, Va.	June 13, 20, '64.	Right; circ. A.A.Surg. J. Moneypenny. Died June 24, 1864.
473	Martin, C., Pt., C, 16th Michigan, age 19.	July 2, 5. '63.	Right. Hæm. July 14, re-amp. mid. third; hæm. Died July 21, 1863; pyæmia. Autopsy.
474	Marx, J., Pt., F, 24th Illinois.	Sept. 20, 30, '63.	Left. Surg.I. Moses, U.S.V. Died Oct. 6, 1863. *Spec.* 2127.
475	Marys, D., Pt., C, 90th Pennsylvania.	May 5, 20, '64.	Right. (Gang.; May 10, amp. knee j't; art. sloughed; hæm.) Surg. J. Ebersole, 19th Ind. Died May 20, 1864. *Spec.* 2340.
476	Mather, Z. H., Serg't, M, 5th Mich. Cav., age 27.	July 8, 26, '63.	Left (hæm.); flap, skin; circ. mus. Died Aug. 19, 1863; pyæmia. Autopsy. *Spec.* 3963.
477	McAnnay, L., Corp'l, L, 20th Penn. Cav., age 21.	Mar. 25, Ap. 1,'65.	Left (humid gang.); circ. A. A. Surg. W. B. McCausland. Died April 15, 1865; pneumonia.
478	McCallum, M., Serg't, D, 140th Penn., age 32.	May 3, 9, '63.	Left. A. Surg. W. Thomson, U. S. A. Erysipelas. Died May 17, 1863; pyæmia. *Spec.* 1081.
479	*McCloud, M.*, Pt., E, 32d Alabama.	Nov. 25, De. 3,'63.	Left; circ. Surg. J. C. Morgan, 29th Mo. Died Dec. —, 1863.
480	McCormick, C., Pt., A, 57th Penn., age 22.	July 2, 5, '63.	Left. Hæm. Died July 12, '63; exhaustion.
481	McConnell, D. W., Pt., H, 46th Ohio.	April 6, —, '62.	——. (April 10, amp. knee joint; slough'g; necrosis.) Surg. E. C. Franklin, U. S. V. Died April 25, 1862.
482	McDonald, J., Corp'l, B, 94th New York, age 20.	April 1, 8, '65.	Left; circ. A. A. Surg. H. Gibbons, jr. Hæm. Died April 20, 1865; pyæm. Autop. *Spec.* 3200.
483	McGee, J., Pt., C, 6th Missouri.	De.29,'62, Jan.8,'63.	Left. Died February 2, 1863.
484	*McHarvard, T.*, Pt., C, 28th North Carolina.	July 2, 15, '63.	——. Died July —, 1863.
485	McKittrick, L., Pt., A, 37th Indiana.	Jan. 1, 10, '63.	Left. Died February 13, 1863; pyæmia. Autopsy.
486	McLean, P., Pt., E, 86th Col'd Troops, age 23.	April 10, 29, '65.	Left; circ. skin flaps; circ. sect. muscles. Surg. F. E. Piquette, 86th Col'd Troops. Died May 8, 1865; ac. diarrhœa.
487	Mellick, M., Pt., F, 11th Pennsylvania.	Aug. 9, 15, '62.	Right; ant. post. dou. flap. Surg. J. E. Summers, U. S. A. Hæm. from w'd in axilla. Died Aug. 26, 1862. *Spec.* 41.
488	Merron, J., Pt., D, 12th Mass., age 31.	May 9, 16, '64.	Left; circ. A. A. Surg. J. O. French. Died May 25, 1864; pyæmia. Autopsy. *Spec.* 2286.
489	Metitel, F., Corp'l, F, 26th Penn., age 20.	Nov. 27, De.23,'63.	Right; ant. post. flap. Surg. C. Page, U.S.A. Hæm. Died Jan. 19, 1864. *Specs.* 1433, 2019.
490	Miller, A., Pt., E, 95th Penn., age 18.	May 3, 14, '63	Right; circ. Hæm.; lig. fem. art. Died June 6, 1863. Autopsy. *Spec.* 1243.
491	Miller, C., Corp'l, K, 5th N. Hampshire, age 33.	April 7, 23, '65.	Left. Surg. B. A. Vanderkieft, U.S.V. Died April 29,'65. *Spec.* 4104.
492	Miller, L., Pt., D, 100th Ohio, age 25.	May 15, 18, '64.	Left; circ.; necrosis. Died April 4, 1865; gangrene.
493	Miller, L. S., Pt., E, 12th Massachusetts.	Aug. 30, Sept. 18, 1862.	Right; flap. Surg. B.A.Clements, U. S. A. Died October 3, 1862; pyæmia. *Spec.* 3493.
494	Miller, S. C., Pt., K, 8th Illinois, age 38.	April 9, M'y 8,'65.	Left; bi-lat. flap. Ass't Surg. A. Hartsuff, U. S. A. Died May 9, 1865.
495	Mills, W. F., Pt., E, 8th N. Y. H. A., age 42.	June 16, —, '64.	Left. (Prim. amp. right thigh.) Died June 23, 1864.
496	Moan, F. H., Corp'l, F, 6th Maine, age 22.	May 3, 14, '63.	Right; circ.; hæm.; lig. fem. art. Died May 23, '63. *Spec.* 1255.
497) 498)	Moore, J., Pt., E, 46th Pennsylvania.	Aug. 9, 15, '62.	Both; double flap. Surg. J. E. Summers, U. S. A. Died Aug. 26, 1862. *Specs.* 46, 47.
499	Moorehouse, O. J., Pt., H, 31st Iowa.	Nov. 24, 30, '63.	Right (ball extr'd); circ. Surg. J. C. Morgan, 29th Mo. Died Dec. 18, 1863.
500	More, J., Pt., I, 76th Colored Troops, age 30.	April 9, 25, '65.	Right; circ. Surg F. E. Piquette, 86th Col'd Troops. Died May 1, 1865; exhaust'n and diarrhœa.
501	Moriarty, C., Pt., K, 8th New Hampshire.	April 13, M'y 1,'63.	Left. Died May 3, 1863.
502	Morse, J., Pt., B, 2d Penn. Art'y, age 22.	June 16, 25, '64.	Right. (Amp. leg.) A. A. Surg. E. T. Caswell. Hæmorrh. Died August 10, 1864; pyæmia.
503	Murray, H. T., Serg't, I, 6th Maryland, age 24.	Nov. 27, Dec. 10, 1863.	Right; circ. Surg. E. Bentley, U. S. V. Died Dec. 19, '63; pyæmia. Autopsy.
504	Murray, W., Pt., C, 20th Iowa, age 25.	Dec. 7, 20, '62.	Left; lat. flap. Surg. P. Harvey, 19th Iowa. Died Dec. 29, 1862; pyæmia.
505	Myers, E., Pt., A, 154th New York.	May 3, 16, '63.	——. Died May 22, 1863.
506	Myers, H., Pt., E, 93d Penn., age 23.	May 12, 31, '64.	Left; ant. post. flap. Surg. R. B. Bontecou, U. S. V. Hæm. Died June 11, 1864; typhoid fever.
507	*Nance, T. J.*, Pt., H, 30th Texas Cavalry.	April 4, May 1,'64.	Right (April 4, amp. leg); circ. Surg. C. E. Swasey, U. S. V.; pyæmia. Died May 8, '64; exhaustion, etc.
508	Nelson, C., Pt., A, 129th Indiana, age 18.	Mar. 8, 29, '65.	Right (abscess); skin flap. Ass't Surgeon E. F. Hendricks, 15th Conn. Died April 13, 1865; exhaustion, etc.
509	Nelson, D., Pt., E, 13th Colored Troops.	Dec. 15, —, '64.	Right. Died Dec. 22, 1864.
510	Nicely, M., Pt., E, 79th Indiana.	Sept. 19, —, '63.	Left thigh. Died October 17, '63.
511	*Nickinson, A.*, Pt., G, 52d North Carolina.	July 3, —, '63.	——. Surg. C. S. Wood, 66th N. York. Gang. (prim. amp. arm). Died July 19, 1863.
512	Noye, C., Pt., C, 63d Colored Troops.	June 7, 21, '63.	Right. Died July 14, 1863.
513	Ocker, T., Capt., A, 6th Maryland.	April 2, —, '65.	Left. Died May 3, 1865.
514	O'Hara, H., Pt., I, 19th Iowa, age 23.	Dec. 7, '62, Jan. 1,'63.	Right; lat. flap. Surg. P. Harvey, 19th Iowa. Died Jan. 9, 1863; pyæmia.
515	O'Reilly, P., Pt., E, 42d New York, age 20.	Sept. 17, Oct. 1,'62.	Left; lat. flap. A.A. Surg. W. W. Keen, jr. Died Oct. 6,'62; exh'n. *Spec.* 793.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
516	Osborn, E., Pt., D, 91st New York, age 20.	Mar. 31, Ap. 6,'65.	Left; semi-circ. Surg.T. R. Crosby, U.S.V. Died April 18, 1865; pyæmia.
517	Osborne, S., Pt., M, 2d Conn. H. Art'y, age 44.	May 31, Je. 27,'64.	Right (gang.); double flap. A.A. Surg. W. C. Earle. Died June 30, 1864; pyæmia.
518	Osgood, T. J., Pt., A, 39th Illinois, age 20.	Aug. 16, Sept. 15, 1864.	Right (sloughing); circ. A. A. Surg. J. C. Martin. Hæm.; lig. fem. art. Died Sept. 28, 1864; exhaustion.
519	Paddock, D. G., Pt., G, 83d Penn., age 23.	May 8, 16, '64.	Right; lat. flap. Surg. R. B. Bontecou, U. S.V. Hæm.; lig. fem. art. Died May 24, '64; exh'n.
520	Page, A., Pt., B, 161st New York.	April 7, 15, '64.	Right; circ. A.Surg.S.H.Orton, U. S. A. Died April 27, 1864.
521	[1]*Parker, N.*, Corp'l, B, 51st Georgia, age 40.	May 16, June 2, 1864.	Left. (Hæm.; lig. post. tib. art.; hæm. recurred; lig. fem. art'y.) Died June 2, 1864; shock.
522	Parsons, T. H., Capt., C, 91st Penn., age 29.	May 3, 11, '63.	Left; circ. A. A. Surg. J. O. Stanton. Abscess; exostosis. Died June 26, 1863; pyæmia. *Spec.* 1324.
523	Payne, D., Pt., H, 2d Conn. H. Art'y, age 25.	Oct. 19, Nov. 2, 1864.	Left; double flap. Surg. R. W. Pease, U. S. V. Hæm.; lig. fem. art. Died Nov. 17, 1864.
524	Payne, G. H.,Pt., K,64th New York, age 18.	Oct. 12, 29, '64.	Left (Oct. 21, hæm.; lig. pop. art. Oct.28, hæm.; lig.fem.art.); flap. A. A. Surg. J. C. Norton. Died Dec. 4, 1864; exhaustion.
525	Peck, N. A., Serg't, D, 2d Rhode Island.	May 3, 29, '63.	Left. (Gang.) Died June 2, '63. *Spec.* 1181.
526	*Perkins, W. J.*, Pt., A, 7th C. S. Cav., age 24.	June 18, —, '64.	Left. Surg.F. F. Burmeister,69th Penn. Died June 28,'64. *Spec.* 4512.
527	Perry, A., Pt., C, 6th N. York Cav., age 24.	Aug. 16, Sept. 3, 1864.	Left (art. sloughed; hæm.); circ. A. A. Surg. B. B. Miles. Died July 8,'65; osteo-myelitis. *Spec.* 2965.
528	*Perry*, W., Pt., A, 34th North Carolina.	June —, J'y 8, '62.	Left. (Irrita. fever.) Died July 16, 1862.
529	Peters, F., Pt., A, 49th Penn., age 24.	June 1, 7, '64.	Left; circ. A. A. Surg. J. Cass. Died June 8, 1864; exhaustion.
530	Philbrick, R., Pt., D, 117th N. Y., age 25.	June 15, 24, '64.	Left; circ. A. A. Surg. J. Money-penny. Died June 27,'64; exh'n.
531	*Phillips, J.*, Pt., I, 37th North Carolina.	June —, J'y 3, '62	Right. Surg. — Eads, C. S. A. Died July 7, 1862.
532	*Pippin, A. P.*, Pt., D, 2d Alabama, age 18.	April 9, 26, '65.	Left; flap. Surg. A. McMahon, U. S. V. Died May 11, 1865; suppuration and exhaustion.
533	Polhemus, J., Pt., F, 137th New York.	May 3, 8, '63.	Left; circ. Died May 15, 1863; hæmorrhage.
534	Potter, F. B., Pt., D, 12th Mass., age 24.	May 6, 27, '64.	Right. Died June 5, 1864.
535	Powers, J., Pt., H, 74th New York.	Aug. 30, Sep.–,'62.	——. Died Sept. 11,'62; tetanus.
536	Prescott, C. R., Corp'l, F., 14th New York S. M., age 27.	July 21, 24, '61.	——; circ. Drs. Darby and Conrad. Exc. end of femur. Died August 8, 1861.
537	Preston, T., Serg't, E, 14th W. Virginia Cav., age 21.	July 9, 25, '64.	Left; circ. A. A. Surgeon T. J. Dunott. Died August 2, 1864. *Spec.* 3911.
538	Price, A.H.,Pt ,H, 188th Penn., age 25.	May 30, J'ne8,'64.	Right; circ. Surg. O. A. Judsou, U. S. V. Died June 13, 1864; shock. *Spec.* 2942.
539	Pulhemus, J., Pt., E, 1st Mich., age 20.	Dec. 13, 26, '62.	Left. (Hæm.) Dec. 30, hæm.; lig. fem. art. Died Jan. 15, '63; exhaustion.
540	Putnam, G. R., Pt., 10th Mass. Battery, age 32.	Aug. 25, Sept. 23, 1864.	Right (sloughing); ant. post. flap. Surg. G. S. Palmer, U. S. V. Hæm. Died Nov. 2, 1864.
541	Rainier, M. G., Pt., G, 124th Indiana, age 20.	Mar. 10, 13, '65.	Left (gang.); flap. Surg. C. A. Cowgill, U. S. V. Died March 22, 1865; shock.
542	Rairdon, W., Pt., I, 40th Indiana, age 36.	June 27, July 9, 1864.	Right (gang.); circ. A. Surg. C. C. Byrne, U. S. A. Hæm.; lig. Died July 23,'64; hæmorrhage.
543	*Ramsey, W.*, Pt., H, 6th Virginia Cav., age 19.	April 1, 8, '65.	Right; circ. A. Surg. W. Thomson, U. S. A. Sloughing. Died April 18, '65; pyæmia. Antop.
544	Ransom, F. H., Corp'l, D, 34th Ohio.	May 16, 27, '62.	Left. (Gangrene.) Died May 30, 1862.
545	Reeves, G. T., Pt., E, 29th Iowa.	April 30, M'y 3,'64.	Left. Died May 5, 1864.
546	Reeves, W., Pt., K, 11th Mass., age 45.	May 24, 28, '64.	Right. Died May 31,'64; tetanus.
547	*Reinhart, L.*, Pt., F, 23d N. Carolina, age 30.	May 12, 19, '64.	Left. Surg. O. A. Judson,U.S.V. Hæm. Died May 30,'64; pyæm. Autopsy. *Spec.* 2276.
548	*Revis, W.*, Pt., D, 8th Tenn. Cavalry, age 21.	Feb. 20, Mar.5,'64.	Left. (Hæm.) Surg. H. L. W. Burritt, U. S. V. Gang. Died March 11, 1864. *Spec.* 2228.
549	Reynolds, H. H., Pt., F, 1st Mich. Cav., age 28.	Sept. 4, 18, '64.	Left. A. A. Surg. J. H. Bartholf. Hæm.; lig. popliteal art. Died Sept. 30, 1864; pyæm. Autop. *Spec.* 3930.
550	Rice, S., Pt., A, 142d New York, age 27.	Sept. 29, Oc.14,'64.	Left; circ. A.Surg D.R.Brower, U.S.V. Died Oct. 21,'64; pyæm.
551	Richards, E., Pt., H, 8th Maine, age 20.	June 3, 9, '64.	Left (hæm.); ant. post.flap. Surg. R. B.Bontecou,U.S.V. Slough.; hæm.; re-amp. mid. third. Died June 13,'64; exh'n. *Spec.* 3064.
552	Ridy, J., Pt., I, 9th N. Y. H'vy Art'y, age 41.	Oct. 19, 25, '64.	Left; circ. A.A. Surg.W.B. Morrison. Died Nov. 11, 1864.
553	Ripley, F., Pt., G, 10th Massachusetts.	May 5, 10, '64.	——. (Gangrene.) Surg. G. T. Stevens, 77th N. Y. Died May 13, 1864.
554	Robbins, E. H., Serg't, F, 15th Mass., age 29.	May 6, June 2, 1864.	Right (hæm.; May 30, lig. fem. art.; slough.; hæm.); double lat. flap. A. A. Surg. J. Ransom. Died July 15, 1864.
555	Robinson, F. B , Pt., H. 7th New Hampshire.	July 11, Au. 1,'63.	Left (hæm.); circ. Died Aug. 10, 1863. *Spec.* 1662.
556	Robinson, J., Pt., D,12th Conn., age 34.	Oct. 19, Nov. 4, 1864.	Right; ant. post. flap. A.A.Surg. C.H.Jones. Nov. 11, hæm.; fem. art. lig. Died Nov. 23,'64; hæm. *Spec.* 3443.
557	*Rogers, D.*, Pt., E, 1st S. Carolina, age 22.	July 28, Au 21,'64.	Left; double flap. A. A. Surg.W. L. Hammond. Died Aug. 22,'64.
558	Rombaugh, I., Pt., B, 28th Pennsylvania.	Sept. 17, Oc.13,'62.	Left. Surg.C. Page,U.S.A. Died Jan. 5,'63; col. diarr. *Spec.* 1745.
559	Rosenfelt, N., Serg't, D, 26th Penn., age 22.	July 2, 19, '63.	Right. Surg.C.W.Jones, U.S.V. Slough.; exc.end of bone; hæm.; lig. fem. art. Died Oct. 2, 1863. *Spec.* 1699.
560	Ross, B. W., Pt., C, 26th New York, age 22.	Dec. 13, 29, '62.	Right. Died Jan. 9, 1863. *Spec.* 577.
561	Rowe, J. A., Pt., I, 3d Maryland Cavalry.	Aug. 16, 28, '64.	Left; circ. A.A.Surg.E.B.Woolston. Sloughing. Died Oct. 18, 1864; exhaustion.
562	Royal, R. B., Pt., B, 6th Maine, age 25.	June 3, –, '64.	Left; circ. Died June 23, 1864.
563	Ruhling, F.J.,Serg't, E, 112th N. Y., age 29.	June 1, 11, '64.	Left; lat. flap. Surg. R. B. Bontecou, U. S. V. Hæm.; lig. fem. art. Died June 18, 1864; gang. *Spec.* 3050.
564	Sackner, J. C., Pt., E, 2d Michigan.	May 31, June 24, 1862.	Left; circ. A. A. Surg. F. H. Brown. Died June 24, 1862; shock.
565	Sailor, J., Serg't, E, 45th Ohio.	Sept. —, 30, '63.	Right. Died Oct. 1, 1863.
566	Sailor, W., Pt , E, 119th Penn., age 40.	Nov. 7, 14, '63.	Left; circ. A. Surg. G. A. Mursick, U. S. V. Died Dec. 1, '63; pyæmia. Autopsy. *Specs.* 1887, 1888, 1889, 1890.
567	Salzman, C., Pt., K, 2d Infantry, age 31.	De.27,'65, Jan.3,'66.	Left (gang.), ant. post. flap. A. Surg. C. C.Gray,U.S.A. Hæm.; lig. fem. art. Died Jan. 13, '66. Autopsy.
568	Saltzman,W.C., Bugler, 1st N. Y. Ind. Battery, age 21.	Oct. 19, Nov. 16, 1864.	Left; ant. post. flap. A. A. Surg. E.G.Waters. Died Nov. 22,'64; diphtheria. *Spec.* 3731.
569	Sampson, D. B.. Pt., C, 67th New York, age 34.	May 31, J'e —,'62.	Left. (Pyæmia.) Died June 26, 1862.
570	Saunders, S., Pt., K, 52d New York.	June 16, —, '64.	Left. A.Surg.T.O.Cornish, 15th Mass. Died J'e 25,'64. *Spec.* 204.
571	[2]*Saxon, J. N.*, Pt., D, 9th Louisiana, age 27.	Nov. 7, 18, '63.	Right; flap. Surg. J. A. Lidell, U. S.V. Osteo-myelitis. Died Dec. 3, 1863; hæm. Autopsy. *Specs.* 1819, 1860, 1892.
572	[3] Schaffer, C., Corp'l, D, 9th Illinois Cavalry.	Aug. 24, 27, '63.	Left; ant. post. flap. A. A. Surg. S. R. Coale. Died Sept. 12,'63; pyæmia. *Spec.* 2101.
573	Schaup, H., Pt., K,100th New York, age 29.	May 14, J'e 11,'64.	Left; circ. A.A.Surg. J. S. Hill, Died June 15, 1864; shock.
574	Schlaf, A., Pt., B, 2d Penn. Art'y, age 42.	Nov. 30, Dec. 7, 1864.	Right; ant. post. flap. A.A.Surg. C. W. Harper. Dec. 15, hæm. Died Dec. 16, 1864; pyæmia.
575	Schneider, F., Pt., E, 20th Wis., age 25.	Dec. 7, 11, '62.	Right; lat. flap. Surg.P.Harvey, 19th Iowa. Slough. Died Dec. 18, 1862; hæmorrhage.
576	Schweitzer, S., Pt., A, 161st Ohio, age 18.	July 7, 21, '64.	Left. A. A. Surg. J. C. Shimer. Slough. Died July 29, 1864. *Spec.* 3920.
577	Seber, J.W., Pt., A, 76th New York, age 27.	July 1, 4, '63.	Left. July 20, hæm.; August 3, re-amp.; 15, slough. Died Aug. 29, 1863; diarrhœa.
578	Schman, C., Pt., F, 28th Ohio.	May 16, 30, '62.	Left. Died June 1, 1862.
579	Senior, T. H.,Pt.,C, 10th Maine.	July 2, 18, '63.	Right; circ. Hæm.; slough. Died July 24,'63; pyæmia. Autopsy.
580	Sheridan, N. B., Pt., A, 90th Pennsylvania.	Dec. 13, 17, '62.	Right. Died February 4, 1863. Autopsy.

[1] Holloway (J. M.), *Consecutive and Indeterminate Hæmorrhage from Large Arteries after Gunshot Wounds, etc.*, in *Am. Jour. Med. Sciences, N. S.*, 1865, Vol. L, p. 344. Lidell (J. A.), *U. S. Sanitary Commission Memoirs*, 1870, Surgical Volume I, p. 188.

[2] Lidell (J. A.), *On the Secondary Traumatic Lesions of Bone, etc.*, in *U. S. San. Com. Memoirs*, 1870, Surgical Volume I, p. 358.

[3] Bryan (J.), *loc cit.*, p. 288.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
581	Sherren, L., —, I, 12th Ohio, age 22.	Sept. 17, Oct. 14, 1862.	Right. Asst. Surg. J. A. Bigelow, 8th Conn. Hæm. Died Oct. 25, 1862.
582	Shields, J. J., Pt., K, 105th Penn., age 19.	June 1, 10, '62.	Left (gang.); flap. A. A. Surg. G. W. Edwards. Died June 30, 1862. Autopsy.
583	Shuey, A. B., Corp'l, C, 93d Pennsylvania.	Sept. 19, 22, '64.	Right; flap. Surg. W. A. Barry, 98th Penn. Died Sept. 27, '64; exhaustion.
584	Six, I., Pt., K, 14th W. Virginia, age 16.	July 20, 26, '64.	Left; ant. post. flap. Surg. J. B. Lewis, U. S. V. Aug. 3, hæm.; lig. fem. art. Died Aug. 14,'64; hæmorrhage. *Spec.* 4270.
585	Smith, A. M., Pt., I, 10th Vermont, age 20.	July 9, Aug. 3, 1864.	Right; circ. A. A. Surg. A. R. Gray. Died Aug. 8,'64; exh'n. Autopsy. *Spec.* 3814.
586	Smith, C. D., Pt., H, 15th Massachusetts.	Sept. 17, 24, '62.	Right. Died Sept. 27, 1862.
587	Smith, E. W., Capt., D, 21st Michigan.	Sept. 19, 22, '63.	Right. Died October 16, 1863.
588	Smith, G., Pt., B, 2d Infantry.	Aug. 10, Sep.1,'61.	——. Died September 15, 1861.
589	Smith, J., Pt., B, 162d New York, age 18.	July 26, Au. 1,'64.	Right; flap. A. A. Surg. C. T. Bullen. Died August 23, 1864; exhaustion.
590	Smith, J., Pt., F, 6th Col'd Troops, age 27.	Sept. 29, Oct. 6,'64.	Left; circ. A. A. Surg. C. C. Ela. Hæm. Died Oct. 14,'64; hæm.
591	Smith, J., Pt., B, 98th Ohio.	Nov. 25, —, '63.	Left. Died Dec. 4, 1863.
592	*Smith, J. H.*, Lieut., G, 34th Georgia, age 32.	Dec. 16, 29, '64.	Left (gang.); bi-lateral skin flaps; circ. musc. Surg. J. R. Brust, 1st Tenn. Died May 28, 1865; exhaustion.
593	Smith, R. K., Pt., K, 13th Missouri Cav., age 21.	Oct. 25, Nov. 13, 1864.	Left (Nov. 10, pyæmia); ant. post. flap. A. Surg. W. H. Warner, 3d Wisconsin Cavalry. Died Nov. 13, 1864; pyæmia.
594	[1]*Smith, W. L.*, Pt., I, 5th North Carolina. age 24.	May 9, 18, '64.	Left; ant. post. flap. A. Surg. G. A. Mursick, U. S.V. Died May 31, 1864; pyæmia. Autopsy.
595	Snider, D., Pt., G, 4th Maine, age 47.	May 6, 20, '64.	Right (slough.); circ. Surg. R. B. Bontecou, U. S. V. Died May 23, 1864; hæmorrhage.
596	Somers, J., Pt., E, 64th New York, age 21.	April 1, 10, '65.	Left; ant. post. flap. A. Surg. W. F. Norris, U. S. A. Died May 1, 1865; pyæm. Autop. *Spec.* 2629.
597	Spenholtz, F., Pt., A, 5th New Jersey.	May 3, 7, '63.	Left. Surg. G. P. Oliver, 111th Penn. Died May 24. 1863.
598	Spring, W., Pt., K, 19th Iowa, age 20.	Dec. 7, 11, '62.	Left; circ. Surg. G. H. Hubbard, U. S.V. Slough'g. Died Dec. 30, 1862.
599	Steadman, W., Pt., A, 1st Mass. H'vy Art'ry, age 21.	May 16, 25, '64.	Right. Surg. D. P. Smith, U.S.V. Died June 8, 1864; pyæmia. *Spec.* 3296.
600	Steele, W., Pt., H, 2d New York H'vy Art'y.	Oct. 17, —, '64.	Left. Died November 9, 1864.
601	Steinhofer, A., Pt., D, 20th Mass., age 24.	May 18, 27, '64.	Left. Died May 30, 1864; pyæmia. *Spec.* 832.
602	Stephens, E., Pt., I, 1st Pennsylvania Rifles.	June 18, July 15, 1864.	Left (spic. rem'd); lat. flap. Surg. N. R. Moseley, U. S. V. Died April 11, 1865; debility. *Spec.* 2874.
603	Sterling, G., Pt., I, 20th Maine, age 29.	Sept. 30, Oct. 15, 1864.	Left (Oct. 11, amp. leg; gang.); bi-lat. flap. Died Oct. 20, 1864; exhaustion. *Spec.* 3285.
604	Stoldt, G., Capt., 58th New York.	July 3, 6, '63.	Left. Died July 21,'63; tetanus.
605	Stone, G. E., Pt., M, 1st Mass. Art'y, age 29.	May 19, 29, '64.	Right; ant. post. flap. A. Surg. W. Thomson, U. S. A. Died June 18, 1864; pyæmia. Autopsy.
606	Story, J. C., Pt., D, 114th New York.	Sept. 19, 24, '64.	Right; circ. Surg. L. P. Wagner, 114th N. Y. Died Oct. 7, 1864; pyæmia. Autopsy.
607	Stover, A. W., Serg't, I, 20th Maine, age 23.	June 20, 28, '64.	Right; circ. A. A. Surg. A. N. Brockway. Died June 30, '64; shock.
608	Stowell, F. M., Pt., D, 70th N. York, age 28.	July 2, 31, '63.	Left; hæm.; lig. Died August 3, 1863.
609	Strader, F. P., Capt., H, 6th Indiana, age 26.	Nov. 25. Dc. 9, '63.	Left. A. Surg. C. C. Byrne, U. S. A. Died Dec. 16, 1863; pyæmia.
610	Stringer, T. J., Pt., C, 98th Ohio.	——, —, Oc.—,'62.	Left. Died November 4, 1862.
611	*Stubbs, J. P.*, Pt., F, 13th Georgia.	Sept. 19, 22, '64.	——; circ. A. Surg. — D'Orsay, P. A. C. S. Died Oct. 10, 1864; pyæmia.
612	Stuckey, J. E., Corp'l, B, 42d Pennsylvania.	Dec. 13, 24, '62.	Right. Died November 17, 1863.
613	Sullivan, J. W., Pt., C, 6th Maryland, age 18.	Oct. 19, Nov. 9, 1864.	Left; ant. post. flap. A. A. Surg. T. F. Murdock. Died Nov. 22, 1864; exhaustion. *Spec.* 3414.
614	[2]*Tate, J. G.*, Pt., —, 53d Georgia, age 20.	Sept. 17, 29, '62.	Left; circ. Died Sept. 30, 1862; pyæmia.
615	*Taylor, C. W.*, Pt., C, 60th Georgia, age 20.	Dec. 13, 26, '62.	Left. (Hæm.; gangrene.) Died Dec. 28, 1862. *Spec.* 638.
616	Taylor, J., Pt., H, 91st Ohio, age 32.	July 20, Aug. 6, 1864.	Left (gang.); ant. post. flap. A. A. Surg. M. M. Townsend. Died August 10,'64. *Spec.* 4273.
617	Taylor, J. G., Pt., G, 12th Mass., age 37.	Dec. 13, —, '62.	——; circ. Surg. E. Bentley, U. S. V. Dec. 28, hæmorrh. Died Dec. 28, 1862.
618	Teagles. B. A., Pt., G, 126th N. York, age 20.	Feb. 6, 11, '64.	Right. Surg. J. Dwinelle, 106th Penn. Died Feb. 19, 1864; pyæmia. *Spec.* 2045.
619	Thompson, J. M., Pt., H, 12th N. Hamp., age 20.	June 3, 9, '64.	Left; lat. flap. Surg. R. B. Bontecou, U.S.V. Died June 15, '64.
620	Thompson, W., Pt., H, 69th N. York, age 19.	Mar. 25, April 2, 1865.	Right. (Dry gangrene.) Surg. D. W. Bliss. Pyæmia. Died April 15, 1865; exhaustion.
621	Thompson, W. H., Pt., C, 1st U.S.S.S., age 20.	June 3, 16, '64.	Right; flap. Surg. A. F. Sheldon, U.S.V. Died June 16,'64; shock.
622	Thornsley, J., Pt., I, 97th Ohio, age 18.	Nov. 25. Dc. 9, '63.	Right; circ.; gang. Died Dec. 13, 1863.
623	Thorn, S. R., Pt., A, 124th Pennsylvania.	May 3, 7, '63.	Left. Surg. G. P. Oliver, 111th Penn. Died May 8, 1863.
624	Tibbetts, W. B., Serg't, K, 1st Me. Cav., age 28.	Mar. 31, Ap.13,'65.	Left; lat. flap. Surg. E. Griswold, U. S. V. Died April 19, 1865.
625	Tibbs, L., Serg't, 5th Col'd Troops, age 21.	Sept. 29, Oct. 7,'64.	Right; circ. A. A. Surg. B. T. Crooker. Hæm. Died Oct. 19, '64; pyæm. Autop. *Spec.* 1049.
626	Timberlake, T., Corp'l, H, 25th Ohio, age 20.	Nov. 30, Dc. 5, '64.	Right; ant. post. flap. A. A. Surg. H. Seaman. Dec. 12, hæm. Died Dec. 19,'64; pyæmia. Autopsy.
627	Tracy, A. L., Pt., K, 141st Penn., age 35.	July 2, 5, '63.	Right. Hæm.; lig. fem. artery. Died July 22, '63; exhaustion.
628	Tresonthick, S. H., Capt., E, 18th Penn. Cavalry, age 22.	June 15, 23, '64.	Left; circ. Surg. A. P. Frick, 103d Penn. Gang. Died July 26, 1864.
629	Trimbly, J. E., Pt., D, 68th Indiana.	Sept. 20, Oct. 1,'63.	Left; circ. Died Oct. 22, 1863.
630	Truex, J. P., Corp'l, F, 14th N. Jersey, age 22.	May 31, June 14, 1864.	Right. A. A. Surg. J. H. Thompson. Hæm.; fem. art. secured. Died June 20, 1864; pyæmia.
631	Truitt, H. W., Pt., E, 137th Illinois, age 22.	Aug. 21, 24, '64.	Left; ant. post. flap. A. A. Surg. C. H. Wade. Died Sept. 26,'64; typhoid fever.
632	Uhland, F., Pt., G, 47th Pennsylvania.	Oct. 22, 25, '62.	Left. Died Oct. 30, 1862; hæm. *Spec.* 732.
633	Unknown, Pt., 23d Ky.	De 31,'62. Jan. 5,'63.	——. Died January 5, 1863.
634	Unks, G., Corp'l, L, 63d Pennsylvania.	May 12, 30, '64.	Left. Gangrene. Died June 5, 1864; pyæmia.
635	Valley, J. R., Pt., I, 20th Maine, age 20.	Feb. 7, 23, '65.	Right; circ. A. Surg. J. Vansant, U.S.A. Died Mar. 3,'65; pyæm.
636	Vanderslice, A. H., Corp, E, 27th Penn., age 30.	July 1, 16, '63.	Left. (Hæm.) Died August 20, 1863; colliquative diarrhœa.
637	Vermillye, J. C., Pt., K, 124th N. York, age 24.	May 12, 20, '64.	Left (hæm.); skin flaps; circ. mus. Surgeon T. R. Crosby, U. S. V. Hæm.; lig. fem. art. Died May 28, 1864; exhaustion.
638	*Vest, C.*, Pt., B, 42d Virginia, age 23.	May 12, 19, '64.	Left; ant. post. flap. A. Surg. T. McMillin, U. S. A. Died June 10, 1864; pyæmia. *Spec.* 2820.
639	Vincent, R., Corp'l, H, 149th New York.	May 3, 9, '63.	——. Surg. G. P. Oliver, 111th Penn. Died May 15,'63; hæm.
640	Vittman, G. L., Pt., K, 14th N. Hamp., age 27.	Oct. 19, No. 2, '64.	Right; circ. Surg. R. W. Pease, U. S. V. Died Nov. 9, 1864; exhaustion.
641	Walker, T. S., Pt., D, 116th Pennsylvania.	May 3, 15, '63.	Left. Surg. A. N. Dougherty, U. S. V. Died May 23, 1863.
642, 643	Wallace, D., Pt., I, 5th Artillery.	July 1, 4, '63.	Both; circ. Died Aug. 2, 1863. *Specs.* 1383, 1384.
644	Wallace, W., Pt., E, 63d New York, age 34.	June 3, 19, '64.	Right; circ. A. Surg. S. B. Ward, U. S. V. Died July 14,'64; pyæmia. *Spec.* 2713.
645	Walters, C., Pt., H, 42d New York, age 21.	Sept. 30, Oc.17,'64.	Left; circ. Surg. — Whitman. Died October 30, 1864.
646	Wannamaker, D., Pt., F, 5th New York.	Aug. 28, Sep. 9,'62.	——. (Sept. 7, gang.) Sept. 17, hæm. Died Sept. 27, 1862.
647	Ward, J., Pt., I, 170th New York, age 30.	May 25, 30, '64.	Right; circ. A. A. Surg. R. Ottman. Died July 12, '64. *Spec.* 2471.
648	Watkins, F. M., Serg't, F, 57th Indiana, age 24.	May 15, 30, '64.	Right (four inches tibia rem'd; caries); circ. A. Surg. R. McNeilly, 19th Ohio. Died June 22, 1864; exh'n. *Spec.* 3368.
649	Weatherell, J. H., Capt., C, 10th Mass., age 39.	May 5, 19, '64.	Right. Surg. H. W. Ducachet, U. S. V. Hæm.; lig. fem. art'y. Died June 20, 1864; pyæmia.
650	Weaver, A., Pt., C, 2d Tenn., age 35.	June 8, 19, '63.	Left; circ. Surg. J. Shrady, 2d Tenn. Venous hæm. Died June 25, 1863.
651	Weaver, J. E., Pt., A, 3d Indiana Cavalry.	July 1, 17, '63.	Left. Surg. W. H. Rulison, 9th N. Y. Cavalry. Died Aug. 30, 1863. *Spec.* 1482.

[1] LIDELL (J. A.), *On the Secondary Traumatic Lesions of Bone, etc.*, in *U. S. San. Com. Memoirs*, 1870, Surgical Volume I, p. 380. LIDELL (J.A.), *On Thrombosis and Embolism*, in *Am. Jour. of the Med. Sciences, N. S.*, 1872, Vol. LXIV, p. 356.

[2] FISHER (G. J.), *Report of Fifty-seven Cases of Amputations, etc.*, in *Am. Jour. of the Med. Sciences, N. S.*, 1863, Vol. XLV, p. 47.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
652	*Weaver, J.*, Pt., K, 59th Alabama, age 36.	June 17, 23, '64.	——; post. flap. Died July 2, 1864.
653	Weiser, A., Pt., I, 73d Pennsylvania.	May 3, –, '63.	Left. Died June 3, '63; pyæmia. *Spec.* 1545.
654	Weiss, C., Pt., F, 29th New York, age 30.	Aug. 28, Se.—,'62.	——. Died September 23, 1862.
655	Wells, A. A., Serg't, I, 5th New Hampshire.	May 3, 8, '63.	Left. Surg. G. P. Oliver, 111th Penn. Died May 15, 1863.
656	Wenger, W., Pt., E, 1st Ohio.	Nov. 25, —, '63.	Left. Died December 15, 1863.
657	Werber, G., Pt., K, 39th New York, age 31.	May 6, 25, '64.	Left; circ. Surg. E. Bentley, U. S. V. Died June 7, '64; asthenia.
658	Whaley, C. H., Pt., G, 14th New York.	Aug. 29 Sept. 2, 1862.	Left. (Gang.) A. A. Surg. J. Nichols. Died Sept. 6, 1862. *Spec.* 138.
659	Whallon, W. M., Pt., C, 129th Penn., age 21.	Dec. 13, 18, '62.	Left. (Dec. 14, lig. fem. artery.) Dec. 24, hæm.; lig. fem. artery. Died June 4, 1863; pyæmia.
660	Wheeler, H. S., Serg't, B, 2d Conn. H'vy Art., age 29.	Oct. 19, 26, '64.	Right; ant. post. flap. A. A. Surg. B. B. Miles. Hæm.; lig. Died Nov. 11, '64; ch. diar. *Spec.* 3434.
661	Wiesmiller, C., Pt., B, 12th Penn. Reserves, age 22.	Dec. 13, 25, '62.	Left. A. A. Surgeon D. Weisel. Hæm.; lig. Died Dec. 27, '62; exhaustion. *Spec.* 569.
662	Wilcox, B. F., Pt., B, 135th Ohio, age 21.	July 3, 14, '64.	Right; ant. post. flap. Surg. J. B. Lewis, U. S. V. Hæm. Died Aug. 5, 1864.
663	Will, J., Pt., A, 10th New York.	Aug. 30, Sep. 5, '62.	——. A. Surg. B. Howard, U. S. A. Died Sept. —, 1862.
664	[1]Wilkie, T., Pt., D, 14th Coun., age 40.	Sept. 17, Oct. 2, '62.	——; ant. post. flap. A. Surg. C. A. McCall, U. S. A. Died Oct. 23, 1862; pyæmia. Autopsy.
665	*Wilkins, T. E.*, Corp'l, A, 49th Virginia.	Oct. 19, 31, '64.	——; circ. (Hæm.; lig. ant. tib. and pop. arteries.) Surg. J. M. G. McGuire, C.S.A. Slough'g; gang. Died Nov. 12, '64; hæm.
666	Wilson, C. M., Pt., F, 4th New York, age 35.	May 5, June 2, 1864.	Left; ant. post. flap. Surg. R. B. Bontecou, U. S. V. Hæm.; lig. fem. art. Died June 5, 1864; exhaustion. *Spec.* 3043.
667	Wilson, G., Pt., F, 1st New Jersey, age 21.	June 3, 13, '64.	Right. A. A. Surg. W. C. Minor. Diarrhœa. Died June 25, '64.
668	Wilson, G. S., Adjutant, 17th New York, age 24.	De. 13, '62, Ja. 12, '63.	Right. Hæm. Jan. 12, lig. fem. art. Hæm. recurred 17; 21, lig. fem. artery. Died Feb. 7, 1863; pyæmia.
669	Wilson, T. C., Pt., C, 26th Ohio.	Sept. 19, 22, '63.	Right. Died September 22, 1863.
670	Wilson, W. C., Pt., C, 105th Penn., age 21.	Aug. 16, Se. 14, '64.	Left. Died September 16, 1864; pyæmia.
671	Wilson, W., Serg't, F, 9th Penn. Cav., age 22.	De. 29, '63, Ja. 19, '64.	Right; circ. Died May 27, 1864.
672	Wimer, A., Pt., A, 139th Penn., age 21.	May 5, 13, '64.	Left. Died June 3, 1864.
673	Wolf, W., Pt., H, 91st Pennsylvania, age 35.	June 18, July 5, 1864.	Left; ant. post. flap. Surg. E. Bentley, U. S. V. Died July 9, 1864; exh'n. Autop. *Spec.* 2832.
674	Wollenweber, L., Pt., K, 90th Pennsylvania.	Dec. 13, 27, '62.	Right. Died January 7, 1863.
675	Woodward, J. A., Lieut., I, 86th N. Y., age 20.	May 3, 11, '63.	Right; circ. Died June 1, 1863; pyæmia. Autopsy.
676	Wright, J., Pt., D, 7th New York H'vy Art'y, age 19.	June 4, 19, '64.	Right; ant. post. flap. Surg. R. B. Bontecou, U. S. V. Hæm. Died June 29, 1864; exhaustion.

In two instances intermediary amputations in the lower third of both thighs were unsuccessfully performed. One of these cases is detailed:[2]

Case 474.—Private D. Wallace, Co. I, 5th Artillery, aged 37 years, was wounded in both legs, at Gettysburg, July 1, 1863, and suffered amputation at the field hospital of the 2d division, Fifth Corps. Assistant Surgeon B. Howard, U. S. A., reported: "The patient was struck by a minié ball, which passed through one knee joint and shattered the patella of the other. A flesh wound was also received by another shot in the upper third of the left thigh. Both thighs were amputated by the circular method in the lower third, in immediate succession, on the third day after the wound was received. Very little blood was lost at the operation, and no appreciable oozing had occurred by the next day, at which time the patient was in such good spirits as to create frequent merriment among his wounded comrades by his funny witticism. His pulse and appetite had both improved." The patient was subsequently transferred to Camp Letterman, where he was received on August 1st, in a very exhausted condition, the stumps not having been dressed for two days; he died on the following day, August 2, 1863. The bones of the knee joints of the amputated limbs were contributed to the Museum by Dr. Howard, and constitute specimens 1383 and 1384 of the Surgical Section. The former consists of a ligamentous preparation of the right knee, from which the patella was shot away; the latter embraces the bones of the left knee, the condyles of the femur being completely shattered.

The amputations in the foregoing table were performed, for shot injuries of the lower third of the thigh, in forty-one; of the knee joint, in four hundred and thirteen; of the leg, in two hundred and two; and of the ankle joint or foot, in twenty instances. The Museum possesses specimens in two hundred and three of the six hundred and seventy-six cases of intermediary amputations in the lower third of the thigh.

Intermediary Amputation in the Shaft of the Femur without Indication of the Seat of Incision.—In twenty-six only of the thirteen hundred and twenty intermediary operations the seat of operation was not specified. Seven had successful and nineteen fatal terminations; a mortality of 73.0 per cent. Eighteen operations were performed on Union and eight on Confederate soldiers. The seat of fracture in the twenty-six cases was in the lower third of the femur in two; in the knee joint, in three; and in the leg, in three cases; in eighteen instances the fracture was recorded to have been in the femur, but the precise point was not indicated. Such meagre details as are reported on the records of this office will be found in the table on the next page.

[1] Coues (E.), *Report of some Cases of Amputations and Resections from Gunshot wounds, performed by Ass't Surgeon C. A. McCall, U. S. A.*, in *Medical and Surgical Reporter*, 1862–3. Vol. IX, p. 195.

[2] The other instance of intermediary amputation of both thighs in the lower thirds is that of Private J. Moore, E, 46th Pennsylvania (Table XXXVI, p. 300, Nos. 497, 498, *ante*), wounded Aug. 9, 1862; double flap amputations at lower thirds of both thighs, Aug. 15, 1862; death Aug. 26, 1862.

TABLE XXXVII.

Summary of Twenty-six Cases of Intermediary Amputation in the Thigh for Shot Fracture, the Point of Ablation unspecified.

[Recoveries, 1—7; Deaths, 8—26.]

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.	No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	*Grim, P.*, Pt., F, 25th Virginia.	Aug. 9, 29, '62.	Left. Surgs. Bland and Miller C. S. A. Recovery.	14	Lohnes, A., Pt., K, 104th New York, age 27.	July 1, 9, '63.	Right. July 22, re-amp. Died August 20, 1863.
2	*Read, J. M.*, Pt., H, 48th Alabama.	Oct. 29, No.13,'63.	——. Surg. — Westmoreland, C. S. A. Recovery.	15	McDonald, A. O., Serg't, D, 7th Mich., age 25.	Dec. 13, 28, '62.	Left. Died January 2, 1863; pyæmia.
3	*Sibley, R. W.*, Pt., A, 6th Louisiana.	June 13, 17, '62.	Left. Surg. J. N. K. Monmonier, 8th La. Recovery.	16	Peck, M. A., Pt., H, 33d Iowa.	April 30, M'y 3,'64.	——. Died June 5, 1864.
4	Stevens, —, Pt., —, 13th Massachusetts.	Aug. 30, Sep.4,'62.	Right. Ass't Surg. B. Howard, U. S. A.	17	Rankin, W. H., Pt., C, 95th Pennsylvania.	June 27, J'y10,'62.	——. Died July 21, 1862.
5	Terry, W., Pt., —, 76th Pennsylvania.	Aug. 30, Sep.3,'62.	Left. Ass't Surg. B. Howard, U. S. A.	18	*Rhoads, D. W.*, —, 11th Kentucky.	April 7, M'y 3,'62.	——. (Erysipelas; hæm.) Died May 3, 1862; hæmorrhage.
6	*Vogt, F. E.*, Serg't, F, 1st Maryland.	June 8, 19, '62.	Left. Disch'd June 28, 1864.	19	Rodgers, E. F., Serg't, C, 1st Michigan.	Aug. 30, Sept. 6, 1862.	Right. Ass't Surg. B. Howard, U. S. A. Died Sept. 16, 1862; pyæmia.
7	*Williams, G. H.*, Pt., B, 7th South Carolina.	Sept. 19, 27, '63.	——. Surg. — Carlisle, C. S. A. Recovery.	20	Ross, C., Pt., E, 5th N. York, age 17.	Aug. 30, Se. 23,'62.	Right; circ. Died Oct. 7, 1862; pyæmia.
8	Anderson, A., Pt., B, 43d Illinois.	April 6, 22, '62.	Left. Died April 28, 1862; hæmorrhage.	21	Shields, J. A., Pt., K, 105th Penn., age 19.	May 31, Je. 10,'62.	——. June 17, pyæmia. Died June 30, 1862. Autopsy.
9	*Dixon, W.*, Pt., D, 14th N. Carolina, age 21.	May 12, 19, '64.	——. Died May 21, 1864; pyæmia.	22	Sonderman, C., Pt., K, 17th Illinois.	April 6, 25, '62.	——. (Erysipelas; hæm.) Died April 25, 1862.
10	Fox, M., Pt., B, 1st Michigan.	Aug. 30, Sep.4,'62.	Right. Ass't Surg. B. Howard, U. S. A. Died Sept. 10, 1862.	23	Thornburg, G., Pt., C, 70th Ohio.	April 6, 20, '62.	——. Died May 2, 1862; hæmorrhage.
11	Freyer, W., Pt., K, 1st Michigan.	Aug. 30, Sep.2,'62.	Right. Ass't Surg. B. Howard, U. S. A. Died Sept. —, 1862.	24	*Waller, D. J.*, —, E, 23d South Carolina.	Sept. 14, 25, '62.	——. Sept. 15, amp. leg; 25, hæm. Died Oct. 13, 1862.
12	Harney, R., Serg't, A, 29th Mass., age 28.	June 2, 14, '64.	Left; circ. A. A. Surg. F. G. H. Bradford. Died June 26, 1864; exhaustion.	25	Warren, H. M., Corp'l, D, 18th Mass.	Dec. 13, 20, '62.	Right. Died December 20, 1862.
13	Legler, G., Pt., K, 9th Wisconsin.	April 30, M'y25,'64.	Right. Died June 3, 1864.	26	Weston, H., Pt., K, 15th Illinois.	April 6, 25, '62.	Right. Died May 13, 1862.

SECONDARY AMPUTATIONS IN THE SHAFT OF THE FEMUR.—There were four hundred and forty-two cases in which the amputation in the thigh was practised subsequent to the thirtieth day after the reception of the injury. Two hundred and thirty-nine recovered and two hundred and three died, a fatality of 45.9 per cent., or 3.9 per cent. less than in the series of primary, and 17.8 per cent. less than in the series of intermediary operations.

Secondary Amputations in the Upper Third of the Shaft of the Femur.—Fifty-five operations of this nature were reported, with twenty-five deaths, or a mortality of 45.4 per cent. The operations were performed on forty-five Union and ten Confederate soldiers. In thirty the right limb, and in twenty-one the left limb, was involved, and in four this point was not indicated.

Recoveries after Secondary Amputations in the Upper Third of the Femur.—Thirty of the secondary amputations in the upper third of the femur resulted favorably, six on Confederate and twenty-four on Union soldiers. Twenty-three of the latter were pensioned, and all but one were living in October, 1879. In two cases the lesions were consequent on injuries inflicted by shell, in one by grape shot; in twenty-seven, the injuries were believed to have been caused by small projectiles. Two of the patients had undergone prior operations, one, an amputation of the same leg, and one, an excision of three and a half inches of the upper third of the femur.[1] The convalescence was retarded by pyæmia in one, by gangrene in two, and by hæmorrhage in three instances. In the following case bleeding occurred on the thirteenth day, but was readily controlled by the tourniquet and ice:

CASE 475.—Captain J. A. Bates, Co. D, 12th New York, was wounded in the right leg at Gaines's Mill, June 27, 1862, and underwent amputation nineteen months afterwards. Surgeon A. B. Mott, U. S. V., who performed the operation, made the following report of it: "The wound was caused by a shell which splintered the tibia about midway between the knee and the foot without completely fracturing it. The patient entered Ladies' Home Hospital, New York City, December 25, 1863, and

[1] The amputation of the thigh had been preceded by amputation in the leg in the case of C. Basim, Pt., H, 8th Pennsylvania Reserves (TABLE XXXVIII, No. 2, p. 308), by excision in the shaft of the femur in the case of Pt. S. C. Hall, F, 3d Indiana Cavalry (TABLE XXV, No. 3, p. 208, *ante*, and TABLE XXXVIII, No. 9, p. 308).

thirty days afterwards the limb was amputated. At the time of the operation the leg had become greatly swollen from enlargement of the bone, the skin was discolored with numerous ulcerations, and there was an immense discharge of matter from the ulcers and from an abscess about the knee joint. The patient was in a very low and emaciated condition, had no appetite, and was unable to sleep without taking anodynes. The amputation was performed at the upper third of the thigh by the circular method, and was attended with little hæmorrhage, chloroform being used, and followed by prompt reaction. Ligatures were applied to every bleeding vessel. The patient did well from the time the operation was performed. He was ordered to have two pints of porter and six ounces of brandy daily, together with nourishing diet. Some hæmorrhage took place on the thirteenth day, which was easily controlled with the tourniquet and ice, but recurred one week afterwards. On June 12, 1864, the patient was discharged from the hospital cured." Captain Bates re-entered the Army as an officer of the 43d Infantry, July 28, 1866, and four years later he was retired from active service. He was furnished with an artificial limb by B. F. Palmer, of Philadelphia, July 14, 1869.

In the next case the amputation was not performed until seven years after the date of the reception of the injury:

FIG. 196.—Right femur fractured at junction of upper and middle thirds. *Spec.* 5558.

CASE 476.—Private Jesse M. Jones,[1] Co. K, 21st Indiana, aged 29 years, was wounded at Baton Rouge, August 5, 1862, by a musket ball, which fractured the right femur at the junction of the middle and upper thirds. He was taken to the regimental hospital, remained there one day, and was then sent on a hospital transport to New Orleans, the limb meanwhile being supported by bandages and pillows. On arrival, August 7th, he was admitted to the St. James Hospital, where a long splint was applied, seventeen days after the reception of the wound. He was discharged April 15, 1863, and pensioned. On November 14, 1866, Examining Surgeon W. J. Hoadley, of Danville, Indiana, reports: "The wound still unhealed, fracture had united by large deposits of bone; limb shortened four and three-fourths inches." In January, 1869, he entered Providence Hospital, Washington; and, on the 23d, Dr. D. W. Bliss, late Surgeon U. S. V., amputated the thigh in the upper third by the antero-posterior flap method. The pathological specimen was presented to the Army Medical Museum by the operator. It is No. 5558 of the Surgical Section (FIG. 196), and shows great deformity, with exfoliations on posterior aspect, and a fragment of lead imbedded in the callus. On March 9, 1869, Jones visited the Museum, when his photograph (A. M. M. *Card Photographs*, Vol. I, p. 27) was taken, a copy of which is shown in the wood-cut (FIG. 197). His pension was paid December 4, 1879.

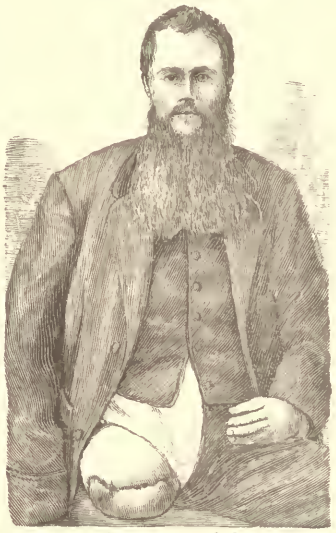


FIG. 197.—Appearance of the stump six weeks after operation. [From a photograph.]

Of four of this series of thirty cases of secondary amputation in the upper third of the femur the specimens are preserved in the Army Medical Museum:

CASE 477.—Sergeant J. Hammill, Co. D, 8th New Jersey, aged 23 years, was wounded in the right knee, at Chancellorsville, May 3, 1863. From the field he was conveyed to Potomac Creek Hospital, and thence, six weeks afterwards, to Washington, where the injured limb was amputated. Surgeon D. W. Bliss, U. S. V., who performed the operation, reported: "The wound was caused by a minié ball, which struck the external condyle of the femur and passed directly through, comminuting the condyles and lower part of the femur and opening the joint. The patient was admitted to Armory Square Hospital, June 14th. He was then suffering from profuse suppuration from the joint, and had a large abscess attended with disintegration of the tissues of the calf of the leg, in consequence of which he was in a very reduced condition. There were no symptoms of pyæmia, however. As there was no possible chance of life for the patient without an operation, it was decided to amputate, which was done on June 16th, by the circular method, at the junction of the middle and upper thirds. The soft parts were found in a very diseased condition. The patient stood the operation well and progressed favorably. Three months afterwards he was transferred to St. Elizabeth Hospital." The man was ultimately discharged from Ward Hospital, Newark, May 4, 1864, having been previously furnished with an artificial limb by E. D. Hudson, of New York City. He is a pensioner, and was paid June 4, 1878. The amputated part of the femur, together with the bones of the knee, were contributed to the Museum by the operator, and are shown in the cut (FIG. 198). The specimen shows a slight deposit of callus on the border of the fracture, and much disorganization of the articulation by suppuration.

FIG. 198.—Shot fracture of lower third of right femur, with slight deposit of callus. *Spec.* 1263.

As already remarked, one of the twenty-three pensioners of this group died nearly fifteen years after the operation:

CASE 478.—Private M. Hartigan, Co. H, 108th New York, aged 18 years, was wounded in the left knee, at Antietam, September 17, 1862. He was moved from a field hospital to Frederick twelve days after the injury, and two days later to Chester, where the injured limb was amputated. Acting Assistant Surgeon C. J. Morton, who performed the operation, contributed

[1] An account of the case has been published in *Circular* No. 3, Surgeon General's Office, Washington, 1871, p. 209.

the pathological specimen (*Cat. Surg. Sect.*, 1866, p. 337, *Spec.* 262), with the following details of the case: "The wound was produced by a ball, which entered near the centre of the popliteal space and emerged at outer side of the knee. The man walked from the battle field to the field hospital. After his admission to Chester Hospital, on October 2d, the wound did well for a few days, when synovitis ensued, and the knee joint became highly inflamed and painful on motion. The patient was also suffering from diarrhœa, poor appetite, and was much emaciated. About a week afterwards large dissecting abscesses formed above and below the knee, which were freely opened, and compresses were then applied to prevent the upward tendency of the abscesses. On October 29th, the muscles were completely dissected with pus to above the middle of the thigh, and the least movement of the limb would cause the most agonizing pain; the patient's appetite now being completely gone and his emaciation very great. On consultation, it was then decided that, as the only means of preserving life, amputation should be resorted to, which was performed about four and a half inches below the great trochanter. The patient spent a wakeful night after the operation, his pulse being 160; but after several days he began to rest better and regained some appetite, and by November 6th his general condition was much improved, the stump healing nicely and showing every prospect of recovery. By December 11th, the stump was nearly healed and the patient had almost recovered. Dissection of the amputated limb showed that the ball had passed through the joint and struck the outer condyle of the femur. The cartilage of the femur and tibia was very much roughened." The specimen consists of a ligamentous preparation of the bones of the injured knee. The patient was discharged from service May 19, 1863, and pensioned. He was subsequently supplied with an artificial limb by the Palmer Arm and Leg Co., by whom the operation was described as having been performed by the flap method. The pensioner died April 1, 1877.

Fatal Cases of Secondary Amputations in the Upper Third of the Thigh.—The twenty-five operations of this group were performed on four Confederate and twenty-one Union soldiers. In one instance excision in the middle third of the femur had preceded the secondary amputation.[1] Four patients perished from pyæmia, two from gangrene, ten from exhaustion, three from shock. In one instance it was believed that chloroform contributed to the unfortunate result,[2] and in five the cause of death was not recorded.

CASE 479.—Private John Pool, Co. H, 119th Pennsylvania, aged 23 years, was wounded by a conoidal ball, at Rappahannock Station, November 7, 1863. He was admitted into the Stanton Hospital, Washington, November 9th. Surgeon John A. Lidell,[3] U. S. V., furnished the following history, with the specimen (No. 2229, Sect I), to the Army Medical Museum: "The bullet had entered the lateral and external part of the left thigh near the junction of the middle and upper thirds, and passing downward, inward, and somewhat forward, had fractured the femur at its middle. The missile appears to have been split, by contact with the bone, into two pieces, which made their escape through separate openings in the popliteal space. When admitted the knee was much swollen and hot; the patella floated some distance above the femoral condyles. He did not complain of pain, and his general condition was favorable. The wounded limb was propped up with long sand bags placed on either side of it, and moderate extension was applied by a weight hanging over the foot of the bed and attached to the foot and leg by strips of adhesive plaster. Counter extension was effected by elevating the foot of the bed. He was put upon supporting diet, and simple dressings applied. The inflammation and swelling at the knee gradually subsided, and, on December 1st, had entirely disappeared, the wounds in the popliteal space closed; the wound of entrance, however, was still open and discharging. On the 20th, there was a slight hæmorrhage of arterial blood from the wound of entrance, which was readily checked. On the 28th, the limb was placed in Hodgen's splint to facilitate the outflow of pus. January 8, 1864, the wound in the popliteal space reopened and the wounds, both of entrance and exit, discharged freely. 24th, pulse 110; he was daily becoming more feeble. On exploring the wound through the orifice of exit with Nélaton's probe detached fragments were found at the seat of fracture. The patient was etherized, and through an incision about four inches long, made in the back part of the thigh, six detached fragments of considerable size, the largest about two inches long by three-fourths of an inch wide, were extracted. The superior and inferior part of the fractured femur were found to be held in proper position by strong splints of provisional callus, which had been thrown out on the inner and outer sides of the bone. The finger could be readily passed between the broken extremities of the bone, both ends of which were necrosed but not yet detached. On the 25th, the thigh had swelled a good deal and was emphysematous, but, on the 28th, the emphysema had disappeared and the swelling was subsiding; the limb was again placed in Hodgen's splint. On the 31st, he was improving in every respect. On February 14th, he was doing finely; no night sweats; slept well; appetite good; pulse 80; discharge of pus moderate. 24th, two fragments of bone were extracted. March 1st, a diffuse inflammation, accompanied with redness and much swelling, attacked the thigh and spread rapidly through the limb; there was also great constitutional disturbance. After a time this inflammation subsided in a great measure but left him much weakened. About April 1st, another attack of diffuse inflammation brought him still lower. 18th, the whole limb was greatly swollen from the groin to the toes; a small slough on the instep separated; the knee joint was extended with effusion, the patella floating some distance above the femoral condyles. There was a profuse discharge of thin pus from the wound of operation in the back part of the thigh. He was much emaciated, pale, and weak; pulse frequent and feeble; tongue red and inclined to be dry; appetite capricious and poor, and he was subject to frequent attacks of diarrhœa. He was steadily

[1] Case of Private C. Collar, F, 45th Illinois (TABLE XXVI, No. 8, p. 210, *ante*, and TABLE XXXVIII, No. 34, p. 308).

[2] Case of Private *J. Bradley*, D, 25th North Carolina (TABLE XXXVIII, No. 32, p. 308), admitted to Chimborazo Hospital, Richmond, June 25, 1862, with a slight wound of patella and integuments covering it, not penetrating joint. July 11th, patella partially necrosed; gangrene appeared on inner and outer aspect of knee joint, showing tendency to spread. July 18th, amputation of thigh at junction of middle and upper thirds. Death July 18, 1862, a few minutes after the operation. A remark on the hospital register explains: "The wound was deemed of trifling importance until the 11th, when the patella was discovered to be necrosed. The chloroform may have contributed to the unfavorable result, for it caused him to vomit freely, and he was unable to retain any stimulants on his stomach."

[3] LIDELL (J. A.), *On Secondary Traumatic Lesions of Bone, viz: Osteo-myelitis, Periostitis, Ostitis, Caries, and Necrosis*, in *U. S. Sanitary Commission Memoirs*, 1870, Surgical Volume I, p. 414.

PLATE LXVI—SHOT FRACTURE OF THE MIDDLE THIRD OF THE FEMUR

Private John Pool, Co. H, 49th Pennsylvania.

Specimen 2229 A.M.M.

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failing, and, there being no hope of saving his life without amputation, he was placed under the influence of sulphuric ether, digital compression applied to the femoral artery, and the thigh amputated in the upper third, by the double flap method, by Surgeon J. A. Lidell, U. S. V. The femur was sawn off about one and a half inches below the trochanter minor. The soft parts of the thigh were so much diseased as not to admit the performance of the operation at any point below. But little blood was lost during the operation. There was a good deal of shock, but he reacted promptly afterward. In a short time the stump became sloughy; he gradually failed, and died of exhaustion April 26, 1863. On examining the amputated member, extensive burrowing of pus was found among the muscles of the thigh, and numerous small pieces of the bullet and fragments of bone sticking into the soft part around the seat of fracture. The ends of the broken femur were not in apposition, but separated from each other by the space which had formerly been occupied by the fragments of bone extracted by operation. Pretty firm union had, however, taken place by means of a bridge of new bone which arched over the chasm in front. On splitting the femur open lengthwise with a saw the marrow presented a coppery-red color, and there were abundant deposits of new reddish colored osseous tissue both within the medullary canal, endostosis, and, external to the bone, periostosis, for a considerable distance above the fracture. In the marrow below the fracture there was a large-sized chocolate-colored spot, the result, apparently, of an old extravasation of blood. The substance of the marrow was decidedly tougher than normal. There was a considerable deposit of new osseous tissue lying between the periosteum and the bone. The periosteum itself was thicker and redder than natural in that locality, and from it these laminæ of new osseous tissue had been developed. Th knee joint was swelled out with a straw-colored jelly-like substance; the synovial fringes were reddened, but the articular cartilage presented no abnormity." A drawing of the specimen, No. 2229, by Hospital Stewart E. Stauch, is copied in PLATE LXVI, opposite p. 306.

In the following instance amputation was performed twenty-two months after the injury. The patient had been discharged and pensioned, but the wound reopened, allowing the end of the lower portion of the femur to protrude through a fistulous passage:

CASE 480.—Private P. Riley, Co. A, 10th New York, aged 24 years, was wounded at Cold Harbor, June 3, 1864, and admitted to the field hospital of the 2d division, Second Corps. Surgeon J. F. Dyer, 19th Massachusetts, recorded: "Gunshot fracture of left thigh, upper third." Surgeon J. C. McKee, U. S. A., contributed a photograph, which is shown in the wood-cut (FIG. 199), and reported as follows: "Admitted to Lincoln Hospital, Washington, June 11th, with a gunshot fracture of the left femur, the ball entering the anterior surface of the thigh four inches below the anterior superior spinous process of ilium, passing directly backward, producing a compound comminuted fracture of the upper third of the femur, and lodging in the muscular substance of the thigh posteriorly. Extension and counter-extension were used, but removed on account of the inflammation of the parts and the severe pain produced. Three weeks after admission free incisions were made for the discharge of pus. The patient slowly recovered, with four and a half inches shortening of the limb." He was mustered out of service August 1, 1865, and pensioned. A cast of the injured limb in this case was also contributed by Dr. McKee, and constitutes specimen 4051 of the Surgical Section of the Museum. (See *Cat. Surg. Sect.*, 1866, p. 535.) Examiner W. H. Thomson, of New York City, certified, January 22, 1866: "A ball entered the inner aspect of the left thigh and fractured the femur opposite the great trochanter. The limb is now much distorted and marked with fistulous passages, from one of which, at the anterior upper third of the limb, the end of the lower portion of the femur protrudes. He should not have been discharged from hospital in that condition." Dr. M. M. Marsh, Surgeon at the Lincoln Hospital, New York City, certified: "That in the month of April, 1866, Peter Riley came into the hospital for an operation on a shattered femur in its upper third, the lower fragment of bone protruding. Amputation was performed, and the patient died of pyæmia May 7, 1866, and in consequence of the injury received in the service as the remote cause." (See *Photo. Series*, A. M. M., No. 117.)

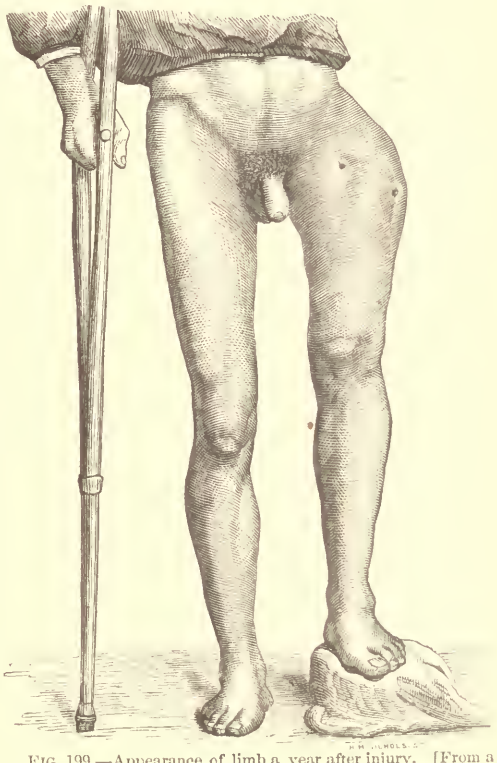

FIG. 199.—Appearance of limb a year after injury. [From a photograph.]

Consecutive bleeding was observed in three instances, two of which necessitated ligation of the femoral artery. One of the cases is detailed:[1]

CASE 481.—Private J. B. Lynn, Co. B, 83d Ohio, aged 19 years, was wounded in the right leg, at Fort Blakely, April 9, 1865, and was admitted to Sedgewick Hospital, Greenville, four days afterwards. Assistant Surgeon A. Hartsuff, U. S. A., who amputated the injured limb, furnished the following report of the operation: "The wound consisted of a longitudinal fracture of the upper portion of the tibia, involving the knee joint. The ball passed through the bone downward and emerged opposite the tendon of the gastrocnemius. On May 30th, the limb being infiltrated with serum and there being extensive bur-

[1] The other instance of ligation of the femoral artery is that of Private H. Griffith, E, 8th New York Cavalry; wounded at Antietam, September 17, 1862; shot fracture of left knee joint. Amputation at upper third of thigh, November, 1862; ulceration of branch of femoral artery, hæmorrhage; ligation of femoral at Scarpa's triangle, November 19, 1862; death November 19, 1862. *Specimens* 768 and 855, *Sect.* I, A. M. M.

rowing of pus from phlegmonous erysipelas, amputation was performed at the upper third of the thigh by the circular method. No sutures were introduced on account of the condition of the parts, thereby favoring the draining of the serum. Though the patient was debilitated and much emaciated, he finally rallied under stimulants and nourishing diet. On June 5th, hæmorrhage occurred, amounting to over twenty ounces, when the femoral artery was immediately cut down upon, exposed in its continuity, and ligated about an inch above the face of the stump. Death occurred two days later, from exhaustion. The ligatures were found to have ulcerated through, the arteries being patulous and showing no attempt at closing."

TABLE XXXVIII.

Summary of Fifty-five Cases of Secondary Amputation in the Upper Third of the Femur for Shot Fracture.

[Recoveries, 1—30; deaths, 31—55.]

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1	Babson, C. L., Pt., K, 16th Maine, age 21.	De. 13, '62, Mar. 28, 1863.	Left; circ. A. A. Surg. A. Coolidge. Disch'd Oct. 16, 1863.
2	Basim, C., Pt., H, 8th Penn. Reserves, age 20.	Sept. 17, Dec. —, 1862.	Right. (Sept. 17, amp. leg; gang.) Drs. Jones, Stewart, and Thompson, Strattonville, Pa. Disch'd Dec. 6, 1862.
3	Bates, J. A., Capt., D, 12th New York.	Je. 27, '62, Jan. 24, 1864.	Right; circ. Surg. A. B. Mott, U. S. V. Feb. 6, hæm. recurred. Disch'd June 12, 1864.
4	Brinker J. H., Pt., E, 11th Penn., age 23.	De. 13, '62, Mar. 21, 1864.	Right (necrosis); flap. A. A. Surg. J. H. Thompson. Discharged March 3, 1865.
5	Crede, F., Pt., C, 178th New York, age 29.	April 9, Sept. 1, 1864.	Left; ant. post. flap. Surg. J. F. Randolph, U. S. A. Discharged Oct. 21, 1865.
6	*Drew, D.*, Pt., F, Phillips' Legion.	Au. 31, '62, Ja. 31, '63.	Left. Surg. — Owens, C. S. A. Recovery.
7	*Ellett, L.*, Pt., D, 16th Mississippi, age 20.	May 3, J'ne 6, '63.	——; circular. Recovery.
8	Glenn, J., Pt., K, 42d Pennsylvania.	De. 20, '61, Fe. 9, '62.	Right; circ. Surg. E. Shippen, U. S. V. Disch'd May 16, 1862.
9	Hall, S. C., Pt., F, 3d Indiana Cavalry.	Nov. 8, '63, April 13, 1864.	Right. (Exc. femur.) Surg. T. R. Crosby, U. S. V. Disch'd July 8, 1864.
10	Hammill, J., Serg't, D, 8th New Jersey.	May 3, June 16, 1863.	Right; circ. Surg. D. W. Bliss, U. S. V. Disch'd May 5, 1864. *Spec.* 1263.
11	Hartigan, M., Pt., H, 108th New York, age 18.	Sept. 17, Oc. 30, '62.	Left (synovitis); flap. A. A. Surg. C. J. Morton. Disch'd May 19, 1863. *Spec.* 262.
12	Henry, D. P., Pt., H, 11th Missouri, age 29.	Oct. 4, De. 26, '62.	Left. Discharged April 7, 1863.
13	Hervey, R., Pt., C, 82d Pennsylvania, age 20.	July 1, Aug. 1, 1862.	Left; flap. Surg. C. Page, U. S. A. Aug. 12, lig. femoral artery. March 28, '63, gen. hæm.; gang.; pyæmia. Disch'd Oct. 6, 1863.
14	Jarvis, H., Pt., K, 55th Massachusetts.	No. 30, '64, M'y 8, '67.	Right (disch'd Nov. 25, '65); flap. Dr. A. R. Carey. Recovery.
15	*Johnson C.*, Pt., H, 13th Louisiana.	Oc. 20, '63, J'y 14, '64.	——. Surg. — Friend, C. S. A. Recovery.
16	Jones, J. M., Pt., K, 21st Indiana, age 29.	Au. 5, '62, Jan. 23, 1869.	Right (necrosis; exfol.); ant. post. flap. Disch'd April 15, 1863. Surgeon D. W. Bliss, U. S. V. Recovery. *Spec.* 5558.
17	Knox, A. G., Pt., D, 18th New York, age 19.	Sept. 14. De. 12, '62.	Right; flap. Act. Ass't Surg. A. North. Disch'd Jan. 14, 1863.
18	Kuhns, W. H., Serg't, C, 102d Pennsylvania.	May 31, J'y 2, '62.	Right; flap. Discharged July 6, 1862.
19	*Loggins, W.*, Pt., E, 6th Texas Cavalry, age 21.	De. 21, '62, Feb. –, '63.	Right; circular. To Prison Nov. 9, 1863.
20	Morris, T. H., Pt., D, 6th Iowa, age 21.	Ap. 6, '62, Ap. 5, '67.	Right (discharged April 29, 1863. Suppuration, erysip., etc.); flap. Dr. H. S. Sawyer, Centerville, Iowa. 1870, stump healthy.
21	*Oakes, E.*, Pt., E, 14th Louisiana.	May 5, J'y 9, '62.	Right thigh. Recovery.
22	*Page, W. A.*, Pt., F, 21st North Carolina.	May 25, J'y 19, '62.	Left. Surg. — Brundidge, C. S. A. Recovery.
23	Perry, H. D., Pt., H, 19th Mass., age 17.	De. 13, '62, May 29, 1866.	Left. (Portion of ball and spiculæ removed; necrosis; deformity. Disch'd Sept. —, 1863.)
24	Plack, J. H., Corp'l, F, 34th Ohio.	De. 29, 61, Feb. –, '62.	Right. Surg. W. R. S. Clark, 34th Ohio. Disch'd May 24, 1862.
25	Rufus, C., Pt., 1st Col'd Artillery, age 25.	Jan. —, M'h 1, '64.	Left; flap. Surg. D. O. McCord, 9th La. C. T. Duty Feb. 10, '66.
26	Sears, J., Pt., E, 43d N. York, age 26.	July 1, Aug. 19, 1862.	Left (sloughing); flap. Surg. A. B. Shipman, U. S. V. Disch'd Sept. 14, 1864.
27	Shanen, J., Pt., E, 170th New York, age 46.	May 24, Oct. 1, '64.	Right; lateral flap. Surg. T. R. Crosby, U. S. V. Oct. 6, hæm.; lig. fem. art. Disc'h Aug. 15, '65.
28	Sherwood, G. A., Corp'l, G, 14th Indiana.	Sept. 17, Oc. 25, '62.	Left; flap. A. A. Surg. W. M. Hines. Disch'd Dec. 13, 1862.
29	Smith, P., Pt., F, 5th Infantry.	Feb. 22, M'y 4, '62.	Right; flap. A. Surg. B. Norris, U. S. A. Disch'd July 13, 1862.
30	Walsh, H., Landsman, U. S. S. Mendota, age 18.	July 16. Sept. 2, 1864.	Left; circ. Surg. W. Johnson, U. S. N. Disch'd April 11, 1865. *Spec.* 3213.
31	Bosse, E., Pt., F, 8th New York.	June 8, J'y 15, '62.	Left; lat. flap; hectic fev.; diarr. Died Sept. 1, '62; pyæm. Autop.
32	*Bradley, J.*, Pt., D, 25th North Carolina.	—— —, J'y 18, '62.	——. (Necrosis; gang.) Died few minutes after operation.
33	Byram, W., Pt., K, 3d Michigan Cav., age 23.	May 6, Aug. 7, 1864.	Right. (July 30, bone rem'd.) Surg. A. Hammer, U. S. V. Died August 10, 1864.
34	Collar, C., Pt., F, 45th Illinois, age 20.	Feb. 14, M'y 1, '64.	Right. (March 12, exc.) Surg. W. J. McKim, 15th Ill. Died May 9, 1864; shock.
35	Cowperthwaite, C., Corp., L, 1st N. J. Cav., age 22.	Oc. 12, '63, Jan. 5, '64.	Left; circ. A. Surg. A. Ingram, U. S. A. Died Jan. 6, '64; shock.
36	Cunningham, O. H., Pt., I, 82d Ohio, age 35.	May 2, '63, May 3, '64.	Right (ball ext.; erysip.); double flap. Surg. D. W. Bliss, U. S. V. Died June 5, '64. *Spec.* 2254.
37	Ellithorpe, P. G., Pt., I, 1st Penn., age 20.	July 2, Au. 10, '63.	Left; slough.; diar.; hæm.; tourn. Died Oct. 5, 1863; exhaustion.
38	Farr, F. B., Serg't, H, 2d New York H'vy Artillery, age 22.	April 7, Aug. 2, 1865.	Right (frag's bone and two pieces of ball rem'd; hæm.); ant. post. flap. A. A. Surg. B. B. Miles. Died same day. *Specs.* 1565, 2797.
39	Goodsell, A., Pt., H, 1st Colorado Cavalry.	No. 29, '64, Ja. 14, '65.	Right. Died one hour after operation.
40	Griffith, H., Pt., E, 8th New York Cavalry.	Sept. 17, Nov. —, 1862.	Left. Surg. H. S. Hewit, U. S. V. Hæm; Nov. 19, lig. fem. artery. Died Nov. 19, '62. *Specs.* 768, 855.
41	*Hughes, S. D.*, Pt., D, 14th South Carolina, age 38.	J'y 2, '63, Feb. 6, 1864.	Right; circ. Surg. A. Heger, U. S. A. Died Feb. 16, 1864; pyæmia. Autopsy.
42	Humma, L., Pt., H, 88th Pennsylvania.	Au. 30, '62, Jan. 20, 1863.	Left. (Erysipelas.) Surg. D. P. Smith, U. S. V. Died Jan. 20, 1863. *Spec.* 1186.
43	Icanberry, A., Pt., K, 6th Kansas Cav., age 18.	Nov. —, De. 22, '63.	Left thigh. Died December 30, 1863.
44	Ivery, N., Pt., B, 12th Michigan.	April 7, M'y 15, '62.	——. Died three hours after operation; exhaustion.
45	Kreps, J., Pt., C, 29th Iowa, age 16.	April 30, July 9, 1864.	Right (carious); ant. post. flap. A. Surg. E. A. Clark, U. S. V. Died Aug. 8, 1864; pyæmia.
46	Luxford, G., Pt., A, 50th Illinois, age 16.	Oct. 5, Nov. 20, 1864.	Right (necrosis); circ. Surg. S. S. Boyd, 84th Ind. Died Nov. 28, 1864; exhaustion.
47	Lynn, J. B., Pt., B, 83d Ohio, age 19.	April 9, May 30, 1865.	Right (erysip.); circ. A. Surg. A. Hartsuff, U. S. A. Hæm.; lig. fem. art. Died June 7, 1865.
48	O'Brien, D., Pt., H, 69th New York.	Sept. 17, Dec. 5, 1862.	Right; flap. Surg. H. S. Hewit, U. S. V. Died Dec. 16, 1862; exh'n. Autop. *Specs.* 755, 1101.
49	[1] Peaslee, A., Pt., I, 23d Mass., age 23.	June 27, Au. 14, '62.	Left. Dr. — Halsted. Died Aug. 15, 1862.
50	[2] Pool, J., Pt., H, 119th Penn., age 23.	No. 7, '63, April 18, 1864.	Left (frag's bone rem'd); double flap. Surg. J. A. Lidell, U. S. V. Sloughing. Died April 26, '64; exhaustion. *Spec.* 2229.
51	Riley, P., Pt., A, 10th New York, age 24.	J'e 3, '64, Ap. –, '66.	Left. (Deformity; fistulous passage.) Died May 7, '66; pyæm.
52	Seville, W. S., Pt., G, 1st Delaware.	Sept. 17, 1862, Jan. 5, 1863.	Right (deformity); flap, skin; circ. muscles. A. Surg. R. F. Weir, U. S. A. Died Jan. 10, 1863; shock. *Spec.* 3866.
53	*Shoffeitt, J. H.*, Pt., E, 13th Alabama, age 20.	July 3, Nov. 1, 1863.	Right (thrombo.; gang.; erysip.); circ. Surg. A. Heger, U. S. A. Died Nov. 2, 1863. Autopsy.
54	*Sims, T. R.*, Pt., F, 12th Tenn. Cav., age 20.	Sept. 22, Nov. 7, 1864.	Right; ant. post. flap. A. A. Surg. M. L. Herr. Died November 22, 1864; exhaustion.
55	Smith, C. A., Pt., C, 51st Illinois, age 41.	Nov. 30, 1864, Jan. 8, '65.	Right; circ. Surg. J. R. Ludlow, U. S. V. Died Jan. 8, '65; exh'n.

[1] STURGIS (F. D.), *Reports of Hospitals*, in *American Medical Times*, 1862, Vol. V, p. 174.

[2] LIDELL (J. A.), *On the Secondary Traumatic Lesions of Bone, etc.*, in *U. S. Sanitary Commission Memoirs*, 1870, Surgical Volume I, p. 414.

In three of the fifty-five cases enumerated in the foregoing table the seat of injury was in the upper third; in twelve, in the middle third; in eleven, in the lower third; in seven, in the femur without precise indication; in fifteen, in the knee joint; and in seven cases in the leg.

Secondary Amputations in the Middle Third of the Femur.—The one hundred and sixty-eight cases of this group comprise one hundred and two recoveries and sixty-six deaths, a mortality of only 39.2 per cent., or 6.2 per cent. less than the mortality of the secondary upper third amputations. Twenty-seven of the one hundred and sixty-eight operations were practised on Confederate, and one hundred and forty-one on Union soldiers. Of one hundred and sixty-two cases in which this point was indicated, the injuries were on the left in eighty-nine and on the right side in seventy-three instances.

Cases of Recovery after Secondary Amputation in the Middle Third of the Femur.—One hundred and two cases belong to this category. The injuries were caused by shell in one, by solid shot in two, by canister shot in one, and by small projectiles in ninety-eight cases. Nine patients were Confederate, and ninety-three Union soldiers; five of the latter have died since the termination of the War, while eighty-eight remained pensioners in January, 1880.

Case 482.—Private Andrew Van Vorst, Co. A, 134th New York, age 18 years, was wounded at Gettysburg, July 1, 1863, by a conoidal ball passing through the right knee joint, causing a comminuted fracture. He was admitted into the Camp Letterman Hospital on August 21st. Acting Assistant Surgeon W. M. Welch, under whose care he was placed October 28, 1863, records: "Thigh was amputated at the middle third August 1st; the stump is healiug finely and his health is good." He was sent to Baltimore November 8th, where he remained in the Newton University Hospital until April 25, 1864, when he was sent to New York and admitted into the DeCamp Hospital. His stump had entirely healed. On October 16th, he was transferred to Albany and admitted into the Ira Harris Hospital, from whence Assistant Surgeon J. H. Armsby, U. S. V., reported his recovery and discharge from service August 11, 1865, and contributed a plaster cast of the stump (A. M. M., *Spec.* No. 417, *Sect.* I, *Cat.* 1866, p. 554), a drawing of which is given in the wood-cut (Fig. 200). His pension was paid January 4, 1880.

Fig. 200.—Appearance of stump three months after amputation. *Spec.* 417.

Case 483.—Private J. Scheuermann, Co. K, 9th Ohio, aged 28 years, was wounded at Chickamauga, September 19, 1863, and admitted to the field hospital of the 3d division, Fourteenth Corps, where Surgeon J. R. Arter, 31st Ohio, noted: "Shot fracture of right thigh." Several weeks after the reception of the injury the wounded man was transferred to hospital at Chattanooga, subsequently to Bridgeport, and, on December 11th, to Murfreesboro', whence Assistant Surgeon G. V. Woolen, 27th Indiana, reported the case as follows: "The ball entered the limb anteriorly, about four inches above the knee joint, passing backward and upward, fracturing the femur at the junction of the middle and lower third, and lodging in the gluteus maximus muscle. The fracture was oblique and lateral, and remained ununited, the limb being shortened about three inches. The ends of the bone were necrosed, and suppuration profuse. About three months after his admission the patient had an attack of erysipelas, which subsided, but left the limb in an œdematous condition. At this time his constitutional condition had become very feeble, his appetite was wanting, and he was unable to sleep from pain in the wound, which was discharging considerable quantities of ichorous pus. It was then deemed proper to remove the limb, and amputation was performed by Assistant Surgeon J. E. Link, 21st Illinois, on March 18, 1864. The operation was done by the circular method at the junction of the upper and middle thirds, but little hæmorrhage taking place. The ligatures were applied and chloroform was used. The patient rallied well from the operation, and immediately began to improve in general health. In the course of a month the stump had closed." The patient was subsequently transferred to Washington Park Hospital, Cincinnati, mustered out of service July 14, 1864, and supplied with an artificial limb of Dr. Bly's pattern one year afterwards. He is a pensioner, and was paid September 4, 1879. The amputated femur was contributed by Surgeon I. Moses, U. S. V., and is represented in the cut (Fig. 201), showing a moderate deposit of callus but no union of the fracture.

Fig. 201.—Shot fracture of middle third of right femur. *Spec.* 2802.

Case 484.—Private F. Luck, Co. C, 21st Wisconsin, aged 21 years, was wounded in the right knee, at Chaplin Hills, October 8, 1862. He was admitted to hospital No. 7, Perryville, and discharged from service February 15, 1863, Surgeon J. G. Hatchett, U. S. V., certifying to "complete destruction of the use of the knee," as resulting from the injury. On the 2d day of the following December the man entered Harvey Hospital, at Madison, whence Surgeon H. Culbertson, U. S. V., contributed the pathological specimen (No. 2074, *Surgical Section*, A. M. M.), with the following report: "This soldier received a penetrating wound of the knee joint, and was unfortunately discharged at the breaking up of the Perryville Hospital, when the knee was still running and not in

progress of cure. The injury was caused by a minié ball, which entered posteriorly and to the inside of the tuberosity of the external condyle of the femur, passed obliquely forward and slightly inward, fracturing the external condyle and also the upper and outer margin of the patella, and came out opposite that point of the bone. True and false anchylosis resulted, the former between the inner condyle and head of tibia, and necrosis of the inner condyle ensued. At the time of the patient's admission the state of the parts was as follows: The joint was enlarged and the wound open over the external condyle, and some three inches higher up the thigh another opening existed, both of which discharged unhealthy pus. There was also periostitis extending up as high as the lower fourth of the femur, and the soft parts about the joint were swollen and indurated up to the middle third of the thigh. Circulation below the knee was extremely feeble, and the leg, bent upon the thigh at right angle, was extremely emaciated. The patient's constitution showed marked evidence of scrofulous diathesis. At first I determined to treat the case by resection of the joint, but on reflecting, and with the advice of Dr. E. B. Wolcott, Surgeon General of Wisconsin, I decided upon amputation as affording the best and safest means for the removal of the disease. Just before the operation, which was done on January 3, 1864, the patient fell upon the floor and broke the union between the tibia and inner condyle of femur; yet from the inflammatory exudations thrown out about the joint it was found impossible to straighten the limb, though efforts were made to effect this object while he was under the influence of chloroform. I performed the amputation at the middle third of the thigh, by the circular method, in the presence of Dr. Wolcott, Acting Assistant Surgeons J. J. Brown and J. Favill, and Medical Cadet W. B. Buckley. Nothing unfavorable occurred, and the wound healed by first intention, though the ligature applied to the femoral artery has not yet (February 7th) come away. The stump now certainly demonstrates the superiority of the circular over the flap operation of this member, being one of the most perfect in form I have yet seen. This case illustrates the efforts of nature to diminish the capacity of the joint by anchylosis and the exudation into it of plastic organizable material; also the fact that penetrating gunshot wounds of the knee joint will require amputation, even though nature be given fifteen months in which to effect a cure. On examination of the morbid specimen, it will be seen that the ball passed through the cancellated structure of the external condyle, entering the cavity of the joint only at two opposite points, thus inflicting upon the synovial membrane but a slight wound so far as extent is concerned. Unquestionably great inflammation must have followed the wound, as is proved by the effects observable. But nature could not have been as successful had the external condyle been broken into fragments. It was in fact a penetrating wound of a portion of the joint which inflicted great injury to it, and yet it was singularly and uncommonly local, the wound of the bone appearing as though it might have been made with a circular punch. The fact that the bones entering into the formation of the joint were injured in so limited a manner would seem to be the reason why amputation was not required long since." Dr. Culbertson appends the following remark to this history: "This case is cited not because of the amputation performed, but to illustrate the great efforts of nature in the cure of penetrating gunshot wounds of knee joints, and also her failure in the attempt." Three months after the operation the patient was well enough to proceed to Chicago for the purpose of being fitted with an artificial limb, and on May 28, 1864, he left the hospital for his home. The pensioner was paid June 4, 1879.

CASE 485.—Private E. Green, Co. K, 119th Pennsylvania, aged 35 years, was wounded in the right thigh, at Rappahannock Station, November 7, 1863, and was admitted to Armory Square Hospital, Washington, two days afterwards. Surgeon D. W. Bliss, U. S. V., furnished the following description of the injury, and of the operation which he performed: "The missile, a conical ball, entered one and a half inches above and to the right of the patella, passing across the limb, fracturing the femur in the lower third, and lodging on the inner and posterior side, nearly opposite the point of entrance. The limb was treated in a skeleton fracture-box, and water dressings were used. On November 18th, the ball was extracted. Hæmorrhage occurred on the following day, and again three days afterwards. The discharge of pus became copious about December 1st, and dry gangrene of the toes and dorsum of foot appeared. The upper fragment of the femur protruded one and a half inches, and at every effort to extend the limb so as to retract the protruding bone violent hæmorrhage ensued. The patient's system was greatly reduced, and careful attention was paid to retain his digestive powers by a rotation of stimulants and nourishing diet. A slight change in the position of the limb, on December 28th, brought on a hæmorrhage to the amount of twenty ounces in three minutes' time—evidently from the femoral artery, which was then controlled by pressure. By January 20, 1864, sloughing of the heel and dorsum of foot had commenced, and the patient's system was still so much debilitated that a decision to operate, which had been retarded as calculated to prove fatal, was now arrived at as a last chance to preserve life. On the following day the thigh was amputated at the middle third by antero-posterior flaps, four arteries being tied and but little blood lost. Ether was used as the anæsthetic. At the operation an abscess was discovered in the anterior flap extending upward for three inches, and the femoral artery was found to be destroyed in the upper part of the popliteal space, evidently by the missile. Above the point of the amputation the vessel was healthy; but no clot was found. The vessels of the leg were much constricted. The lower fragment of the femur was flexed at an angle of thirty degrees with the leg, and, by contraction of the muscles of the thigh, was pressed firmly against the wounded extremity of the femoral artery, thereby preventing fatal hæmorrhage. The flaps of the stump presented an unhealthy appearance, being much indurated and infiltrated with serum. Tincture of chloride of iron was applied to the entire surface with a view of stimulating the parts and of obtaining its hæmostatic effect upon the capillary vessels which failed to contract from cold and exposure to the air. A large tent was placed through the fourchette of the stump so as to prevent the accumulation of pus, the flaps being gently brought together and tepid water dressing applied. The patient improved daily, and was in a fair way of recovery one week after the operation." The amputated portion of the femur was contributed to the Museum by the operator, and is shown in the wood-cut (FIG. 202). The specimen shows the parts about the fracture to be dead and stripped, and its upper half to be covered with an involucrum of foliaceous callus tolerably dense posteriorly, also some periosteal deposit above the condyles. The patient subsequently entered Judiciary Square Hospital, and was discharged July 7, 1864. He was furnished with an artificial leg by B. F. Palmer, August 26, 1865, and was paid as a pensioner until September 4, 1867, since when he has not been heard from.

FIG. 202.—Shot comminution of the lower third of right femur. *Spec.* 2033.

In the next case the amputation was performed five years after the reception of the injury, owing to the continual recurrence of abscesses. The patient died eleven years after the operation, of pulmonary disease:

CASE 486.—Private Charles M. Bowen,[1] Co. A, 27th Indiana, aged 19 years, was wounded at Antietam, September 17, 1862. He was taken to Frederick and admitted to No. 1 hospital on September 24th. Acting Assistant Surgeon J. C. Shimer records the following: "A conoidal ball had entered the outer aspect of the left thigh about five inches above the knee, fractured the femur, and passed out directly opposite. Buck's apparatus was applied. On October 19th, considerable amount of callus had been thrown out, and there was some union; his appetite and general condition were good. October 23d, a deep but circumscribed abscess on the outer side of middle third of thigh was opened and evacuated. 30th, both the wounds of entrance and exit were enlarged to evacuate pus more freely. December 5th, he has improved greatly; passive motion has been employed to overcome stiffness of the knee." On March 18, 1863, he was able to walk with the aid of crutches, and the wounds had nearly healed. A slight attack of erysipelas yielded readily to treatment. May 21st, the wound took on a gangrenous condition, for which strong nitric acid was applied. On June 15th, he was transferred to Baltimore. The wounds looked healthy and his general condition was excellent. He entered the Jarvis Hospital on the 16th, and was discharged September 7, 1863. The femur had only partially united; the sciatic nerve was injured; his leg was partially and his foot entirely paralysed. He received a pension, and was employed as a clerk in the Interior Department. Owing to a recurrence of abscesses he entered the Providence Hospital, Washington, in the autumn of 1867, and, on November 11th, the limb was amputated in the middle third by Dr. D. W. Bliss, late Surgeon U. S. V. The wound healed well, and a photograph was taken at the Army Medical Museum on January 9, 1868, at which time the stump was firm and healthy. The specimen was contributed to the Museum by the operator, and is No. 4914, Surgical Section. The fragments are considerably overlapped, having undergone unusual disturbance, and the amount of callus exceeds what is necessary for complete union. On March 10, 1871, the patient was a clerk in the Pension Office; the stump was healthy but his general health poor. He died March 17, 1878, of phthisis pulmonalis.

FIG. 203.—Appearance of stump two months after amputation. [From a photograph.]

The amputation in the thigh in the one hundred and two cases of this group had been preceded by other operations in thirteen instances, viz: by amputation at the knee joint in two, by amputation in the leg and subsequent amputation at the knee in one, by ablation in the leg in six, by excision in the shaft of the femur in one, and by excision in the bones of the leg in three instances.[2]

Fatal Cases of Secondary Amputation in the Middle Third of the Femur.—The sixty-six operations of this category were practised on forty-eight Union and eighteen Confederate soldiers. Eight autopsies are recorded in this series, and twenty-five pathological specimens are preserved. Pyæmia was observed in ten, gangrene in fourteen, and erysipelas in seven cases. In nine instances copious hæmorrhages preceded the amputation, and in eleven hæmorrhages occurred after the operation.

CASE 487.—Private L. Williams, Co. C, 26th Michigan, aged 23 years, was wounded at Spottsylvania, May 12, 1864. Surgeon J. E. Pomfret, 7th New York Artillery, recorded his admission to the field hospital of the 1st division, Second Corps, with "shot wound of left knee, caused by a minié ball." Assistant Surgeon J. C. McKee, U. S. A., who contributed the pathological specimen of the case (*Cat. Surg. Sect.*, 1866, p. 343, *Spec.* 2538), reported the result of the injury as follows: "The wounded man entered Lincoln Hospital, Washington, May 30th. He was a man of nervous and irritable temperament. When admitted he suffered from much constitutional derangement, and the tissues in the neighborhood of the injured joint were much enlarged, tender, and painful. Cold-water dressings were used, and tonics and stimulants were administered. On June 13th, the parts above and below the knee joint being infiltrated with pus and discharging copiously through several openings, ampu-

[1] *Circular* No. 3, Surgeon General's Office, Washington, 1871, p. 205, CASE DLXXXV.

[2] The limb had been removed at the knee in the case of Corp'l F. Hare, B, 6th Wisconsin (TABLE XXXIX, No. 39, p. 314), and of Pt. *L. C. Young*, A, 3d Virginia (TABLE XXXIX, No. 100, p. 315). In the case of Pt. A. Bronchard, 5th New Hampshire (TABLE XXXIX, No. 11, p. 313), the fracture in the foot had been followed by excision of the 3d and 4th metatarsal bones, then by amputation in the lower third of the leg, then by amputation through the knee joint, and finally by amputation in the thigh. The patients who had undergone amputation in the leg were Corp'l H. W. Hughes, I, 133d New York (TABLE XXXIX, No. 43, p. 314); Pt. W. Stitle, A, 29th Ohio (TABLE XXXIX, No. 86, p. 314); Pt. J. Bowen, C, 42d Illinois (TABLE XXXIX, No. 8, p. 313); Pt. B. Nussbaumer, B, 67th Ohio (TABLE XXXIX, No. 67, p. 314); Corp'l G. Dewey, M, 11th Illinois Cavalry (TABLE XXXIX, No. 24, p. 314); and Lieut. J. H. Bell, D, 61st Ohio (TABLE XXXIX, No. 5, p. 313). In the case of Corp'l T. Duggan, M, 11th Illinois Cavalry (TABLE XXVII, No. 4, p. 212, *ante*, and TABLE XXXIX, No. 26, p. 314), an excision in the shaft of the femur had been performed, and excisions in the bones of the leg in the cases of Pt. S. Montgomery, I, 139th Pennsylvania (TABLE XXXIX, No. 63, p. 314); Pt. W. Stockdale, D, 48th Indiana (TABLE XXXIX, No. 87, p. 314); and Pt. C. Murphy, D, 69th New York (TABLE XXXIX, No. 65, p. 314).

tation was decided upon, and performed at the middle third of the femur by Acting Assistant Surgeon A. Ansell, as the only chance of saving the patient's life. On examining the injured parts after the operation the missile was found to have passed through the joint, comminuting the patella and knocking away the head of the tibia on its inner side. The subsequent treatment consisted of cold-water dressings to the stump and the administration of six ounces of brandy per diem; one grain of sulphate of morphia was given at bedtime after the operation. Iron and quinine were prescribed some days afterwards. The patient did exceedingly well, and the stump healed kindly, the cicatrix forming perfectly with the exception of one small opening, which served as an outlet for a small abscess about the size of a pigeon's egg. Hæmorrhage took place from this part of the stump on July 18th, when the tourniquet was applied to the femoral artery, which had the effect of arresting the flow of blood. A plug of lint saturated with a solution of persulphate of iron was then introduced into the wound and the tourniquet removed. Hæmorrhage occurred again on the morning of the following day, when, on consultation, it was decided to open the stump and ligate the bleeding vessel. This was also done by Dr. Ansell, who tied the femoral as well as two muscular arteries, which had been opened by the incision. The operation was performed at 11.30 A. M., and the patient died at 6 P. M. on the same day, July 19, 1864, not having rallied, and having lost altogether about twenty ounces of blood. The interior of the stump was found to be perfectly healthy, with the exception of the small abscess before mentioned." The specimen consists of the bones of the amputated knee, showing the articular surface to be carious, and a longitudinal incomplete fracture extending between the condyles two and a half inches up the femur, on the shaft of which two trivial points of periosteal thickening appear. The stump of the femur, showing a partially detached sequestrum and handsome but useless foliaceous deposit, together with a wet preparation of the ligated femoral artery, were also contributed to the Museum by Acting Assistant Surgeon H. M. Dean, and constitute specimens 2882 and 2883 of the Surgical Section.

CASE 488.—Captain *E. W. Capps*, Co. C, 15th Virginia Cavalry, aged 35 years, was wounded at Brandy Station, Virginia, October 11, 1863. He was admitted, on October 21st, into Lincoln Hospital, Washington. Assistant Surgeon H. Allen, U. S. A., reported:[1] "A conoidal ball entered the right leg, from without inward, about one and a half inches below the patella, passed through the anterior portion of the leg, fractured the spine of the tibia, and emerged on the inner side of the limb. On admission a bandage was found applied tightly to the affected part. Upon its removal the joint was discovered to be greatly swollen from effusion, and the wounds presented an inflamed appearance. Cold-water dressings were applied. No constitutional symptoms were present. After the effusion in the joint had subsided a thorough examination of the wound was made. The head of the tibia was found pierced by the ball. No stellation existed, nor was the joint involved. A seton of tow was thrust through the wound and withdrawn, bringing away several small fragments of bone. On October 21st, a small abscess was opened in the popliteal space. The patient, from this time, did remarkably well, and all thought him to be out of danger. On January 26, 1864, however, when he was walking, with the assistance of crutches, from one ward to another, he stumbled, and, in order to preserve his balance, bore his weight upon the injured limb. The following day an erysipelatous inflammation set in about the joint, which became enormously swollen. He was restless and uneasy, his skin hot and dry, tongue coated with a thick whitish fur; he had severe pain in the head; pulse 140; anorexia and constipation present. On January 29th, a sense of decided fluctuation was felt in the joint, and it was thought at the time that pyarthrosis of the knee joint was present. He had little or no fever. His pulse averaged 120 beats per minute, soft, compressible. Face very pale, mind clear. The swelling in the course of a week had gone down completely from the limb below and above the joint; but around the seat of injury and joint a dull purplish red color lingered. By judicious pressure pus could readily be made to exude through the internal wound. Pus had burrowed a very little distance in the parts connected with the popliteal abscess above mentioned. No sinus of any extent existed. It was now evident that the case was one demanding amputation, and, the patient's condition being favorable, the circular operation was performed by Assistant Surgeon J. C. McKee, U. S. A., in charge, on February 8th. The joint, which gave evidence of the presence of pus of long standing, the cartilages being denuded and partially destroyed, was sent to the Army Medical Museum (*Specimen* 2036 of the Surgical Section). The patient did well until February 12th, when he had a severe chill which lasted forty minutes. This was followed by a profuse diaphoresis. The skin became cold and clammy, the pulse 120 and feeble. On the following day he had another chill, and, on the 15th, two more, one in the morning at six, the other at four o'clock in the afternoon. Another exacerbation occurred on the morning of the 16th. In other respects the constitutional symptoms of what was evident to all to be pyæmia were remarkably slight. His tongue remained clean. His appetite continued the same. There was no vomiting, no fever of any consequence followed the chills; his pulse varied from 120 to 140, rapid and weak. His appearance at this time was that of a man who was suffering from a severe hæmorrhage; his anæmic condition was startling; his sclerotica were pearly white, his lips and gums pale, his finger nails blue. He had a slight cough, though no expectoration. His most distressing symptom was the colliquative sweatings, which came on during the night, and which were not apparently connected with the chills. The limb looked well, and there was no unusual amount of pain in it. The flaps were granulating finely. On February 18th the sixth chill took place, and, on the next day, the seventh, followed by vomiting. He now rapidly sank, and died on February 20th, at four o'clock A. M. Autopsy: Rigor mortis marked. Adipose tissue abundant. Limb much swollen and of a tallow color. Upon dissecting out the vessels the tissues of the thigh were found greatly indurated, especially along the course of the Hunterian tract. The interior of the femoral vein was filled with a solid black clot, which was firmly adherent to the walls of the vein. No disintegration noticed. The lower third of the vessel, that which had lain in contact with the suppurating surface of the stump, was stained by a purulent fluid for about two inches from the patulous opening. A curious appearance was observed in one of the small branches of the profunda vein in the upper third of the thigh. It presented the same general aspect seen in the patulous end of the femoral, and was filled with pseudo-pus." A drawing (made by Hospital Steward E. Stauch, and copied in PLATE XXIII, opposite) of the upper two-thirds of the femur, removed at the *post-mortem*, shows the separation of the periosteum in osteomyelitis. Upon a longitudinal section of the femur (PLATE XLIX, opposite p. 314) the medulla throughout was found to be of a grayish-yellow color, which was more intense at the region of the trochanter than elsewhere. Numerous small abscesses, more or less elliptical, were arranged lineally

[1] A condensed abstract of this case was published by Dr. ALLEN in the *American Journal of Medical Sciences*, 1865, Vol. XLIX, p. 39, in connection with his *Remarks on the Pathological Anatomy of Osteomyelitis, with Cases.*

down the central portion of the medulla. The bone was not thickened or vascular. The periosteum, however, was inflamed, and, at the lower two-thirds of the specimen, was readily stripped from the bone, where it presented the appearance of having been pulled away from the femur by the fibres of the muscles inserted upon it.

CASE 489.—Lieutenant-Colonel G. F. Lamon, 32d New York, was wounded in the left thigh, at Crampton's Pass, September 14, 1862. He was conveyed to hospital at Burkittsville, whence Assistant Surgeon H. A. DuBois, U. S. A., contributed the pathological specimen (*Cat. Surg. Sect.*, 1866, p. 287, *Spec.* 792), with the following history: "The injury was caused by a minié ball, producing a compound comminuted fracture of the femur in the lower third, which was treated with Smith's anterior splints. The wound suppurated freely, and at the end of the second week all inflammatory symptoms had subsided. There was no pain from the first. On November 3d, I found recorded in the case book: 'A speedy recovery beyond doubt; shortening about an inch.' Several days after this bleeding took place, which was thought to be from the femoral. The artery was then compressed with the finger at Poupart's ligament for about fifty hours. Up to the time of the hæmorrhage the patient had an excellent appetite; but he now sank speedily and did not rally for two days, though strongly stimulated and receiving the most nourishing diet. On November 9th, the thigh was removed by the flap method by Surgeon L. W. Oakley, 2d New Jersey, it being decided inexpedient to secure the artery. The patient did not completely recover from the shock. Eight hours after the operation he commenced to sink with great rapidity, and three hours later he died. The specimen illustrates well the nature of a wound in the bone caused by a minié ball, also the amount of union after two months' rest. On examining the removed limb it was found that the ball had brushed the artery, and that the artery had ulcerated to the extent of about one-third of an inch. During the last month the case was under the care of Surgeon Oakley." The pathological specimen consists of the amputated lower half of the femur, and exhibits shortening, with slight union and some deformity, the fractured extremities being necrosed and spanned at points by new bone.

Of the sixty fatal secondary operations in the middle third of the thigh, ten had been preceded by other major operations, viz: one by a primary amputation in the middle third of the opposite thigh, two by exarticulations at the knee joint, and seven by amputations in the leg.[1] In one instance the amputation in the thigh was followed by exarticulation at the hip joint.[2]

TABLE XXXIX.

Summary of One Hundred and Sixty-eight Cases of Secondary Amputation in the Middle Third of the Femur for Shot Fracture.

[Recoveries, 1—102; Deaths, 103—168.]

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.	No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	Abbott, T., Pt., E, 7th Penn. Reserves.	Sept. 14, Nov. 14, 1862.	Left (abscesses); flap. Surg. H. S. Hewit, U. S. V. Discharged Jan. 27, 1863.	11	Bronchard, A., Pt.. A, 5th New Hampshire, age 31.	April 7, 1865, ——.	Left. (Disch'd April 12, 1865; 17, exc. met.; May 15, amp, leg; Feb. 18,'66, amp. kn. jt.) Rec'y.
2	Barger, W. M., Pt., H, 34th Illinois.	April 7, J'e 1,'62.	Right; flap. Surg. O. Martin, U. S.V. Disch'd July 22, 1862.	12	Brunemer, J. H., Corp'l, H, 7th Wisconsin.	Sept. 14, De. 8, '62.	Left (gang.); circ. A. A. Surg. G. W. Carey. Disch'd April 1, 1863. *Spec.* 917.
3	Barnes, B. C., Pt., C, 146th N. York, age 20.	May 5, J'ne 9,'64.	Left; ant. post. flap. Surg. E. Donnelly, 2d Penn. Reserves. Disch'd Jan. 26, 1865.	13	Buckley, J., Pt., A, 15th Infantry, age 24.	Aug. 7, Sept. 12, 1864.	Right (hæm. post. tib.); circ. A. A. Surg. P. L. Rice. To regiment Dec. 7, 1864.
4	Barnett, W. M., Pt., F, 10th West Va., age 18.	Nov.6,'63, May 25, 1865.	Right; flap. Dr. J. W. Ramsey, Wilsonburg, W. Va. Mustered out May —, 1865.	14	Burgenson, S., Pt., F, 15th Wis., age 22.	De.31,'62, Mar. 17, 1863.	Right; flap. Disch'd July 13, 1864.
5	Bell, J. H., Lieut., D, 61st Ohio, age 52.	July 20, 1864, Oct. 27, 1870.	Left. (July 20, 1864, amp. leg. Disch'd Dec. 15, 1864. Neuralg. aff'n of stump.) Dr. D. A. Hart, Cleveland, Ohio. Recovery.	15	Burnes, W., Pt., A, 14th Ohio, age 36.	Sept. 19, No.24,'63.	Right; flap. Disch'd Sept. 8, 1864.
6	Besley, S. B., Corp'l, H, 147th N. York, age 30.	May 5, Oct. 3,'64.	Right (gang.; bone dis.); circular. A. A. Surg. C. E. Lee. Disch'd August 17, 1865.	16	Cain, J. H., Pt., I, 17th Illinois.	Oct. 21. No.30,'61.	Right; flap. Surg. I. Casselberry, 1st Ind. Cavalry. Discharged.
7	Bowen, C. M., Pt., A, 27th Indiana, age 19.	Sept. 17, 1862, Nov. 11, 1867.	Left. (June,'63, nec. bone rem'd. Disch'd Dec. 7,'63.) Dr. D. W. Bliss. *Spec.* 4914. Died March 17, '78; phthisis pulmonalis.	17	Capp, A., Serg't, B, 2d Maryland, age 24.	April 2, Oct. 11, 1865.	Right (nec.); circ. Surg. E. Bentley, U. S. V. Disch'd Jun. 15, 1866. *Spec.* 4387.
8	Bowen, J., Pt., C, 42d Illinois, age 21.	Dec. 30, 1862, June 21, 1863.	Right (Dec. 31, 1862, amp. leg; June 17, 1863, hæm.); circular. Surg. T. D. Fitch, 42d Illinois. Disch'd April 28, 1864.	18	Carey, C., Pt., F, 5th Infantry.	Feb. 21, Ap.15,'62.	Left; circ. A. Surg. B. Norris, U. S. A. Discharged.
9	Brader, S., Pt., M, 4th N. Y. Cavalry, age 25.	June 12, Aug. 15, 1864.	Left (carious): circ. A. Surg. C. A. McCall, U. S. A. Disch'd July 5, 1866. *Spec.* 2927.	19	*Coleman, O. A.*, Pt., B, 3d South Carolina.	No.18,'63, Mar.4,'64.	——. Surg. C. L. Dunkley, C. S. A. Recovery.
10	Brister, J. J., Pt., G, 19th Ohio, age 23.	Se.19,'63. Sept. —, 1864.	Left. (Disch'd; anch. knee, July 22, '64.) Drs. Smith and Hannan, Huntington, O. Recovery.	20	Conlon, J. H., Pt., B, 5th Wisconsin.	May 5, J'e 20,'62.	Left; double flap. A. A. Surg. J. W. Dickie. Disch'd July 8,'63.
				21	Crispin, J. A., Pt., A, 3d New Mexico.	Feb. 21, Mar.–,'62.	Right. A. Surg. B. Norris, U. S. A. Disch'd Feb. 28, 1863.
				22	Culley, J., Pt., K, 7th Missouri, age 23.	May 18, 1863, Ap.10,'64.	Right (caries; erysip.); circ. A. Surg. H. R. Tilton, U. S. A. Disc. July 14, 1864. *Spec.* 2677.
				23	Daniels, S., Pt., K, 1st Iowa.	Aug. 10, Oc.—,'61.	Right; circ. Dr. J. P. Coulter, Marion, Iowa. Discharged.

[1] Primary amputation in the middle third of the opposite thigh had been performed in the case of Pt. S. Baguley, B, 5th New Hampshire (TABLE XXXI, No. 703, p. 235, *ante*, and TABLE XXXIX, No. 105, p. 315). In the cases of Pt. George T. Skilton, I, 36th Wisconsin, and Pt. J. M. Storey, H, 37th Wisconsin (TABLE XXXIX, No. 156, p. 316, and No. 157, p. 316), exarticulation at the knee joint had been performed prior to the amputation in the high; and amputation in the leg had preceded thigh amputation in the cases of Corp'l H. G. Brown, B, 37th Wisconsin; Pt. G. Christiana, A, 120th New York; Pt. W. L. Hindman, E, 155th Pennsylvania; Pt. H. Linn, A, 6th Pennsylvania Reserves; Pt. *L. Winters*, K, 50th Georgia; Pt. *J. F. Drain*, A, 53d Virginia; and Pt. A. C. Frost, C, 15th Massachusetts (TABLE XXXIX, Cases Nos. 108, 112, 125, 137, 166, 116, and 122).

[2] Case of Lieut. C. H. Hawkins, C, 4th New York Calvary (CASE 337, p. 158, and No. 8 of TABLE XVIII, p. 159, *ante*, and No. 124 of TABLE XXXIX, p. 315).

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
24	Dewey, G., Pt., D, 51st New York.	De.13,'62, Jan.–,'63.	Left (Dec. 14, amp. leg; 28, re-amp. leg; slough.); double flap. A. A. Surg. W. V. White. Disc. Oct. 23, 1863.
25	[1]Draper, L. G., Lieut., F, 75th N. Y., age 27.	Oc.19,'64, M'y 2,'67.	Left. (M. O. Feb. 15,'66, deformity of limb.) Dr. M. D. Bennedict, late Surgeon 75th N. Y.
26	Duggan, T., Corp'l, M, 11th Illinois Cavalry.	De.18,'62, J'y 5,'66.	Right (disch'd April 7,'65); flap. Surg. E. Andrews, late 1st Ill. Light Artillery.
27	Durkee, E. W., Pt., G, 18th Wisconsin.	April 6, M'y20,'62.	Right; circ. Disch'd July 16, 1862.
28	Dwyer, J., Pt., G, 69th New York, age 33.	Sept. 17, Oc.20,'62.	Right. Disch'd April 27, 1863. Died April 9,'70; consumption. *Spec.* 756.
29	Eastman, W., Pt., I, 114th New York, age 35.	Oct. 19, No.29,'64.	Right; ant. post. flap. Surg. T. Sim, U. S. V. Disch'd April 10, 1865. *Spec.* 3474.
30	Ekstrand, J. H., Lieut., H, 13th Col'd Troops, age 33.	Aug. 30, 1864, July 17, 1868.	Left. (Nov. 24,'63, shell injury of left tibia. Disch'd Jan. 12, '65. 1868, constant pain in site of first wound; cancerous tumors inv. entire knee joint.) Recov'y. *Specs.* 5479, 5480.
31	English, J., Pt., D, 23d Ohio.	Sept. 17, Oc.23,'62.	Right; flap. A. Surg. A. Mass, 100th Penn. Disch'd Mar. 6,'63.
32	Everett, P., Pt., K, 53d Pennsylvania.	June 1, Au. 1,'62.	Left; flap. Surg. P. A. Jewett, U. S. V. Disch'd April 2, 1863.
33	Fisk, J., Pt., C, 4th R. Island Bat'ry, age 25.	J'y 1,'62, Ja. 17,'63.	Left (hæm.); circ. Surg. J. Neill, U. S. V. Disch'd Aug. 6, 1863.
34	Galway, R., Pt., E, 54th New York, age 36.	April 20, 1865, Sept. 8, 1866.	Right (Dec. 15,'65, frag's nec. bone rem'd; disch'd June 22,'66); flap. A. Surg. G. M. McGill, U. S. A. Recovery.
35	Gibson, J. W., Corp'l, F, 123d Ohio.	June 15, July 26, 1863.	Right; circ. A. Surg. W. G. Bryant, 122d Ohio. Disch'd Feb. 13, 1864.
36	Green, E., Pt., K, 119th Penn., age 35.	No. 7,'63 Jan. 21, 1864.	Right (hæm's; dry gang.); ant. post. flap. Surg. D. W. Bliss, U. S. V. Disch'd July 7, 1864. *Spec.* 2033.
37	Griffin, W., Pt., A, 69th New York, age 20.	June 3, Au. 2,'64.	Right; flap. Surgeon — Gibbs, C. S. A. Recovery.
38	*Griggs, W. I.*, Serg't, A, 42d Virginia.	Au. 9,'62, J'e 20,'63.	——. Surg. — Douglass, C. S. A. Recovery.
39	Hare, F., Corp'l, B, 6th Wisconsin, age 23.	May 5, Au. 6,'64.	Left (May 6, amp. kn. j't; gang.); circ. Confed. surgeon. Disch'd May 22, 1865.
40	Harvie, W. E., Pt., A, 2d Kentucky.	Oct. 4,'63, Jan. 10, 1864.	Left (symptoms of gang.); flap. Surg. S. J. W. Mintzer, U. S. V. Disch'd March 21, 1864.
41	Haycock, H. H., Pt., K, 137th New York, age 21.	Oc.28,'63, Mar.8,'64.	Right; circ. A. A. Surg. H. C. May. Disch'd June 18, 1864. *Spec.* 2201.
42	Howard, W. H., Pt., A, 7th Infantry, age 24.	July 2, Au. 4,'63.	Left. Discharged June 3, 1864.
43	Hughes, H. W., Corp'l, I, 133d New York.	J'e 14,'63, Jan. 21, 1864.	Right (amp. leg June 14,'63; dis. Oct. 12, '63); circ. Dr. Olcott, Williamsburg, N. Y. Recovery.
44	Husband, J., Serg't, K, 5th Penn. Art'y, age 21.	Mar. 18, Ap 22,'65.	Right; circ. Surg. A. Hard. 8th Ill. Cav. Disch'd Aug. 5, 1865.
45	Jefferson, E., Pt., E, 1st Minnesota, age 19.	July 2, Sept. 14, 1863.	Left (gang.; erysip.); ant. post. flap. A. A. Surg. B. B. Miles. Disch'd Dec. 9,'63. *Spec.* 1732.
46	Jones, J., Pt., K, 13th Tenn. Cav., age 26.	No.13,'64, M'y10,'65.	Right; circ. A. A. Surg. T. W. Baugh. Disch'd Aug. 22, 1865.
47	Keigan, P., Pt., D, 1st Colorado.	Mar. 26, Ap.26,'62.	Right; flap. A. Surg. J. C. Baily, U. S. A. Disch'd Aug. 23, 1862.
48	Kelly, B., Pt., G, 83d New York.	Sept. 17, Oc.20,'62.	Right; circ. A. A. Surg. W. H. Matlock. Disch'd March 7,'63. *Spec.* 4826.
49	Kelly, M., Pt., B, 106th Penn., age 23.	July 2, Nov. 10, 1863.	Left; ant. post. flap. A. A. Surg. F. Hinkle. M. O. Sept. 10,'64. *Spec.* 1994.
50	*King, J. M.*, Capt., C, 13th Louisiana, age 25.	Jan. 1, Sept. 15, 1863.	Right. (Nec. bone rem'd.) Surg. A. H. Thurston, U. S. V. Furl'd Nov. 7, 1864. *Spec.* 1918.
51	Kreidler, C. W., Pt., A, 15th Infantry.	Apr.7,'62, May 21, 1863.	Right (disch'd May 16,'63; bone diseased); flap. Dr. G. C. Blackman, late Surg. U. S. V. Recov'y.
52	LaMarsh, J., Pt., I, 3d Vermont, age 20.	Sept. 19, No. 1,'64.	Left; flap. A. A. Surg. C. W. Stinson. Caries. Disch'd Aug. 4, 1865.
53	Litzinger, R. A., Corp'l, G, 2d Cavalry.	Feb. 21, J'ne 4,'62.	Right; circ. A. Surg. B. Norris, U. S. A. Discharged.
54	Luck, F., Pt., C, 21st Wisconsin, age 21.	Oct. 8,'62, Jan. 3,'64.	Right (caries; periostitis; disch'd Feb. 15, 1863); circ. Surg. H. Culbertson, U. S. V. *Spec.* 2074.
55	Ludis, M., Pt., A, 2d Missouri, age 37.	Oct. 8,'62, Fe. 11,'63.	Right; circ. Surg. J. G. Hatchitt, U. S. V. Recovery.
56	Mangan, J., Pt., H, 1st Artillery, age 23.	June 24, Oct. 24 1864.	Left (gang.; hæm.; nec.); circ. Surg. E. Bentley, U. S. V. Reg'l Headquarters Jan. 27, 1865.
57	Marshall, J., Pt., I, 69th Ohio, age 20.	Mar. 19. Sep. 5,'65.	Left; flap. Surg. C. O'Leary, U. S. V. Disch'd Feb. 6, 1866.
58	*Martin, R. C.*, Lieut., K, 25th Arkansas.	Sept. 19, Oc.20,'63.	——. Surgeon — Hall, C. S. A. Recovery.
59	*McDonald, S. H.*, Released prisoner, age 22.	De.25,'64, ———.	Right. (Gangrene.) Recovery Sept. 22, 1865.
60	McDougall, R., Corp'l, G, 2d Mich., age 21.	April 1, Je. 1,'64.	Left; flap. Disch'd July 13, '65.
61	McFarland, D., Corp'l, A, 22d C. T., age 22.	June 16, Au. 2,'64.	Right; circ. A. A. Surg. W. L. Wells. Disch'd Sept. 7, 1865.
62	McWhinney, F., Pt., A, 123d Illinois, age 21.	April 2, M'y11,'65.	Left; circ. Surg. J. B. Larkin, 17th Ind. Disch'd July 22,'65.
63	Montgomery, S., Pt., I, 139th Penn., age 23.	May 12, July 29, 1864.	Left (May 12. exc. tibia); flap. Surg. E. Bentley, U. S. V. Disch. August 2, 1865.
64	Moore, D. A., Corp'l, H, 92d New York, age 27.	J'e 1,'64, Jan. 13, 1865.	Right (disch'd Nov. 18,'64); bilat. flap. Dr. O. F. Parker, Parishville, N. Y. Recovery.
65	Murphy, C., Pt., D. 69th New York, age 24.	Sept. 17, 1862. Mar. 23, 1863.	Right (March 18,'63, dead bone exc.); circ. A. A. Surg. A. North, Disch'd Sept. 12,'64. Died Dec. 28,'64; pneumonia. *Spec.* 3867.
66	Nickerson, C., Corp'l, K, 1st Maine H'vy Art'y, age 23.	May 31, Oct. 27, 1864.	Right (gangren's); lat. flap. Surg. N. R. Moseley, U. S. V. Disch'd April 12, 1865. Stump dis'd, re-amp. Died April 29,'68; tuberculosis. *Spec.* 2808.
67	Nussbaumer, B., Pt., B, 67th Ohio, age 27.	Ma.22,'62, ——,'63.	Left. (April 22. 1862, amp. leg; caries. Disch'd July 28, 1862.)
68	Nutting, J., Pt., F, 19th Maine, age 21.	May 5, Aug. 22, 1864.	Right; flap. Surg. — Manson, Hartland, Maine. Disch'd Jan. 26, 1865.
69	Page, E., Corp'l, H, 17th Kentucky, age 21.	Sept. 20, 1863, Jan. 24, 1864.	Left (gang.; bone diseased); ant. post. flap. A. A. Surg. P. Peter. Erysip. March 25,'64. exc. end fem.; Oct. 20, seq. rem'd. Duty Jan. 21, 1865. *Spec.* 2196.
70	Painter, G. W., Serg't, H, 139th Penn., age 24.	May 5, J'e 5,'64.	Left; flap. A. A. Surgeon J. L. Stewart. Disch'd April 19,'65.
71	Porter, E., Pt., G, 2d Vermont, age 37.	June 1, Au. 22,'64.	Right; circ. A. A. Surg. S. N. Goss. Disch'd June 12, 1865.
72	Powell, J. E., Serg't, A, 6th Kans. Cav., age 28.	May 10, J'e 11,'64.	Right; circ. Surg. C. E. Swasey, U. S. V. Disch'd Jan. 23. '65.
73	Rand, K., Corp'l, C, 2d Vermont, age 23.	May 5, J'e 23,'64.	Left (May 26, hæm.; gang.); circ. A. Surg. J. C. McKee, U. S. A. Nec. bone rem'd. Disch'd Oct. 28, 1865.
74	Reed, J., Pt., K, 11th Illinois, age 37.	Feb. 5, Ma.24,'64.	Right; circ. Surg. G. S. Kemble, U. S. V. Disch'd June 22, '64.
75	Rich, R. E., Pt., B, 19th Massachusetts.	Sept. 17, No.10,'62.	Left; circ. A. A. Surg. P. Middleton. Disch'd Jan. 17, 1863.
76	Robb, B. F., Pt., K, 26th Pennsylvania, age 25.	May 3, Aug. 6, 1863.	Right. (Gangrene.) Surg. D. W. Bliss, U. S. V. Disch'd Dec. 19, 1863. *Spec.* 1582.
77	Robertson, W. B., Pt., H, 27th N. York, age 20.	J'e 27,'62, May 14, 1863.	Left (erysip.); flap. Surg. J. Neill, U. S. V. Disch'd Jan. 27, 1864. *Spec.* 1350.
78	Sauer, C., Pt., I, 88th Illinois.	Nov. 25, De.30,'63.	Left; flap. Disch'd Jan. 10, '65.
79	Scheuerman, J., Pt., K, 9th Ohio, age 28.	Se. 19,'63, Mar. 18, 1864.	Right (erysip.); circ. A. Surg. J. E. Link, 21st Ill. Disch'd July 14, 1864. *Spec.* 2802.
80	Scott, J., Pt., K, 18th Massachusetts.	June 18, Au. 12,'64.	Left; circ. A. A. Surg. J. C. Lamont. Disch'd Feb. 17, 1865.
81	Schneider, M., Pt., F, 26th Wisconsin, age 26.	July 1, Aug. 13, 1863.	Right; ant. post. flap. Disch'd Jan. 29, 1864.
82	Shaw, J. W., Pt., I, 111th New York.	J'y 3,'63, June 1, 1872.	Right (M. O. June 16, 1865; '66, bone came away); ant. post. flap. H. K. Spooner, late Surg. 61st Ohio. Recovery. *Spec.* 6670.
83	*Sherrer, J. M.*, Pt., C, 27th S. C., age 38.	May 16, J'e16,'64.	Left; circ. Furloughed October 10, 1864.
84	Steel, J. L., Corp'l, C, 2d Iowa Cavalry, age 26.	Nov. 3, De.29,'63.	Left; lat. flap. A. A. Surg. W. P. Sweetland. Disch'd Oct. 1,'64.
85	Stinson, J., Pt., B, 99th Penn., age 18.	July 2, Sep.2,'63.	Left; flap. Surgeon H. Palmer, U. S. V. Erysipelas; abscesses. Mustered out Sept. 8, 1864.
86	Stitle, W., Pt., A, 29th Ohio, age 21.	May8,'64, March 15, 1866.	Right (May 9,'64. amp. leg; disc. Aug. 16, 1865, gangrene); flap. Recovery.
87	Stocdale, W., Pt., D, 48th Indiana, age 28.	May 14, J'y 6,'63.	Right; flap. Confed. surgeon. Mustered out July 15, 1865.
88	Sullivan, J., Pt., H, 15th Indiana, age 37.	No.25,'63, Jan. 22, 1864.	Right; flap. A. Surg. R. Bartholow, U. S. A. Carious bone rem'd. Disch'd April 26,'65. *Spec.* 2105.
89	Suter, J., Pt., H, 19th Illinois.	Jan. 2, M'h 4,'63.	Right; flap. Surg. F. Seymour, U. S. V. Disch'd June 18, 1863.
90	Thayer, A., Pt., F, 48th New York, age 18.	May 7, Sep.6,'64.	Right; flap. Dr. C. Freiot, Troy, New York. Disch'd January 4, 1865.
91	*Todd, M. A.*, Pt., E, 14th Alabama, age 22.	Aug. 29, Oc.10,'64.	Left; circ. Retired March 30, 1865.
92	Vanvoorst, A. K., Pt., A, 134th N. Y., age 18.	July 1, Au. 1,'63.	Right. Disch'd Aug. 11, 1865. *Spec.* 417.
93	Ward, F., Pt., D, 49th New York.	April 6, My12,'62.	Left. (Gangrene.) Dr. White. Disch'd October 28, 1862.

[1] Homans (J., jr.), *Cases of Gunshot Fracture of the Thigh, Results of Conservative Surgery*, in *Boston Med. and Surg. Journal*, 1865, Vol. 72, p. 29.

PLATE XLIX_MEDULLARY ABSCESSES OF THE FEMUR

Case of Capt. E. W. Capps 1st Va. Cavalry

LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
94	Wellman, J. G., Serg't, I, 27th New York, age 25.	July 21, Nov. 5, 1861.	Right (slough.; necrosis); long int., short ext. flap. Dr. R. Stebbins, Allegany Co., N.Y. Disc'h Dec. 15, 1862. *Spec.* 1067.
95	West, W., Pt., F, 2d Ohio Cavalry.	Jan. 17, Mar. 29, 1862.	Left; flap. A. A. Surg. W. Dickinson. Disch'd April 24, 1862.
96	Whiting, C., Pt., C, 17th New York.	Aug. 30, Oct. —, 1862.	Left; ant. post. flap. A. Surg. W. E. Waters, U. S. A. Discharged March 25, 1863.
97	Whortenberry, J. M., Pt., B, 15th Kentucky.	De. 31, '62, Au. —, '63.	Left. Surg. F. Seymour, U. S. V. Disch'd Feb. 15, 1864.
98	Winning, J., Pt., A, 125th Ohio, age 27.	May 14, Oct. 12, 1864.	Left (gang.; rupt. pop. art.); ant. post. flap. Surg. H. P. Stearns, U. S. V. Hæm. Dec. 5, re-amp. upper third. Hæms. Disch'd May 20, 1865.
99	*Wood, W. W.*, Pt., D, 46th Georgia.	Sept. 20, De. 27, '63.	Right. Surg. — Agnes, C. S. A. Recovery.
100	*Young, L. C.*, Pt., A, 3d Virginia.	May 12, July 27, 1864.	Right. (May 12, amp. knee joint.) Surg. W. F. Richardson, C. S. A. Gang. Furl'd Sept. 17, 1864. *Spec.* 5514.
101	Young, M., Pt., F, 25th New York, age 25.	May 27, July 28, 1862.	Right; flap. Dr. J. R. Bronson. Nec.; erysip. Jan. 3, '63, circ., up. third. Disch'd May 26, '63.
102	Zweifel, J., Corp'l, F, 6th Wisconsin, age 23.	J'y 3, '63, April 14, 1864.	Right; circ. A. A. Surg. B. B. Miles. Disch'd Nov. 10, 1864. *Spec.* 2256.
103	Allman, G. W., Pt., I, 8th Iowa Cavalry.	May 7, —, '64.	Left. Died August 7, 1864; exhaustion.
104	Ambrose, B. J., Corp'l, I, 105th Ohio, age 24.	No. 22, '63, Jan. 29, 1864.	Left. (Gang.; diarr.) Feb. 10, gang.: 14, 15, hæm. Died Feb. 18, '64; exh'n. *Spec.* 2199.
105	Baguley, S., Pt., B, 5th New Hamp., age 21.	April 7, June 3, 1865.	Left (April 8, amp. right middle third); ant. post. flap. Surg. O. A. Judson, U. S. V. Died July 10, 1865; exh'n. *Spec.* 4232.
106	Bauer, P., Pt., B, 9th Illinois.	Feb. 14, Mar. 15, 1862.	Right; double flap. Dr. Briggs, Nashville. Mar. 23, hæm.; lig. fem. art. Died May 5, '62; exh'n.
107	*Boling, J.*, Serg't, B, 28th Tenn., age 27.	No. 30, '64, Feb. 18, 1865.	Right (carious); oval skin flap. Surg. B. B. Breed, U. S. V. Died April 26, 1865.
108	Brown, H. G., Corp'l, B, 37th Wisconsin, age 21.	June 17, July 21, 1864.	Right (June 17, amp. leg; slough.); flap. Surg. N. R. Moseley, U. S. V: July 31, bone rem'd. Died Aug. 3, 1864. *Specs.* 2897, 2945.
109	Bryant, E. K., Pt., H, 1st Massachusetts, age 37.	May 19, J'e 20, '64.	Right; circ. A. A. Surg. C. W. Carrier. Died July 3, '64; pyæm.
110	[1]*Capps, E. W.*, Capt., C, 15th Virginia Cavalry, age 30.	Oct. 11, 1863, Feb. 8, 1864.	Right (erysip.; pyarthrosis); circ. A. Surg. J. C. McKee, U. S. A. Died Feb. 20, 1864; pyæmia. Autopsy. *Spec.* 2036.
111	Carr, W. E., Pt., D, 27th Mass, age 21.	June 3, Se. 8, '64.	Left; circ. A. A. Surg. J. Morris. Died October 7, 1864.
112	Christiana, G., Pt., A, 120th N. Y., age 36.	July 2, Sept. 2, 1863.	Right. (August 10, amp. leg.) A. A. Surg. H. Leaman. Died Sept. 26, 1863; exhaustion.
113	Cobb, C. P., Pt., F, 1st Michigan, age 20.	Mar. 31, June 3, 1865.	Left; circ. Surg. A. F. Sheldon, U. S. V. Died July 1, 1865; osteomyelitis. *Spec.* 4215.
114	Curly, J., Pt., K, 69th New York.	Sept. 17, Oc. 20, '62.	Left; flap. Died Oct. 27, 1862. *Spec.* 4828.
115	Debar, J., Pt., I, 88th New York.	Sept. 17, Oc. 21, '62.	Left; flap. A. Surg. P. Adolphus, U. S. A. Nec. bone rem'd. Died Nov. 27, '62. *Specs.* 446, 447.
116	*Drain, J. F.*, Pt., A, 53d Virginia, age 26.	July 2, Oct. 9, 1863.	Left. (July 4th, amp. leg, nec. bone rem'd.) Died Nov. 5, '63; exhaustion. *Specs.* 1963, 1975.
117	Eastman, H. J., Pt., F, 1st Vt. Cav., age 23.	Mar. 2, J'e 6, '64.	Left (extracted splinters of bone); slough. Died Sept. 19, '64; exh'n.
118	*Edwards, J. W.*, Pt., G, 44th Alabama, age 26.	May 8, July 11, 1864.	Left (sl. ven.; hæm.); circ. A. A. Surg. T. L. Leavitt. Died Oct. 26, '64; dysentery. *Spec.* 2837.
119	Ewing, W. E., Pt., C, 2d Wisconsin, age 32.	July 2, Au. 13, '63.	——. (Gang.; slough.; hæmorr.) Died Aug. 13, 1863; shock.
120	Farley, H., Pt., H, 61st Pennsylvania, age 27.	May 5, J'y 15, '64.	Left; circ. A. A. Surg. W. W. Volk. Died Sept. 2, 1864.
121	*Flippin, A. M.*, Corp'l, C, 33d Miss., age 34.	July 20, Nov. 14, 1864.	Left (tib. carious); circ. A. A. Surg. D. D. Talbot. Died Dec. 28, 1864; exhaustion.
122	Frost, A. C., Pt., C, 15th Massachusetts.	July 2, Se. 12, '63.	Left. (Prim. amp. leg.) Died Sept. 16, 1863; gangrene.
123	*Goode, W. F.*, Pt., H, 2d Mississippi, age 18.	Sept. 17, Dec. 22, 1862.	Left; flap, skin; circ. mus. A. Surg. R. F. Weir, U. S. A. Dec. 27, hæm.; gang. Died Jan. 15, '63; pyæm. *Specs.* 3858, 3893.
124	[2]Hawkins, C. H., Lieut., C, 4th New York Cav., age 23.	J'e 8, '62, April 29, 1863.	Right. (Oct., '62, dis. bone rem'd.) Surg. A. B. Mott. U. S. V. Sept., '63, exc. four ins. Amp. hip jt., Sept. 21, '64. Died Sept. 22, '64; syncope from shock.
125	Hindman, W. L., Pt., E, 155th Penn., age 20.	May 23, June 24, 1864.	Left (May 23, amp. leg; gang.); circ. A. A. Surg. M. C. Mulford. Died June 24, '64; inflammation and suppuration of stump.
126	[3]*Holland, W.*, Pt., I, 6th N. Carolina, age 45.	June 1, Aug. 4, 1864.	Left (erysip.; gang.; bone rem'd; hæm.); circ. A. A. Surg. T. L. Leavitt. Died August 4, 1864. *Spec.* 2924.
127	Holmes, J., Pt., D, 1st New York, age 26.	June 30, Aug. 7, 1862.	Left. A. A. Surg. S. D. Gross; pyæm. Died August 19, 1862. Autopsy. *Spec.* 256.
128	Hoxey, G., Pt., D, 10th Illinois, age 20.	Mar. 21, June 24, 1865.	Right (sloughing); circ. A. A. Surg. E. P. Fitch. Died June 24, '65, one hour after.
129	Ingram, W. A., Serg't, B, 20th N. Y. S. M.	Aug. 30, —, '62.	——. Died October 4, 1862.
130	*Jackson, H. A.*, Lieut., D, 45th Alabama, age 29.	No. 29, '64, Jan. 1, 1865.	Left; ant. post. flap. A. A. Surg. R. McNeilly. Died Jan. 20, '65; exhaustion.
131	Jell, F., Serg't, I, 95th New York, age 35.	July 3, Au. 26, '63	Right; gang.; hæm Died Sept. 25, 1863; exhaust'n and diarr.
132	*Johnson, E. F.*, Pt., I, 8th Georgia, age 18.	July 3, Au. 12, '63.	Left. Died Sept. 7, '63; exh'n *Spec.* 1947.
133	Kirke, S. H., Pt., K, 200th Pennsylvania, age 19.	April 2, May 22, 1865.	Left (bone carious); ant. post. flap. Surg. E. Bentley, U. S. V. Died May 29, '65; prostration. Autop.
134	Lafferty, J. C., Capt., C, 12th Illinois, age 21.	Oct. 5, Nov. 9, '64.	Left; circ. A. A. Surg. P. L. Rice. Died Nov. 25, '64; exhaustion.
135	Lamon, G. F., Lieut. Col., 32d New York.	Sept. 14, Nov. 9, '62.	Left (ule. fem. art.; hæm.); flap. Surg. L. W. Oakley. 2d N. J. Died Nov. 9, '62. *Spec* 792.
136	Lemar, J. C., Pt., B, 97th Illinois, age 21.	Jan. 11, My 25, '63.	Left. (Synovitis.) Died June 23, 1863; pyæmia.
137	Linn, H., Pt., A, 6th Pa. Reserves, age 25.	Sept. 17, 1862, Jan. 15, 1863.	Left (Dec. 4, amp. leg; gang.; nec.); flap. Surg. J. B. Lewis, U. S. V. Hæm. Feb. 4, '63, lig. fem. art.; March 5, bone rem'd. Died March 31, 1863. Autopsy. *Specs.* 3818, 3983, 748.
138	Long, J., Pt., B, 47th Indiana.	May 1, J'e 10, '63.	Right. Surg. G. Grant, U. S. V. Died Jan. 15, 1864. *Spec.* 1351.
139	Matthews, T., Pt., D, 8th Ohio, age 32.	May 6, June 10, 1864.	Right; circ. Surg. D. W. Bliss, U. S. V. Died June 12, '64; amp. *Spec.* 2499.
140	McBain, W., Serg't, E, 23d Illinois, age 31.	——. Sept. 24, 1864.	——. Gang.; hæm; flap. A. A. Surg. A. M. McLetchie. Gang. Died Sept. 25, 1864.
141	*McCann, R. H.*, Corp'l, G, 13th Miss., age 19.	May 3, J'e 7, '63.	Right. Surg. C. Witsell, C. S. A. Died July 2, '63; typ. fever.
142	*McCure, A.*, Pt., F, 3d Alabama, age 19.	Sept. 19, Oct. 31, 1864.	Right; oval flap. Surg. A. Atkinson, C. S. A. Died Oct. 31, 1864; pneumonia.
143	[4]McGowan, P., Pt., A, 61st New York, age 32.	May 31, J'y 15, '62.	Left (prof. discharges; erysip.); circ. Dr. W. Parker. Diarrh. and gastric irritability. Died in the course of twenty-four hours
144	*Meadows, J. W.*, Pt., C, 16th Tennessee, age 20.	No. 30, '64. Jan. 24, 1865.	Right; bi-lat. skin flap; circ. sect. mus. A. A. Surg. R. McNeilly. Died Jan. 31, '65; exhaustion.
145	[5]Meyer, S., Pt., H, 110th Pennsylvania, age 25.	July 2, Nov. 9, 1864.	Left (nec.; bone rem'd); ant. post. flap. A. A. Surg. W. P. Moon. Died Nov. 9, 1864.
146	*Meyres, D. C.*, Serg't, C, 7th Mississippi Battery, age 24.	No. 30, '64, Jan. 1, 1865.	Left; ant. post. flap. A. A. Surg. W. J. R. Holmes. Died Jan. 1, 1865; exhaustion; shock.
147	*Patton, S.*, Pt., G, 31st Georgia, age 42.	July 9, Aug. 10, 1864.	Left; circ. A. A. Surg. J. H. Coover. Died August 27, 1864; exhaustion. *Spec.* 3836.
148	Pitcher, A., Pt., G, 122d New York, age 25.	May 6, June 7, 1864.	Left; circ. Surg. D. W. Bliss, U. S. V. Died July 13, '64. *Spec.* 2449.
149	Poucher, A., Pt., A, 14th New York.	Aug. 29, Oct. 4, '62.	Left. A. S. J. B. Brinton, U. S. A. Died Oct. 21, 1862; pyæmia.
150	Roe, J., Pt., B, 42d N. York.	Sept. 17, Oct. 27, 1862.	Left. A. A. Surg. N. Webb. Oct. 29, hæm.; 30, rec'rd, lig. femoral art. Died Oct. 30, 1862; exh'n. *Spec.* 436.
151	Roth, J., Pt., K, 2d Wisconsin.	Au. 30, '62, ——.	Left. Died Oct. 19, 1862. *Spec.* 4014.
152	Roxbury, C. F., Pt., F, 124th Penn., age 29.	Sept. 17, 1862, Feb. 24, 1863.	Left (erysip.); flap of skin; circ. of mus. A. Surg. R. F. Weir, U. S. A. Erysip. Died March 11, '63; exh'n. *Specs.* 3855, 3903.

[1] Allen (H.), *Remarks on the Pathological Anatomy of Osteomyelitis, with Cases*, in *American Jour. Med. Sciences*, 1865, N. S., Vol. XLIX, p. 39.

[2] Waters (E. G.), *A Report of Twelve Gunshot Fractures of the Thigh*, in *Am. Med. Times*, 1863, Vol. VI, p. 185. Hamilton (F. H.), *Amputations in Gunshot Fractures of the Femur*, in *Am. Med. Times*, 1864, Vol. VIII, p. 1. *Circ.* 6, S. G. O., 1865, p. 50. *Circ.* 7, S. G. O., 1867, pp. 47, 65.

[3] Leavitt (T. L.), *Tenacity of Human Life as seen in Cases of Gunshot Injuries*, in *Medical and Surgical Reporter*, 1865, Vol. XIII, p. 205.

[4] Kennedy (J. T.), *Reports of Hospitals*, in *American Medical Times*, 1862, Vol. V, p. 105.

[5] Moon (W. P.), *Case of Gunshot Wound of the Thigh*, in *American Journal Medical Sciences*, N. S., 1868, Vol. LV, p. 62.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
153	Ryall, W. C., Corp'l, E, 121st Penn.	De.13,'62, Feb. 4, 1863.	Left (necrosis); circ. A. Surg. A. Hartsuff, U. S.A. Died Feb. 14, 1863; exh'n. *Spec.* 1053.
154	Scott, M. E., Pt., B, 17th Indiana, age 25.	April 2, J'e 23,'65.	Left (necrosis); circ. Surg. H. Wardner, U. S. V. Died July, 19, 1865; exhaustion.
155	Shindler, M., Pt., H, 43d New York, age 16.	May 5, June 19, 1864.	Left (gang.); ant. post. flap. Surg. E. Bentley, U. S.V. Slough'g; hæm. Died June 27,'64; hæm.
156	Skilton, G.T., Pt., I, 36th Wisconsin, age 31.	June 3, Aug. 30, 1864.	Right (gang.; hæm.; Aug. 8, amp. knee; gang.; hæm.); circ. A. A. Surg. N. F. Martin. Died Sept. 19, 1864; exhaustion.
157	Storey, J. M., Pt., H, 37th Wisconsin, age 30.	J'y30,'64, April 14, 1865.	Left. (July 31, amp. knee; hæm.; gang.) A. Surg. S. H. Orton, U. S. A. Died July 3,'65; gang.
158	Stratton, A., Pt., D, 110th Ohio, age 21.	May 5, June 24, 1864.	Left (nec.; pyæm.); ant. post. flap. A. A. Surg. J. Priestly. Died June 29, 1864; pyæm. Autopsy.
159	*Stuart, S. H.*, Pt., D, 2d Arkansas Cavalry.	Sept. 27, ——,'64.	Right. Died November 10, 1864.
160	*Sullins, W.*, Texan Legeon, age 20.	De.21,'62, Fe.18,'63.	Left. Died March 2, 1863; erysipelas.
161	Tufft, F. H., Pt., K, 3d Rhode Island Artillery.	June 16, July 23, 1862.	Left; circ. A. A. Surg. W. K. Cleveland. Died July 27, '62; exhaustion.
162	Thomas, J., Pt., K, 30th Indiana, age 26.	Sept. 19, Dec. 18, 1863.	Left. (Gang.) Teal's method. Dec. 31, rupture fem. art. Died Dec. 31, '63; hæm. *Spec.* 2172.
163	*Travicke, W. H.*, Pt., A, 8th Alabama, age 46.	July 2, Au.6,'63.	Left. Sloughing; Aug. 18, hæm.; gang. Died Sept. 4, 1863.
164	Warner, S. N., Pt., H, 83d Penn., age 21.	July 1, Au. 3,'63.	Left. Died August 14, 1863; diarrhœa.
165	Williams, L., Pt., C, 26th Michigan, age 23.	May 12, June 13, 1864.	Left. A. A. Surgeon A. Ansell. Hæm.; lig. fem. art. Died July 19, '64; hæm. Autopsy. *Specs.* 2882, 2883, 2538.
166	*Winters, L.*, Pt., K, 50th Georgia.	July 3, Sept. 11, 1863.	Right (July 3, amp. leg; slough.; hæm.); circ. A. Surg. B. Stone, U. S. V. Died Sept. 30, 1863; pyæmia.
167	Woolsey, A., Pt., H, 20th New York.	Aug. 30, Oct. 1,'62.	Left. Hæm.; lig. fem. art. Died Oct. 5, 1862; exhaustion.
168	Zody, A. E., Capt., D, 102d Ohio, age 28.	Se.24,'64, Jan. 26, 1865.	Left; (erysip.); flap. Surg. R. H. Gilbert, U. S. V. Diarr. Died Feb. 21, 1865; pyæmia.

The seat of fracture in the foregoing one hundred and sixty-eight cases was in the middle third of the femur in seven; in the lower third in twenty-three; in the femur, precise seat not indicated, in twelve; in the knee joint, in sixty-eight; in the bones of the leg, in forty-eight; and in the ankle joint or foot, in ten cases.

Secondary Amputations in the Lower Third of the Femur.—Two hundred and seven operations of this group were reported. One hundred and seven were successful and one hundred proved fatal, a fatality of 48.3 per cent.

Successful Cases of Secondary Amputation in the Lower Third of the Femur.—Fourteen of the one hundred and seven successful secondary operations were practised on Union and ninety-three on Confederate soldiers. Eighty-nine of the former were pensioned, but seven have died since the close of the War. The side of operation was not indicated in seven instances; in forty-four the right, and in fifty-six the left side was implicated. Major operations had preceded the amputation in the thigh in thirty-one cases, viz: amputation at the knee joint in four, in the leg in twenty; excision in the bones of the leg in six, and amputation of the opposite leg in one instance.[1]

In the following instance the amputation was performed by the subperiosteal flap, advocated by Assistant Surgeon George M. McGill, U. S. A.

Case 490.—J. H. Allison, a farrier of Co. I, 21st Pennsylvania Cavalry, aged 19 years, was wounded in the left thigh, at Amelia Court House, April 5, 1865. From a field hospital he passed to the Cavalry Corps Hospital at City Point, thence to Annapolis, and afterwards to Baltimore, where he entered Jarvis Hospital, and subsequently, on July 24th, Hicks Hospital. Assistant Surgeon G. M. McGill, U. S. A., in charge of the latter, reported the following history: "The wound was caused by a minié ball, which entered the inner aspect of the lower third of the thigh and made its exit posteriorly, having passed downward, outward, and backward behind the femur, and clipped a piece from the posterior surface of the bone. The femoral artery was cut by the bullet, and profuse primary hæmorrhage occurred on the field, followed by a secondary attack on May 19th, and two recurrences since. Each secondary hæmorrhage ceased spontaneously and did not amount to more than a teacupful. About

[1] The four cases in which the amputation in the thigh was preceded by exarticulation at the knee are: Pt. J. M. Brooks, A, 17th Pennsylvania Cavalry (Table XL, No. 14, page 320); Pt. H. Desmond, I, 28th Massachusetts (Table XL, No. 25, p. 320); Pt. C. H. Rist, A, 36th Wisconsin (Table XL, No. 82, p. 321); and Pt. H. Sholes, D, 26th New York (Table XL, No. 84, p. 321). Antecedent amputations in the leg had been performed in the following cases, enumerated in Table XL: Pt. D. M. Fletcher, 10th Indiana Battery (No. 36, p. 320); Pt. G. McIntire, I, 7th Maine (No. 61, p. 320); Pt. J. Morrin, G, 126th New York (No. 69, p. 321); Pt. J. B. Bronson, I, 14th Ohio (No. 13, p. 320); Lieut. M. A. Cobb, A, 23d Alabama (No. 20, p. 320); Pt. E. Crawford, F, 105th Ohio (No. 23, p. 320); Pt. H. S. Dickens, H, 126th New York (No. 26, p. 320); Pt. W. F. Dudley, F, 1st Maine Cavalry (No. 28, p. 320); Corp'l D. C. Eaton, H, 5th New Hampshire (No. 31, p. 320); Pt. H. Hadlow, H, 81st New York (No. 42, p. 320); Pt. F. Hoffman, H, 2d Pennsylvania Heavy Artillery (No. 47, p. 320); Pt. I. M. Welsh, B, 8th Maine (No. 101, p. 321); Pt. B. Thompson, C, 28th Pennsylvania (No. 93, p. 321); Pt. W. Bacon, I, 7th Maine (No. 4, p. 320); Corp'l A. Bisbee, B, 7th Maine (No. 9, p. 320); Corp'l J. Duran, C, 17th Maine (No. 29, p. 320); Pt. W. H. Miller, I, 72d Pennsylvania (No. 67, p. 321); Pt. L. N. Kimball, H, 22d Massachusetts (No. 53, p. 320); Pt. J. Kerrin, G, 19th Infantry (No. 52, p. 320); and Pt. H. Pust, K, 104th Illinois (No. 78, p. 321). Excision in the bones of the leg had been performed in the cases of: Pt. J. A. Angell, D, 1st Wisconsin Cavalry (No. 2, p. 320); Pt. W. H. Burdick, B, 82d Pennsylvania (No. 17, p. 320); Corp'l T. Odell, H, 5th Michigan (No. 73, p. 321); Pt. J. Fergus, A, 70th Indiana (No. 34, p. 320); Serg't J. Lowth, M, 4th Wisconsin Cavalry (No. 57, p. 320); and Pt. E. A. Bennett, F, 44th New York (No. 7, p. 320). In the case of Pt. H. Brown (No. 15, p. 320), K, 22d Colored Troops, the opposite leg had been previously removed.

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PLATE LXXII.—INVOLUCRA OF BONES OF THE LEG.

Fig 1. Private Oliver Payne,
D. 28 U.S. Colored Troops
Specimen 4740, A.M.M.

Fig. 2. Private W Miller
I. 72 Pennsylvania Vols.
Specimen 4172, A.M.M.

April 20th, the wound was attacked with gangrene. The knee joint at first, and at different periods since, became severely inflamed, and was opened eight times, discharging a serous purulent fluid on each occasion. The leg became bent at right angle with the thigh and firmly anchylosed, and several attempts were made to straighten the limb by means of anterior splints, which, however, gave the patient great pain, and were followed on each occasion by erysipelas. One attack of this disease supervened about December 13th, leaving the limb in a flabby and œdematous condition, and with several indolent ulcers, which obstinately refused to heal and were a source of great anxiety and annoyance to the patient. On February 16, 1866, the limb being found in a sloughing condition and the patient seeming to sink gradually, being very nervous, sallow, and anæmic, and his pulse very weak, quick, and irritable, Acting Assistant Surgeon H. McElderry amputated the leg by my direction. The operation was performed in the lower third of the femur through the diaphysis, by forming an ample anterior flap and a short and somewhat thick posterior one, and raising a very long and wide periosteum flap. The periosteum flap was raised with the greatest ease, and, after the operation was completed, was folded over every part of the cut surface of the bone. Great prostration followed the operation, from which the patient reacted rather slowly. He was kept under the influence of morphia the first several days. The bandages were removed and the stump dressed for the first time on the third day. Fever and attacks of vomiting appeared on February 19th, but after the next day the patient improved steadily and speedily. The last ligatures came away on February 24th. During the progress of his cure his blood presented the remarkable phenomenon of a change of the white corpuscles into red. At his own request the patient was discharged from service March 20, 1866, at which time he was able to sit in a chair all day, the stump being perfectly well with the exception of a surface granulation in the cicatrix. The end of the bone in this case was beautifully rounded." Dr. McGill[1] further reported that an examination of the amputated limb fully corroborated the previous diagnosis of extensive fatty degeneration, and contributed two specimens of the case, one of which, embracing the amputated femur and upper portion of tibia, is shown in the cut (FIG. 205). The other specimen consists of a ligamentous preparation of the tarsus and metatarsus and lower portion of the bones of the leg, and shows anchylosis of the ankle joint as well as a transverse fracture in the astragalus, believed to have been inflicted after the operation. (*Cat. Surg. Sect.*, 1866, p. 440, *Spec.* 483.) A cast of the stump, made four weeks after the amputation, was also contributed by the same donor, and constitutes Specimen 403 of the Surgical Section (FIG. 204). The patient, after being discharged, was admitted on the Pension Rolls, and furnished with an artificial limb two years afterwards. The Muscatine, Iowa, Examining Board, on June 4, 1873, reported that "on account of contraction of the anterior muscles of the thigh, preventing the limb from being carried backward, he is unable to wear an artificial leg." This pensioner was paid June 4, 1879.

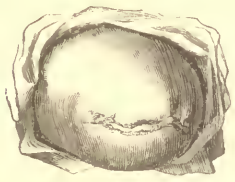

FIG. 204.—Appearance of stump of left thigh four weeks after operation. *Spec.* 403.

FIG. 205.—Upper portion of left tibia and fibula and lower portion of femur. *Spec.* 477.

Necrosis of the tibia and fibula following amputation in the lower third of the leg, and unhealthy condition of the soft parts of the stump, rendered secondary amputation in the lower third of the thigh unavoidable in the following instance:

CASE 491.—Private W. H. Miller, Co. I, 72d Pennsylvania, aged 21 years, received a shot fracture of the tarsal and metatarsal bones of the left foot, at Antietam, September 17, 1862. Assistant Surgeon J. J. Woodward, U. S. A., recorded his admission, six days after the injury, to the Patent Office Hospital, Washington, where the injured limb was amputated on September 28th, by Acting Assistant Surgeon P. Middleton, the operation being performed by the circular method at the lower third of the leg. Several months afterwards the patient was transferred to Armory Square Hospital, and subsequently he passed through several hospitals in Philadelphia, entering Christian Street on March 21, 1864. Acting Assistant Surgeon R. J. Levis, in charge of the latter, reported that he found the patient's general health feeble, both bones of the stump necrosed in nearly their whole length, and the soft parts in a very unhealthy condition, necessitating a re-amputation at the lower third of the thigh, which he performed by the antero-posterior flap method on April 28, 1864. He also reported that the patient reacted promptly, and that his general health improved greatly after the second amputation, and that the stump healed readily. On September 3, 1864, the patient was discharged from service and became a pensioner. He was paid as such March 4, 1879. The amputated bones of the foot and the soft tissues, as well as the bones removed at the second operation, were contributed to the Museum by the respective operators (*Cat. Surg. Sect.*, 1866, pp. 440, 503, and 402, *Specs.* 97, 2748, and 4172). The last of these specimens is represented in FIG. 2 of PLATE LXXII, opposite, showing the dead shafts of the tibia and fibula surrounded by a quite complete involucrum, which, in size, approaches hypertrophy. The extremity of the fibula is roughened, but softened as if carious. The tibia approaches roundness, but its extremity is incomplete, exhibiting the end of the sequestrum.

[1] The late Dr. G. M. McGILL in a letter to the Surgeon General, U. S. A., dated April 12, 1866, says: "When a bone is cut in amputations, two conditions, I believe, must result from the action of its distal living bone tissues. First, metamorphosis into such transitional forms as will connect with ordinary fibrous tissue. Second, change of medullary tissue into such transitional tissue and into bone proper. If, then, we adapt living transitional tissue we substitute the mere action of union the cohesion of homologous formed material, the easiest in nature apparently, for the action of change that reproduces bone out of medullary tissue and forms a connective tissue, certainly by means of the germinal matter that lives in fully formed bone, and that has already performed the work of development and growth. Again, it might be reasoned, *a priori*, that in changes one and two, made, of course, feebly by substance of exhausted (?) formative energy, the least injury of the general health and the most trifling local injury are calculated to kill or set the germinal matter free (in the form of pus), and so throw the labor of formation, and, it may be, an added one of separation, upon more proximal forms. Thus we have sequestra, thus often osteomyelitis and pyæmia. With periosteum over the cut end of a bone, we have a tissue there whose office is to form, to connect, and to resist. So promising have the results of amputations with a periosteal flap been in my hands, that I am constrained, most respectfully, to call your attention again to the subject." The case of Allison and the preceding extract from Dr. MCGILL'S letter have been noted in *Circular* No. 3, S. G. O., War Department, Washington, 1871, p. 280, CASE 4.

Amputation at the knee joint had preceded amputation of the thigh in the next case:

CASE 492.—Private Cutler H. Rist, Co. A, 36th Wisconsin, aged 18 years, was wounded at Cold Harbor, June 1, 1864, by a conoidal ball, which entered on the inner and posterior portion of the left leg and caused a fracture of the tibia, which extended into the knee joint. He was immediately conveyed to the field hospital of the 2d division, Second Corps, where amputation at the knee joint was performed by Surgeon J. M. Burr, 42d New York. On June 11th, he was admitted into Lincoln Hospital, Washington, where Acting Assistant Surgeon C. H. Bowen reported: "Date of operation, June 3d; amputation at knee joint, leaving patella and condyles of femur." Dr. Bowen adds: "Having seen several of these operations performed, they have all died in periods varying from six to twenty days, from pyæmia, tetanus, etc., I totally discard the operation: 1st, from the extensive suppuration from the condyles of the femur and from the patella, from the duration of the suppuration, which will continue until the entire cartilaginous substance from condyles and patella is either cut away or has sloughed off by the work of nature, after which comes the continuous discharge of the synovial fluid from the wound. In the case of Rist, in which the limb was amputated on June 3, 1864, the synovia still exudes, in December, 1864, in quantities varying from a teaspoonful to a tablespoonful, and, more especially, after the least exertion, such as walking by means of crutches; besides, the cicatrix is of a sloughing character, tending to gangrene. December 14th, amputation not healed; continuous discharge of synovial fluid, more especially when walking; tendency to slough; patient otherwise in a healthy condition, and desires a re-amputation, and, in my opinion, the stump will never heal while remaining in its present condition." On December 15, 1864, Assistant Surgeon J. C. McKee, U. S. A., amputated the thigh at the lower third; skin flap and circular section of muscles. Simple dressings were applied. The patient recovered rapidly. He was transferred to Harvey Hospital, Madison, Wisconsin, on March 23d, and discharged from service May 20, 1865. His pension was paid March 4, 1879. Dr. McKee contributed a photograph of the patient (*Contributed Photographs*, Vol. II, p. 25), which is reproduced in the wood-cut (FIG. 206), and the pathological specimen, which consists of "the extremity of the left femur and the soft tissues forming the stump, after amputation through the knee joint." (*Catalogue of Surgical Section*, A. M. M., 1866, p. 502, *Spec.* 3514.)

FIG. 206.—Appearance of stump after amputation in lower third of thigh.

Primary amputation of the right leg at the upper third and secondary ablation at the lower third of the left thigh were performed in the next case. The patient survived the operations eight years:

CASE 493.—Private H. Brown, Co. K, 22d Colored Troops, aged 19 years, was wounded in both legs, at Petersburg, July 30, 1864. He was admitted to the Eighteenth Corps Field Hospital, where Surgeon S. A. Richardson, 13th New Hampshire, recorded "amputation of right leg." Surgeon J. H. Taylor, U. S. V., reported the following history: "The patient was admitted to Summit House Hospital, Philadelphia, August 17th, with shell wound of both legs, the right leg having been amputated at the upper third by flap method on the field. The stump of the right leg healed entirely, but the wound of the left tibia, which was injured in the upper third, resulted in necrosis of the bone extending into the knee joint, and was attended by extensive sloughing of the soft parts. The left limb was amputated on March 19, 1865, above the knee joint, by Acting Assistant Surgeon O. Shittler, the double flap method being employed and chloroform used. The treatment consisted of simple dressings, tonics, and stimulants. The stump healed kindly and the patient progressed well." Several months after the operation he was supplied with artificial limbs by the Palmer Arm and Leg Company. At the closing of Summit House Hospital the patient was transferred to Mower Hospital, and subsequently to the Post Hospital at Philadelphia. On September 11, 1866, he left for his home, cured, having been discharged from service to date from March 20, 1865. His name appeared on the Pension Rolls until July 14, 1872, when he died. The cause of his death has not been ascertained.

Fatal Secondary Amputations in the Lower Third of the Thigh.—One hundred secondary operations in the lower third of the femur proved fatal. Twenty-four were practised on Confederate and seventy-six on Union soldiers. In three the injuries had been caused by shell, in two by grapeshot, and in ninety-five by small projectiles. Pyæmia was noted in twelve, tetanus in one, and gangrene in twenty-one instances:

CASE 494.—Private *W. H. Powell*, Co. I, 3d South Carolina, aged 20 years, was wounded at Antietam, September 17, 1862, and entered hospital No. 5, Frederick, November 25th. Surgeon H. S. Hewit, U. S. V., recorded the following history: "The patient had been wounded by a grapeshot in the right leg and through the ankle joint, for which amputation had been performed at the middle third of the leg. The stump was doing badly, having commenced sloughing on the outer side. There was also much swelling. The granulations on the inner side of the stump were very exuberant. Pain in the knee joint indicated cartilaginous inflammation. Reamputation was deemed necessary, and was performed by Acting Assistant Surgeon A. V. Cherbonnier, above the knee, on November 30th. At the operation, the track of an old abscess was discovered, extending some distance up the thigh. Two days afterwards the stump showed some fungous granulations and the dressing was supplemented with a weak solution of nitric acid, with which the sinus was also injected. This treatment was kept up until December 10th, when

the stump had assumed a healthy appearance, but a large quantity of laudable pus was being discharged from the sinus. The injection was then increased and a tight bandage applied, and the dressing of the stump was changed to a solution of tannin. On the 20th, the stump was still doing well, and the sinus seemed to have closed, pus having ceased to come from it. On the 24th, the stump grew painful and the discharge ceased. Poultices were now applied and tincture of iodine used to the hip. Iodide of potassa was also prescribed in doses of five grains three times a day, and the same quantity of quinine, and one half ounce of cod-liver oil every four hours. On the 26th, the patient's condition had improved. The discharge of pus having become offensive, the stump was washed with a dilution of chlorinate of soda, the poultice discontinued, and wet strips applied." The patient was transferred to hospital No. 6 on December 29th, and to hospital No. 1 six weeks later. Assistant Surgeon R. F. Weir, U. S. A., in charge of the latter, recorded the termination of the case as follows: "At the time of admission the stump looked healthy and was suppurating, and the patient was in tolerable good health, but had quite a large bedsore above the sacrum, which was healing. He was taking tonics and stimulants, also iron mixture and cod-liver oil, and the stump was dressed with oakum saturated with acid wash. On February 29th, fluctuation was detected in the stump, and an opening was made on the anterior aspect one inch long, through which pus escaped. On March 17th, the patient complained of pain in the stump and more pus was discovered by the probe, necessitating another incision, one and one half inches long, to be made to allow it to escape, after which poultices were applied. Two days afterwards an abscess was discovered on the anterior aspect of the stump and just opposite the point of the previous incision, which on being opened evacuated two ounces of pus. For some days after this the patient was much better and the stump was improving slowly. One month later, however, he was noticed to be failing, and looking very pale and anæmic. Erysipelas was discovered in the stump on April 24th, for which lead and opium lotion was applied. At the same time the patient was suffering from considerable irritability of the stomach, being unable to retain any food or medicine for any length of time. Hydrocyanic acid having been administered for this without any good effect, lime water was given, which appeared to relieve the patient to some extent. On the following day the erysipelas was found to be extending to the opposite side and body, and, on April 28th, it was leaving the stump and was spreading still farther upon the body, the patient's condition being quite feeble, having no appetite, his tongue coated, skin dry, and pulse weak. During the two following days he was in a critical condition and unable to retain anything on his stomach, nourishment being given by the rectum. Hydrocyanic acid and lime water were now used without benefit, and tincture of opium was substituted with apparent relief. On the morning of May 1st, the patient appeared brighter, having rested well and being able to retain his nourishment. The erysipelatous inflammation had left the stump, but had extended across the body and was spreading down the other thigh. In addition to his treatment egg-mixture and tincture of iron was now prescribed for the patient. He failed rapidly on the next day, and died on the morning of May 3, 1863. At the *post-mortem* examination four ounces of purulent serum was discovered in each side of the chest, and the lungs were found to be partly congested, with small calcareous deposits in the upper lobe of the right side. The heart was of normal size, the cavity of the stomach very much congested, the liver having the appearance of fatty degeneration, the gall bladder very much distended, and the kidneys moderately congested. The tissues about the stump were healthy, but on opening the capsular ligament about two ounces of pus was found around the hip joint. The cartilage lining the acetabulum was softened, and in some places entirely gone. On dissecting out the nerves the bulbous expansions of their ends were shown to be well marked. Above the saphenous a wire ligature was found, which seemed to have given rise to little or no irritation. The patient had frequently complained of pain in the stump, but it is impossible to say whether it was caused by this ligature or by the abscesses that were forming from time to time. The end of the stump of the femur was found to be surrounded by an involucrum, exposing a small sequestrum running up the shaft." The amputated stumps of the tibia and fibula were forwarded to the Museum by the operator, and the stump of the femur was contributed by Acting Assistant Surgeon A. North.—(*Cat. Surg. Sect.*, 1866, p. 400, *Spec.* 795, and p. 300, *Spec.* 3837.)

In the following instance Syme's amputation at the ankle joint had been performed on the day of the injury, but continuous sloughing and abscesses followed, and amputation at the upper third of the leg and subsequently at the lower third of the femur were practised:

CASE 495.—Private F. M. Bland, Co. D, 23d Iowa, received a shot wound in the left foot, during the engagement at the Black River, May 19, 1863. "Syme's amputation at the ankle was performed the same evening at a field hospital. On June 13th, the patient was admitted into Adams Hospital, at Memphis, at which time nearly the entire flaps had sloughed off the stump and the bones were exposed to view. An abscess had also formed at about the middle of the lower third of the leg, and periostitis of the tibia and fibula existed at the same point. The general condition of the patient was low; he having suffered from diarrhœa for four months. He was put upon iron, quinine, stimulants, and astringents. On June 17th, his general condition being somewhat improved and the diarrhœa checked, it was decided to amputate, which was accordingly done at the junction of the upper and middle thirds of the leg by Acting Assistant Surgeon J. Thompson. I saw the patient for the first time on the following day, when, though in a low condition, he seemed to be rallying from the shock of the operation. I administered iron, quinine, stimulants, and beef tea, and had water dressings applied to the stump, under which course the general condition of the patient gradually improved. The stump at first appeared to do well, but before many days began to discharge thin ichorous looking pus. This was the condition of the patient when his ward was transferred to the charge of Acting Assistant Surgeon W. P. Sweetland. On June 26th, the wound gaped open, no adhesions having formed in any part of the stump, and the flaps soon commenced sloughing. It was then decided that the only chance for the patient rested in another operation, and accordingly, on July 2d, the thigh was amputated at the middle of the lower third. The patient seemed to bear up well under the operation, and, as before, seemed at first to be doing well. But soon the stump became gangrenous; an abscess also formed on the patient's shoulder below the clavicle, the edges of which sloughed, laying bare the thyroid axis and destroying its branches. On July 13th, the patient was removed to my ward in a rapidly sinking condition. He died on July 16, 1863." The foregoing history was transmitted by Acting Assistant Surgeon B. J. Bristol, and the bones removed at the second amputation were contributed to the Museum by Surgeon J. G. Keenon, U. S. V. (*Cat. Surg. Sect.*, 1866, p. 441, *Spec.* 1706.) The specimen shows the extremities to be necrosed, no reparative action having occurred.

TABLE XL.

Summary of Two Hundred and Seven Cases of Secondary Amputation in the Lower Third of the Femur for Shot Fracture.

[Recoveries, 1—107; Deaths, 108—207.]

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1	Allison, J., Farrier, I, 21st Pennsylvania Cavalry, age 19.	Ap. 5, '65, Feb. 16, 1866.	Left (hæm's; erysip.); ant. post. flap. A. A. Surg. H. McEldery, Disch'd March 20, 1866. *Specs.* 477, 403, 483.
2	Angell, J. A., Pt., D, 1st Wisconsin Cav., age 23.	July 23, Sept. 18, 1864.	Right (gang.; Aug. 1, '64, excis. tibia; hæm.); circ. A. A. Surg. J. C. Thorpe. June 16, '65, re-amp. Recovery. *Spec.* 5549.
3	Arendt, J., Pt., E, 5th Kentucky.	Jan. 1, Mar. 1, '63.	Left; flap. A. Surg. J. W. Pearce, 51st Ind. Disch'd Nov. 17, '63.
4	Bacon, W., Pt., I, 7th Maine, age 21.	J'y 12, '64, ——, '66.	Left (amp. leg; nec.; disch'd June 16, '65); flap. 1870, good stump. *Spec.* 2841.
5	Bass, J. B., Pt., K, 59th Illinois.	M'h 7, '62, Jan. 16, 1863.	Left (disch'd Sept. 20, '62); circ. Dr. S. Cabbot, Mass. Hospital. Necrosed bone removed.
6	Bassett, J. F., Pt., I, 114th New York, age 22.	Oct. 19, Nov. 29, 1864.	Left; ant. post. flap. A. A. Surg. A. W. Emory. Disch'd April 10, 1865. *Spec.* 3476.
7	Bennett, E. A., Pt., F, 44th New York, age 41.	May 22, 1864, Mar. 2, '69.	Left. (M. O. Oct. 11, '64; Dec. '64, nec. bone rem'd; Jan., '69, exc. up. frag. fibula.) Dr. T. Becket, Albany. Re-amputation.
8	Biddle, D., Corp'l, A, 107th Ohio, age 23.	July 1, Au. 13, '63.	Left; circ.; gang.; exfol. Disch'd June 24, 1864.
9	Bisbee, A., Corp'l, B, 7th Maine, age 25.	Ap. 16, '62, Ap. 8, '63.	Right (May 12, 1862, amp. leg; disch'd Feb. 10, 1863); circular.
10	Bishoff, D. D., Pt., B, 14th West Va., age 25.	May 9, '64, Mar. 13, 1865.	Left (nec.); circ. A. A. Surg. J. H. Butler. Disch'd May 20, '65.
11	Blakeley, J. W., Pt., F, 11th Massachusetts.	J'y 21, '61, No. —, '62.	Right (disch'd Sept. 29, '62); flap. Died Jan. 30, 1870; phthisis.
12	Boyd, H., Pt., D, 51st Colored Troops, age 42.	May 25, Je. 25, '65.	Left; lat. flap. A. A. Surg. R. H. Blandry. Recovered.
13	Bronson, J. B., Pt., I, 14th Ohio, age 18.	Aug. 5, ——, '64.	Right. (Pr. amp. leg.) Disch'd June 21, 1865.
14	Brooks, J. M., Pt., A, 17th Penn. Cav., age 28.	June 21, Sept. 10, 1863.	Left (June 21, amp. knee joint; gang.); ant. post. flap. Disch'd July 28, 1865.
15	Brown, H., Pt., K, 22d Colored Troops, age 19.	July 30, 1864, Mar. 19, 1865.	Left (July 30, amp. right leg); dou. flap. A. A. Surg. O. Shittler. Disch'd March 20, 1865. Died July 14, 1872.
16	Brown, W. C., Pt., K, 93d Ohio, age 23.	Se. 20, '63, April 12, 1864.	Left (erysip.); ant. post. flap. A. Surg. B. E. Fryer, U. S. A. Disc'd Oct. 7, 1864. *Spec.* 117.
17	Burdick, W. H., Pt., B, 82d Penn., age 24.	Ap. 6, '65, Mar. 27, 1866.	Right (exc. tibia; disch'd Oct. 12, 1865); flap. Dr. B. E. Phelps, Corry, Pa. 1870, stump healthy.
18	Chase, H. W., Pt., H, 96th New York, age 21.	Sept. 29, De. 1, '64.	Left; flap. A. A. Surg. E. Vogel. Disch'd April 14, 1865.
19	Clapp, F., Pt., K, 2d Mass. Cavalry, age 21.	J'y 13, '63, Mh 18, '64.	——; circular. A. A. Surg. J. F. Thompson. Disch'd Sept. 13, '64.
20	*Cobb, M.*, Lieut., A, 23d Alabama, age 39.	De. 15, '64, Jan. 19, 1865.	Right (Dec. 17, amp. leg; gang.); bi-lat. skin flap; circ. sect. musc. A. A. Surg. W. I. R. Holmes. Provost Marshal June 3, 1865.
21	*Comer, C.*, Serg't, F, 13th Virginia Cavalry.	June 19, Oc. 20, '63.	Right. Surg. I. P. Smith, C. S. A. Recovery.
22	Costello, P., Pt., E, 88th Illinois, age 26.	No. 25, '63, July 18, 1864.	Right; circ. Surg. G. Grant, U. S. V. Gang. Disch'd June 17, 1865. *Spec.* 3006.
23	Crawford, E., Pt., F, 105th Ohio, age 20.	Sept. 19, 1863, Aug. 5, 1864.	Right (Oct. 4, '63, amp. leg); circ. A. Surg. G. M. Sternberg, U. S. A. Hæm's; lig. prof. art. Disch'd March 18, 1865. *Spec.* 3108.
24	Derry, J. M., Pt., B, 126th Ohio, age 23.	Sept. 21, Oct. 30, 1864.	Right; nec.; sect. skin flap. A. A. Surg. B. B. Miles. Disch'd June 28, 1865. *Spec.* 3417.
25	Desmond, H., Pt., I, 28th Massachusetts, age 29.	De. 13, '62, ——, '63.	Right (Dec. 21, '62, amp. knee j't); post. flap. Disch'd Dec. 22, '63.
26	Dickens, H. S., Pt., H, 126th N. Y., age 30.	J'y 2, '63, April 24, 1864.	Left (July 11, amp. leg); ant. post. flap. A. A. Surg. R. J. Lewis. Disch'd April 28, '65. *Spec.* 2740.
27	[1] Doerflinger, C. H., Lt., B, 26th Wis., age 20.	May 2, Je. 27, '63.	Left; circ. Surg. J. A. Lidell, U. S. V. Disch'd Feb. 25, 1864.
28	Dudley, W. F., Pt., F, 1st Maine Cav., age 24.	Mar. 1, June 14, 1864.	Left (March 2, amp. leg; gang.); circular. A. Surg. W. Webster, U. S. A. Disch'd Aug. 14, 1865.
29	Duran, J., Corp'l, C, 17th Maine, age 23.	M'y 6, '64, May 18, 1865.	Left (gang.; Aug. 28, amp. leg); circ. Surg. G. Derby, U. S. V. Disch'd August 7, 1865.
30	Eastman, J., Pt., E, 1st Wisconsin.	Sept. 19, Dec. 25, 1863.	Right (gang.); circ. A. A. Surg. W. E. Whitehead. Disch'd Nov. 29, 1864. Died April 10, 1870. *Spec.* 2035.
31	Eaton, D. C., Corp'l, H, 5th New Hamp., age 30.	Sept. 17, De. 29, '62.	Left. (Sept. 17, amp. leg.) Disc'd March 13, '63. Died July 1, '63.
32	*Elliott, T. A.*, Corp'l, Shumaker's Battery.	Jan. 4, Fe. 18, '62.	——. Surg. H. McGuire, C. S. A. Recovered.
33	Eustis, J. B., Pt., E, 149th New York, age 23.	Oc. 28, '63, Jan. 21, 1864.	Left (hæm.); circ. Surg. W. Varian, U. S. V. Disch'd April 3, 1864. *Spec.* 2097. Died Feb. 18, 1875; consumption.
34	Fergus, J., Pt., A, 70th Indiana, age 34.	May 14, Aug 15, 1864.	Left (June 24, exc. fib.; gang.; tib. art. sloughed; hæm.); circular. Surgeon R. L. Stanford, U. S. V. Disch'd Jan. 20, 1865.
35	Fisher, A., Pt., C, 7th N. Y. H'vy Art'y, age 26.	June 17, Oc. 19, '64.	Left; circ. Surg. J. W. Merriam, U. S. V. Disch'd June 24, 1865.
36	Fletcher, D. M., Pt., 10th Ind. Battery, age 25.	Oc. 27, '64, ———	Right (Oct. 28, amp. leg); flap. Mustered out July 10, 1865.
37	Fulwiler, L. B., Pt., A, 20th Indiana.	June 25, J'y 26, '62.	Left; flap. A. Surg. P. Goddard, U. S. V. Disch'd Aug. 22, 1862.
38	Garlick, J., Pt., I, 26th Pennsylvania, age 21.	May 3, J'y 11, '63.	Right; flap. Disch'd June 27, 1864.
39	Glavin, D., Pt., E, 87th New York.	June 1, July 2, 1862.	Left (frag. of bone rem'd); double flap. A. Surg. W. Thomson, U. S. A. Disch'd Feb. 28, 1863. *Spec.* 4931.
40	Graham, R. P., Pt., H, 7th Illinois, age 23.	Oct. 5, Nov. 9, 1864.	Right; circ. A. A. Surg. D. C. Bell. Hæm.; lig. fem. artery. Disch'd May 22, 1865.
41	Grant, W., Pt., G, 9th N. York Artillery, age 36.	Oct. 19, No. 26, '64.	Right; ant. post. flap. A. A. Surg. C. H. Jones. Disch'd Feb. 2, '65.
42	Hadlow, H., Pt., H, 81st New York, age 21.	May 31, Aug. 1, 1862.	Right (prim. amp. leg; July 24, gang.); circ. Aug. 15, re-amp. mid. third. Necrosed. Disch'd May 2, 1863.
43	Hagadone, A., Serg't, M, 2d New York Heavy Artillery, age 29.	Aug. 25, Nov. 21, 1864.	Right (gang.; nec.); flap. A. A. Surg. W. H. Ensign. Disch'd July 12, 1865. *Spec.* 3436.
44	Ham, W., Pt., G, 42d Indiana, age 20.	Sept. 20, De. 6, '63.	Left; circ. A. Surg. N. Teal, 88th Indiana. Disch'd Sept. 30, 1864.
45	Hanley, M., Pt., A, 18th Connecticut, age 19.	June 13, Dec. 23, 1863.	Left; circ. A. A. Surg. C. H. Jones. Disch'd June 15, 1864. Died March 2, 1866. *Spec.* 1993.
46	Hill, G. N., Corp'l, A, 5th Colored Troops, age 21.	Sept. 29, De. 29, '64.	Left; lateral flap. Recovery.
47	Hoffman, F., Pt., H, 2d Penn. Heavy Artillery, age 21.	June 18, Dec. 6, '64	Left (July 11, amp. leg); flap. A. A. Surg. J. S. Waggoner. Disch'd August 15, 1865. *Spec.* 3714.
48	Hogg, W., Pt., I, 76th New York, age 34.	May 5, J'ne 7, '64.	Right; ant. post. flap. Surg. E. Donnelly, 2d Penn. Reserves. Disch'd May 6, 1865.
49	Hubbard, A., Pt., D, 6th New York Cav., age 31.	July 22, 1864, Jan. 1, '65.	Left (inter. amp. leg; ext. nec.); circ. A. Surg. S. H. Orton, U. S. A. Disch'd Nov. 7, 1865. *Spec.* 278.
50	Inman, A. W., Pt., B, 124th Ohio, age 30.	May 27, J'y 5, '64.	Left; circular. Disch'd June 15, 1865.
51	*Jinnett, J.*, Pt., D, 67th North Carolina.	De. 29, '63, J'e 22, '64.	——. Surg. — Turner, C. S. A. Recovery.
52	Kerrin, J., Pt., G, 19th Infantry, age 27.	Aug. 13, ——, —, 1864.	Right (Aug. 13, amp. leg; gang.); flap. A. Surg. T. A. McGraw, U. S. V. Bone rem'd. Disch'd June 4, 1865.
53	Kimball, L. N., Pt., H, 22d Mass., age 19.	May 10, 1864, Jan. —, 1867.	Right. (May 10, '64, amp. leg; hæm.; lig. Disch'd Oct. 17, '64.) Dr. W. H. Thorndike, Boston, Mass. Recovery.
54	Kirk, W. H., Capt., D, 3d N. C. M't'd Infantry.	De. 29, '64, Feb. 4, '65.	Right; circular. Resigned May 15, 1865.
55	Klammer, A., Pt., E, 5th Minnesota, age 26.	De. 16, '64, Feb. 10, 1865.	Right (nec. fragm'ts rem'd); circ. A. A. Surg. H. M. Lilly. Disch'd June 1, 1865. *Spec.* 4245.
56	*Love, J. W.*, Pt., D, 25th Georgia, age 24.	De. 7, '64, Au. 31, '65.	Left; oval flap. A. A. Surg. G. E. Sloat. Disch'd Jan. 14, 1866.
57	Lowth, J., Serg't, M, 4th Wisconsin Cavalry, age 26.	Aug. 24, 1864, June 2, 1865.	Right (gang.; May 27, '65, exc. fib.; lig. post. tib. art'y); at condyles. Surg. H. Culbertson, U. S. V. Disch'd July 17, 1865.
58	Mason, D., Corp'l, G, 104th Illinois, age 23.	May 14, July 6, 1864.	Right; circ. A. Surg. C. W. Lawrence, 22d Mich. Disch'd Jan. 6, 1865.
59	McClelland, W. H., Pt., A, 12th Ohio Cavalry.	De 18, '64, Feb. 7, '65.	Right; circ. Confed. surgeon. Disch'd Sept. 11, 1865.
60	McCue, A., Pt., G, 21st Massachusetts.	Sep. 1, '62, Feb. 27, 1864.	Left (disch'd June 23, '63); circ. Dr. B. S. Shaw, Mass. Hospital. Recovery.
61	McIntire, G., Pt., I, 7th Maine, age 24.	May 10, Oct. 16, 1864.	R't (May 11, amp. leg); ant. post. flap. A. A. Surg. G. E. Brickett. Hæm. Disch'd June 16, 1865.

[1] LIDELL (J. A.), *On the Major Amputations for Injuries in both Civil and Military Practice.* in *Am. Jour. Med. Sci.*, N. S., 1864, Vol. XLVII, p. 368.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
62	McLeppy, J., Corp'l, C, 20th Indiana, age 31.	June 28, Dec. 6,'62.	Right; circ. A. A. Surg. J. E. Steel. Disch'd June 8, 1863. *Specs.* 1836, 4760.
63	McLin, V., Pt., H, 7th Wisconsin, age 20.	July 3, Aug. 3, 1863.	Right; ant. post. flap. Surg. C. W. Jones, U. S. V. (August 6, hæm.; lig. fem. artery; disch'd Sept. 6, '64.) *Specs.* 1697, 2154.
64	McMahon, A., Pt., G, 9th New York S. Militia.	Sept. 17, Oc.22,'62.	Left. Surg. J. B. Lewis, U. S. V. Disch'd Jan. 9, '63. *Spec.* 449.
65	*McMurray, J. T.*, Serg't, D, 9th Alabama, age 24.	July 2, Au. 3, '63.	Right; circ.; end of fem. rem'd. Exchanged March 3, 1864.
66	Miller, J. M., Pt., D, 6th Michigan Artillery.	May 27, J'y 18,'63.	Left; flap. A. A. Surg. R. Koeler. Disch'd Sept. 22, 1863.
67	Miller, W. H., Pt., I, 72d Pennsylvania, age 24.	Sept. 17, 1862, April 28, 1864.	Left (Sept. 28,'62, amp. leg; nec.); ant. post. flap. A. A. Surg. R. J. Levis. Disch'd Sept. 3, 1864. *Specs.* 97, 2748, 4172.
68	*Montano, J. R.*, Surgeon from Mexico.	April 6, 1862,	Left. (Ulceration.) Langenbeck's method. Dr. Sutherland, S. C. Recovery. *Spec.* 90.
69	Morrin, J., Pt., G, 126th New York, age 21.	July 3, Nov. 3, 1863.	Left (July 4, amp. leg; gang.; hæm.); ant. post. flap. A. Surg. T. C. Brainerd, U. S. A. Seq. and fragments rem'd. Disch'd June 18, 1865. *Specs.* 2604, 1416.
70	Newman, E. B., Serg't, F, 48th New York, age 23.	Feb. 20, 1864, June 18, 1868.	Left (disch'd June 19, 1865, limb distorted; knee j't anchy.); flap. Dr. S. Shove, Katonah, N. Y. Recovery.
71	Nichols, L., Pt., F, 157th New York, age 18.	July 1, Aug. 14, 1863.	Right; hæm. A. A. Surg. C. H. Jones. Disch'd May 31, 1864. *Spec.* 1670.
72	O'Boyle, M., Pt., E, 156th New York, age 17.	Oc.19,'64, Jan. 13, 1865.	Left; ant. post. flap; skin, circ. sect. muscles. A. A. Surg. B. B. Miles. M. O. 1865. *Spec.* 3728.
73	Odell, T., Corp'l, H, 5th Michigan, age 20.	J'e 18,'64, Jan. 13, 1865.	Left (slough.; excis. tibia); flap. A. A. Surg. G. C. Harlan. Discharged May 22, 1865.
74	*Perryman, J. L.*, Pt., D, 20th Georgia.	Sept. 19, Oc.30,'63.	Left. Surgeon A. M. Spalding. C. S. A. Recovery.
75	Potter, H. G., Serg't, A, 74th Indiana, age 20.	Se. 20,'64, May 13, 1865.	Right. (Synovia; nec.) A. A. Surg. J. W. Taylor. Re-amp. mid. third. Disch'd June 20,'65.
76	Potts, N. H., Serg't, B, 95th Penn., age 22.	May 3, J'ne 5,'63.	Left (hæm. recur'nt); circ. Surg. R. S. Kenderdine, U. S. V. Discharged August 24, 1864.
77	Powell, S. H., Corp'l, C, 14th New Jersey, age 24.	J'ly 9,'64, Sept. 15, 1864.	Right (gang.; nec.); ant. post. flap. Surg. T. Sim, U. S. V. Disch'd Jan. 3, 1865. *Spec.* 3468.
78	Pust, H., Pt., K, 104th Illinois, age 25.	De. 7,'62, Oct. 24, 1863.	Left (Dec. 11, amp. leg); conical. A. A. Surg. R. N. Isham. Discharged March 4, 1864.
79	*Reid, W. F.*, Pt., A, 1st N. C. Battery.	May 25, Se. 15,'62.	——. Surg. — Miller, C. S. A. Recovery.
80	Rice, R., Pt., I, 1st Missouri Cavalry, age 23.	May 26, Oc.27,'63.	Right (gang.); circ. A. A. Surg. A. L. Allen. Disch'd July 29,'64.
81	Ringold, W. H., Pt., I, 188th New York, age 19.	June 1, July 13, 1864.	Right; flap. A. A. Surg. R. J. Levis. Disch'd Feb. 11, 1865. *Spec.* 3080.
82	Rist, C. H., Pt., A, 36th Wisconsin, age 19.	June 1, Dec. 15, 1864.	Left. (June 1, amp. knee joint.) Surg. J. C. McKee, U. S. A. Dis. May 20, 1865. *Spec.* 3514.
83	Shafer, A., Pt., B, 13th Ohio Cavalry, age 18.	Sept. 30, Nov. 15, 1864.	Left; circ. A. A. Surg. W. H. Coverton. Seq. rem'd. Disch'd Aug. 5, 1865. *Spec.* 3723.
84	Sholes, H., Pt., D, 26th New York, age 20.	De.13,'62, Feb. —, 1863.	Right (Dec. 15, amp. knee joint; gang.); ant. post. flap. Surg. D. W. Bliss, U. S. V. Disch'd June 4, 1863.
85	Silsbee, J. H., Pt., C, 8th New Jersey, age 27.	May 3, June 18, 1863.	Left; circ. A. A. Surg. W. S. Ward. Aug. 5, re-amp. Disch'd May 6, 1864.
86	Sloppy, P., Pt., E, 148th Pennsylvania, age 20.	May 10, J'y 25,'64.	——. Confed. surgeon. Necrosed end femur removed. Recovery.
87	*Smith, M.*, Pt., G, 16th Virginia.	Au. 30,'62, May 4,'64.	——. Ass't Surg. M. P. Shelton, C. S. A. Recovery.
88	Sollers, J. H., Lieut., B, 73d Pennsylvania.	May 2, July 28, 1863.	Right; ant. oval flap. A. A. Surg. T. Liebold. Exfol. Disch'd Oct. 9, '63. Died Mar. 14, '64; fatty degenerat'n. Autop. *Spec.* 1808.
89	Stout, A. H., Pt., H, 13th Pennsylvania Cavalry, age 25.	Sept. 29, Dec. 3, 1864.	Left (nec.): flap. A. A. Surg. J. H. Thompson. Disch'd July 8, 1865. *Spec.* 3477.
90	Street, B., Pt., E, 27th Indiana, age 20.	Aug. 2, Sept. 7, 1864.	Left; ant. post. flap. Ass't Surg. G. W. Burke, 46th Penn. Mustered out Feb. 7, 1865.
91	Sullivan, E., Pt., D, 5th Infantry, age 39.	Feb. 21, M'y 14,'62.	Left; circ. Ass't Surg. B. Norris, U. S. A. Disch'd Aug. 23, 1862.
92	Taylor, W., Serg't, B, 106th N. York, age 26.	Sept. 19, Nov. 25, 1864.	Left (nec.); ant. post. flap. A. A. Surg. J. Neff. Disch'd Aug. 6, 1865. *Specs.* 5, 4856.
93	Thompson, B., Pt., C, 28th Penn., age 33.	Se. 17,'62, April 14, 1863.	Right (Oct. 3, amp. leg; erysip.; gang.); flap of skin; circ. musc. Dis. May 6,'63. *Specs.* 3883, 3965.
94	*Vannoy, J.*, Pt., E, 36th Virginia, age 33.	Aug. 17, Oc.27,'64.	Left thigh. For exchange April 8, 1865.
95	Vogt, M., Pt., I, 15th N. York Artillery, age 23.	May 19, June 28, 1864.	Left (gang.; nec.); ant. post. flap. Surg. R. B. Bontecou, U. S. V. Disch'd Oct. 21,'65. *Spec.* 3053.
96	Wagenknight, W., Pt., G, 118th Penn., age 38.	Sept. 20, Nov. 23, 1864.	Left (gang.; hæm.); circ. A. A. Surg. J. Cass. Discharged July 26, 1865.
97	Wager, G. H., Pt., H, 22d New York.	Aug. 30, ——, '62.	Right thigh. Discharged March 11, 1863.
98	Wandel, G., Pt., K, 7th Ohio, age 25.	No.27,'63, Mar. 15, 1864.	Left (gang.); circ. A. A. Surg. M. L. Herr. Duty June 28, '64. *Spec.* 2202.
99	Waters, W. W., Serg't, K, 6th Cavalry, age 23.	Mar. 30, 1865, Mar. 19, 1866.	Right (Disch'd July 6, '65); circ. Dr. N. S. Lincoln, Washington, D. C. Recovery. *Spec.* 4047.
100	Weiderecht, M., Pt., D, 6th Ohio.	No.25,'63, Oc.19,'64.	Right; circ. A. Surg. R. Bartholow, U. S. A. Disch'd May 17,'65.
101	Welsh, I. M., Pt., B, 8th Maine, age 21.	M'y 20,'64, April 12, 1865.	Right. (Amp. leg; nec.; hæm.) Surg. G. Derby, U. S. V. Discharged August 25, 1865.
102	Weymouth, H. G. O., Capt., K, 19th Mass.	De.13,'62, Jan. 17, 1863.	Left (ball extr'd); circ.; flap. A. A. Surg. D. R. Good. Disch'd April 8, 1863. *Spec.* 701.
103	*White, H. S.*, Pt., F, 54th Virginia.	Jan. 30, Ap. 1,'63.	Right thigh. Recovery.
104	*Wilder, F. W.*, Pt., A, 59th Georgia, age 22.	July 2, Oc.24,'63.	Right; ant. posterior flap. A. A. Surg. J. E. Steel, U. S. A. Prison April 19, 1864.
105	*Wood, M. P.*, Pt., G, 43d Georgia.	May 16, J'y 26,'63.	——. Surgeon — Burk, C. S. A. Recovery.
106	Wren, R. L., Pt., C, 15th Ohio, age 26.	No. 8,'63, Feb. 1,'64.	Left; circ. A. A. Surg. P. Peter. Disch'd July 28,'64. *Spec.* 2195.
107	Yearkes, G., Pt., A, 3d Maryland Cav., age 30.	Sept. 26, No. 22,'64.	Left; ant. post. flap. A. A. Surg. J. N. Snively. *Spec.* 3721.
108	Anthony, C., Pt., H, 55th Penn., age 34.	J'e 25,'64.	Right; flap. A. A. Surg. W. L. Welles. Died July 12,'64; exh'n.
109	*Ashford, W. H.*, Pt., I, 18th Georgia.	Oct. 19, No.—,'64	——. Profuse suppuration. Surg. — Love, C. S. A. Sloughing. Died Nov. 30, 1864; gangrene.
110	Baesier, J. P., Pt., C, 75th Ohio.	Aug. 29, ——, '62.	——; thigh. Died December 12, 1862.
111	Ballinger, R., Pt., A, 113th Ohio, age 29.	June 27, Aug. 10, 1864.	Left (gang.); oval flap. A. A. Surg. J. C. Thorpe. Died Aug. 12, '64; gang. and irrit. fever.
112	Barrett, G., Pt., C, 13th Indiana, age 22.	July 21, Au. 23,'64.	Left (slough'g); flap. A. Surg. H. M. Sprague, U. S. A. Slough. Died Aug. 31, 1864; exhaustion.
113	Beebe, C., Serg't, B, 3d Wisconsin, age 26.	May 28, J'y 7,'64.	Right; circ. Surg. S. E. Fuller, U. S. V. Died July 7,'64; shock.
114	Bertsch, W., Corp'l, G, 58th New York.	Aug. 29, ——, '62.	——; thigh. Died October 7, 1862.
115	*Binns, E. D.*, Pt., K, 53d Virginia, age 19.	July 3. Se. 30,'63.	Right; hæm. Died October 3, 1863. *Spec.* 1943.
116	Black, B. F., Pt., A, 6th Kentucky.	Sept. 19, Oc.30,'63.	Right; circ. Died October 30, 1863; hæmorrhage. Autopsy.
117	Bland, F. M., Pt., D, 23d Iowa.	May 19, July 2, 1863.	Left. (May 19, Syme's amp.; slough.; June 17, amp. leg.) A. A. Surg. W. P. Sweetland. Gang. Died July 16, 1863. *Spec.* 1706.
118	Brady, B., Pt., C, 4th Infantry, age 34.	May 24, J'e 25,'64.	Right; circular. A. A. Surg. A. Ansell. Died Nov. 2, 1864.
119	Brooks, J. H., Pt., E, 1st Maryland Cav., age 39.	Aug. 16, Sept. 28, 1864.	Left (slough.; hæm.; lig. femoral art.); circ. A. A. Surg. J. C. Morton. Died Oct. 17, '64; exh'n.
120	*Bullen, H. W.*, Lieut., Darden's Bat'y, age 25.	No.30,'64, Jan. 6,'65.	Right. (Dec. 31, amp. leg; teta.) Died Jan. 7, 1865; trismus.
121	Callahan, M., Corp'l, K, 1st New Jersey, age 17.	June 11, Aug. 3, 1864.	Left; circ. A. A. Surg. W. C. Mulford. Died August 5,'64; hæm. and asthenia. *Spec.* 2922.
122	Camp, W. H., Pt., B, 203d Penn., age 35.	Jan. 15, Mar. 5, 1865.	Left; circ. A. Surg. S. H. Orton, U. S. A. Died March 15, 1865; hæmorrhage.
123	Cannivan, C. C., Pt., G, 88th Pennsylvania.	Aug. 30, Oc.31,'62.	—— (nec.; aneurism); ant. post. flap. Died Nov. 14, 1862.
124	Cogby, H. J., Corp'l, B, 139th Penn., age 25.	May 3. J'ne 9,'63.	Left. (Bone and ball removed.) Surg. J. H. Baxter, U. S. V. Died June 17, '63. *Specs.* 1229, 1230.
125	Colby, H. A., Serg't, G, 2d U. S. Sharpshooters, age 23.	June 18, Oct. 20, 1864.	Left (nec.; gang.); ant. post. flap. Surg. N. R. Moseley, U. S. V. Died Nov. 1, 1864. *Spec.* 3319.
126	*Crocker, W.*, Pt., H, 42d Virginia.	Oct. 2, Nov. 4. 1863.	Right (slough.); Teale's method. A. Surg. C. W. P. Brock, C. S. A. Died Nov. 9, 1863; exhaustion.
127	DeHoff, E., Pt., H, 38th Ohio, age 26.	Aug. 7. Dec. 5, 1864.	Left (Aug. 7, amp. leg; gang.); lat. flap. Surgeon B. B. Breed, U. S. V. Died January 16, 1865.
128	Derr, J. W., Pt., E, 7th Maryland, age 18.	Mar. 31, May 15, 1865.	Right (March 31, rem'd patella); circ. A. A. Surg. F. Hall. Died June 23, '65; exh'n. *Spec.* 4199.
129	Doubleday, W. O., Corp., H, 14th Vt., age 41.	July 1. Au. 10,'63.	Left. Surg. L. W. Oakley, 2d N. J. Diarr.; dysen. Died Aug. 12,'63.
130	Drake, J. H., Pt., I, 71st Pennsylvania, age 23.	June 1, July 10, 1862.	Left. (Knee ulcerated.) Dr. H. Marsh, Albany, N. Y. Died July 14, 1862.
131	*Efner, J. B.*, Pt., F, 4th Texas Cavalry.	June 14, ——, '63.	Left thigh. Died July 18, 1863.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
132	Eline, J. A., Pt., D, 76th Pennsylvania.	July 18, Au.20,'63.	Left. August 31, hæm. Died August 31, 1863; exhaustion.
133	Fennimore, H., Pt., E, 101st Indiana.	Sept. 19, ——,'63.	Left thigh. Died November 2, 1863.
134	Gates, A. E., Pt., C, 18th Connecticut.	June 5, J'y22,'64.	Left thigh. Died July 26, 1864.
135	*George, M.*, Captain, A, Louisiana Zouaves, age 25.	Dec.8,'64, J'y 7,'65.	Left; circ. Surg. C. H. Lord, 102d N.Y. July 21, ligature torn off; hæm.; fatal.
136	Hall, W. H., Pt., I, 19th Maine, age 18.	May 24, Aug. 12, 1864.	Left (slough.); ant. post. flap. A. A. Surg. W. H. Randolph. Died Sept. 5,'64; pyæm. *Spec.* 3025.
137	Hannans, J., Pt., K, 97th Pennsylvania, age 23.	May 20, July 10, 1864.	Right. (Hæm.; diarr.; June 11, amputation leg.) A.A. Surg. W. Stillman. Died Sept. 20, 1864; pyæmia.
138	Harriman, R. C., Pt., F, 11th Maine, age 39.	Aug. 16, Sept. 16, 1864.	Left; circ. A.A.Surg.J.C.Morton. Sept. 23, hæmorrhage; lig. femoral artery. Died Sept. 26,'64. *Spec.* 3711.
139	Harrington, W., Pt., A, 106th N. York, age 20.	May 9, Sept. 11, 1864.	Left. Teale's method. Surg. R. B. Bontecou, U.S.V. Died Sept. 19,'64; exhaustion. *Spec.* 3328.
140	Hartman, L., Pt., B, 2d Infantry, age 24.	July 2, Oct. 19, 1863.	Right; ant. post. flap. A. Surg. H. E. Brown, U.S.A. Died Oct. 24,'63; exhaustion. Autopsy.
141	*Henderson, E.*, Pt., B, 16th N. C., age 32.	De.16,'64, Jan. 24, 1865.	Left (gang.); bi-lat. flap. Surg. B. B. Breed, U. S. V. Died April 3, 1865.
142	Hines, T. I., Pt., D, 1st Maryland, age 32.	July 1, Au.27,'63.	Right. Died September 17, 1863; hectic fever.
143	Holbrook, E., Corp'l, B, 40th Mass., age 25.	June 3 July 12, 1864.	Left (gang.); circ. Surg. R. B. Bontecou, U. S. V. Sloughing. Died July 30,'64; exhaustion.
144	Holland, A., Pt., B, 6th New Jersey, age 26.	May 6, June 15, 1864.	Left; ant. post. flap. Surg. E. Bentley, U. S.V. Died July 21, 1864. Autopsy. *Spec.* 3342.
145	[1]*House, J.*, Pt., K, 2d Mississippi, age 16.	Aug. 1, Oc.29,'64.	Right. (Gang.; erysip.; exfol.; nec.) Stump swollen greatly.
146	Ingerson, A., Pt., A, 123d Ohio, age 18.	May 15, June 19, 1864.	Left; ant. post. flap. Surg. J. B. Lewis, U. S. V. Died June 26, 1864; pyæmia.
147	Jacobson, F., Pt., C, 11th Connecticut, age 18.	June 18, Aug. 20, 1864.	Right (June 18, amp. leg; gang.); circ. A. A. Surg. W. B. Casey. Died August 26, 1864.
148	Johnson, D. A., Pt., E, 43d New York, age 37.	No. 7,'63, July 2, 1864.	Right (Nov. 7, exc. tib.); circular. A. A. Surgeon T. B. Townsend. Gangrene. Died Aug. 6, 1864.
149	Jones, T., Pt., E, 70th New York, age 26.	July 3, Au. 7,'63.	Left (hæm.); flap. Surg. C. W. Jones, U. S. V. Died Aug. 18, 1863. *Spec.* 1695.
150	*Kennedy, P.*, Pt., C, 59th Georgia, age 46.	July —, Au. —,'63.	Left thigh. Died August 23, 1863.
151	Kewley, W. C., Pt., G, 68th Ohio, age 46.	May 22, J'e 24,'63.	Right; extensive burrowing of pus. A. A. Surg. J. Thompson. Died July 11,'63. *Spec.* 1702.
152	Kightlinger, J., Pt., F, 145th Penn., age 23.	Aug. 14, Oct. 1,'64.	Left (œdematous); circ. Surg. A. F. Sheldon, U. S. V. Died Oct. 8, 1864; exhaustion.
153	Lane, W., Pt., I, 1st E. Tennessee, age 20.	De.31,'62, Mar.2,'63.	Left; lig. torn off; hæm.; re-lig. Died March 6, 1863.
154	Langfield, W. E., Pt., K, 7th New Hampshire.	May 14, J'y 2,'64.	Right (hæm.); flap. A. A. Surg. F. H. Getchell. Died July 5, 1864; exhaustion.
155	Langworthy, S., Pt., B, 117th New York, age 28.	May 14, J'y 12,'64.	Left; flap. A. A. Surgeon F. H. Getchell. Died July 12, 1864; exhaustion.
156	*Lawrence, T. K.*, Pt., G, 24th Georgia, age 31.	July 3, Au. 6,'63.	Left thigh. Died Aug. 19, 1863.
157	Lininger, S., Pt., H, 74th Indiana, age 32.	Sept. 19, No.19,'63.	Right. (Exc. int. condyle.) Died December 7, 1863.
158	*Lockey, A.*, Pt., F, 3d Mississippi, age 29.	No.30,'64, Fe.24,'65.	Right (gang.; carious); oval flap. A. A. Surg. D. D. Talbot. Died April 27, 1865; pyæmia.
159	[2]Loomis, I. A., Pt., G, 16th Wisconsin, age 23.	Apr.6,'62, Jan. 25, 1866.	Right (sloughing; necro.); ant. post. flap. Dr. F. H. Milligan. Died February 18, 1866.
160	Lovell, P., Pt., C, 10th Missouri, age 41.	No.25,'63, Feb.2,'64.	Left (exc. tibia; Jan. 10,'64, amp. leg; gang.; hæm.); circular. A. Surgeon R. Bartholow, U. S. A. Died Feb. 3, 1864. *Spec.* 2108.
161	*Lumley, F. S.*, Pt., H, 29th Mississippi, age 26.	Nov. 24, De.31,'63.	——; circ. A. Surg. J. H. Wilson, 73d Penn. Died Jan. 5, 1864; shock and gangrene.
162	Lyons, G. W., Pt., I, 43d Ohio.	Oct. 4,'62, Feb.2,'63.	Left. (Necrosed bone removed.) Died Aug. 14, 1863. *Spec.* 968.
163	Maxfield, D. E., Pt., E, 97th New York, age 20.	Sept. 17, Oc.22,'62.	Left; circ. A. A. Surgeon A. V. Cherbonnier. Oct. 23, 25, hæm.; lig. femoral artery. Died Oct. 27, 1862; exhaustion.
164	McCreary, G. L., Pt., F, 100th Penn., age 19.	May 12, J'e 12,'64.	Right; circ. A. A. Surg. F. G. H. Bradford. Died June 25, 1864; exhaustion.
165	McDerbit, W., Pt., D, 173d New York, age 27.	June 14, ——,'63.	Right. (Amp. right second and third fingers.) Died July 29,'63.
166	McGir, E., Pt., F, 5th New York.	Aug. 30, ——,'62.	——. Died October 3, 1862.
167	*McHenry, A.*, Pt., B, 11th Mississippi, age 26.	July 3, Au. —,'63.	Right. Died August 23, 1863.
168	Miller, A. J., Pt., D, 5th Kentucky.	Sept. 20, No. 1,'63.	Right (sloughing); circ. Died November 15, 1863.
169	Millsap, M., Pt., I, 31st Iowa, age 23.	May 22, J'e 29,'63.	Right. Died July 6, 1863; pyæmia.
170	Morgan, J., Pt., E, 11th Penn. Reserves.	July 2, Oct. 2,'61.	Right. A. Surg. W. A. Hammond, U. S. A. Died October 4, 1861; exhaustion.
171	Munn, W., Pt., I, 27th Michigan, age 31.	May 10, Sept. 20, 1864.	Right (May 10, amp. leg; gang.); Teale's method. A. A. Surg. C. F. Trautman. Died Oct. 4,'64; exhaustion. *Spec.* 2330.
172	Nevins, T., Pt., F, 63d New York.	Sept. 17, Oc.24,'62.	Left. (Joint eroded.) Surgeon H. S. Hewit, U. S. V. Died Oct. 24, 1862; shock. *Spec.* 489.
173	Ogden, D., Pt., E, 2d Illinois Cav., age 21.	Sept. 25, Nov.1,'64.	Left (slough.; ant. tib. art.; hæm.); semi-circ. flap of skin; circ. inc. thro. mus. Surg. C. Winne, 77th Illinois. Died Nov. 6,'64; exh'n.
174	Otto, B. G., Serg't, A, 48th Pennsylvania.	Aug. 30, ——,'62.	——. Died October 15, 1862.
175	*Owen, A.*, Serg't, G, 19th Georgia.	Sept. 17, Oc.21,'62.	Right; circ. A. Surg. C. Bacon, U. S. A. Died October 28, 1862. *Spec.* 926.
176	*Patten, W. F.*, Pt., C, 9th Mississippi, age 24.	Nov. 30, 1864, Mar. 24, 1865.	Right (Mar. 19, amp. leg; gang.; hæm.); ant. post. flap. A. Surg. J. C. Thorpe, U. S. V. Died April 20, 1865; pyæmia.
177	Perry, O., Pt., F, 41st Illinois.	July 12, ——,'63.	Right. (Prim. amp. leg; gang.) Died September 12, 1863.
178	[3]*Pettigrew, J. A.*, Capt., C, 20th Tennessee.	J'e 24,'63, Jan.4,'64.	Right; circ. A. Surg. J. E. Link, 21st Ill. Died Jan. 7, 1864; shock. *Spec.* 2136.
179	[4]*Powell, W. H.*, Pt., I, 3d South Carolina, age 20.	Sept. 17, Nov. 30, 1862.	Right. (Sept. 18, amputat'n leg.) A. A. Surg. A. V. Cherbonnier. Erysip. Died May 2,'63; exh'n. Autopsy. *Specs.* 795, 3837, 3962.
180	Prentice, S. B., Pt., C, 1st District Columbia Cav.	June 15, J'y 21,'64.	Left (necrosis); flap. A. Surg. E. Curtis, U. S. A. Died August 7, 1864; exhaustion.
181	Rader, J., Pt., F, 59th Illinois, age 21.	Aug. 19, Dec.7,'64.	Left (Aug. 19, exc. tib.; caries); circ. A. A. Surg. M. L. Herr. Gang. Died Jan. 4,'65; exh'n.
182	Richard, J., Corp'l, E, 9th Wisconsin.	——, —. Se. 23,'63.	Left. Died September 27, 1863.
183	Roberts, J. F., Pt., K, 147th New York, age 33.	May 5, J'ne 8,'64.	Left; ant. post. flap. Surg. E. Donnelly, 2d Penn. Reserves. Died Aug. 2, 1864; chr. diarr.
184	Robinson, A., Pt., D, 8th Wisconsin, age 30.	May 8, J'ne —,'64.	Left; ant. post. flap. A. A. Surg. J. N. Sharpe. Died July 1,'64; exhaustion.
185	Rodrigues, A., Corp'l, C, 101st Illinois, age 23.	May 15, J'y 28,'64.	——; circ. A. A. Surg. R. C. C. Jones. Gangrene. Died Aug. 3, 1864; exhaustion. Autopsy.
186	Schultz, C., Pt., K, 5th Minnesota, age 44.	De.16,'64, Jan. 27, 1865.	Left (nec. tib.); circ. A. A. Surg. J. G. Harvey. Died Feb. 9,'65; chronic dysentery.
187	Scott, L., Pt., F, 2d New York Mounted Rifles, age 17.	Sept. 20, Nov. 19, 1864.	Right (Nov. 1, gang.); flap. Surg. E. Bentley, U. S. V. Died Nov. 30, 1864; exhaustion.
188	Seiberlich, J., Corp'l, F, 19th Wisconsin, age 23.	May 16, June 28, 1864.	Right (erysip.); circ. A. Surg. D. R. Brower, U. S. V. Died July 13, 1864; exhaustion.
189	*Sharp, O. D.*, Pt., H, 1st North Carolina.	Sept. 17, No.15,'62.	Left; gangrene. Died Nov. 21, 1862.
190	*Shelly, J. J.*, Pt., B, 2d Tennessee.	Ja. 10,'62, ———	Right. Dr. G. H. Higgins. Died a few hours after the operation. *Spec.* 405.
191	Staggs, A., Pt., K, 10th Kentucky Cavalry.	July 3, Au. 5,'63.	Left. Died Sept. 1, 1863; pyæm. Autopsy.
192	Stanley, F. E., Serg't, A, 13th Connecticut.	April 13, ——,'63.	Left. (Hæmorrhage.) Died May 29, 1863.
193	Stanton, J., Pt., H, 2d Infantry, age 40.	July 3, Au. 8,'64.	Left. (Chronic diarrhœa.) Died August 11, 1863.

[1] JONES (J.), *Investigations upon the Nature, Causes, and Treatment of Hospital Gangrene as it prevailed in the Confederate Armies*, 1861–1865, in *United States Sanitary Commission Memoirs*, 1871, Surgical Volume II, p. 291.

[2] MILLIGAN (F. H.), *Amputation of the Thigh resulting from Injury received nearly four years prior to the operation*, in *Cincinnati Lancet and Observer*, 1869, Vol. XII, p. 590.

[3] MOSES (I.), *Surgical Notes of Cases of Gunshot Injuries occurring during the advance of the Army of the Cumberland, Summer of* 1863, in *American Journal of the Medical Sciences*, 1864, N. S., Vol. XLVII, p. 340.

[4] FISHER (G. J.), *Amputations after the Battle of Antietam*, in *American Journal of the Medical Sciences*, 1863, N. S., Vol. XLV, p. 48.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.	No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
194	Teefle, S., Pt., H, 9th Iowa, age 34.	Mar. 21, Ap.21,'65.	Left; circ. A. A. Surg. D. Sheppard. Died May 1,'65; exh'n.	202	*Wileman, L. G.*, Pt., C, 32d Mississippi.	Oct. 8, ——, '62.	——; circular. Surgeon J. G. Hatchitt, U. S. V. Died Jan. 16, 1863.
195	Thomas, G. M., Blacksmith, I, 3d Penn. Cav.	Oct. 13, Nov. 23, 1863.	Right; circ. A. Surg. A. Ingram, U. S. A. Died Jan. 28, 1864; pyæmia. *Spec.* 2821.	203	Wilson, S., Pt., I, 6th N. Hampshire, age 24.	May 10, June 13, 1864.	Right; circ. Surgeon G. L. Pancoast, U. S. V. Died June 21, 1864; exhaustion. *Spec.* 2581.
196	Touhey, J. D., Corp'l, B, 14th New York.	Aug. 30, Oc.10,'62.	Left. (Hæmorrhage.) Died Oct. 13, 1862; pyæmia.	204	Wingate, B., Capt., D, 5th Infantry.	Feb. 21, May 19, 1862.	Right (nec.); circ. A. Surg. B. Norris, U. S. A. Died June 1, 1862; operation and diseased stomach.
197	Turner, J. P., Serg't, I, 16th Massachusetts.	Aug. 30, Oct. 9,'62.	Left. Died October 18, 1862; pyæmia.	205	*Wormsley, L. W.*, Pt., K, 8th Florida, age 35.	July 2, Dec. 29, 1863.	Right (July 6, amp. leg; necr.); circ. A. Surg. C. W. P. Brock, P. A. C. S. Died Dec. 30, 1863; exhaustion.
198	Twining, P. E., Serg't, F, 36th Wisconsin, age 26.	June 1, Sept. 14, 1864.	Left. (June 1, amp. leg.) A. A. Surg. M. Rizer. Slough'g. Died October 16, 1864.	206	Wright, J. E., Pt., K, 11th Wisconsin, age 23.	April 9, June 18, 1865.	Left; flap. A. Surg. W. H. Forwood, U. S. A. Died June 26, 1865; pyæmia.
199	*Veasey, J. W.*, Pt., C, 3d Alabama.	Sept. 19, Oc.25,'64.	Right; circ. Surg.—Weatherby, C.S.A. Died Nov. 14,'64; exh'n.	207	*Wyatt, I.*, Capt., 10th Missouri Cavalry.	Sept. 27, No.23,'64.	Left. Died November 25, 1864.
200	Waters, B. G., Pt., H, 19th Maine, age 19.	Oct. 15, Nov. 27, 1864.	Left (Oct. 15, amp. leg); circular. Surg. E. Bentley, U. S. V. Died April 28, '65. *Specs.* 3445, 3446, 3447, 3448.				
201	Wenzell, A., Pt., E, 121st Pennsylvania, age 21.	J'y 1, '63, Sept. 9, 1864.	Right (fragm'ts nec. bone rem'd); oval skin flap; circ. muscles. A. A. Surg. J. H. Jamar. Died Sept. 28, 1864; pyæmia.				

The seat of fracture in the foregoing two hundred and seven cases was in the lower third in seventeen; in the knee joint, in seventy-three; in the leg, in ninety-one; and in the ankle joint or foot in twenty-six instances.

Secondary Amputations of the Thigh, Point of Ablation not specified.—Of twelve secondary amputations in which the seat of operation was not indicated, nine were performed on Union and three on Confederate soldiers; all resulted fatally. Seven operations were on the right, two on the left side; in three cases this point was not recorded. In two instances total excision of the knee joint and in two other cases amputation in the leg had preceded the ablation of the thigh. One of the latter cases is here detailed:[1]

Case 496.—Private G. R. Hathaway, Co. A, 125th Illinois, aged 24 years, received a shot fracture of the tarsal bones of the left foot, at Kenesaw Mountain, June 27, 1864. Five days after the reception of the injury he entered the field hospital at Chattanooga, where amputation was performed, but not recorded. Surgeon B. Cloak, U. S. V., reported the termination of the case as follows: "The patient was admitted to Cumberland Hospital, Nashville, July 11th, having undergone amputation of the leg below the knee previous to his admission. On August 11th, a second amputation was performed above the knee, by the antero-posterior flap method, by Acting Assistant Surgeon J. C. Thorpe. The flaps at the time of the second operation had become indolent and slightly gangrenous and could not be brought to cover the protruding bones; the patient's condition being weak and anæmic and his tongue whitish. Stimulating dressings were applied to the stump of the thigh, which looked clean but failed to close by first intention, though it became covered with healthy granulations. The patient died of irritative fever September 9, 1864."

Table XLI.

Summary of Twelve Fatal Cases of Secondary Amputations in the Thigh for Shot Fracture of the Femur, the point of Ablation not specified.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.	No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1	Dowd, J., Farrier, M, 10th Missouri Cavalry, age 24.	April 18, 1863,	Right. (April 19, '63, amp. leg, lower third; 1865, gang.) Nov., 1867, necrosis; re-amp. of thigh. Died Nov. 15, 1867.	6	Kiefer, M., Pt., C, 31st Pennsylvania, age 33.	June 29, Au. 1,'62.	——. Diarrhœa. Died August 18, 1862; exhaustion.
				7	Turpen, J., Pt., B, 2d Missouri, age 36.	Oct. 8, No. –, '62.	Right. Died November 14, 1862.
2	Edmondson, W.W., Pt., C, 11th Iowa, age 20.	July 22, ——, '64.	Right. Died September 3, 1864.	8	Traube, A., Corp'l, E, 2d Missouri, age 34.	Oct. 8,'62, Mar. 25, 1864.	Left; ant. post. flap. A. A. Surg. P. Gilroy. Died May 5, 1864.
3	Hathaway, G. R., Pt., A, 125th Illinois, age 24.	June 27, Aug. 11, 1864.	Left (int. amp. leg; gang.); ant. post. flap. A. A. Surgeon J. C. Thorpe. Died Sept. 9, 1864; irritative fever.	9	[2]*Unknown.*	May —, ——, '64.	——. (Total excision knee joint.) Fatal.
				10	[3]*Unknown.*	May —, ——, '64.	——. (Total excision knee joint.) Fatal.
4	Hawkins, W., Pt., C, 17th Ohio.	Se. 20,'63, Feb. 28, 1864.	Right; circ. Surg. S. E. Fuller, U. S. V. Died March 21, 1864; pyæmia.	11	*Vaughn, W.*, Pt., B, 13th South Carolina.	———	Right thigh. Died June 26, 1864.
5	Kellum, T. H., Pt., B, 89th Indiana, age 18.	May 18, J'y 18,'64.	Right; circ. Surg. E. Powell, 72d Ill. Died Aug. 3,'64; septæmia.	12	Whitbeck, O., Pt., D, 109th N. York, age 29.	May 6, J'y 9, '64.	Right. (Typ. fev.) Dr. G. Burr, Binghamton. Died July 10,'64.

[1] The other instance is that of Farrier J. Dowd, M, 10th Missouri Cavalry, aged 24; wounded at Cherokee, April 18, 1863; shot fracture of right foot; April 19th, amputation of leg at lower third by Surgeon P. N. Wood, 39th Iowa; discharged January 25, 1864. In 1865, gangrene appeared on the stump; bromine was applied without effect; amputation of the thigh; necrosis of femur in November, 1867; re-amputation and death November 15, 1867.

[2] Culbertson (H.), *Tabular Statement of Excision of Knee Joint*, in *Transactions of the Am. Med. Ass'n; Prize Essay*, 1876; Supplement to Vol. XXVII, p. 186. McGuire (H.), *Clinical Remarks on Gunshot Wounds of Joints, etc.*, in *Richmond Medical Journal*, 1866, Vol. I, p. 263.

[3] Culbertson (H.), *loc. cit.* McGuire (H.), *loc. cit.*

AMPUTATIONS IN THE CONTINUITY OF THE FEMUR, OF UNCERTAIN DATE.—In five hundred and eighteen cases of amputations in the thigh for shot injury the intervals between the injuries and operations are unknown, one or the other or sometimes both dates having been omitted in the reports. The ablations were practised in the upper third in thirty-three, in the middle third in seventy, in the lower third in one hundred and four, and at an unspecified portion of the thigh in three hundred and eleven cases. Although the recorded data are generally meagre, the results have been ascertained in all but thirty-two cases. One hundred and sixty-three had successful, and three hundred and twenty-three fatal terminations, a mortality rate of 66.4 per cent.

Amputations in the Upper Third of the Thigh, of Uncertain Date.—There were thirty-three amputations in the upper third of the thigh, in which the length of interval between the injury and operation could not be ascertained. Twenty-eight of the patients were Confederate, and five were Union soldiers; twelve recovered and twenty-one died.

Successful Cases of Amputation in the Upper Third of the Thigh, of Uncertain Date. The twelve operations of this group were all performed on Confederate soldiers—on the right side in four, on the left in three, unspecified in five cases. The nature of the missiles and the methods of operating are not recorded.

Fatal Cases of Amputation in the Upper Third of the Thigh, of Uncertain Date.—There were twenty-one operations of this class, five performed on Union and sixteen on Confederate soldiers; eight on the right and nine on the left limb; in four cases the side was not specified. No antecedent operations were recorded.

TABLE XLII.

Summary of Thirty-three Cases of Amputation in the Upper Third of the Femur, time of Ablation not specified.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.	No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1	*Anderson, J. E.*, Pt., F, Holcomb's S.C.Legion.	———	——. Furloughed May 27, 1864.	18	*Cleland, D.*, Pt., D, 1st South Carolina Rifles.	———	Right. Died May 25, 1864.
2	*Brown, S.*, Pt., C, 53d South Carolina.	———	Left. Released July 8, 1865.	19	Dillings, I., Pt., A, 5th Artillery, age 34.	Dec. 3, ——,'64.	Left. Died January 9, 1865.
3	*Carroll, J.*, —, 2d South Carolina.	———	Right. Provost Marshal May 31, 1865.	20	Garreth, W. A., Pt., B, 45th Penn., age 21.	Sept. 30, ——,'64.	Left. Died October 22, 1864.
4	*Chambers, D. W.*, Pt., D, 37th North Carolina.	June 3, ——,'64.	Right. Furloughed September 12, 1864.	21	*Kinsley, P.*, Pt., C, 31st Virginia.	———	Right. Died June 7, 1864.
5	*Freeman, R.*, Pt., F, 14th North Carolina.	May 2, ——,'63.	Left. Furloughed November 30, 1864.	22	*Loflon, J.*, Pt., G, 8th Louisiana.	———	——. Sloughing; hæmorrhage. Died July 17,'63; hæmorrhage.
6	*Long, J. D.*, Pt., I, 1st Texas.	April 26, ——,'63.	Right. Furloughed September 2, 1863.	23	*McWhorter, J. B.*, Pt., E, 2d S. Carolina Rifles.	———	Right. Died October 7, 1864.
7	*O'Bryant, W. H.*, Pt., F, 2d S. Carolina Rifles.	———	——. Discharged February 21, 1863.	24	*Neighbours, W.*, Pt., K, 3d Georgia.	———	Left. Died September 22, 1864.
8	*Piles, J. M.*, Pt., I, 12th Mississippi, age 23.	Nov. 1, ——,'64.	Right. Retired January 23, 1865.	25	*Neil, W.*, Pt., K, 14th S. Carolina.	———	Left. Died June 16, 1864.
9	*Ward, J.*, Pt., D, 8th Louisiana.	July 6, ——,'64.	——. Surgeon — Momer, C. S.A. Recovery.	26	Peterson, L., Pt., K, 36th Wisconsin, age 37.	June 3, ——,'64.	Right. Died June 11, 1864.
10	*White, A. C.*, Serg't, H, 5th South Carolina.	Aug. 16, ——,'64.	Left. Furloughed September 7, 1864.	27	*Segrist, W. D.*, Pt., I, 5th South Carolina, age 30.	May 28, ——,'64.	Left. Died July 16, 1864; pyæmia.
11	*Williamson, G. A.*, Col., 2d Arkansas.	———	——. Recovery.	28	*Snider, J. A.*, Pt., D, 12th Virginia Cavalry.	———	Right. Died June 30, 1864; pyæmia.
12	*Wimmer, J. W.*, Pt., K, 48th North Carolina.	De.13,'62.	——. Surg. W. D. Lindsay, 48th N. C. Recovery.	29	*Trott, J. H.*, Serg't, K, 57th North Carolina.	———	Left. Died December 17, 1862.
13	*Anderson, G. B.*, Pt., F, 41st Alabama.	———	Left. Died September 21, 1864.	30	*Underhill, J.*, Pt., C, 1st N. Carolina Battery.	De.17,'62. ———	——. Died March 24, 1865.
14	*Blankenship, E. P.*, Pt., E, 57th Virginia.	July —, ——,'63.	——. Died July 23, 1863.	31	*Whitworth, R. A.*, Corp'l, E, 64th Georgia, age 40.	Aug. 16, ——,'64.	Right. Died September 7, 1864; exhaustion.
15	*Bowen, J.*, Pt., B, 7th Virginia.	July —, ——,'63.	Left. Died August 15, 1863.	32	Wilkinson, W., Pt., I, 22d Col'd Troops, age 38.	June 15, ——,'64.	Right; ant. posterior flap. Died July 15, 1864.
16	*Buford, P. M.*, Pt., G, 11th Miss., age 20.	July —, ——,'63.	Left. Died August 15, 1863.	33	*Wooddle, P. H.*, Corp'l, F, 19th Virginia Cav., age 25.	———	——. Necr.; ext. purulent infil.; circ. Surg. W. S. Love, P.A.C.S. Died Nov. 8, 1864; exhaustion.
17	Burley, H. H., Pt., G, 49th Pennsylvania, age 21.	May 12, ——,'64.	Right. Extensive bedsore over sacrum. Died June 6, 1864.				

Amputations in the Middle Third of the Thigh, of Uncertain Date—In this group are recorded seventy cases, of which thirty-four were successful, twenty-nine proved fatal,

while the result in seven cases could not be ascertained. Fifty-three of the patients were Confederate, and seventeen Union soldiers. The amputations were on the right side in twenty-eight, on the left in thirty-one, not reported in eleven instances. The seat of fracture in these cases was in the middle third of the femur in one, in the lower third in sixteen; in the femur, precise seat not recorded in forty-two; in the knee joint in seven, and in the leg in four instances.

TABLE XLIII.

Condensed Summary of Seventy Cases of Amputation in the Middle Third of the Femur, of Uncertain Date.

[Recoveries, 1–34; Deaths, 35–63; Results unknown, 64–70.]

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1	*Baldwin, J.*, Pt., A, 26th North Carolina.	July 2, ——, '63.	Left; gangrenous. Paroled Nov. 12, 1863.
2	*Boykin, P.*, Pt., C, 19th Louisiana, age 18.	Aug. 31, ——, '64.	Right. Retired Dec. 22, 1864.
3	Clark, J., Pt., D, 1st Louisiana N. G.	May 27, ——, '63.	Left thigh. Duty July 31, 1863.
4	*Comer, T.*, Capt., H, 5th South Carolina.	Aug. 16, ——, '64.	Left. Furloughed September 23, 1864.
5	*Cribb, J.*, Pt., C, 49th Georgia, age 32.	——	Right. Retired October 31, 1864.
6	*Croft, J.*, Pt., L, 50th Georgia.	May 3, ——, '63.	——. Furloughed July 3, 1863.
7	*Dell, P.*, Pt., C, 20th Louisiana.	Jan. 2, ——, '63.	Left; flap. Discharged July 17, 1865.
8	*Edmonson, J. C.*, Pt., K, 13th Georgia.	May 12, ——, '64.	Right. Furloughed November 8, 1864.
9	*Evans, W. S.*, Lieut., B, 4th Georgia.	July 9, ——, '64.	Right. Furloughed October 9, 1864.
10	*Farr, J. R.*, Pt., I, 18th Tennessee.	Sept. 19, ——, '63.	Left. Surg. H. W. Brown, P. A. C. S. Recovery Dec. 20, 1864.
11	*Fechner, C.*, Pt., —, 3d Alabama, age 28.	May 2, ——, '63.	Right. Retired January 19, 1865.
12	*Ferguson, J. G.*, Pt., A, 12th Tennessee, age 24.	July 20, ——, '64.	Left. Retired January 23, 1865.
13	*Foster, P.*, Pt., I, 57th Virginia, age 21.	July 12, ——, '64.	——. Retired February 6, 1865.
14	*Gales, F. V.*, Musician, E, 30th Tenn., age 31.	Nov. 30, ——, '64.	Left; ant. posterior flap. Provost Marshal March 7, 1865.
15	*Hearn, B. L.*, Pt., H, 6th Georgia.	Sept. 30, ——, '64.	Right. Furloughed December 6, 1864.
16	*Helms, C. A.*, Pt., B, 43d North Carolina, age 33.	July 18, ——, '64.	Right. Retired January 20, 1865.
17	*Hunt, S. J.*, Pt., D, 18th Virginia.	——	Right. Paroled May 31, 1865.
18	*Ingraham, L.*, Pt., D, 42d Mississippi.	July 2, ——, '63.	Right. Exchanged Mar. 3, 1864.
19	*Johnston, W. S.*, Pt., I, 20th North Carolina.	May 3, ——, '63.	——. Furloughed October 13, 1863.
20	*Kennedy, T. J.*, Pt., E, 16th Ark. Cav., age 25.	Sept. 27, ——, '64.	Right. Retired March 18, 1865.
21	*Mayne, J. J.*, Pt., A, 11th Georgia.	——	Left. Exchanged March 3, 1864.
22	*Passons, W.*, Pt., F, 5th Kentucky Cav., age 44.	——	Right; circ. Prison April 28, 1865.
23	[1]*Powell, J. K. P.*, —, C, 31st Georgia.	June 26, ——, '62.	——; circ. Furloughed August 26, 1862.
24	*Praft, J. H.*, Pt., F, 7th Tennessee, age 41.	—— 1865.	Right; flap. Released June 28, 1865.
25	*Satterwhite, D. S.*, Pt., G, 7th Georgia.	Oct. 7, ——, '64.	Left; flap. Discharged July 17, 1865.
26	*Scott, G. W.*, Serg't, H, 7th South Carolina.	July —, ——, '63.	Right. Exchanged October 13, 1863.
27	*Sharp, W. T.*, Serg't, G, 22d Georgia.	Feb. 6, ——, '65.	Right. Retired March 11, 1865.
28	*Stegen, J. W.*, Serg't, D, 56th Virginia.	June 27, ——, '62.	——. Recovered.
29	*Stout, T. N.*, Pt., C, 6th Louisiana.	July 2, ——, '63.	——. Furloughed September 9, 1863.
30	*Swicegood, J. H.*, Pt., A, 54th N. C., age 26.	June 7, ——, '64.	Left. Retired March 3, 1865.
31	*Underwood, J.*, Corp'l, K, 18th Georgia.	May 3, ——, '63.	——. Furloughed September 17, 1863.
32	*Watson, J. B.*, Pt., Cobb's Georgia Cavalry.	July —, ——, '63.	Left. Exchanged November 12, 1863.
33	*Wilkinson, S. R.*, Pt., I, 14th Alabama.	——	Right. Furloughed September 16, 1863.
34	Williamson, A., Seaman, St'r Savannah, age 55.	——	Left. Recovered.
35	*Bagby, A. V.*, Pt., E, 23d North Carolina.	—— 1864.	Right. Died October 3, 1864.
36	*Barker, E.*, Pt., A, 26th North Carolina, age 21.	July —, ——, '63.	Left. Died August 12, 1863.
37	Beiden, R., Pt., H, 116th Pennsylvania, age 24.	June 5, ——, '64.	Left. Died June 23, 1864.
38	*Boswell, J.*, Pt., B, 63d Georgia, age 31.	June 19, ——, '64.	Right; circ. Gang.; diarrhœa. Died July 21, 1864; exhaustion.
39	*Butler, W. C.*, Serg't, F, 2d Florida, age 26.	July —, ——, '63.	Left. Died August 15, 1863.
40	*Chinn, F. E.*, Pt., H, 7th North Carolina.	—— 1864.	Left. Died September 12, 1864.
41	*Cobb, J.*, Pt., G, 9th Virginia, age 22.	Aug. 28, ——, '64.	——; flap; diarr.; slough'g; hæm. Died Sept. 22, '64; pyæ. Autop.
42	*Cobb, L. G.*, Pt., H, 45th North Carolina.	July —, ——, '63.	Right. Died August 16, 1863.
43	Conway, J., Pt., F, 11th Infantry, age 23.	July —, ——, '63.	Left. Re-amputation upper third. August 11, 1863, bone cut off. Died Aug. 18, 1863; exhaustion.
44	*Davis, J. D.*, Corp'l, D, 8th Virginia.	April —, ——, '65.	Right. Died May 5, 1865.
45	*Gohegan, T. O.*, Pt., D, 19th Mississippi.	—— 1863.	Right. Died August 18, 1863.
46	Goodman, E., Pt., D, 27th Pennsylvania.	—— 1863.	Right. June 18, hæm.; lig. of fem. art. Died August 9, 1863.
47	*Hall, J. H.*, Pt., E, 43d Tennessee.	——	Left thigh. Died July 2, 1864.
48	Heath, G. E., Pt., I, 12th Massachusetts.	July —, ——, '63.	Left. Died Sept. 12, 1863; diarrhœa.
49	*Jones, J. C.*, Pt., F, 122d New York, age 26.	May 6, ——, '64.	Left thigh. Died May 30, 1864.
50	*Mallory, I. T.*, Pt., E, 45th North Carolina, age 24.	July —, ——, '63.	Right. Died August 12, 1863.
51	Metz, J., Pt., A, 68th Pennsylvania.	July —, ——, '63.	Left. Died August 18, 1863.
52	*Milroy, J. T.*, Pt., E, 45th North Carolina.	July —, ——, '63.	Right. Died August 12, 1863.
53	*Robinson, J.*, Pt., B, 45th North Carolina.	July —, ——, '63.	Left. Died August 14, 1863.
54	*Sheperd, W. B.*, Pt., E, 45th Georgia, age 30.	—— Aug. 9, —	Left. Died August 19, ——; pyæmia.
55	Simons, L., Pt., F, 7th N.Y. H'vy Art., age 27.	June 3, ——, '64.	Left. Diarrhœa. Died July 9, 1864; exhaustion.
56	Spiess, H., Pt., I, 67th Ohio, age 23.	May 10, ——, '64.	Left. June 5, erysipelas. Died August 13, 1864; exhaustion.
57	Suggett, T., Pt., G, 24th Michigan.	July 1, ——, '63.	——. Died August 3, 1863.
58	*Sutton, O. D.*, Pt., D, 45th Georgia.	——	Left thigh. Died May 30, 1864.
59	Thomas, H. L., Pt., F, 45th Penn., age 18.	June 16, ——, '64.	Left thigh. Died July 29, 1864.
60	*Walrom, J. P.*, Lieut., D, 28th Virginia.	July —, ——, '63.	Right thigh. Died July 30, 1863.
61	White, T. H., Pt., I, 6th Wisconsin, age 19.	Aug. 18, ——, '64.	Right. Died September 14, 1864; wound.
62	Williams, C., Contrab'nd, Government employé.	—— Feb. 22, 1865.	——; circ. A. Surg. J. E. McGirr, U. S. V. Died Feb. 22, 1865; prostration.
63	*Wingfield, W. L.*, Pt., D, 58th Virginia, age 19.	—— Au. 13, —	Right. Died of pyæmia and pneumonia within ten days.
64	*Bennett, W.*, Pt., B, 13th South Carolina, age 19.	May 3, '63, ——	——; circular.
65	Carmonay, D., Pt., K, 5th Michigan.	——	Left thigh; circular. Not a pensioner.
66	*Coleman, J. L.*, Pt., B, 9th Virginia Cavalry.	——	Right thigh.
67	*Daniels, W.*, Pt., K, 6th Alabama.	——	Left thigh.
68	*Edwards, W. H.*, Pt., G, 41st Virginia.	——	Left thigh.
69	Fullerton, W., Pt., G, 60th Ohio, age 44.	Se. 30, '64, ——	——. Not a pensioner.
70	Phelix, —, Colored servant, age 25.	——	Left thigh.

[1] SMITH (E. H.), *Report of Cases of Compound Comminuted Fracture of Femur*, in *Confed. States Med. and Surg. Jour.*, 1864, Vol. I, p. 24.

Amputations in the Lower Third of the Thigh, of Uncertain Date.—This group comprises one hundred and four cases, with thirty-seven recoveries, sixty-one deaths, and six cases in which the final result could not be ascertained. The operations were performed on thirty-two Union and seventy-two Confederate soldiers; thirty-seven amputations being on the right and forty-six on the left side, while in twenty-one this point was not recorded. The seat of the injury was in the lower third of the femur in fifty-two, in the knee joint in twenty seven, in the leg in twenty-four, and in the foot in one instance. In one of the fatal cases the patient had undergone amputation of the arm, and, in a second, hæmorrhage from the femoral artery was followed by ligation of that vessel.

TABLE XLIV.

Condensed Summary of One Hundred and Four Cases of Amputations in the Lower Third of the Thigh, of Uncertain Date.

[Recoveries, 1–37; Deaths, 38–98; Result unknown, 99–104.]

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.	No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1	*Adams, R. T.*, Pt., H, 21st Virginia, age 19.	June 2, ——,'64.	Left. Retired February 10, 1865.	34	*Tunstall, P. A.*, Serg't, B, 34th Virginia.	——— 1864.	Left. Furloughed December 16, 1864.
2	*Allen, W. S.*, Captain, E, 2d Mississippi.	Sept. 17, ——,'62.	Left. Surg. A. Y. P. Garnett, P. A. C. S. Recovered.	35	*Whitaker, J.*, Capt., E, 47th Alabama.	July 2, ——,'63.	Left; circular. Prison October 22, 1864.
3	*Bowen, B.*, Pt., G, 1st South Carolina.	Sept. 30, ——,'64.	Right. Furloughed December 9, 1864.	36	*Witherspoon, J. C.*, Lt., D, 1st S. Carolina.	Sept. 30, ——,'64.	Left. Furloughed November 9, 1864.
4	*Burns, G.*, Pt., D, 50th Virginia.	July —, ——,'63.	Right; bi-lateral flaps. Paroled August 24, 1863.	37	Young, J. E., Pt., H, 7th Maine, age 17.	May 14, ——,'64.	Left. Furloughed June 29, 1864. Not a pensioner.
5	*Chamberlain, W. A.*, Pt., A, 61st Georgia.	June 27, ——,'64.	Left; flap. Discharged July 17, 1865.	38	Ames, E. T., Pt., I, 1st N.Y. Dragoons, age 26.	May 7, ——,'64.	Left thigh. Died June 25, 1864.
6	*Clarke, S.*, Pt., E, 23d North Carolina.	May 3, ——,'63.	Right. Furloughed June 16, '63.	39	*Aslwood, T. W.*, Pt., C, 12th Virginia Cavalry.	———	——. Hæmorrhage. Died Oct. 1, 1863; pyæmia.
7	*Coffee, L.*, Pt., E, 22d Alabama, age 19.	———	Left; flap. Prison July 4, 1865.	40	*Becker, C.*, Pt., C, 2d Tennessee, age 25.	———	Left; circular. Died May 19, 1865.
8	*Craft, J. H.*, Pt., F, 7th Tennessee, age 20.	——— 1864.	——. Retired December 29, '64.	41	*Blackwood, J.*, Pt., H, 49th North Carolina.	———	Left. Died September 14, 1864.
9	*Fields, L.*, Pt., Latham's Battery.	M'y31,'62.	Right. Furloughed October 5, 1864.	42	Boorman, E., Pt., C, 6th New Jersey.	May 5, ——,'62.	——. Died May 14, 1862.
10	*Foster, S.*, Pt., A, 33d Alabama.	J'e 2,'64.	——; circular. Transferred.	43	Bostwick, D., Pt., C, 2d Michigan.	Nov. 24, ——,'63.	Right. Died December 10, 1863.
11	*Fountain, A. G. C.*, Pt., E, 6th S. C., age 29.	——— 1865.	Right. Provost Marshal May 31, 1865.	44	*Bradley, T. C.*, Pt., K, 22d North Carolina.	———	Right. Died September 1, 1864.
12	*Foust, E. B.*, Pt., B, 13th Mississippi, age 21.	Nov. 29, 1863.	Left. Retired March 15, 1865.	45	*Burgoy, H. C.*, Pt., F, 44th Georgia.	———	Left. Died October 31, 1862.
13	*Gonton, A.*, Pt., F, 25th North Carolina.	———	——. Retired January 19, 1865.	46	*Byles, M.*, Pt., F, 55th North Carolina.	——— 1864.	Left. Died September 13, 1864.
14	*Hoye, H. H.*, Serg't, Falling Battery, age 23.	Sept. 30, ——,'64.	Left. Prison April 14, 1865.	47	Collins, J. C., Pt., C, 2d N. York M. R., age 29.	May 31, ——,'64.	Left thigh. Died June 6, 1864.
15	*King, W. A.*, Corp'l, L, 1st South Carolina.	Aug. 16, ——,'64.	Right. Furloughed September 2, 1864.	48	Connelly, J. A., Pt., G, 100th Pennsylvania.	Nov. 21, ——,'63.	Right. Surg. G. B. Cogswell, 29th Mass. Died Dec. 6, 1863.
16	*King, W. H.*, Pt., F, 2d Mississippi, age 23.	Sept. 17, ——,'62.	Right. Dr. Eads. Transferred March 3, 1863.	49	Duffy, S. K., Pt., D, 48th New York.	July 18, ——,'63.	Right thigh. Died July 31, 1863.
17	*Kleckley, J. F.*, Pt., A, 10th Georgia.	Aug. —, ——,'64.	Right. Furloughed October 21, 1864.	50	*Evins, N.*, Pt., H, Cobb's Georgia Legion.	——— 1864.	——. Died November 19, 1864.
18	*Loney, S. L.*, Pt., B, 26th North Carolina.	———	Right. Furloughed October 6, 1864.	51	*Faircloth, J.*, Pt., A, 59th Georgia.	Sept. 30, ——,'64.	Right. Died January 26, 1865.
19	*Maddox, M.*, Corp'l, F, 7th S. Carolina, age 19.	July 1, ——,'63.	Right. Exchanged March 17,'64.	52	*Fowler, W. S.*, Pt., B, 10th N. Carolina Artillery.	———	Left thigh. Died March 29, 1865.
20	*Mahoney, D. A.*, Corp'l, A, 60th Alabama.	———	Right. Discharged October 9,'65.	53	Freeland, J. A., Pt., G, 5th New Jersey.	May 5, ——,'62.	Left thigh. Died May 20, 1862.
21	*Maud, J. P.*, Pt., F, 10th Virginia Cavalry.	May 22, ——,'64.	Left. Surg. — Douglas, C. S. A. Recovered.	54	*Glisson, J.*, Pt., A, 11th Florida.	———	Right. Died September 16, 1864.
22	*McVey, W. J.*, Pt., F, 37th Virginia, age 24.	Mar. 23, 1862.	Right. Retired March 27, 1865.	55	Hamilton, W., Pt., 124th New York, age 44.	May 3, ——,'63.	Right thigh. Died June 16, 1863.
23	*Nowland, J.*, Serg't, B, 1st Ga., Cobb's Legion.	Sept. 17, ——,'62.	Left thigh. Recovered.	56	Harmon, J. E., Pt., G, 79th Pennsylvania.	Oct. 8, ——,'62.	——. Died November 2, 1862.
24	*Painter, S. B.*, Pt., H, 65th N. C., age 19.	April 2. ——,'65.	Left. Discharged from hospital July 2, 1865.	57	Ingalls, A. S., Major, 40th New York.	——— 1862.	Right; double flap. Died Aug. 11, 1862.
25	*Parks, J. D.*, Pt., A, 2d Mississippi.	July 21, ——,'61.	——. Discharged October 4, '61.	58	Johnson, D. R., Pt., I, 82d New York.	July —, ——,'63.	——. Died July 31, 1863.
26	*Phillips, E.*, Serg't, C, 6th Miss., age 23.	Nov. 20, ——,'64.	Left; ant. posterior flap. Provost Marshal March 7, 1865.	59	Knapp, E., Pt., A, 4th Vermont, age 34.	May 5, ——,'64.	Right; circ. Died May 28, 1864; exhaustion.
27	*Prong, A.*, Pt., H, 2d Louisiana.	May 27, ——,'63.	Left. Duty August 17, 1863.	60	*Knox, J. P.*, Pt., B, 13th North Carolina.	May 5, ——,'62.	——. Died May 16, 1862; hæmorrhage.
28	*Reed, A.*, Pt., B, 5th S. Carolina.	———	Left. Furloughed December 16, 1864.	61	Kurach, C., Pt., D, 10th Ohio.	Oct. 8, ——,'62.	Left. Died November 4, 1862.
29	*Ryan, E.*, Pt., B, 5th Confederate, age 35.	June 25, ——,'64.	Left. Retired December 31, '64.	62	Lovell, D. O., Pt., H, 25th Massachusetts, age 25.	May 16, ——,'64.	Right thigh. Died June 17, '64.
30	*Stone, S. M.*, Pt., I, 55th North Carolina.	July —, ——,'63.	Right. Exchanged November 12, 1863.	63	Lovell, W. H., Pt., B, 72d New York.	July 2, ——,'63.	——. Died July 26, 1863.
31	*Stroud, E. D.*, Pt., H, 8th Alabama.	July 2, ——,'63.	Right. Furloughed October 1,'63.	64	Maloy, P., Pt., D, 5th Cavalry.	June 27, ——,'62.	——. Died July 9, 1862.
32	*Talley, W. O.*, Pt., G, 23d Virginia, age 22.	May 5, ——,'64.	Left. Retired January 20, 1865.	65	Martin, C., Pt., I, 38th Illinois.	——— 1862.	Left. Died October 8, 1862; pyæmia.
33	*Thurman, M. P.*, Pt., K, 6th South Carolina.	June 12, ——,'64.	Right. Furloughed October 21, 1864.	66	Martin, G. C., Pt., G, 2d Maine.	April —, ——,'62.	Left thigh. Died June 10, 1862.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
67	Maxey, D. M., Serg't, C, 3d Maine.	July 2, ——,'63.	Right. Died August 14, 1863.
68	*May, G.*, Pt., I, 55th N. Carolina.	———	Right. Died September 10, 1864.
69	*May, J.*, Pt., K, 9th Alabama, age 20.	J'y30,'62.	——. Surg. — Thorn, C. S. A. Died Sept. 3, 1862.
70	*McDonald, J. M.*, Pt., G, 21st Georgia.	———	——. Hæmorrhage. Died July 26, 1863.
71	*McElveen, E.*, Pt., E, 20th Georgia, age 18.	May 28, ——,'64.	Left. Died August 14, 1864.
72	McGovern, J., Pt., H, 9th Massachusetts.	J'y30,'62.	——. Died August 5, 1862; exhaustion.
73	McKenzie, J. R., Pt., E, 1st Minnesota.	July 3, ——,'63.	Left thigh. Died August 7, 1863.
74	*McKerroll, J. M.*, Ensign, C, 1st S. C. Cavalry.	———	Right. Died August 22, 1864.
75	Miller, M. S., Pt., E, 116th Ohio.	June 5, ——,'64.	Right. Died September 11, 1864.
76	Mingle, E., Serg't, A, 148th Pennsylvania.	July 3, ——,'63.	Right. Died August 1, 1863.
77	*Myers, A. R.*, Pt., I, 48th Virginia.	May 6, ——,'64.	Right. Died May 17, '64; mortification of stump.
78	*Myers, G. R.*, Pt., E, 6th Virginia Cavalry.	———	Left; slough; hæm.; lig. fem. art.; hæm. recur'd. Died Oct. 10,'64.
79	*Nettles, W.*, Pt., C, 11th South Carolina.	——— 1864.	Left. Died September 14, 1864.
80	*Peele, J. J.*, Pt., C, 3d N. C. Artillery, age 19.	———	Left. Died February 12, 1865; pyæmia.
81	*Pegram, S.*, Pt., E, 22d North Carolina.	———	Left. Died September 20, 1864.
82	Pellett, S. S., Pt., D, 4th Louisiana, age 24.	———	——; circular. Died August 20, 1864.
83	*Peterson, S.*, Pt., I, 56th North Carolina.	——— 1864.	Right. Died January 2, 1865.
84	Pilney, G. H., Pt., C, 2d N. Y. H. A., age 25.	June 3, ——,'64.	Left thigh. Died June 12, 1864.
85	*Poole, J.*, Pt., G, 13th Mississippi.	July 21, ——,'61.	——. Died August 28, 1861.
86	*Powers, E. G.*, Pt., K, 40th N. C., age 27.	———	Left; flap. Died February 12, 1865; pyæmia.
87	*Pridmore, F.*, Serg't, K, 41st Alabama.	———	Right thigh. Died April 6, 1865.
88	Reed, F., Pt., A, 53d Illinois.	July 12, ——,'63.	Left. (Amputation arm.) Died August 12, 1863.
89	*Rogers, J. H.*, Pt., A, 21st South Carolina.	———	Left. Died September 9, 1864.
90	*Seloy, A.*, Corp'l, K, 15th Louisiana.	———	——. Died June 20, 1863.
91	Smith, W. H. H., Pt., G, 55th Penn., age 22.	Sept. 29, ——,'64.	Right. Died October 23, 1864.
92	*Smoot, D. J.*, Lieut., G, 4th North Carolina.	——— 1864.	——. Died May 20, 1864.
93	Snyder, J., Pt., L, 2d Mich. Cavalry, age 33.	Dec. 25, ——,'63.	Right. Died April 12, 1864; congestion of the brain.
94	*Spain, H. P.*, Pt., D, 21st South Carolina.	———	Left thigh. Died June 9, 1864.
95	Templin, W. C., Corp'l, C, 73d Ohio.	July —, ——,'63.	Left thigh. Died August 9, 1863.
96	Thompson, G. T., Pt., F, 56th North Carolina.	———	Left thigh. Died April 12, 1865.
97	Walker, H., Pt., F, 27th Massachusetts, age 35.	July 14, ——,'64.	Right. Died August 3, 1864; exhaustion.
98	*Webb, J.*, Pt., C, 5th Arkansas.	Oct. 8, ——,'62.	Left. Died November 2, 1862.
99	*Barrett, J. L.*, Pt., H, 21st Virginia.	———	Right thigh.
100	*Fewell, J. W.*, Pt., A, 4th Virginia Cavalry.	——— 1865.	Right thigh.
101	*Prather, J.*, Pt., H, 41st Alabama.	———	Left thigh.
102	*Racer, W.*, Pt., Fry's Battery, Orange Art.	———	Left thigh.
103	Thomas, C., Pt., G, 5th Col'd Troops, age 22.	Sept. 29, ——,'64.	Left thigh.
104	*Tibbs, J. A.*, Pt., F, 50th Alabama.	——— 1865.	Left thigh.

Amputations in the Continuity of the Femur, of Uncertain Date, and without Indication of the Seat of Operation.—In three hundred and eleven cases of amputations of the thigh the interval between the injury and the operation and also the precise seat of the operation were not recorded. The operations were performed on three hundred and nine patients, in two instances both thighs having been amputated; seventy-nine, among them one with an amputation of both thighs, recovered, and two hundred and eleven perished, while the fate of nineteen could not be ascertained, giving a death-rate of 72.7 per cent. for the determined cases. Eighty-nine were Union, and two hundred and twenty were Confederate soldiers. The three hundred and eleven operations were on the right side in eighty-nine instances, on the left in one hundred, and not stated in one hundred and twenty-two. Such meagre details as are entered on the records of this Office will be found in the following table:

Table XLV.

Condensed Summary of Three Hundred and Eleven Cases of Amputations of the Thigh, of Uncertain Date and Seat.

[Recoveries, 1–80; Deaths, 81–292; Result unknown, 293–311.]

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1	*Barclay, R. G.*, Lieut., G, 5th Louisiana.	May 3, ——,'63.	Right. Furloughed October 26, 1863.
2	*Bass, J.*, Pt., F, 2d South Carolina.	July —, ——,'63.	——. Transferred Oct. 1, 1863.
3	*Bost, H. M.*, Pt., F, 1st North Carolina, age 18.	June 1, ——,'64.	Right. Retired January 24, 1865.
4	*Bowie, H. L.*, Capt., H, 6th Alabama.	May 12, ——,'64.	Left. On leave July 4, 1864.
5	*Boyle, J. R.*, Lieut., C, 12th South Carolina.	July 1, ——,'63.	Right. Furloughed March 12, 1864.
6	*Bristow, J. C.*, Pt., E, 5th Texas.	———	——. Discharged Oct. 16, 1862.
7	*Brown, E. Z.*, Pt., D, 1st South Carolina.	Sept. 30, ——,'64.	Right. Furloughed November 17, 1864.
8	*Brownfield, T. N.*, Pt., G, 9th Georgia.	Oct. 7, ——,'64.	Left. Furloughed December 24, 1864.
9	*Bullard, J. N.*, Pt., G, 12th Georgia.	May 3, ——,'63.	Left. Furloughed June 24, 1863.
10	*Carlisle, V.*, Pt., F, 40th Alabama.	———	Left thigh. Recovery.
11	*Carter, J. P.*, Pt., K, 2d Va. Cavalry, age 21.	———	Right. Retired February 16, 1865.
12	*Christian, J. O.*, Serg't, D, 8th Georgia.	Sept. 30, ——,'64.	Right. Furloughed December 27, 1864.
13	*Daniels, J. A.*, Pt., K, 9th Georgia.	Oct. 7, ——,'64.	Right. Retired December 16, '64.
14	*Dunkin, G. W.*, Pt., D, 33d North Carolina.	June 30, ——,'62.	——. Surg. — Hickerson, C.S.A. Recovery.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
15	*Dunn, S. M.*, Lieut., A, Cabell's Art'y Batt'n.	June 4, ——,'64.	Right. On leave August 12, 1864.
16	*Eargle, W. R.*, Corp'l, H, 13th South Carolina.	July 3, ——,'63.	Left. Paroled September 12, 1863.
17	*Edens, W. M.*, Pt., B, 9th Louisiana.	——,'65.	Left. Discharged September 26, 1865.
18	*Ennis, H.*, Pt., F, 26th North Carolina, age 38.	May 5, ——,'64.	Right. Retired February 23,'65.
19	*Evans, C.*, Pt., I, 47th North Carolina.	Oct. 14, ——,'63.	Left thigh. Furloughed.
20	*Fadeley, I. P.*, Pt., K, 33d Virginia.	July 21, ——,'61.	——. Recovery.
21	*Fears, E. B.*, Serg't, E, 3d Georgia.	——,'64.	Left. Furloughed January 17, 1865.
22	*Foster, J. A.*, Serg't, F, 52d North Carolina.	———	Right. Released June 14, 1865.
23	*Fowler, E. W.*, Lieut., C, 18th North Carolina.	——,'64.	Left. Transferred September 30, 1864.
24	*Frangan, A.*, Corp'l, C, 2d Missouri.	Oct. 8, ——,'62.	Left. Transferred March 10, '63.
25	*Gammon, G. D.*, Pt., D, 44th Virginia.	May 2, ——,'63.	——. Furloughed July 2, 1863.
26	*Gleadon, G. W.*, Pt., G, 19th Georgia.	Sept. 17, ——,'62.	——. Discharged from hospital March 4, 1863.
27	*Haymons, A.*, Pt., F, 12th Georgia.	Sept.——	Right. Discharged from hospital May 28, 1863.
28	*Hays, R. W.*, Pt., G, 17th Georgia.	———	——. Discharged October 13, '62.
29	*Hederick, H. J.*, Pt., E, 25th Virginia.	———	Right. Discharged August 29, 1862.
30	*Henderson, D. J.*, Pt., A, 35th North Carolina.	May 20, ——,'64.	Left. Furloughed July 26, 1864.
31	*Holmes, M. C.*, Lieut., H, 4th Texas.	Aug. 30, ——,'62.	Right. On leave September 26, 1863.
32	Huffman, W., Pt., I, 1st Ky. Cavalry, age 19.	Aug. 15, ——,'63.	Left Discharged December 1, 1864.
33	*Hughes, J.*, Pt., F, 54th North Carolina.	May 4, ——,'63.	Right. Furloughed June 11, '63.
34	*Ivie, L. C.*, Pt., F, 60th Georgia.	May 2, ——,'63.	Right. Furloughed June 25, '63.
35	*James, J. W.*, Lieut., A, 21st Georgia.	Nov. 14, ——,'63.	——. On leave February 11,'64.
36	*Jones, O. T.*, Pt., H, 2d S. C. Rifles, age 21.	Sept. 30, ——,'64.	Right. Retired February 3, 1865.
37	*Lawrence, J. H.*, Serg't, B, 4th Virginia.	Nov. 27, ——,'63.	Left. Furloughed April 1, 1864.
38	*Lawrence, P.*, Pt., B, 19th Louisiana, age 25.	———	Right. Retired October 19, 1864.
39	Lutz, C., Serg't, Marine Corps, U. S. N., age 29.	De. 9,'64.	Right. Surg. — ———, C. S. A. Discharged Nov. 17. 1865.
40	*Mathews, J.*, Pt., F, 32d North Carolina.	———	Right. Transferred April 9, '65.
41	*McDaniel, J. J.*, Serg't, F, 55th Georgia.	———	Left. Furloughed February 9, 1863.
42	Miller, S., Pt., A, 1st Mo. S. M. Cavalry.	———	——. Discharged May 13, 1862.
43	*Mims, R.*, Pt., H, 6th Georgia.	——,'63.	Right. Transferred August 3, 1863.
44	*Mook, L. A.*, Pt., G, 2d North Carolina Bat'ry.	July 3, ——,'63.	——. Transferred July 12, 1863.
45	*Morgan, E. C.*, Serg't, E, 2d S. Carolina Rifles.	———	Left. Furloughed March 17, '65.
46	*Moss, W.*, Pt., H, 4th Alabama.	July 21, ——,'61.	——. Discharged September 9, 1861.
47	*Mullen, W.*, Pt., D, 45th Alabama.	Oct. 8, ——,'62.	Left. Transferred February 11, 1863.
48	*Nunnery, J. M.*, Pt., A, 41st Louisiana.	———	Right. Paroled June 21, 1865.
49 50	*Parker, J. A.*, Pt., L, Cobb's Ga. Leg. Cav.	June 24, ——,'64.	Both. Furloughed Aug. 2, 1864.
51	*Patterson, P. B.*, Pt., Adam's Co. Hampton's S. Carolina Legion.	——,'61.	——. Discharged August 29,'61.
52	*Patterson, W.*, Pt., G, 27th North Carolina.	Sept. 17, ——,'62.	——. Discharged from hospital April 27, 1863.
53	*Perkins, C.*, Pt., B, 1st Louisiana.	———	——. Discharged October 20,'62.
54	*Pierce, T. M.*, Pt., B, Bradford's Battery, age 22.	———	Left; circular. Released July 13, 1865.
55	*Reid, A. J.*, Pt., I, 37th North Carolina.	———	——. Discharged October 7, '62.
56	*Rhoades, C. A.*, Serg't, B, 10th Georgia.	May 3, ——,'63.	Right. Furloughed June 23, '63.
57	*Roberts, C. M.*, Lieut., B, 1st N. C. Cavalry.	Aug. 15, ——,'64.	Right. Furloughed September 9, 1864.
58	*Robertson G. T. N.*, Corp., H, 13th N. Carolina.	July 3, ——,'63.	——. Paroled September 5, 1863.
59	*Robertson, J. A.*, Serg't, B, 12th Georgia, age 21.	Feb. 6, ——,'65.	Left. Retired March 17, 1865.
60	*Robinson, E. S. D.*, Pt., B, 1st South Carolina.	———	——. Discharged October 24, 1862.
61	*Rutledge, R. S.*, Corp'l, C, 1st South Carolina.	Sept. 30, ——,'64.	Right. Furloughed November 17, 1864.
62	*Segrist, D. F.*, Pt., B, 4th Alabama.	———	Right. Discharged June 26, 186–.
63	*Shippey, J.*, Pt., C, 5th South Carolina.	———	——. Discharged October 12,'62.
64	*Singleton, R. L.*, Serg't, C, 17th Tenn., age 22.	Dec. 31, ——,'62.	Left. Retired March 18, 1865.
65	*Smith, J.*, Pt., I, 1st Missouri L. A., age 22.	June 18, ——,'61.	Right. Discharged November 30, 1861.
66	*Smith, J. C.*, Pt., G, 11th South Carolina.	Oct. 27, ——,'64.	Right. Furloughed January 21, 1865.
67	*Spainhond, P.*, Pt., D, 53d North Carolina.	July —, ——,'63.	——. Exchanged October 22, 1863.
68	*Spears, A. D.*, Pt., H, 15th South Carolina.	July 28, ——,'64.	Left. Furloughed September 6, 1864.
69	*Stevens, J. G.*, Lieut., E, 4th Georgia.	Oct. 12, ——,'63.	Left. Furloughed November 11, 1863.
70	*Stone, J. L.*, Pt., B, 37th Virginia.	May 3, ——,'63.	——. Furloughed June 11, 1863.
71	*Stovall, J. E.*, Pt., B, 21st Georgia.	———	——. Discharged October 1, '62.
72	*Weeks, W.*, Pt., C, 34th North Carolina.	May 3, ——,'63.	Right. Furloughed July 6, 1863.
73	*Welch, J.*, Pt., D, 3d Arkansas.	Sept. 19, ——,'63.	Right. Retired December 31,'64.
74	*Whitly, D.*, Pt., H, 27th North Carolina.	———	Right. Transferred September 30, 1864.
75	*Whitman, R. F.*, Pt., A, 44th Alabama.	———	Left. Discharged November 5, 1862.
76	*Willis, H. C.*, Pt., B, 45th North Carolina.	Oct. 14, ——,'63.	Left. Furloughed November 12, 1863.
77	*Winslow, E. G.*, Pt., G, 29th Mississippi.	———	Right. Furloughed June 25, '63.
78	*Woodbridge, W. B.*, Lt. Col., 4th Va. Cavalry.	———	Right. On leave August 15, '64.
79	*Youngblood, W. S.*, Corp., A, 45th Georgia.	———	Left. Furloughed February 21, 1863.
80	*Zoble, J.*, Pt., E, 3d S. Carolina.	Nov. —, ——,'63.	Left. Furloughed March 14,'65.
81	*Abernathy, S. M.*, Pt., B, 28th North Carolina.	———	Right. Died May 27, 1864; pyæmia.
82	*Adicks, H.*, Pt., I, 27th South Carolina.	——,'64.	Left. Died August 26, 1864.
83	Allen, C. A., Pt., E, 1st Michigan Cavalry.	July 14, ——,'63.	——. Died October —, 1863; wound.
84	Allen, R., jr., Lieut., F, 1st Cavalry.	June 28, ——,'62.	Right. Died July 28, 1862.
85	*Amos, D. J.*, Serg't, I, 5th Georgia.	Dec. 5, ——,'63.	——. Died January 1, 1864.
86	*Angel*, —, Pt., —, 5th Texas.	——,'62.	——. Died September 5, 1862.
87	*Ashby, W.*, Pt., F, 8th North Carolina.	———	——. Died October 12, 1864.
88	Atridge, R., Corp'l, A, 6th Wisconsin.	Sept. 17, ——,'62.	Right. Died November 28, 1862.
89	*Ballentine, J. L.*, Serg't, A, 6th South Carolina.	———	Right. Died March 28, 1865.
90	Barbor, A., Pt., D, 3d Michigan.	Aug. 30, ——,'62.	——. Died September 22, 1862; diarrhœa.
91	Barlow, M., —, D, 109th New York, age 41.	——,'64.	Left. Died May 29, 1864.
92	*Baughan, R. E.*, Pt., D, 21st Virginia.	———	Left. Died June 4, 1865.
93	*Beaman, C. C.*, Pt., G, 3d Arkansas.	July —, ——,'63.	——. Died July 10, 1863.
94	*Bellflower, H.*, Pt., H, 14th Georgia.	——,'62.	Right. Died December 24, 1862.
95	*Blair, S. F.*, Pt., B, 38th Virginia.	July —, ——,'63.	——. Died July 15, 1863.
96	Bonnell, W., W., Pt., I, 26th New Jersey.	May 3, ——,'63.	Left. Died June 7, 1863.
97	*Bowen, A. P.*, Lieut., F, 4th Virginia.	——,'63.	Left. Died December 9, 1863.
98	Brayman, G., Pt., E, 52d Massachusetts, age 18.	June 14, ——,'63.	——. Died July 15, 1863.
99	Bresner, J., Pt., H, 9th New York.	Sept. 17, ——,'62.	Right. Died November 1, 1862.
100	*Brewer, J. C.*, Pt., D, 13th Mississippi.	———	Left. Died June 15, 1864; pyæmia.
101	*Bristor, P.*, Pt., C, 16th Tennessee.	Oct. 8, ——,'62.	——. Died October 28, 1862.
102	*Brown, J.*, Pt., L, 1st Texas.	July —, ——,'63.	——. Died July 10, 1863.
103	Bryant, J. S., Pt., I, 100th Ohio.	May 8, ——,'64.	Right. Died June 1, 1864.
104	*Bryant, T. D.*, Capt., A, 27th North Carolina.	———	Right. Died October 30, 1863.
105	Burrows, P. A., Pt., I, 57th Massachusetts.	May 6, ——,'64.	Left. Died June 1, 1864; exhaustion.
106	Burweniek, A., Pt., A, 1st Kansas.	Aug. 10, ——,'61.	——. Died August 24, 1861.
107	Butler, L. F., Pt., H, 2d Ohio Cav., age 18.	July 2, ——,'64.	Right. Died August 7, 1864.
108	*Butler, W. B.*, Pt., I, 50th Georgia.	July —, ——,'63.	Left. Died August 7, 1863.
109	Campbell, G. J., Corp'l, D, 10th Maine.	Aug. 9, ——,'62.	——. Died September 20, 1862.
110	Chadman, J. H., Colored Teamster.	July 3, ——,'63.	Left. Died August 13, 1863.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
111	*Chappel, H. J.*, Lieut., I, 21st South Carolina.	———	——. Died July 8, 1864.
112	*Chapple, J. A.*, Capt., E, 3d Virginia Cavalry.	——,'64.	Left. Died September 24, 1864.
113	*Cheevers, K.*, Pt., F, 34th Georgia.	———	Right. Died March 27, 1865.
114	Church, W., Pt., K, 5th Vermont, age 23.	——,'62.	Right. Died August 19, 1862; chronic diarrhœa.
115	Clark, J. R., Serg't, K, 115th New York.	——,'64.	Right. Died August 15, 1864.
116	*Comer, W. E.*, Pt., C., 34th North Carolina.	———	Left. Died April 8, 1865.
117	*Cone, T. J.*, Lieut., G, 18th Georgia.	———	Left. Died July 7, 1862.
118	Conklin, J.W., Lieut., K, 152d New York.	May 6, ——,'64.	Left. Supposed to be dead.
119	*Connor, J. B.*, Pt., F, 3d South Carolina.	——,'62.	——. Died December 29, 1862.
120	Cook, G. M., Pt., B, 28th New York.	Aug. 9, ——,'62.	——. Died August 29, 1862.
121	Cooper, J., Pt., C, 73d Illinois.	Oct. 8, ——,'62	Right. Died October 30, 1862.
122	*Copage, W. F.*, Pt., A, 8th N. Carolina, age 17.	June 3, ——,'64.	Right. Died June 15, 1864.
123	Crews, B., Pt., E, 2d N. Carolina Battery.	July —, ——,'63.	——. Died July 16, 1863.
124	Crowley, T., Pt., A, 1st Minnesota.	July 3, ——,'63.	Right. Died July 27, 1863.
125	*Cunningham, P.*, Pt., E, 5th North Carolina.	July 6, ——,'63.	Left. Died July 17, 1863.
126	*Dampert*, —, Pt., H, 4th Alabama.	———	——. Died September 4, 1862.
127	*Darnsoe, C. S.*, Serg't, D, 14th South Carolina.	July —, ——,'63.	Right. Died July 23, 1863.
128	*Dew, J.*, Pt., B, 44th N. Carolina.	———	Left. Died October 23, 1863.
129	*Donohoe, F.*, Pt., B, 15th Louisiana.	———	——. Died September 20, 1862.
130	*Dowdy, J.*, Pt., B, 11th Virginia.	——,'64.	Left. Died May 22, 1864.
131	Duffield, W., Pt., D, 86th Illinois.	June 27, ——,'64.	Right. Died August 8, 1864.
132	Dunbar, A.B., Pt., I, 33d Massachusetts.	May 15, ——,'64.	Left. (Also fracture right femur.) Died June 25, 1864.
133	Everett, D., Pt., E, 7th Ohio.	Sept. 17, ——,'62.	——. Died October 9, 1862.
134	*Falley, J. S.*, Corp'l, K, 11th Georgia.	———	Right. Died September 31, 1862.
135	*Fant, L. T.*, Pt., A, 11th Mississippi.	——,'62.	Left. Sloughing; pyæmia. Died December 26, 1862.
136	Farris, R. E., Corp'l, G, 10th Maine.	Aug. 9, ——,'62.	——. Died September 5, 1862.
137	Fieldsend, H., Pt., I, 5th Connecticut.	Aug. 9, ——,'62.	——. Died August 19, 1862.
138	*Fleming, J.*, Pt., K, 7th Louisiana.	———	Left. Died October 12, 1863; pyæmia.
139	*Frank, A.*, Pt., I, 5th Louisiana.	———	——. Died May 31, 1862.
140	*Freeman, B.*, Pt., —, 5th Texas.	———	——. Died September 7, 1862.
141	Freeman, G., Pt., H, 26th Michigan, age 22.	——,'64.	Left. Died June 17, 1864.
142	*Funderbunk, F.*, Pt., E, 8th Georgia.	July 21, ——,'61.	——. Died August 28, 1861.
143	*Gamage, T. B.*, Pt., E, 9th Georgia.	Dec. 5, ——,'63.	——. Died January 1, 1864.
144	Geron, A. D., Pt., C, 84th New York, age 22.	July 21, ——,'61.	——. Died August 13, 1861.
145	*Gilbert, S. P.*, Pt., D, 28th North Carolina.	———	——. Died September 13, 1862.
146	Gillespie, P., Pt., K, 2d Michigan.	July 11, ——,'63.	Left. Died July —, 1863.
147	Glave, F., Pt., A, 1st Minnesota.	July —, ——,'63.	——. Died August 3, 1863.
148	*Goldsticker, J. A.*, Pt., A, 4th Texas.	July —, ——,'63.	Left. Died July 15, 1863.
149	Goodin, H., Pt., I, 39th Illinois, age 47.	——,'64.	Left. Died August 10, 1864.
150	*Goodman, E.*, Serg't, D, 27th North Carolina.	———	Right. Died January 29, 1864; anæmia.
151	*Goodson, J. H.*, Pt., B, 18th North Carolina.	July —, ——,'63.	——. Died July 14, 1863.
152	*Gow, E. J.*, Pt., F, 1st South Carolina Cav.	———	——. Died September 30, 1862.
153	*Goynes, D.*, Pt., B, 14th Louisiana.	———	——. Died January 5, 1863.
154	*Grady, J. W.*, Pt., E, 30th North Carolina.	———	——. Died October 25, 1863.
155	*Greer, J. N.*, Pt., C, 9th Georgia.	———	——. Died August 9, 1864.
156	*Haines, F.*, Pt., A, 8th Virginia.	Oct. 21, ——,'61.	——. Died November 5, 1861.
157	*Hall, H.*, Pt., H, 18th North Carolina.	July —, ——,'63.	——. Died July 22, 1863.
158	Hamlet, B. O., Pt., A, 2d U. S. S. S.	July —, ——,'63.	Left. Died July 20, 1863.
159	Hamlin, J., Pt., D, 1st Penn. Rifles, age 28.	———	Right. Died June 28, 1864.
160	*Hancock, T.*, Pt., I, 5th North Carolina.	July —, ——,'63.	——. Died July 12, 1863.
161	*Hannah, E. B.*, Pt., G, 45th Georgia.	July —, ——,'63.	——. Died July 27, 1863.
162	Hardsaw, D., Pt., B, 17th Iowa.	May 14, ——,'63.	Left. Died August 15, 1863.
163	Harner, W. T., Serg't, E, 98th Ohio, age 39.	Oct. 8, ——,'62.	——. Died November 9, 1862.
164	Hartneady, P., Pt., B, 69th New York, age 26.	——,'64.	——. Died June 11, 1864.
165	*Hatley, D.*, Pt., K, 21st North Carolina.	July —, ——,'63.	——. Died July 24, 1863.
166	*Hawes, J. E.*, Lieut., G, 2d Virginia Battery.	———	Left. Died December 24, 1862.
167	*Hedrick, W.*, Pt., C, 1st N. Carolina Jun. Res.	———	Left. Died March 25, 1865; erysipelas and tetanus.
168	*Henderson, J. M.*, Pt., F, 2d South Carolina.	———	Right. Died June 1, 1863.
169	*Hera, E. A. W.*, Pt., D, 7th Tennessee.	———	——. Died September 16, 1862.
170	Hernandez, I., Pt., C, 39th New York.	May 6, ——,'64.	Left. Died June 13, 1864.
171	*Hill, L. N.*, Pt., G, 14th Georgia.	———	——. Died January 9, 1863.
172	*Hinds. L. A.*, Pt., H, 1st South Carolina.	——,'64.	Right. Died October 15, 1864; pneumonia.
173	Hoffman, A., Pt., C, 30th New York.	Sept. 17, ——,'62.	Right. Died November 17, 1862.
174	*Holder, G. A.*, Pt., H, 6th Alabama.	———	Left. Died May 27, 1864; pyæmia.
175	*Holmes, B.*, Pt., F, 57th North Carolina.	July —, ——,'63.	——. Died July 17, 1863.
176	*Holt*, —, Pt., Page's Battery.	July —, ——,'63.	Left. Died August 4, 1863.
177	*Holt, R. S.*, Pt., A, Morris's Artillery.	——,'63.	Right. Died October 1, 1863.
178	*Howard, T.*, Pt., —, 28th North Carolina.	July —, ——,'63.	——. Died July 19, 1863.
179	*Howse, A. J.*, Pt., C, Cobb's Legion.	———	——. Died June 16, 1863.
180	*Irwin, J. C.*, Pt., E, 37th Mississippi.	Oct. 8, ——,'62.	——. Died October 21, 1862; pyæmia.
181	*Jackson, F.*, Pt., G, 27th North Carolina.	———	Right. Pyæmia. Died March 21, 1865.
182	*Jenkins, S.*, Serg't, B, 6th Louisiana.	——,'65.	Right. Died April 11, 1865.
183	Johns, —, Corp'l, E, 2d Infantry.	Aug. 10, ——,'61.	——. Died August 20, 1861.
184	*Johnson, W.*, Pt., F, 1st Tennessee.	Oct. 2, ——,'62.	——. Died October 26, 1862.
185	Johnston, A., Pt., D, 80th Ohio.	Oct. 3, ——,'62.	Right. Died December 13, 1862.
186	Keith, A. B., Corp'l, I, 7th Massachusetts.	May 3, ——,'63.	Left. Died June 2, 1863.
187	*Kelly, M.*, Pt., H, 43d North Carolina.	———	Right. Died May 22, 1864.
188	Kendrick, I. L., Pt., A, 10th Maine.	Aug. 9, ——,'62.	——. Died August 16, 1862.
189	*King, D. R.*, Capt., B, 48th Alabama.	———	——. Died November 26, 1862.
190	Lair, A., Serg't, C, 1st Penn. Cavalry.	Aug. 9, ——,'62.	——. Died September 23, 1862.
191	*Letellier, J. C.*, Pt., E, 19th Virginia.	——,'65.	Left. Died April 19, 1865.
192	*Loyd, B. F.*, Pt., G, 22d Georgia.	———	——. Died September —, 1862.
193	Mahon, S. B., Pt, D, 7th Penn. Reserves.	Aug. 31, ——,'62.	——. Died October 20, 1862.
194	*Mathews, J.*, Pt., I, 48th Georgia.	———	——. Died September 4, 1862.
195	*McBride, B.*, Pt., B, 42d Mississippi.	———	Right. Died June 3, 1864.
196	*McClendon, R. L.*, Pt., G, 61st Alabama.	——,'65.	Right. Died April 11, 1865.
197	*McCrae, F.*, Serg't, K, 8th South Carolina.	———	——. Died December 5, 1864.
198	*McCullough, W.*, Pt., K, 6th S. C. Cavalry.	——,'64.	Left. Died November 3, 1864.
199	*McDaniel, J. W.*, Pt., B, 2d Mississippi.	——,'61.	——. Died September 9, 1861.
200	*McDonald, J. T.*, Pt., B, 11th Georgia.	———	Left. Died May 22, 1864.
201	McElhany, J., Pt., C, 42d Pennsylvania.	J'ne 6,'62.	——. Died.
202	McGuire, M., Pt., G, 4th Infantry.	Sept. 17, ——,'62.	Left. Died September 29, 1862.
203	McMillen, A., Pt., A, 12th Infantry.	Aug. 9, ——,'62.	——. Died September 7, 1862.
204	McNaughton, J. B., 108th New York.	Dec. 13, ——,'62.	Left. Died December 26, 1862.
205	*Merrill, V. J.*, Pt., F, 19th Georgia.	———	——. Died September 25, 1862.
206	*Miles, J. E.*, Pt., H, 18th Georgia.	———	——. Died September 18, 1862.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
207	Miller, O. O., Pt., B, 145th Penn., age 23.	——,'64.	Left. Died May 23, 1864.
208	*Millirons, A. B.*, Pt., Jordon's Battery.	——,'63.	Left. Died August 4, 1863.
209	Minrieck, S., Corp'l, B, 10th Wisconsin.	Oct. 8, ——,'62.	——. Died October 14, 1862.
210	Mitchel, A. S., Pt., H, 7th Ohio Cavalry, age 21.	April 28, ——,'64.	——. Died October 14, 1864; chronic diarrhœa.
211	*Moss, T.*, Pt., C, 10th Georgia.	———	Right. Died June 20, 1863.
212	Moulton, A., Pt., G, 3d New Hamp., age 24.	Aug. 13, ——,'64.	Left. Died September 26, 1864.
213	*Mullen, J. H.*, Pt., G, 37th North Carolina.	July —, ——,'63.	——. Died July 13, 1863.
214	*Myers, G. N.*, Pt., A, 2d Virginia.	July 21, ——,'61.	——. Attempted to tie fem'l art.; had to amp. Died Aug. 13, '61.
215	*Nall, W. A.*, Pt., F, 68th North Carolina.	———	——. Died January 12, 1863.
216	*Nelms, W. M.*, Pt., D, 5th Texas.	———	——. Died September 7, 1862.
217	*Nelson*, W., Pt., A, Lowther's Battalion.	Oct. 22, ——,'64.	——. Jaundiced. Died Nov. 12, 1864.
218	*Nicholls, W.*, Pt., I, 27th Alabama, age 22.	Dec. 7, ——,'64.	Left. Died December 19, 1864; gangrene.
219} 220}	*Nunenger, G.*, Pt., A, 58th Virginia.	——,'62.	Both. Died August 17, 1862.
221	O'Neil, H., Pt., C, 1st Kansas.	Aug. 10, ——,'61.	——. Died August 21, 1861.
222	Otto, F., Pt., H, 1st Iowa, age 31.	Aug. 10, ——,'61.	——. Died August 25, 1861.
223	Padgett, T., Pt., I, 1st Artillery.	July —, ——,'63.	——. Died July 26, 1863.
224	Park, L. H., Pt., G, 21st Connecticut, age 34.	May 16, ——,'64.	Left. Died June 11, 1864.
225	Parker, S. M., Pt., A, 32d Mississippi.	Oct. 8, ——,'62.	Left. Died November 3, 1862.
226	Parrish, J. A., Pt., B, 12th Infantry.	Aug. 9, ——,'62.	——. Died August 23, 1862.
227	*Parvin, L.*, Pt., B, 7th Tennessee.	———	Left. Gangrene. Died September 24, 1864.
228	Penno, A. B., Pt., B, 1st Rhode Island.	July 21, ——,'61.	——. Died September —, 1861.
229	Perry, C., Pt., F, 15th Massachusetts, age 18.	Sept. 17, ——,'62.	——. Died eight days after amputation.
230	*Peterson, J. H.*, Pt., H, 33d Alabama.	Oct. 8, ——,'62.	Right. Died October 26, 1862.
231	*Pierce, W. F.*, Pt., G, 27th Mississippi.	———	Right. Died February 16, 1863.
232	Piper, L. R., Corp'l, F, 8th Penn. Reserves.	Dec. 13, ——,'62.	Right. Died January 1, 1863.
233	*Powell, C.*, Pt., E, 9th Virginia.	July —, ——,'63.	——. Died July 21, 1863.
234	Pritchet, J., Pt., G, 50th Indiana.	Sept. 14, ——,'62.	Left. Died November 26, 1862.
235	*Pritchett, T. R.*, Pt., K, 55th Virginia.	———	——. Also wound of lungs. Died December 9, 1863.
236	Quinn, W., Pt., —, 2d Vermont Battery.	June 14, ——,'63.	Left. Died August 20, 1863.
237	Radford, G., Corp'l, B, 26th New Jersey.	May 3, ——,'63.	Left. Died May 31, 1863.
238	*Rawls, J. T.*, Pt., C, 3d South Carolina Cav.	———	——. Died June 9, 1864.
239	Reaser, U., Pt., B, 151st Pennsylvania.	July 1, ——,'63.	——. Died July 23, 1863.
240	Reed, F., Pt., A, 53d Illinois.	July 12, ——,'63.	—— thigh and left arm amputat'd. Died August 12, 1863.
241	*Reese, J.*, Pt., E, 8th Georgia.	July 21, ——,'61.	——. Died August 18, 1861.
242	Rhinebast, J., —, 62d N. York, age 32.	May 31, ——,'62.	——. Died August 14, 1863; pyæmia.
243	*Roberts, A. J.*, Pt., I, 48th Alabama.	———	——. Died September 11, 1862.
244	*Robins, W. F.*, Pt., M, 22d North Carolina.	——,'63.	——. Died July 23, 1863.
245	Rogers, R., Corp'l, K, 2d N. Y. Artillery, age 21.	May 19, ——,'64.	Left. Died June 13, 1864.
246	Sann, J., Pt., A, 7th N. York Heavy Artillery.	——,'64.	Left. Died June 19, 1864.
247	*Saunders, W.*, Pt., F, 47th Alabama.	———	——. Sloughing. Died October 1, 1864; diarrhœa.
248	*Sax*, —, Capt., K, 37th Mississippi.	Oct. 8, ——,'62.	——. Died October 16, 1862; gangrene.
249	*Sensabaughn, W.*, Pt., E, 5th Texas.	July —, ——,'63.	Left. Died July 21, 1863.
250	Sheldon, H., Pt., C, 8th Michigan.	May 12, ——,'64.	Right. Died May 20, 1864.
251	*Simpson, R. H.*, Major, 17th Virginia.	———	——. Died June 15, 1864.
252	*Sink, J.*, Pt., F, 15th N. Carolina.	———	Left. Died October 23, 1863.
253	*Smoke, J.*, Pt., K, 11th South Carolina.	——,'64.	Right. Died June 5, 1864.
254	Spencer, S. G., Pt., D, 76th New York.	July —, ——,'63.	——. Died.
255	Stackhouse, S. W., Pt., G, 104th Penn.	June 1, ——,'62.	——. Died June 18, 1862.
256	Stanley, G., Pt., H, 63d Pennsylvania.	May 5, ——,'64.	Right. Died.
257	Stephens, G. W., Pt., F, 3d Vermont, age 40.	———	Right. Died June 11, 1864.
258	Sturtevant, E., Serg't, E, 11th New Jersey.	July —, ——,'63.	Left. Died July 13, 1863.
259	*Sullivan, D. C.*, Pt., E, 11th Mississippi.	——,'64.	——. Hæmorrhage. Died June 26, 1864.
260	*Sullivan, W. H.*, Pt., A, 49th Virginia.	——,'64.	Right. Died June 12, 1864.
261	*Tabor, J.*, Pt., C, 4th Virginia.	———	——. Gangrene. Died July 23, 1863.
262	*Taylor, W. L.*, Pt., E, 27th North Carolina.	———	——. Died November 21, 1863.
263	*Terrell, C.*, Pt., E, 15th Virginia.	———	——. Died May 25, 1864; nervous shock.
264	*Thornton, J. W.*, Corp'l, B, 40th Alabama.	———	Left. Died March 29, 1865.
265	*Tolin, E. S.*, Pt., I, 8th Alabama.	———	Right. Died February 12, 1864; pyæmia.
266	Tyler, E., Pt., E, 4th Rhode Island.	Sept. 17, ——,'62.	Right. Died October 13, 1862; hæmorrhage.
267	Tyrrell, J., Pt., I, 8th N. York H. Art'y, age 46.	Oct. 27, ——,'64.	Left. Died November 21, 1864.
268	Van Aman, J., Pt., A, 57th New York, age 20.	June 1, ——,'62.	——. Died June 9, 1862.
269	*Vanpell, J. S.*, Pt., H, 1st North Carolina.	——,'64.	Right. Died August 27, 1864.
270	*Vaughn, G. W.*, Pt., H, 40th North Carolina.	Mar. 31, 1865.	Right. Died under operation, March 31, 1865.
271	*Wade, H.*, Pt., C, Cobb's Georgia Legion.	———	Right. Died June 25, 1863.
272	*Wadkins, C.*, Serg't, H, 45th North Carolina.	July —, ——,'63.	——. Died July 23, 1863.
273	Wakefield, L., Pt., C, 3d Iowa.	July 12, ——,'63.	Left. Died July 25, 1863.
274	*Walker, J. M.*, Pt., F, 48th North Carolina.	———	Left. Died November 1, 1863; tetanus.
275	Wallron, W., Corp'l, E, 52d Pennsylvania.	May 31, ——,'62.	——. Died July 29, 1862.
276	Walls, J., Scout.	———	Right. Died February 4, 1865.
277	*Ward, J. D.*, Serg't, A, 4th Mississippi.	July —, ——,'63.	Left. Gangrene. Died August 19, 1863.
278	Ward, W. F., Corp'l, D, 57th Massachusetts.	May 6, ——,'64.	Right. (W'nd of left lung.) Died June 5. 1864; pyæmia.
279	*Wardlaw, J. S.*, Serg't, G, 9th Georgia.	Dec. 5, ——,'63.	——. Died January 7, 1864.
280	Weiand, J., Pt., F, 148th Penn., age 30.	May 12, ——,'64.	Left. Died June 17, 1864.
281	Welch, J., Pt., K, 98th Ohio.	Oct. 8, ——,'62.	Left. Died November 1, 1862.
282	Whitcher, J. S., Pt., I, 116th New York.	May 27, ——,'63.	Left. Died June 5, 1863.
283	*White, H. Y.*, Pt., I, 25th North Carolina.	——,'64.	Right. Died August 29, 1864.
284	*Wilkerson, J.*, Pt., E, 1st Georgia Cavalry.	——,'64.	Left. Died August 23, 1864.
285	*Williamson, W. W.*, Pt., H, 57th Alabama.	———	Left. Died June 17, 1864.
286	*Willis, W. W.*, Pt., I, 21st Virginia.	Aug. 9, ——,'62.	——. Died September 23, 1862.
287	Wilson, C., Corp'l, B, 7th Ohio.	Aug. 9, ——,'62.	——. Died August 17, 1862.
288	*Wilson, T.*, Pt., D, 18th Mississippi.	Oct. 21, ——,'61.	——. Died October 28, 1861.
289	*Wingo, M. S.*, Pt., F, 18th Georgia.	——,'63.	——. Died June 1, 1863.
290	*Wood, P. S.*, Lieut., C, 4th Texas.	———	——. Died July 22, 1862; pyæmia.
291	*Wood, W. B.*, Serg't, I, 16th Tennessee.	Oct. 8, ——,'62.	Left. Died November 14, 1862; typhoid fever.
292	[1]Woods, J., Pt., C, 14th Louisiana.	———	——. Traumatic delirium; suicide.
293	*Balman, J. W.*, Pt., G, 2d South Carolina.	Oct. 7, ——,'64.	Left thigh.
294	*Bonnell, G. B.*, Pt., C, 2d Florida.	July —, ——,'63.	Left thigh.
295	*Campbell, W. G.*, Pt., D, 45th Alabama.	Oct. 8, ——,'62.	Left thigh.
296	Carnolf, J., Pt., B, 1st New Jersey Cavalry.	June 2, ——,'62.	—— thigh.
297	*Champion, J. A.*, Pt., G, 66th Georgia.	———	Right thigh.
298	*Collins, B. R.*, Pt., F, 13th Georgia.	———	Right thigh.
299	*Cousins, W. T.*, Capt., C, 17th Georgia.	——,'64.	Left thigh.
300	*Earheart, R.*, Lieut., C, 54th Virginia.	———	Left thigh.
301	*Freret, J.*, Pt., —, Washington Artillery.	July —, ——,'63.	Left thigh.

[1] Hitchcock (A.). *Army Medical Intelligence*, in *Boston Medical and Surgical Journal*, 1862, Vol. LXVI, p. 361.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.	No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
302	*Gardin, W. J.*, Pt., H, 5th Georgia.	———	Right thigh.	307	*Mass, M.*, Pt., C, 49th North Carolina.	———	Right thigh.
303	*Hagler, J. G.*, Pt., D, 20th Alabama.	———	Right thigh.	308	*Norlow, J. R.*, Pt., D, 41st Georgia.	Oct. 8, ——,'62.	Right thigh.
304	*Hendrick, W. D.*, Pt., D, 55th North Carolina.	———	Left thigh.	309	*Odam, J. J.*, Pt., F, 1st South Carolina.	Sept. 30, ——,'64.	Left thigh.
305	*Humant, J. A.*, Capt., C, 12th South Carolina.	——,'64.	Left thigh.	310	*Tucker, D.*, Pt., F, 9th Arkansas.	———	Left thigh.
306	*Jones, H. E.*, A. A. G., Gracie's Brigade.	———	Right thigh.	311	*Williams, J.*, Pt., C, 1st Texas.	———	Right thigh.

The seat of fracture was recorded to have been in the lower third of the femur in two; in the femur, precise location not specified, in three hundred and four; in the knee joint in one; and in the leg in four instances. The two patients with amputations of both thighs were Confederate soldiers; one recovered and was furloughed, and has not been heard from since; the other died shortly after the operation.

Recapitulation.—Six thousand two hundred and twenty-nine cases of amputation in the shaft of the femur have been enumerated in Tables XXX to XLV, inclusive, and the results ascertained in all but eighty cases. Two thousand eight hundred and thirty-nine had successful and three thousand three hundred and ten fatal terminations, a mortality rate of 53.8 per cent. Had it been practicable to determine the issues in the eighty cases with unknown results the fatality rate would only be slightly modified. Assuming that all these eighty cases had proved fatal the mortality would be 54.4 per cent., an increase of only 0.6 per cent.; or, supposing all the eighty cases terminated successfully the decrease in the rate of mortality would be 0.7 per cent., leaving a fatality of 53.1 per cent., a deviation of only a little over one half of one per cent. from the percentage of fatality obtained in the determined cases.

In five thousand seven hundred and eleven of the six thousand two hundred and twenty-nine amputations in the femur the precise length of time between the injury and the operation was recorded. Three thousand nine hundred and forty-nine, or over two-thirds, were primary operations; one thousand three hundred and twenty intermediary, and four hundred and forty-two, only, secondary operations. In the three thousand nine hundred and forty-nine primary operations the results were not ascertained in forty-eight instances; one thousand nine hundred and fifty-eight were successful, and one thousand nine hundred and forty-three fatal, a mortality rate of 49.8 per cent. One thousand three hundred and twenty intermediary operations were followed by four hundred and seventy-nine recoveries and eight hundred and forty-one deaths, a fatality of 63.7 per cent. Four hundred and forty-two secondary operations comprise two hundred and thirty-nine recoveries and two hundred and three deaths, a mortality of 45.9 per cent. Of the remaining five hundred and eighteen cases in which the time between the injury and operation could not be ascertained, thirty-two were recorded as without result, one hundred and sixty-three as recoveries, and three hundred and twenty-three as fatal, a death rate of 66.4 per cent. The foregoing results differ somewhat from those obtained in the series of amputations of the arm (*Second Surgical Volume*, p. 805). In the latter, the primary operations gave a mortality of 18.4 per cent.; the intermediary, of 33.4; and the secondary, of 27.7 per cent.,—the fatality of the secondary operations exceeding that of the primary,—while in the femur the mortality of the primary amputations exceeds that of the secondary.

Considering the series of amputations in the continuity of the thigh according to the seat of the original injury (TABLE XLVI) it will be seen that the femur had been fractured in twenty-nine hundred,[1] or in 46.6 per cent. of the total number of amputations; the

TABLE XLVI.

Tabular Statement indicating the Seats of Injury in Six Thousand Two Hundred and Twenty-nine Cases of Amputation of the Thigh after Shot Fractures.

POINT AND PERIOD OF OPERATION.		CASES.	SEAT OF INJURY.																	
			FEMUR.												KNEE JOINT.		LEG.		ANKLE JOINT OR FOOT.	
			UPPER THIRD.			MIDDLE THIRD.			LOWER THIRD.			THIRD NOT INDICATED.								
			Recovery.	Fatal.	Undetermined.	Recovery.	Fatal.	Undetermined.	Recovery.	Fatal.	Undetermined.	Recovery.	Fatal.	Undetermined.	Recovery.	Fatal.	Recovery.	Fatal.	Recovery.	Fatal.
UPPER THIRD.	Primary	533	19	45	2	92	76	2	29	21	....	92	112	1	27	10	1	4	....	....
	Intermediary	147	4	14	....	16	34	....	5	10	....	14	16	....	8	21	3	2	....	....
	Secondary	55	1	2	....	7	5	....	3	8	....	6	1	....	7	8	6	1	....	....
	Period Unknown	33	....	6	....	1	3	....	....	2	....	11	10	....	.....	.....	.....	.....	.....	.....
MIDDLE THIRD.	Primary	1,157	.....	.....	.....	38	60	....	212	146	....	155	127	8	248	105	33	25	....	....
	Intermediary	471	.....	.....	.....	3	14	....	41	53	....	35	31	....	96	138	29	27	1	3
	Secondary	168	.....	.....	.....	3	4	....	15	8	....	11	1	....	42	26	25	23	6	4
	Period Unknown	70	.....	.....	.....	....	1	....	3	13	....	28	7	7	2	5	1	3	....	....
LOWER THIRD.	Primary	1,914	.....	.....	.....	.....	.....	.....	233	179	14	....	....	....	581	552	157	196	2	....
	Intermediary	676	.....	.....	.....	.....	.....	.....	18	23	....	....	....	....	121	292	73	129	5	15
	Secondary	207	.....	.....	.....	.....	.....	.....	13	4	....	....	....	....	33	40	45	46	16	10
	Period Unknown	104	.....	.....	.....	.....	.....	.....	24	22	6	....	....	....	8	19	5	19	....	1
SEAT NOT SPECIFIED.	Primary	345	.....	.....	.....	.....	.....	.....	8	6	....	31	275	21	.....	2	....	2	....	....
	Intermediary	26	.....	.....	.....	.....	.....	.....	1	1	....	6	12	....	.....	3	....	3	....	....
	Secondary	12	.....	.....	.....	....	1	....	....	1	....	....	1	....	.....	4	....	2	....	3
	Period Unknown	311	.....	.....	.....	.....	.....	.....	2	....	....	77	208	19	.....	1	1	3	....	....
Aggregates		6,229	24	67	2	160	198	2	607	497	20	466	801	56	1,173	1,226	379	485	30	36
			2,900												2,399		864		66	

knee joint in twenty-three hundred and ninety-nine, or 38.5 per cent.; the bones of the leg in eight hundred and sixty-four, or 13.8 per cent.; and the ankle joint or foot in sixty-six, or 1.1 per cent. Of the twenty-nine hundred amputations for shot fractures of the femur twelve hundred and fifty-seven were successful, fifteen hundred and sixty-three fatal, and eighty results could not be ascertained, a mortality of 55.4 per cent.; of these the amputations following fractures of the upper third had a fatality of 73.6 per cent.; those following fractures of the middle third a mortality of 55.3 per cent.; and those following fractures of the lower third a death rate of 45.0 per cent. The ratio of mortality of the twenty-three hundred and ninety-nine amputations following shot injuries of the knee was 51.1 per cent., eleven hundred and seventy-three patients having recovered, and twelve hundred and twenty-six having died. The mortality of the eight hundred and sixty-four amputations of the thigh for shot injuries of the leg was 56.1 per cent., four hundred and eighty-five of the eight hundred and sixty-four operations having proved fatal. Finally, the sixty-six

[1] While the total number of amputations following shot fractures of the femur as cited in this table, viz: 2,900, agrees with the total number of amputations as indicated in TABLE XX, page 175, *ante*, the figures in several of the subdivisions have been slightly modified, as, in the progress of the work, the results as well as the seats of fracture in several cases classified in TABLE XX as "undetermined" or "unspecified" were ascertained. Thus, the number of amputations for fractures of the upper third remains the same, 93 cases with 24 recoveries, 67 deaths, and 2 undetermined results. The amputations for fractures in the middle third are 360, as in TABLE XX, but the number of recoveries is increased by 2, while the undetermined cases number 2 less. Similarly the total number of amputations for fractures in the lower third is increased by 2, and those for fractures with unspecified seat decreased by 2, the seats of fracture in these cases having been determined since the publication of TABLE XX. Finally, the results have since been ascertained in 5 cases recorded in TABLE XX as undetermined with unspecified seat of injury, thus giving, in this group, 466 recoveries and 56 undetermined results instead of 461 recoveries and 63 unknown results.

operations for shot injuries of the ankle joint or foot were followed by thirty-six deaths, a fatality of 54.6 per cent. Thus it would seem that of the amputations in the thigh performed for shot fractures, those for fractures of the lower third of the femur offered the best chance for life.

The point of section or ablation in the thigh was in the upper third in seven hundred and sixty-eight, in the middle third in one thousand eight hundred and sixty-six, in the lower third in two thousand nine hundred and one, and in the femur, point not specified, in six hundred and ninety-four instances. The mortality rate of the first group was 53.8 per cent., of the second, 44.5, of the third, 53.6, and of the last, 80.7 per cent., the death rate being the largest in amputations in the upper third, next in the amputations of the lower third, and lowest in those of the middle third, a result differing from that obtained in the different thirds of the arm, where the operations in the upper third were less fatal than those in the lower third (*Second Surgical Volume*, pp. 805, 806), the percentage of fatality after amputation in the upper third being 18.4, in the middle third 16.4, and in the lower third 26.0 per cent.

Of the six thousand two hundred and twenty-nine amputations in the continuity of the femur the side was not indicated in seven hundred and nine cases. The right side was involved in two thousand six hundred and ninety-eight, the left in two thousand eight hundred and twenty-two. Of the former, one thousand two hundred and ninety-six recovered, one thousand three hundred and seventy-three died, and in twenty-nine cases the results were unknown, a death rate of 51.4; of the latter, one thousand three hundred and seventy-seven recovered, one thousand four hundred and sixteen died, and in twenty-nine cases the results were undetermined, a mortality of 50.7 per cent. This would point to the fact already noticed in the discussion on the amputations of the shoulder joint and arm (*Second Surgical Volume*, pp. 655, 806), that the left extremity, although most frequently interested, had a less proportionate fatality than the right; but the difference in the mortality rates of the two sides is too insignificant to allow conclusions to be drawn, especially as the number of undetermined cases is sufficiently large to materially modify the result.

As already stated on page 214, *ante*, the six thousand two hundred and twenty-nine operations were performed on six thousand two hundred and nine patients, twenty having submitted to amputations of both thighs.[1] Four thousand seven hundred and seventy-one were Union, and one thousand four hundred and thirty-eight were Confederate soldiers. Of the Union soldiers, two thousand and ninety-six recovered and two thousand six hundred and fifty-seven died, while the results in eighteen cases were undetermined, a mortality of 55.9 per cent. Of the Confederates, seven hundred and forty survived, six hundred and thirty-six died, and the fate of sixty-two remained undecided, a fatality of 46.2 per cent.

[1] Of the twenty cases of amputations of both thighs, three were successful, viz: Corporal M. Dunn, H, 46th Pennsylvania (CASE 448, p. 242, and Nos. 239, 240, TABLE XXXII, p. 248); Private *C. G. Rush*, C, 21st Georgia (CASE 449, p. 243, and Nos. 737, 738, TABLE XXXII, p. 254); Private *J. A. Parker*, L, Cobb's Legion Cavalry (Nos. 49, 50, TABLE XLV, p. 328). The seventeen fatal cases are: Pt. S. Baguley, B, 5th New Hampshire (No. 703, TABLE XXXI, p. 235, and No. 105, TABLE XXXIX, p. 105); Serg't T. Deud, C, 2d Michigan (CASE 442, p. 226, and Nos. 806, 807, TABLE XXXI, p. 236); Corp'l J. W. Woodworth, H, 11th Infantry (CASE 443, p. 226, and Nos. 1143, 1144, TABLE XXXI, p. 240); Pt. S. Allen, G, 59th Massachusetts, Nos. 984, 985, TABLE XXXII, p. 257); Pt. R. S. Michael, A, 105th Pennsylvania (Nos. 1551, 1552, TABLE XXXII, p. 263); Pt. D. Nicholson, H, 22d Massachusetts (Nos. 1599, 1600, TABLE XXXII, p. 264); Serg't E. C. Rabbit, B, 10th Missouri (Nos. 1652, 1653, TABLE XXXII, p. 264); Pt. J. Stewart, D, 77th New York (Nos. 1769, 1770, TABLE XXXII, p. 265); Lieut. J. Whelpley, D, 1st Maine (Nos. 1862, 1863, TABLE XXXII, p. 267); Pt. S. Goodwell, G, 29th Illinois (Nos. 128, 129, TABLE XXXIII, p. 269); Pt. *H. Kenner*, 4th Virginia (Nos. 169, 170, TABLE XXXIII, p. 270); Pt. C. Meyer, 30th Missouri (Nos. 212, 213, TABLE XXXIII, p. 270); Pt. W. F. Mills, E, 8th New York H. A. (No. 205, TABLE XXXIII, p. 270, and No. 495, TABLE XXXVI, p. 300). Pt. H. Tieman, C, 119th New York (Nos. 285, 286, TABLE XXXIII, p. 271); Pt. J. Moore, E, 46th Pennsylvania (Nos. 497, 498, TABLE XXXVI, p. 300); Pt. D. Wallace, I, 5th Artillery (Nos. 642, 643, TABLE XXXVI, p. 302); Pt. *G. Nunenger*, A, 58th Virginia (Nos. 219, 220, TABLE XLV, p. 330). Of the 20 cases, 2 were primary operations in the middle thirds; 8, primary operations in the lower thirds; 4, primary operations, the seat not recorded; 2, intermediary operations of both thighs in the lower thirds; 2, amputations of both thighs, time and operation not stated; 1, primary amputation of the right and intermediary of the left thigh, and 1, primary amputation of right and secondary operation in left thigh.

The following tabular statement will enable the reader to compare the results of the amputations in the thigh of the American civil war with those of other wars:

TABLE XLVII.

Results of Amputations of the Thigh on the Occasions named and from the Authorities quoted.

ACTION, ETC.	AMPUTATIONS.				PRIMARY OPERATIONS.			INTERMEDIARY OPERATIONS.			SECONDARY OPERATIONS.			OPERATIONS OF UNKNOWN DATE.		
	Cases.	Recoveries.	Deaths.	Result Unknown.	Recoveries.	Deaths.	Result Unknown.	Recoveries.	Deaths.	Result Unknown.	Recoveries.	Deaths.	Result Unknown.	Recoveries.	Deaths.	Result Unknown.
Siege of Spires, 1689 (DIONIS[1])	1	.....	1	....	.....	.....	....	.....	1	....	.....	.....	....	.....	.....	...
Battle of Mollwitz, 1741 (SCHMUCKER[2])	1	1	.....	....	1	.....	....	.....	.....	....	.....	.....	....	.....	.....	....
Battle of Dettingen, 1743 (HOME[3])	1	.....	1	....	.....	.....	....	.....	.....	....	.....	1	....	.....	.....	....
Battle of Fontenoy, 1745 (FAURE,[4] BOUCHER,[5] BAGIEU[6])	4	2	2	....	.....	1	....	.....	1	....	2	.....	....	.....	.....	....
Siege of Tournay, 1745 (BOUCHER[7])	1	.....	1	....	.....	.....	....	.....	1	....	.....	.....	....	.....	.....	....
Germany, 1756–1763 (MEHÉE,[8] MURSINNA[9])	3	2	1	....	.....	.....	....	.....	.....	....	.....	1	....	2	.....	....
Napoleonic Wars, 1791–1815 (LARREY,[10] HENNEN,[11] GUTHRIE,[12] EUDES,[13] CARRÉ,[14] MIREAU,[15] ARNAL,[16] KLEIN[17])	198	112	77	9	49	21	4	.....	.....	....	54	53	5	9	3	....
War of 1812–14 (MANN[18])	4	2	2	....	.....	.....	....	2	2	....	.....	.....	....	.....	.....	....
Revolution in Paris, 1830 (ARNAL,[19] MENIÈRE,[20] D. J. LARREY,[21] H. LARREY,[22] ROUX[23])	23	9	14	....	4	4	....	1	7	....	2	2	....	2	1	....
Siege of Antwerp, 1832 (H. LARREY[24])	15	13	2	....	12	2	....	1	.....	....	.....	.....	....	.....	.....	....
French in Algiers, 1830–1836 (BAUDENS[25])	35	17	18	....	.....	.....	....	.....	.....	....	.....	.....	....	17	18	....
Spanish Peninsular War, 1836–37 (ALCOCK[26])	37	12	23	2	5	11	1	.....	.....	....	7	12	1	.....	.....	....
Campaign of Constantine, 1837 (SÉDILLOT[27])	8	1	7	....	.....	.....	....	.....	.....	....	1	7	....	.....	.....	....
Campaign in Mexico, 1847 (PORTER,[28] JARVIS[29])	5	1	4	....	1	4	....	.....	.....	....	.....	.....	....	.....	.....	....
Revolution in Milan, 1848 (RESTELLI[30])	18	8	10	....	7	4	....	.....	.....	....	1	6	....	.....	.....	....
Paris, 1848 (HUGUIER,[31] AMUSSAT,[32] BAUDENS,[33] JOBERT,[34] MALGAIGNE,[35] ROUX[36])	20	7	12	1	2	3	....	.....	3	....	3	3	1	2	3	....
Sleswick-Holstein, 1848–1850 (STROMEYER,[37] DJÖRUP[38])	218	90	128	....	.....	.....	....	.....	.....	....	.....	.....	....	90	128	....
Revolution in Baden, 1849 (BECK[39])	13	7	6	....	5	1	....	.....	.....	....	2	5	....	.....	.....	....
Bombardment of Svéaborg, 1855 (HEYFELDER[40])	7	.....	7	....	.....	.....	....	.....	.....	....	.....	7	....	.....	.....	....
Crimean War, 1854–57 (MATTHEW,[41] CHENU,[42] HUBBENET[43])	2,748	227	2,033	488	165	1,424	....	.....	.....	....	24	197	....	38	412	488
British in India, 1857–58 (WILLIAMSON,[44] GORDON[45])	16	14	2	....	.....	.....	....	.....	1	....	.....	.....	....	14	1	....
Italy, 1859–60 (CHENU,[46] DEMME,[47] GHERINI[48])	806	195	611	....	8	58	....	.....	.....	....	16	73	....	171	480	....
New Zealand War, 1863–65 (MOUAT[49])	6	3	3	....	1	.....	....	.....	.....	....	2	3	....	.....	.....	....
Danish War, 1864 (HEINE,[50] LÜCKE,[51] OCHWADT,[52] NEUDÖRFER[53])	33	3	29	1	.....	3	1	2	18	....	1	3	....	.....	5	....
Germany, 1866 (STROMEYER,[54] FISCHER,[55] MÄNNEL,[56] BECK,[57] BIEFEL,[58] MAAS[59])	166	87	72	7	27	12	....	9	15	....	19	35	....	32	10	7
Austro-Italian War, 1866 (GRITTI[60])	19	13	6	....	7	.....	....	2	2	....	4	4	....	.....	.....	....
United States Army, 1865–70 (OTIS[61])	12	6	6	....	6	4	....	.....	2	....	.....	.....	....	.....	.....	....
Franco-German War, 1870–71, Germans (HEINZEL[62])	798	243	514	41	106	149	8	.....	.....	....	121	359	26	16	6	7
Franco-German War, 1870–71, French (CHENU[63])	3,794	342	3,452	....	.....	.....	....	.....	.....	....	.....	.....	....	342	3,452	....
Russo-Turkish War, 1876 (TILING,[64] STEINER[65])	7	2	5	....	.....	.....	....	.....	.....	....	.....	.....	....	2	5	....
Totals	9,017	1,419	7,049	549	406	1,701	14	17	53	....	259	771	33	737	4,524	502

Of the aggregate of nine thousand and seventeen amputations in the thigh here adduced, five hundred and forty-nine were undetermined, one thousand four hundred and

[1] DIONIS (P.), *Cours d'opérations de Chirurgie*, éd. par G. DE LA FAYE, Paris, 4me éd., 1750, p. 740. [2] SCHMUCKER (J. L.), *Vermischte Chirurgische Schriften*, Berlin und Stettin, 1785, B. I, p. 43. [3] HOME (FRANCIS), *Medical Facts and Experiments*, London, 1759, p. 115. [4] FAURE, *L'amputation étant absolument nécessaire*, etc., in *Prix de l'Acad. Royale de Chir.*, 1819, T. III, p. 337 (2 recoveries). [5] BOUCHER, *Obs. sur des playes d'armes à feu compliquées sur tout de fracas des os*, in *Mém. de l'Acad. Roy. de Chir.*, Paris, 1753, T. II, p. 470 (1 fatal). [6] BAGIEU, *Examen de Plusieurs Parties de la Chirurgie*, Paris, 1756, T. I, p. 153 (1 fatal). [7] BOUCHER, in *Mém. de l'Acad. Roy. de Chir.*, Paris, 1753, T. II, p. 477. [8] MEHÉE (JEAN), *Traité des plaies d'armes à feu*, Paris, An. VIII (1799), p. 215 (1 fatal). [9] MURSINNA (C. L.), *Neue Med. Chir. Beobachtungen*, Berlin, 1796, pp. 177, 181 (2 recoveries). [10] LARREY (D. J.), *Clin. Chir.*, Paris, 1829, T. III, p. 623 (7 recoveries); and *Mém. de Chir. Mil. et Camp.*, Paris, 1817, T. IV, p. 53 (1 recovery); and *Relation Hist. et Chir. de l'Expédition de l'Armée d'Orient*, Paris, 1803, pp. 360, 432–433 (10 recoveries, 1 fatal). [11] HENNEN (JOHN), *Principles of Military Surgery*, London, 1829, pp. 276, 278 (2 fatal). [12] GUTHRIE (G. J.), *Gunshot Wounds*, London, 1827, pp. 260, 375 (5 recoveries, 8 fatal); and *Com-*

nineteen had successful, and seven thousand and forty-nine fatal terminations, a death rate of 83.2 per cent.

CONCLUDING OBSERVATIONS ON SHOT INJURIES OF THE FEMUR.

Until the middle of the present century the majority of the writers on military surgery insisted upon immediate amputation as the only means of saving life in comminuted shot fractures of the femur,[1] while there were a few only who questioned the necessity of the operation, and who declared[2] that not only life but also a more or less useful limb might be

mentaries, London, 1855, 6th ed., p. 158 (77 recoveries, 62 fatal, 9 results unknown). [13]EUDES (P. J.), *Sur les avantages de pratiquer l'amputation sur le champ de bataille, etc.*, Paris, 1815, Thèse, p. 16 (1 recovery). [14]CARRÉ (A. C.), *De l'amputation considérée comme moyen curatif dans les accidens de débilité, etc.*, Paris, 1815, Thèse, No. 9, p. 13 *et seq.* (2 recoveries, 2 fatal). [15]MIREAU (H. L. M.), *Sur les inconvéniens de l'amputation du moignon de la cuisse devenu conique*, Paris, 1815, pp. 15, 16, Thèse (1 recovery, 2 fatal). [16]ARNAL, *Mém. sur quelques peculiarités des plaies par armes à feu*, in *Jour. Hebd. de Méd. et de Chir. prat.*, Paris, 1831, T. III, p. 36 (1 recovery). [17]KLEIN (D. C.), *Practische Ansichten der bedeutendsten chirurgischen Operationen*, Stuttgart, 1815, p. 35 (7 recoveries). [18]MANN (J.), *Medical Sketches of the Campaign of* 1812–13–14, Dedham, 1816, p. 213 *et seq.* [19]ARNAL, in *Jour. Hebd. de Méd. et de Chir. prat.*, Paris, 1831, T. III, p. 36 (2 recoveries). [20]MENIÈRE (P.), *L'Hôtel Dieu de Paris, en Juillet et Août*, 1830, Paris, 1830, p. 323 *et seq.* (2 recoveries, 9 fatal). [21]LARREY (D. J.), *Clin. Chir.*, Paris, 1832, T. IV, p. 282 (1 fatal). [22]LARREY (H.), *Relation chirurgicale des événements de Juillet*, 1830, Paris, 1831, p. 111 (4 recoveries, 1 fatal). [23]ROUX (PHIL. J.), *Des plaies d'armes à feu; Communications*, etc., Paris, 1849, p. 37 (1 recovery, 3 fatal). [24]LARREY (H.), *Histoire chirurg. du siège de la citadelle d'Anvers*, 1833, p. 311 *et seq.* (13 recoveries, 2 fatal). [25]BAUDENS (L.), *Clinique des Plaies d'Armes à feu*, Paris, 1836, p. 460. [26]ALCOCK (R.), *Notes on the Med. Hist. and Stat. of the British Legion in Spain*, London, 1838, pp. 92, 95. [27]SÉDILLOT (G.), *Campagne de Constantine de* 1837, Paris, 1838, p. 266. [28]PORTER (J. B.), *Med. and Surg. Notes of Camp*, etc., *in Mexico*, 1845–46–47–48, in *Am. Jour. Med. Sci.*, 1852, Vol. XXIII, N. S., pp. 32, 37, and Vol. XXIV, p. 28 (1 recovery, 2 fatal). [29]JARVIS (N. S.), *Surgical Cases at Monterey*, in *New York Jour. of Medicine*, 1847, Vol. VIII, p. 158 (2 fatal). [30]RESTELLI (A.), *Note ed Osservazioni cliniche di chirurgia mil.*, in *Annal. Univers. di Medicina*, 1849, Vol. CXXX, p. 243. [31-36]*Des plaies d'armes à feu*, Paris, 1849, *Communications*, par HUGUIER, p. 142 (5 recoveries); AMUSSAT, p. 57 (1 fatal); BAUDENS, p. 224 (5 fatal); JOBERT DE LAMBALLE, p. 155 (1 recovery, 3 fatal); MALGAIGNE (1 undetermined); ROUX, p. 38 (1 recovery, 3 fatal). [37]STROMEYER (L.), *Maximen*, Hannover, 1855, pp. 756, 757 (51 recoveries, 77 fatal). [38]DJÖRUP, *Bemærkninger over de i Krigen* 1848–50 *forctagne Amputationer*, in *Hospitals-Meddelelser*, 1852, B. V, p. 106 (39 recoveries, 51 fatal). [39]BECK (B.), *Die Schusswunden*, Heidelberg, 1850, p. 347 (7 recoveries, 6 fatal). [40]HEYFELDER (J. F.), *Die Verwundungen und Operationen in Folge des Bombardements von Svéaborg*, in *Deutsche Klinik*, 1855, B. VII, p. 584–5. [41]MATTHEW (T. P.), *Med. and Surg. Hist. of the British Army*, etc., in the years 1854–55–56, London, 1858, Vol. II, p. 368 (62 recoveries, 119 fatal). [42]CHENU (J. C.), *Rapport*, etc., *pendant la Campagne d'Orient en* 1854–55–56, Paris, 1856, p. 662 (126 recoveries, 1,545 fatal). [43]HÜBBENET (C. v.), *Die Sanitäts-Verhältnisse der Russischen Verwundeten*, etc., *in den Jahren* 1854–56, Berlin, 1871, p. 182 (89 recoveries, 269 fatal, 488 undetermined). [44]WILLIAMSON (G.), *Military Surgery*, London, 1863, p. XXVII (14 recoveries, 1 fatal). [45]GORDON (C. A.), *Experiences of an Army Surgeon in India*, London, 1872, p. 26 (1 fatal). [46]CHENU (J. C.), *Stat. Méd. Chir. de la Campagne d'Italie en* 1859 *et* 1860, Paris, 1869, T. II, p. 754 (79 recoveries, 257 fatal). [47]DEMME (H.), *Militär-Chirurgische Studien*, Würzburg, 1861, Zweite Abth., p. 264 (110 recoveries, 321 fatal). [48]GHERINI (A.), *Relazione chirurgica dell'Ospedale militäre provisorio di S. Filippo*, in *Ann. Universali di Med.*, Milano, 1860, Vol. CLXXIII, pp. 459, 460; 39 cases (6 recoveries, 33 fatal). [49]MOUAT, *The New Zealand War of* 1863–64–65, in *Stat. San. and Med. Reports for the Year* 1865, London, 1867, Vol. VII, p. 513. [50]HEINE (C.), *Die Schussverletzungen der Unteren Extremitäten*, Berlin, 1866, p. 275 *et seq.* (3 fatal, 1 undetermined). [51]LÜCKE (A.), *Kriegschir. Aphorismen*, in LANGENBECK'S *Archiv*, 1866, B. VII, p. 25 (1 fatal). [52]OCHWADT (A.), *Kriegschir. Erfahrungen*, Berlin, 1865, *Appendix* (Table of Operations) (3 recoveries, 20 fatal). [53]NEUDÖRFER (J.), *Aus dem feldärztlichen Berichte über die Verwundeten in Schleswig*, in LANGENBECK'S *Archiv*, 1865, B. VI, pp. 531, 532 (5 fatal). [54]STROMEYER (L.), *Erfahrungen über Schusswunden im Jahre* 1866, Hannover, 1867, pp. 16, 17 (27 recoveries, 23 fatal). [55]FISCHER (K.), *Militairärztliche Skizzen aus Süddeutschland*, Aarau, 1867, p. 90 (32 recoveries, 9 fatal, 7 undetermined). [56]MÄNNEL (O.), *Kriegschir. Beobachtungen*, in *Allg. Wiener Med. Zeitung*, Jahrgang, XII, 1867, No. 48, p. 403 (1 fatal). [57]BECK (B.), *Kriegschir. Erfahrungen während des Feldzuges* 1866, Freiburg i. B, 1867, p. 333 (25 recoveries, 26 fatal). [58]BIEFEL (R.), *Kriegschir. Aphorismen von* 1866, in LANGENBECK'S *Archiv*, Berlin, 1869, B. XI, p. 475 (7 fatal). [59]MAAS (H.), *Kriegschirurgische Beiträge*, Breslau, 1870, p. 73 (3 recoveries, 6 fatal). [60]GRITTI (R.), *Nuovi documenti in favore della cura conservativa*, etc., in *Ann. Universali di Med.*, Milano, 1868, Vol. CCV, p. 518 *et seq.* [61]OTIS (G. A.), *Circular* No. 3, War Department, S. G. O., Washington, 1871, p. 205 *et seq.* (6 recoveries, 6 fatal); 17 amputations following shot wounds are reported in *Circular* 3, but 5 of these cases are from the American civil war, 1861–65, and are included in the preceding tables of amputations. [62]HEINZEL, *Ueber die conservirende Behandlung der Kniegelenkschüsse*, in *Deutsche Militairärzt. Zeitschrift*, 1875, Jahrgang IV, pp. 358–59. [63]CHENU (J. C.), *Aperçu hist. Stat. et Clin. sur le service des ambulances et des Hôpitaux*, etc., Paris, 1874, T. I, p. 493. [64]TILING (G.), *Bericht über* 124 *im serbisch-türkischen Kriege*, etc., *behandelte Schussverletzungen*, Dorpat, 1877, pp. 66–69 (2 fatal). [65]STEINER (F.), *Aus dem Tagebuche eines deutschen Arztes während der Zeit des Krieges im Oriente* 1876, in *Wiener Med. Wochenschrift*, 1877, p. 657 (2 recoveries, 3 fatal). Of these 9,017 operations 366 were in the upper third of the femur, 503 in the middle third, 436 in the lower third, and in 7,712 the seat of ablation was not specified. The results in the upper third amputations were 133 recoveries, 232 deaths, and 1 unknown result, a fatality of 63.5 per cent.; in the middle third, 213 recoveries, 290 deaths, or 57.6 per cent. fatality; in the lower third, 211 recoveries and 225 deaths, a mortality of 51.6 per cent.; and in the femur, seat not specified, 862 recoveries and 6,302 deaths, with 548 undetermined results, a fatality of 87.9 per cent.

[1]GUTHRIE (G. J.) (*Treatise on Gunshot Wounds*, London, 1827, p. 373) remarks: "Injuries of the femur from musket balls are the more common wounds that render amputation necessary," and, on p. 375, "Upon a review of the many cases I have seen I do not believe that more than one-sixth recovered so as to have useful limbs; two-thirds of the whole died, either with or without amputation; and the limbs of the remaining sixth were not only nearly useless, but a cause of much uneasiness to them for the remainder of their lives." LARREY (D. J.) (*Clinique Chirurgicale*, Paris, 1829, T. III, p. 636): "Lorsque les coups sont reçus au centre ou à la partie supérieure de la cuisse, de manière que le projectile la traverse d'avant en arrière, en fracturant le fémur, l'amputation devient indispensable." KERVÉGUEN (H. G.) (*Des cas d'amputation dans les plaies d'armes à feu*, Paris, 1847, p. 33) notices one or two recoveries from pistol shot; but remarks that "these fortunate results must be regarded as exceptions which must not be set up in opposition to the regular rule, viz: that we must amputate whenever the femur is fractured by shot." SCHWARTZ (H.) (*Beiträge zur Lehre von den Schusswunden. Gesammelt in den Feldzügen der Jahre* 1848, 1849 *und* 1850, Schleswig, 1854, pp. 155, 168) cites cases of shot fractures of the shaft of the femur of the Schleswig-Holstein War, 1848–1850, and advises primary amputation in all cases of extensive comminuted fractures, whether in the upper, middle, or lower thirds of the femur. BLENKINS (G. E.) (in his article *Gunshot Wounds*, in COOPER'S *Dict. of Practical Surgery*, London, 1861, Vol. I, p. 817) remarks: "Were I to judge, then, from my own personal observations in the army, and from some other cases which I saw under my colleagues, I should, without hesitation, recommend immediate amputation in all cases of compound fracture of the thigh caused by grapeshot, musket balls, etc."

[2]LE DRAN (H. F.) (*Traité ou reflexions tirées de la pratique sur les plaies d'armes à feu*, Paris, 1737, p. 221) evidently believed that a useful limb might be preserved after comminuted fracture of the femur: "Sans parler des pansemens qui sont énoncés dans la premiere partie, je dirai seulement, que supposant le *fœmer* fracturé en éclats, et qu'il y eut lieu d'espérer de conserver la cuisse, on doit après avoir fait ce que l'art prescrit, faire ensorte de fixir le reste des pieces fracturées, de maniére qu'elles ne jouent pas l'une contre l'autre, comme je l'ai dit en parlant des playes au bras." HUTIN (*Recherches sur le résultat des fractures de la moitié supérieure de la cuisse, etc.*, in *Rec. de Mém. de Méd. de Chir. et de Phar. Mil.*, 1854, T. XIV, p. 253), on page 272, believes that the facts cited by him "démontrent que l'on ne doit pas adopter exclusivement le précepte de recourir *toujours* à l'amputation dans les cas dont il s'agit, et qu'il est de ces fractures dont on peut espérer une guérison bonne et durable, quoiqu'elle ne laisse qu'un membre difforme."

preserved to the patient by an expectant conservative mode of treatment. From the following statistical summary of fractures of the femur treated by conservation, recorded in other wars, it will be seen that of a total of three thousand four hundred and seventy-four cases only about two hundred and fifty antedated the year 1850. But with improvements

TABLE XLVIII.

Results of Shot Fractures of the Femur treated by Conservation on the Occasions named and from the Authorities quoted.

ACTION, ETC.	CASES.				UPPER THIRD.			MIDDLE THIRD.			LOWER THIRD.			SEAT NOT INDICATED.		
	Total.	Recovery.	Fatal.	Result Unknown.	Recovery.	Fatal.	Result Unknown.	Recovery.	Fatal.	Result Unknown.	Recovery.	Fatal.	Result Unknown.	Recovery.	Fatal.	Result Unknown.
Battle of Moncontour, 1569 (PARÉ[1])	1	1	.....	....	.....	.....	....	.....	.....	....	1	.....	....	.....	.....	....
Accidentally, 1608 (FABRICIUS HILDANUS[2])	1	1	.....	....	.....	.....	....	1	.....	....	.....	.....	....	.....	.....	....
Thirty-Years' War, 1618–1648 (SCHMIDT[3])	2	1	1	....	1	.....	....	.....	.....	....	.....	.....	....	.....	1	....
Franco-German War, 1671–78 (PURMANN[4])	3	3	.....	....	3	.....	....	.....	.....	....	.....	.....	....	.....	.....	....
Vaudois War, 1686 (BELLOSTE[5])	1	1	.....	....	1	.....	....	.....	.....	....	.....	.....	....	.....	.....	....
Siege of Milan, 1733 (DESPORT[6])	1	1	.....	....	.....	.....	....	.....	.....	....	1	.....	....	.....	.....	....
Battle of Dettingen, 1743 (RAVATON[7])	3	3	.....	....	1	.....	....	.....	.....	....	2	.....	....	.....	.....	....
Fontenoy and Tournay, 1745 (FAURE,[8] BOUCHER[9])	2	2	.....	....	.....	.....	....	.....	.....	....	2	.....	....	.....	.....	....
Seven-Years' War, 1756-'63 (BILGUER,[10] MEHÉE,[11] MURSINNA[12])	9	9	.....	....	.....	.....	....	5	.....	....	3	.....	....	1	.....	....
Battle of Crevelt, 1758 (MOSCATI[13])	1	1	.....	....	1	.....	....	.....	.....	....	.....	.....	....	.....	.....	....
Battle of Prince Town, 1777 (NEALE[14])	1	1	.....	....	.....	.....	....	1	.....	....	.....	.....	....	.....	.....	....
Revolution in Paris, 1791 (DESAULT[15])	1	1	.....	....	1	.....	....	.....	.....	....	.....	.....	....	.....	.....	....
Napoleonic Wars, 1792–1815[16]	82	36	45	1	4	.....	....	11	20	1	1	2	....	20	23	....
War of 1812–14 (TROWBRIDGE,[17] HAMILTON,[18])	2	2	.....	....	.....	.....	....	2	.....	....	.....	.....	....	.....	.....	....
Revolution in Paris, 1830[19]	27	18	9	....	8	2	....	2	1	....	4	1	....	4	5	....
Revolution in Lyons, 1831 (GENSOUL[20])	3	3	.....	....	1	.....	....	.....	.....	....	.....	.....	....	2	.....	....
Siege of Antwerp, 1832 (H. LARREY[21])	9	6	3	....	4	.....	....	1	2	....	1	1	....	.....	.....	....
French in Algeria, 1830–1836 (BAUDENS[22])	25	2	23	....	.....	.....	....	.....	.....	....	.....	.....	....	2	23	....
Spanish Peninsular War, 1836–37 (ALCOCK[23])	9	.....	8	1	.....	.....	....	.....	.....	....	.....	.....	....	.....	8	1
African Campaigns, 1841–42, and accident, 1843 (LEGOUEST,[24] LE CLERC[25])	3	3	.....	....	2	.....	....	1	.....	....	.....	.....	....	.....	.....	....
Revolution in Paris, 1848[26]	22	12	9	1	6	1	....	.....	.....	1	.....	.....	....	6	8	....
War in Sleswick-Holstein, 1848–50 (STROMEYER[27])	28	14	14	....	2	2	....	.....	.....	....	.....	.....	....	12	12	....
Revolution in Baden, 1849 (BECK[28])	17	3	14	....	.....	.....	....	.....	.....	....	.....	.....	....	3	14	....
Pensioners at the Invalides, Paris, 1847-53 (HUTIN[29])	63	63	.....	....	17	.....	....	28	.....	....	18	.....	....	.....	.....	....
Bombardment of Svéaborg, 1855 (HEYFELDER[30])	1	.....	1	....	.....	.....	....	.....	.....	....	.....	.....	....	.....	1	....
Crimean War, 1854–57 (MATTHEW,[31] LONGMORE,[32] CHENU,[33] BAUDENS[34])	555	153	402	....	43	1	....	20	.....	....	19	.....	....	71	401	....
British in India, 1857–58 (WILLIAMSON[35])	13	12	1	....	6	1	....	5	.....	....	1	.....	....	.....	.....	....
Italian War, 1859–60 (CHENU,[36] ROUX,[37] DEMME,[38] GHERINI[39])	542	231	311	....	86	128	....	37	44	....	68	60	....	40	79	....
New Zealand War, 1863–65 (MOUAT[40])	11	6	3	2	2	1	2	4	1	....	.....	1	....	.....	.....	....
Danish War, 1864 (HEINE,[41] LÜCKE[42])	18	9	9	....	1	2	....	5	5	....	3	2	....	.....	.....	....
Danish Invalids of War of 1864 (HANNOVER[43])	29	29	.....	....	.....	.....	....	.....	.....	....	.....	.....	....	29	.....	....
Six Weeks' War, Germany, 1866[44]	236	128	61	47	11	12	....	11	5	....	6	18	....	100	26	47
Austro Italian War, 1866 (R. GRITTI[45])	26	25	1	....	10	.....	....	9	1	....	3	.....	....	3	.....	....
United States Army, 1865–70 (OTIS[46])	9	4	5	....	.....	3	....	1	2	....	3	.....	3	.....	.....	....
Franco-German War, 1870–71—Germans[47]	811	530	233	48	78	56	2	55	47	1	44	26	....	353	104	42
Franco-German War, '70–71—French[48]	896	811	85	....	199	20	....	97	20	....	127	14	....	388	31	....
Russo-Turkish War, 1876[49]	11	7	4	....	1	1	....	.....	.....	....	.....	.....	....	6	3	....
Totals	3,474	2,132	1,242	100	489	230	4	296	148	3	307	125	3	1,040	739	90

[1] PARÉ (A.), *Oeuvres Complètes*, 6d. MALGAIGNE, Paris, 1840, T. II, p. 170. [2] FABRICIUS HILDANUS, *Wund-Artzney*, Franckfurth, 1652, p. 1207. [3] SCHMIDT (JOSEPH), *Speculum Chirurgicum oder Spiegel der Artzney*, Augspurg, 1656, pp. 148, 150. [4] PURMANN (M. G.), *Funfftzig Sonder-und Wunderbahre Schusswunden-Curen*, Franckfurt und Leipzig, 1721, pp. 32, 213, 250. [5] BELLOSTE, *Le Chirurgien d'Hôpital*, Paris, 1716, p. 206. [6] DESPORT, *Traité des Plaies d'Armes à feu*, Paris, 1740, p. 222. [7] RAVATON, *Chirurgie d'Armée ou Traité des Plaies d'Armes à Feu*, Paris, 1768, pp. 338, 347, 350. [8] FAURE, *L'amputation étant absolument nécessaire*, etc., in *Prix de l'Acad. Royale de Chir.*, 1819, T. III, pp. 351 (1 recovery). [9] BOUCHER, *Obs. sur des Playes d'Armes à feu compliquées surtout de fracas des os*, in *Mém. de l'Acad. Roy. de Chir.*, Paris, 1753, T. II, p. 470 (1 recovery). [10] BILGUER (J. U.), *Chirurgische Wahrnehmungen*, Berlin, 1763, pp. 458, 475, 476, 481, 482, 483 (6 recoveries). [11] MEHÉE (JEAN), *Traité des plaies d'armes à feu*, Paris,

in the manner of securing immobility of the limb, in facilitating the requisite dressings and in the means of transportation, the views of military surgeons experienced a change, and the field of conservative treatment of shot fractures of the femur became enlarged. Baudens, who (as indicated in *Note* 4, on page 174, *ante*), in 1836, strenuously advocated

An. VIII (1799), p. 134 *et seq.* (2 recoveries). [12]MURSINNA (C. L.), *Neue Med. Chir. Beobachtungen*, Berlin, 1796, p. 138 (1 recovery.) [13]MOSCATI, in *Mém. de l'Acad. Roy. de Chir.*, Paris, 1768, T. IV, p. 625. [14]NEALE (H. ST. JOHN), *Chirurgical Institutes*, London, 1805, p. 251. [15]DESAULT, *Plaie d'arme à feu traversant les deux cuisses*, in *Jour. de Chir.*, Paris, 1792, T. III, p. 104. [16]LARREY (D. J.), *Clin. Chir.*, 1836, T. V, p. 328 (1 recovery). HENNEN (JOHN), *Principles of Military Surgery*, London, 1829, pp. 113, 131 (1 recovery, 1 result unknown). GUTHRIE (G. J.). *Gunshot Wounds*, London, 1827, p. 375 (18 recoveries, 13 deaths). EUDES (P. J.), *Sur les avantages de pratiquer l'amputation sur le champ de bataille*, Paris,, 1815 Thèse, p. 17 (2 fatal cases). FENECH (E.), *Sur les plaies d'armes à feu aux extrémités*, Paris, 1813, Thèse, pp. 10, 16 (2 recoveries, 5 fatal). EHRLICH (J. A.), *Chirurgische Beobachtungen*, Leipzig, 1815, B. II, p. 156 (1 recovery). FORGET, *Bull de la Soc. de Chir. de Paris, pendant* 1855–56, p. 230 (1 recovery). RIBES (F.), *Mém. sur la fracture du tiers moyen du fémur*, etc., in *Gaz. Méd. de Paris*, 1831, T. II, pp. 102-106 (7 recoveries, 15 fatal). HUTIN (M. F.), *Mém. sur la necessité d'extraire les corps étrangers et les esquilles*, etc., in *Mém. de l'Acad. Nat. de Méd.*, 1852, T. XVI, pp. 444-448 (3 recoveries). BALLINGALL (G.), *Outlines of Military Surgery*, Edinburgh, 1855, pp. 388-390 (1 recovery, 10 fatal). LEGOUEST (L.), *Mém. de la Soc. de Chir.*, Paris, 1863, T. V, p. 166 (1 recovery). [17]TROWBRIDGE, *Gunshot Wounds*, in *Boston Medical and Surgical Journal*, 1838, Vol. XVIII, p. 343 (1 recovery). [18]HAMILTON (F. H.), *A Practical Treatise on Fractures and Dislocations*, Philadelphia, 1875, p. 518 (1 recovery). [19]ARNAL, *Mém. sur quelques peculiarités des plaies par armes à feu*, in *Jour. Hebd. de Méd. et de Chir. prat.*, Paris, 1831, p. 36 (4 recoveries). MENIÈRE (P.), *L'Hôtel Dieu Paris, en Juillet et Aout*, 1830, Paris, 1830, p. 312 (4 recoveries, 7 fatal). LARREY (H.), *Relation Chirurgicale des événements de Juillet*, 1830, Paris, 1831, pp. 102, 106 (2 recoveries). ROUX (PHIL. J.), *Considérations Cliniques sur les blessés à la Charité*, Paris, 1830, p. 50 (2 fatal). JOBERT DE LAMBALLE (A. J.), *Plaies d'armes à feu*, Paris, 1833, p. 262 (8 recoveries.) [20]GENSOUL, *Note sur les blessés reçus à l'Hôtel-Dieu de Lyon, pendant les troubles de* 1831, in *Gaz. Méd. de Paris*, 1833, T. IV, p. 300. [21]LARREY (H.), *Histoire chirurg. du siège de la citadelle d'Anvers*, 1833, p. 215. [22]BAUDENS (L.), *Clinique des Plaies d'Armes à Feu*, Paris, 1836, p. 460. [23]ALCOCK (R.), *Notes on the Med. Hist. and Stat. of the British Legion in Spain*, London, 1838, pp. 52, 95. [24]LEGOUEST, in *Mém. de la Soc. de Chir. de Paris*, 1863, T. V, p. 167 (2 recoveries). [25]LE CLERC, *Quelques observations particulières de plaies d'armes à feu*, Strasbourg, 1852 (1 recovery). [26]*Communications, Des Plaies d'armes à feu, Paris*, 1849: HUGUIER, p. 131 (3 recoveries, 2 fatal); AMUSSAT, p. 55 (1 recovery); BAUDENS, p. 231 (1 recovery, 1 fatal, 1 undetermined); JOBERT (DE LAMBALLE), p. 153 (2 recoveries, 4 fatal); MALGAIGNE, p. 45 (2 recoveries, 2 fatal). *Bulletin de la Soc. de Chir. de Paris*, 1855–56, pp. 230–234: GERALDES (1 recovery), ROBERT (1 recovery), DENONVILLIERS (1 recovery). [27]STROMEYER (L.), *Maximen der Kriegsheilkunst*, Hannover, 1855, pp. 756–57. [28]BECK (B.), *Die Schusswunden*, Heidelburg, 1850, p. 266. [29]HUTIN, *Recherches sur le résultat des fractures de la moitié supérieure de la cuisse*, Paris, 1854, pp. 10, 14, and *Rec. de Mém. de Méd. de Chir. et de Phar. Mil.*, Paris, 1854, 2me sér., T. XIV, pp. 261, 263 (63 cases, all pensioners). [30]HEYFELDER (J. F.), *Die Verwundungen und Operationen in Folge des Bombardments von Sréaborg*, in *Deutsche Klinik*, 1855, B. VII, p. 554. [31]MATTHEW (T. P.), *Med. and Surg. Hist. of the British Army*, etc., *in the years* 1854–55–56, London, 1858, Vol. II, pp. 355–56 and 361 (19 recoveries, 69 fatal). [32]LONGMORE (T.), in HOLMES'S *System of Surgery*, 1870, 2d ed., Vol. II, p. 225 (1 recovery). [33]CHENU (J. C.), *Rapport*, etc., *pendant la Campagne d'Orient en* 1854–55–56, Paris, 1856, p. 374 (126 recoveries, 333 fatal). [34]BAUDENS (L.), *La Guerre de Crimée*, Paris, 1858, p. 328 *et seq.* (7 recoveries). [35]WILLIAMSON (G.), *Mil. Surgery*, London, 1863, p. XXVI. [36]CHENU (J. C.), *Stat. Méd. Chir. de la Campagne d'Italie en* 1859–60, Paris, 1869, T. II, p. 715 (118 recoveries, 190 fatal). [37]ROUX (J.), *Désarticulation de la cuisse*, Paris, 1860, p. 16 (9 recoveries not in CHENU). [38]DEMME (H.), *Militär-Chirurgische Studien*, Würzburg, 1861, Zweite Abth., p. 232 (79 recoveries, 86 fatal). [39]GHERINI (A.), *Relazione chirurgica dell'Ospedale Militare provisorio di S. Filippo*, in *Annali Universali di Medicina*, Milano, 1860, Vol. CLXXIII, pp. 459, 460 (60 cases—25 recoveries, 35 fatal). [40]MOUAT, *The New Zealand War of* 1863–64–65, in *Stat. San. and Med. Reports for the year* 1865, London, 1867, Vol. VII, pp. 502–3. [41]HEINE (C.), *Die Schussverletzungen der Unteren Extremitäten*, Berlin, 1866, p. 238 *et seq.* (9 recoveries, 7 fatal). [42]LÜCKE (A.), *Kriegschirurgische Aphorismen*, in LANGENBECK'S *Archiv*, B. VII, pp. 13, 21 (2 fatal). [43]HANNOVER (A.), *Die Dänischen Invaliden aus dem Kriege* 1864, Berlin, 1864, p. 26 (29 cases, all pensioners). [44]STROMEYER (L.), *Erfahrungen über Schusswunden im Jahre* 1866, Hannover, 1867, p. 53 (10 recoveries, 15 fatal). FISCHER (K.), *Militärärztliche Skizzen aus Süddeutschland und Böhmen*, Aarau, 1867, p. 83 (98 recoveries, 17 fatal, 47 result unknown). MÄNNEL (O.), *Kriegschirurgische Beobachtungen*, in *Allg. Wiener Med. Zeitung*, Jahrg, XII, 1867, No. 48, p. 403 (1 fatal). BECK (B.), *Kriegschirurgische Erfahrungen während des Feldzuges* 1866, Freiburg i. B. 1867, p. 294 (8 recoveries, 9 fatal). BIEFEL (R.), *Kriegschirurgische Aphorismen von* 1866, in LANGENBECK'S *Archiv*, Berlin, 1869, B. XI, p. 445 (5 recoveries, 6 fatal). MAAS (H.), *Kriegschirurgische Beiträge*, Breslau, 1870, p. 40 (7 recoveries, 13 fatal). [45]GRITTI (R.), *Nuovi documenti in favore della cura conservativa nelle fratture del femore par arma da fuoco*, in *Annali Universali di Medicina*, Milano, 1868, Vol. CCV, p. 518 *et seq.* [46]OTIS (G. A.), *Circular* No. 3, War Department, S. G. O., Washington, 1871, p. 70 *et seq.* [47]BECK (B.), *Chirurgie der Schussverletzungen*, Freiburg, 1872, p. 677 (87 recoveries, 44 fatal). BILLROTH (TH.), *Chirurgische Briefe*, etc., Berlin, 1872, p. 228 (9 recoveries, 12 fatal). FISCHER (G.), *Dorf Floing, etc.*, in *Deutsche Zeitschrift für Chirurgie*, 1872, B. I, p. 185 (26 recoveries, 17 fatal, 4 undetermined). FISCHER (H.), *Kriegschirurgische Erfahrungen*, Erlangen, 1872, p. 177 (9 recoveries, 11 fatal). GOLTDAMMER, *Bericht über die Thätigkeit des Reserve-Lazareths des Berliner Hülfsvereins*, in *Berliner Klin. Wochenschrift*, 1871, No. 13, p. 151 (4 recoveries, 2 fatal). GRAF (E.), *Die Königlichen Reserve-Lazarethe zu Düsseldorf während des Krieges* 1870–71, Elberfeld, 1872, p. 62 (4 recoveries, 5 fatal). GUTEKUNST, *Bericht ueber die während des vorigen Jahres in dem Vereinspital Ludwigsburg aufgenommenen Schussverletzungen*, in *Zeitschrift für Wundärzte*, Stuttgart, 1876, B. XXIII, pp. 140, 146 (1 recovery, 2 fatal). HEYFELDER (O.), *Berichte, etc.*, in *Petersburg. Medizinische Zeitschrift*, 1871, No. 1, p. 57 (1 recovery). KIRCHNER (C.), *Aerztlicher Bericht ueber das K. P. Feld-Lazareth im Palast zu Versailles*, Erlangen, p. 54 (3 recoveries, 12 fatal). KOCH (W.), *Notizen, etc.*, in LANGENBECK'S *Archiv*, 1872, B. XIII, p. 500 (7 recoveries, 11 fatal, 2 undetermined). KÜCHLER (H.), *Analecten aus der Kriegsgeschichte*, in *Memorabilien*, B. XVI, 1871, p. 141 (2 recoveries, 9 fatal). LOSSEN (H.), *Kriegschirurgische Erfahrungen*, in *Deutsche Zeitschrift für Chir.*, 1873, B. II, p. 112 (9 recoveries, 6 fatal). MAYER (L.), *Kriegschir. Mittheilungen*, in *Deutsche Zeitschrift für Chir.*, 1873, B. III, pp. 49-52 (2 recoveries, 4 fatal). MOSETIG (V.), *Erinnerungen aus dem Deutsch-Französischen Kriege*, in *Der Militärarzt*, 1872, Jahrg. VI, p. 21 (1 recovery). OTT, OESTERLEN, und ROMBERG, *Kriegschir. Mittheilungen, etc.*, Stuttgart, 1871, p. 49 (8 recoveries, 5 fatal). RUPPRECHT (L.), *Militärärztliche Erfahrungen*, Würzburg, 1871, p. 74 (4 recoveries, 2 fatal). SALZMANN, *Mittheilungen aus dem Vereinsspital in Esslingen*, in *Med. Correspondenz-Blatt des Württemberg. Ärztl. Vereins*, 1871, B. XLI, pp. 148, 153 (1 recovery, 1 fatal). SCHINZINGER (A.), *Das Reserve-Lazareth Schwetzingen*, Freiburg, 1873, pp. 70, 71 (7 recoveries, 2 fatal). SOCIN (A.), *Kriegschirurgische Erfahrungen*. Leipzig, 1872, p. 134 (16 recoveries, 6 fatal). STEINBERG, *Die Kriegslazarethe und Baracken von Berlin*, Berlin, 1872, p. 147 (233 recoveries, 55 fatal, 40 undetermined). STOLL, *Bericht aus dem K. Württembergischen 4 Feldhospital*, in *Deutsche Mil. Zeitschrift*, 1874, B. III, p. 197 (11 recoveries, 15 fatal, 2 undetermined). STUMPF (L.), *Bericht über das Kriegsspital, etc., Neuberghausen*, in *Bayerisches Aerztl. Intelligenz-Blatt*, 1872, p. 656 (9 recoveries, 3 fatal). CZERNY (VINCENZ), *Bericht ueber die im College Stanislaus in Weissenburg behandelten Verwundeten*, in *Wiener Medizinische Wochenschrift*, 1870, No. 57, p. 1373 (11 recoveries, 9 fatal). BERTHOLD, *Statistik, etc.*, in *Deutsche Militärärztliche Zeitschrift*, 1872, B. I, p. 522 (65 recoveries—4 in upper, 2 in middle, 4 in lower third, and 55 in which the seat is not recorded; all pensioners). [48]CHIPAULT (A.), *Fractures par armes à feu*, Paris, 1872, p. 4 *et seq.* (10 recoveries, 2 fatal). CHRISTIAN (J.), *Relation sur les plaies de guerre*, in *Gaz. Méd. de Strassbourg*, 1872, p. 283 (10 recoveries, 12 fatal). COUSIN, *Ambulances de la Presse Française*, in *L'Union Médicale*, 1872, T. XIII, p. 148 (7 fatal). DESPRÈS (A.), *Rapport sur les travaux de la* 7me *Ambulance à l'Armée du Rhin, etc.*, Paris, 1871, pp. 44, 46, 48 (5 recoveries, 12 fatal). FELTZ et GROLLEMUND, *Rel. Clin. sur les Ambulances de Haguenau*, in *Gaz. Méd. de Strasbourg*, 1871, No. 11, p. 133 (11 recoveries, 3 fatal). JOESSEL, *Ambulance du Petit-Quartier à Haguenau*, in *Gaz. Méd. de Strasbourg*, 1871, p. 8 (7 recoveries, 6 fatal). MACCORMAC (W.), *Notes and Recollections, etc.*, London, 1871, p. 129 (8 recoveries, 20 fatal). MOYNIER (EUGENE), *Ambulance de la Rue Saint Lazare*, in *Gaz. des Hôpitaux*, 1871, Vol. XLIV, p. 445 (2 recoveries, 1 fatal). PANAS (F.), *Mém. sur le traitement des blessures, etc.*, in *Gaz. hebdomadaire de Méd. et de Chir.*, 1872, T. IX, p. 391 (2 recoveries, 4 fatal). PONCET (F.), *Contribu-*

immediate amputation, and who yet, in 1849,[1] insisted that "les fractures du corps du fémur demandent impérieusement l'amputation immédiate," acknowledged, in 1858, after his experience in the Crimean War, "cette sentence trop absolue."[2] The successful attempts at conservation in shot fractures of the femur recorded from the Danish War of 1864, by Heine, from the Six Weeks' War of 1866, by K. Fischer, Beck, and R. Gritti, and from the Franco-German War of 1870–71, by Beck, H. Fischer, Lossen, Rupprecht, and Socin among the Germans, and Chipault, Feltz, Grollemund, Roaldes, Sédillot and others among the French (TABLE XLVIII and notes on p. 336), stimulated the propensity towards conservative opinions in war surgery. B. Beck, who, in 1850, insisted upon immediate amputation,[3] "be it in the field or in cities in well conducted hospitals, in all shot fractures of the femur, even if there be only the slightest splintering or displacement of the ends of the femur in oblique fractures," conceded, in 1872, after the Franco-Prussian War,[4] that "we have, in the field hospitals, by expectative therapy and by the use of the simplest bandages, saved a considerable number of shot fractures of the femur." Sédillot[5] declared that "the extreme mortality of amputations of the thigh in war surgery, and the annoyances and accidents to which the apparatus destined to replace the limb are liable, have led us to renounce this operation in all cases in which the most positive necessity does not require it." Socin[6] considers it "inexcusable to perform in a case of shot fracture of the femur for splintering of bone alone, the primary amputation as yet advocated by the first authorities of French military surgery. Only when we are assured that the vessels, artery and vein, are shot through, is the operation justifiable."

Already in the early part of the War of the Rebellion many American surgeons were

tions, etc., in *Montpellier Médical*, 1872, T. XXVIII, pp. 41–43 (1 recovery, 4 fatal). ROALDES (A. W. DE), *Des fractures compliquées de la cuisse*, Paris, 1871, p. 43, etc. (11 recoveries, 10 fatal). SÉDILLOT, *Du traitement des fractures des membres par armes de guerre*, in *Archives Générales de Médecine*, 1871, 4me sér., T. XVII, p. 423, etc. (25 recoveries). TACHARD (E.), *Reflexions pour servir à l'histoire de la Chirurgie*, in *Gaz. des Hôpitaux*, 1871, p. 238 (1 fatal). VASLIN (L.), *Étude sur les plaies par armes à feu*, Paris, 1872, pp. 102, 244 (7 recoveries, 3 fatal). CHENU (J. C.) (*Aperçu hist. stat. et clinique, etc.*, Paris, 1874, T. II, pp. 153–1038) names 705 pensioners who recovered after shot fractures of the femur; 12 of them have been recorded by the authors just quoted, viz: CHIPAULT (2), CHRISTIAN (2), MACCORMAC (1), FELTZ et GROLLEMUND (2), ROALDES (3), and SÉDILLOT (2), leaving 693 cases to be added to this series, viz: 151 in upper third, 58 in middle third, 110 in lower third, and 374 in which the location of the injury was not specified. MOSSAKOWSKY (P.) (*Stat. Bericht ueber* 1415 *Französische Invaliden*, in *Deutsche Zeitschrift für Chirurgie*, 1872, B. I, p. 342) cites 19 cases of pensioners after shot fracture of the femur not reported by CHENU, viz: 9 in the upper third, 9 in the middle third, and 1 in the lower third of the femur. [49] TILING (G.), *Bericht ueber* 124 *im Serbisch-Türkischen Kriege im Baracken Lazareth des Dorpater Sanitäts-Train Zu Swilainatz behandelte Schussverletzungen*, Dorpat, 1877, pp. 66–69 (1 recovery, 2 fatal). KADE (E.), *Das Temporäre Kriegslazareth des Ressorts der Anstalten der Kaiserin Maria*, in *St. Petersburger Med. Wochenschrift*, 1877, No. 45, p. 384 (4 recoveries, 2 fatal). STEINER (F.), *Aus dem Tagebuche eines Deutschen Arztes während der Zeit des Kriegs im Orient*, 1876, in *Wiener Med. Wochenschrift*, 1877, No. 28, p. 681 (2 recoveries). Of the 3,474 cases of shot fractures of the femur treated by conservation here referred to, 2,132 were successful and 1,242 were fatal, while in 100 instances the result could not be ascertained. But it would obviously be unfair to make a deduction regarding the percentage of mortality from the numbers here adduced. Among the cases of recovery enumerated are 63 pensioners observed by HUTIN (No. 29, *ante*) at the Hotel des Invalides at Paris during the years 1847–1853; 29 pensioners recorded among the Danes after the Schleswig-Holstein War, 1864, by HANNOVER (No. 43, *ante*); 65 pensioners observed by BERTHOLD (No. 47, *ante*); 693 pensioners tabulated by CHENU (No. 48, *ante*); and 19 pensioners observed by MOSSAKOWSKY (No. 48, *ante*). These cases, numbering 869, should be deducted from the total number of recoveries, leaving 1,263 successful to 1,242 fatal cases, a mortality of 49.5 per cent. Of the 869 pensioners thus deducted, 181 recovered after shot fractures in the upper third of the femur, 97 in the middle, 133 in the lower third, and 458 in the femur, third not specified. Deducting these from their respective categories in TABLE XXXVI there remain 489—181=308 recoveries in the upper third to 230 deaths, a mortality of 43.7 per cent.; 296—97=199 recoveries to 148 deaths in the middle third, a death rate of 42.6 per cent.; 307—133=174 recoveries to 125 deaths in the lower third, a fatality of 41.8 per cent., and 1040—458=582 recoveries in the femur, seat unspecified, to 704 deaths, or a mortality of 54.7.

[1] BAUDENS (L.), *Des Plaies d'armes à feu. Communications, etc.*, Paris, 1849, p. 218.

[2] BAUDENS (L.) (*La Guerre de Crimée*, Paris, 1858, p. 131): "Avant la guerre de Crimée, c'était un principe généralement accepté qu'une fracture du fémur déterminée par un coup de feu nécessite l'amputation. Il y a lieu de penser que, grâce à mes nouveaux appareils à fractures, on peut en appeler de cette sentence trop absolue;" and, on p. 333, "Ils prouvent, contrairement à l'opinion reçue, que les fractures comminutives du fémur avec plaie ne sont pas fatalement vouées à l'amputation, si on a le soin d'extraire les esquilles et les corps étrangers pour faire d'une plaie compliquée une plaie simple, et si à l'aide d'un appareil à fracture convenable, on parvient à placer le membre dans une immobilité complète, sans l'ébranler même pendant les pansements, et à donner aux humidités purulentes un facile écoulement."

[3] BECK (B.), *Die Schusswunden*, Heidelberg, 1850, p. 283.

[4] BECK (B.), *Chirurgie der Schussverletzungen*, Freiburg, 1872, p. 691.

[5] SÉDILLOT (*Du traitement des fractures des membres par armes de guerre*, in *Arch. Gén. de Méd.*, 1871, 6me séric, T. XVII, p. 422) remarks: "L'extrême mortalité de l'amputation de la cuisse dans la chirurgie de guerre, et les ennuis et les accidents que causent les moyens de prothèse destinés à remplacer ce membre, nous ont conduit à renoncer à cette opération dans tous les cas où la nécessité la plus évidente ne l'imposait pas. Les ablations partielles ou totales par un boulet, un éclat d'obus; des fracas osseux très-étendus avec division de l'artère, de la veine crurale et du nerf sciatique; la gangrène, les fractures avec large ouverture du genou et fragmentation des condyles du fémur et du tibia, sont les seules complications qui semblent empêcher absolument la conservation de la cuisse."

[6] SOCIN (A.) (*Kriegschirurgische Erfahrungen*, Leipzig, 1872, p. 128) believes that the experiences of the late campaigns confirm on the one hand the previous reports of the enormous mortality of primary amputations of the femur, and, on the other hand, prove that the conservative treatment is not only enabled to save many useful extremities but gives far better results in regard to mortality.

led to similar conclusions. Assistant Surgeon Philip C. Davis, U. S. Army, in a report to the Surgeon General of his services from June 1, 1861, to June 19, 1863, remarked that: "The mortality was very great in cases of amputations for compound comminuted fracture of the femur; better success being met with by using splints and other appliances adapted to the nature of the cases." (See *Appendix to Part I of the Med. and Surg. Hist. of the War of the Rebellion*, p. 15.) Surgeon A. J. Phelps, U. S. V., in his observations after the battle of Chickamauga, September 19, 1863, stated: "As a rule a gunshot fracture of the femur should not be amputated, but should be treated with the expectation of saving the limb. Such appliances should be used as to secure drainage from the wound and comfort to the patient, and the case then be left to nature supported by good air and generous diet." Surgeon J. S. Woods, 99th Ohio Volunteers, in a report from the hospital at Chattanooga, declared: "Amputation is almost never warrantable; but the prospect of success warrants the effort to save the life with the limb." Surgeon Henry J. Churchman, U. S. V., detailed eleven cases of shot fractures of the femur treated at the hospital at Fayetteville, Arkansas, and arrived at the following conclusions: "The results, so far, of the cases given, force me to believe, Guthrie and others to the contrary, that: 1, Gunshot fractures of the femur, as a rule, do not require amputation to save life; 2, As a rule, none should be amputated save those where, in addition to comminution, there is extensive laceration of soft parts or serious injury done to principal artery or nerve or both." Surgeon A. W. Heise, 100th Illinois, who had observed twelve cases of comminuted fractures of the thigh at the first division, Twenty-first Corps, field hospital, "of which six had recovered, two would probably recover, and four had terminated fatally," concludes that "the results of these few cases, so much at variance with the experience of all military surgeons, will be one more reason to encourage a hope for a favorable result from conservative treatment of these unfortunate cases." Like views were entertained by Surgeon I. Moses, U. S. V., Assistant Surgeons A. H. Hoff and DeWitt C. Peters, U. S. A., Assistant Surgeon A. E. Carothers, U. S. V., Acting Assistant Surgeons B. B. Miles, J. Swinburne, E. G. Waters, and the Confederate Surgeon G. M. B. Maughs.[1] That the conservative mode of treating fractures of the femur gave the best results and was most zealously advocated by surgeons in charge of general hospitals remote from the scene of conflict[2] is readily understood when it is considered that

[1] MOSES (I.) (*Surgical Notes of Cases of Gunshot Injuries occurring during the Advance of the Army of the Cumberland*, in *Am. Jour. Med. Sci.*, 1864, Vol. XLVII, p. 338): With our ambulances, "easy and abundant, and the hospitals amply supplied with everything essential . . we were prepared to exert ourselves for the preservation of limbs, and our success has been such as to warrant our efforts." HOFF (A. H.) (*Amputations and Resections—Conservative Surgery*, in *Am. Med. Times*, 1863, Vol. VII, p. 102): "I am heartily tired of amputations, more especially of the thigh, and, with one or two surgeons, have attempted to save limbs as well as lives by calling in Dame Nature and attempting to assist her, and this, I am happy to say, with a success far beyond expectation." PETERS (DEWITT C.) (*Am. Med. Times*, 1864, Vol. VIII, pp. 52, 53) examined 25 cases of recovery after compound fractures of the femur received by Confederate soldiers at the battle of Gettysburg, and remarks: "The general condition of all the men was far above my expectations of finding them, considering they were prisoners of war and liable more or less to nostalgia. . . The treatment they had received was, in my opinion, in conformity with the laws of conservative surgery, yet it seemed to me had a little more care been given to extension or counter-extension, there would have been less shortening and deformity." CAROTHERS (A. E.) (*On Compound Comminuted Fracture of the Femur from Minié Balls*, in *Am. Jour. Med. Sci.*, 1863, Vol. XLV, p. 350, *et seq.*) concludes: "That the operation of resection is not advisable, but that it offers a more favorable prognosis as a primary than as a secondary operation," and advises moderate and regular extension and counter-extension and the use of the anterior wire splint. MILES (B. B.) (*Conservative Treatment of Gunshot Fractures of the Knee-Joint*, in *Am. Med. Times*, 1864, Vol. VIII, p. 50): "In considering the results of gunshot fractures of the femur, the situation of the injury is of vast importance in regard to the chances of recovery, either with or without amputation; as for amputation it has been abandoned, except when large blood-vessels and nerves are implicated." SWINBURNE (JOHN) (*Amputations, when to be performed and when not required in Military Surgery*, in *Am. Med. Times*, 1863, Vol. VI, p. 149): "Excision of the *shaft* is evidently out of the question, since all die after the operation. The question then arises, shall we amputate? Or shall we treat such cases as ordinary compound fractures? I prefer the latter, and have from the first thought it the most reasonable treatment." WATERS (E. G.) (*A Report of Twelve Gunshot Fractures of the Thigh, treated conservatively in the U. S. A. General Hospital "National,"* in *Am. Med. Times*, 1863, Vol. VI, p. 170). MAUGHS (G. M. B.) (*Conservative Treatment of Comp. Comm. Fracture of the Femur, with Cases*, in *Confederate States Med. and Surg. Jour.*, January, 1865, Vol. II, p. 10): "*No excisions of the femur, no incisions of soft parts for the removal* of loose pieces *of bone*, no formidable display of machinery to keep the limb *in* place and the patient *from* sleep. The wounds were carefully examined, and all foreign bodies, including spicula of bone immediately in the track of the ball, removed. . . *As a general rule, ordinary fractures above the knee from rifle balls should never cause primary amputation.*"

[2] Surgeon J. T. HODGEN, U. S. V., on October 17, 1862, reported from the City General Hospital, St. Louis, of shot fractures of the femur, that he "succeeded in saving 37 out of 53 cases admitted," and, in a letter dated April 30, 1863, suggests that "amputation for these fractures should seldom be performed." Surgeon JOHN H. BRINTON, U. S. V., on May 19, 1863, in a report to the Surgeon General U. S. A., on Dr. HODGEN'S cradle splint, takes

cases reaching these hospitals had been generally selected by the surgeons in the field as cases in which there existed some chance of saving the limb.

But while many of the American surgeons advocated and practised conservative measures in shot fractures of the thigh, there were those who deprecated the frequent attempts at conservation, and who were of the opinion expressed by Surgeon S. Hart, U. S. V.,[1] that "more amputations would have saved more lives." Surgeon T. H. Squire, 89th New York Volunteers, wrote in 1862, after the battle of Antietam: "A badly shattered femur by a ball through the thigh should always be amputated, and the quicker the better." Surgeon G. D. Beebe, U. S. V., in his report of the centre division of the Fourteenth Corps, at the battle of Murfreesboro', remarked: "In the shaft of the femur I believe amputation is the true conservative course." Surgeon G. A. Collamore, 100th Ohio Volunteers, declares: "In fractures affecting the lower two-thirds of the limb, I should amputate so as to remove the fractured portion;" and Surgeon H. S. Hewit,[2] U. S. V., Medical Director of the Army of the Ohio, reported, in September, 1864: "Compound comminuted fractures of the thigh were almost invariably amputated primarily when reaction took place." Surgeon F. Sorrel,[3] Inspector of Hospitals of the Confederate States Army, also favored primary amputation on the field as "the greater readiness with which the patient can be transported from the field; the greater ease and comfort realized under these circumstances, when the limb has been removed; the lesser time required in hospital for recovery, would all seem to point to its adoption as the wiser policy."

Reviewing the cases of injuries and operations in the shaft of the femur recorded during the American civil war, it cannot be denied that the results of the conservative mode of treatment as well as of the amputations have been very gratifying. The three thousand four hundred and sixty-seven cases of the former group gave a mortality of 49.9 per cent., while, of the six thousand two hundred and twenty-nine cases of the latter group, 53.8 per cent. were fatal. Less favorable were the results of excisions in the shaft of the femur, which exhibited a mortality of 69.4 per cent. in the one hundred and seventy-five cases of this operation recorded on the registers of this Office. Of the six thousand two hundred and twenty-nine amputations of the thigh it is true only two thousand nine hundred were performed for shot fractures of the femur, while the remaining three thousand three hundred and twenty-nine were done for shot fractures of the knee joint, leg, or foot, and the objection may be made that it would be unfair to compare the results of six thousand two hundred and twenty-nine amputations in the thigh with the results of shot fractures of the femur treated by either conservation or excision, the injuries in all these cases being in the femur; but the mortality of the two thousand nine hundred amputations in the thigh for fractures of the femur, with one thousand two hundred and fifty-seven

issue with the latter suggestion: "I think that neither an examination of gunshot injuries of the thigh made on the battle-field, nor of the study of the pathological specimens in the Army Medical Museum, will sustain this view of Dr. HODGEN. It must, moreover, be remembered that the cases submitted to the treatment of this surgeon are cases which have reached him at advanced periods after the reception of the injuries; that they have been selected by the surgeons at the scene of conflict as cases in which there existed some chance of saving the limb. They were forwarded to St. Louis for that purpose, and not for amputation. Were the worst cases sent him, I doubt much if his results would be as encouraging." From his experience, based upon the cases treated by him at the Stewart Mansion Hospital, Baltimore, Assistant Surgeon DE WITT C. PETERS, U. S. A., reported, in 1863: "My experience in the treatment of compound fractures of the thigh caused by gunshot wounds and by other kinds of violence has inclined me to favor the most conservative course of action. In cases where the large and important blood-vessels and nerves have escaped injury, and where there is not any extensive laceration and destruction of the soft parts, when the constitutional symptoms are not alarming, the true indications are, it appears to me, to try and save the limb. Instances where, by chance or accident, the surgeon has not seen the case in time to perform primary amputation, and has left nature to her own powerful efforts, which have been finally crowned with success, are by no means infrequent, and these instructive cases should not, in my judgment, be overlooked in forming our opinions in deciding whether a limb should be sacrificed or not."

[1] *Appendix to Part I of the Medical and Surgical History of the War of the Rebellion*, p. 118.

[2] *Appendix to Part I of the Medical and Surgical History of the War of the Rebellion*, p. 311.

[3] SORREL (F.), *Gunshot Wounds—Army of Northern Virginia* [*An Extract from a Report on the Sickness and Mortality in the Armies of the Confederate States, for* 1863, in *Confederate States Medical and Surgical Journal*, Richmond, 1864, Vol. I, p. 154.

recoveries, one thousand five hundred and sixty-three deaths, and eighty unknown results, or 55.4 per cent., exceeds that of the total number of amputations (53.8) only 1.6 per cent., leaving the relative results nearly the same—the percentage of fatality of the total number of amputations, and that of the amputations for fractures of the femur, exceeding the fatality of the conservatively treated cases 3.9 per cent. and 5.5 per cent. respectively. But it is obvious that in comparative statements of cases treated by conservation and by amputation the majority of intermediary and secondary operations should be considered only an abandonment of the conservative treatment made necessary by subsequent complications. To arrive, therefore, at a correct estimate of the value of conservation, we must contrast the latter with the primary operations; and here it will be noticed that while the conservative cases presented a fatality of 49.9 per cent., the mortality of the primary amputations was 49.8 per cent., the latter offering a slightly better chance for the preservation of life.[1]

In comminuted fractures of the upper third of the femur surgeons generally considered conservation preferable to amputation. Professor F. H. Hamilton[2] gave it as his impression that "in compound gunshot wounds of the upper third of the femur amputation should never be performed." Surgeon Charles O'Leary,[3] U. S. V., found, during the Peninsular campaign in 1862, that "amputations at the upper third of the thigh proved fatal within a short time in all cases. The results of this operation were such as to dissuade us from resorting to it in subsequent battles, except when a limb was in such a condition as to make its removal a relief to the patient." Surgeon G. A. Collamore,[4] 100th Ohio Volunteers, who advised primary amputation in shot fractures of the middle and lower thirds of the femur, declares that "if the fracture occur in the upper third, I should prefer to trust the case to nature, with such aid from position, splints, etc., as could be obtained." Surgeon J. J. Chisolm,[5] Confederate States Army, declares that "A compound fracture in the upper third of the thigh should be treated, in every respect, as if in the arm. Unless the leg is so mangled that an amputation is an act of necessity, it should not be thought of." That these views largely prevailed among the surgeons of the War of the Rebellion is apparent from a comparison of the number of cases of shot fractures of the upper third of the femur treated by amputation with those treated by conservation. In fifteen hundred and seventy-seven of the twenty-nine hundred amputations for shot fractures of the femur the precise seat of the injury was recorded. Of these fifteen hundred and seventy-seven cases the injury was in the upper third in only ninety-three instances, or 5.8 per cent., while in two thousand seven hundred and twenty-nine of the three thou-

[1] Professor TH. BILLROTH (*Chirurgische Briefe aus den Kriegslazarethen in Weissenburg und Mannheim*, 1870, Berlin, 1872, p. 239) contends that the intermediary and secondary operations should be grouped with the conservation cases, and this result compared with that of the primary operations:

MODE OF TREATMENT.	CASES.	RECOVERY.	FATAL.	UNKNOWN.	MORTALITY.
Conservation	3,467	1,689	1,684	94	49.9
Excisions (Intermediary and Secondary)	67	24	42	1	63.6
Amputations (Intermediary and Secondary)	1,762	718	1,044	.....	59.2
Aggregate	5,296	2,431	2,770	95	53.2

or a fatality of 53.2 per cent. for conservation against 49.8 for primary amputation.

[2] HAMILTON (F. H.), *Amputations in Gunshot Fractures of the Femur*, in *American Medical Times*, 1864, Vol. VIII, p. I.

[3] O'LEARY (CHARLES), Surgeon U. S. V. "*Extract from a Narrative of his Services in the Volunteer Medical Staff*," in *Appendix to Part I of the Medical and Surgical History of the War of the Rebellion*, p. 70.

[4] SMITH (STEPHEN), *Analysis of Four Hundred and Thirty-nine Recorded Amputations in the Continuity of the Lower Extremity*, in *United States Sanitary Commission Memoirs*, 1871, Vol. II, p. 62.

[5] CHISOLM (J. J.), *A Manual of Military Surgery*, Columbia, 1864, p. 394.

sand four hundred and sixty-seven cases treated by conservation, in which the locality of the injury was ascertained, twelve hundred and fifty-four, or 46 per cent., or nearly one-half, were for fractures in the upper third of the femur. The number of amputations for fractures in the middle third of the femur was three hundred and sixty, and for fractures in the lower third eleven hundred and twenty-four, while of the cases treated by conservation those for fractures in the middle third numbered eight hundred and fifty-five, and those for fractures in the lower third only six hundred and twenty.

Ribes,[1] Demme,[2] Pirogoff,[3] and others[4] have called attention to the great fatality following shot fractures in the middle third of the femur, and Surgeon E. Andrews,[5] 1st Illinois Artillery, reports to have had a similar experience. But neither the results of the cases treated in the American civil war (TABLE XX, p. 175, *ante*) nor of the cases collected in TABLE XLVIII, on p. 336, appear to confirm this opinion. In the former the percentage of fatality is 46 per cent. for fractures in the upper third, 40.6 per cent. for fractures in the middle third, and 38.2 per cent. for fractures in the lower third. In the latter the fatality is 43.4 per cent. for the upper third, 43.1 per cent. for the middle, and 42.3 per cent. for the lower third, thus affirming, in shot fractures of the femur at least, the old axiom that the gravity of injuries of the extremities steadily augments in proportion as the seat of the injury approaches the trunk.

When it had been decided in a shot fracture of the femur to attempt preservation of the limb, all loose spiculæ and foreign bodies were carefully removed,[6] the limb was then brought as near as possible to its normal position, and there held by the use of splints. The extraction of splinters retaining any connection by the periosteum, and also the practice of cutting off the broken ends of the bone, was generally deprecated.[7]

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[1] RIBES (F.) (*Mémoire sur la fracture du tiers moyen du fémur compliquée de plaie, et produite par arme à feu*, in *Gazette Médicale de Paris*, 1831, T. II, No. 12, p. 101) asserts: "Toutes les fractures du fémur compliquées de plaie, produites par un corps poussé par la poudre à canon sont des maladies graves; mais celles qui arrivent au tiers moyen de cet os sont extrêmement dangereuses et presque toujours mortelles."

[2] DEMME'S (H.) (*Militär Chirurgische Studien*, Würzburg, 1861, p. 262) tabulations show a similar result in the Italian War of 1859; the mortality of fractures in the middle third of the femur being 60.87 per cent. to 58.14 of the upper and 43.42 of the lower thirds.

[3] PIROGOFF (N.) (*Grundzüge der Allgemeinen Kriegschirurgie*, Leipzig, 1864, pp. 783, 784) remarks that in the hospitals in the Caucasus and after the Crimean War he saw 20 cases of recovery after shot fractures of the upper third of the femur, but no cases of recovery after fractures of the middle third, and adds: "Our own efforts—comparatively few in comparison to the number of amputations—to cure shot fractures of the middle third of the femur, miscarried."

[4] FISCHER (H.) (*Kriegschirurgische Erfahrungen*, Erlangen, 1872, p. 178) analyses twenty cases of fracture of the femur that were treated by him during the Franco-Prussian War, 1870–71: 10, with 6 deaths, or 60 per cent. mortality, were in the upper, 5, all fatal, were in the middle, and 5, all recoveries, were in the lower third; and reaches the conclusion: "That shot fractures in the middle third are the most dangerous, and are least adapted to conservative treatment. I believe, therefore, that it would be best to amputate primarily in extensive comminuted fractures of the middle third, and to attempt conservative treatment only in shot fractures with little splintering. Stress should be laid upon this rule, as especially to-day, too little primary amputating is done. Primary amputation for shot fracture of the femur is considered almost a crime. . . It is altogether different in shot fractures of the lower third of the femur; here the conservative treatment promises the best results. Between the two stand the results of shot fractures in the upper third. There the amputation or exarticulation is, under all circumstances, a dangerous proceeding, and we may, therefore, allow the conservative treatment a larger field." BECK (B.) (*Chir. der Schussverletzungen*, 1872, p. 694) remarks: "Fractures of the middle third of the femur near the junction with the upper third always impressed me most unfavorably, on account of the frequently co-existing injuries of the blood-vessels."

[5] ANDREWS (E.) (*Complete Record of the Surgery of the Battles fought near Vicksburg. December* 27, 28, 29, 30, 1862, Chicago, 1863, p. 37): "It would seem that shots through the cancellar tissue, at the superior fifth of the femur, are much less dangerous than those in the compact bone of the shaft below; the reason is, that when a ball bores its way through spongy bone, it produces only a moderate amount of shattering, owing to the yielding character of that tissue; but the impact of a minié bullet upon the brittle ivory of the shaft shatters it for several inches, and disperses the fragments with the force of an explosion among all the surrounding tissues, producing immense disorganization. These cases nearly all die within the first five days, no matter what treatment is adopted."

[6] The records show that fragments of bone were dislodged in 288 instances at least, of which 170 had successful terminations.

[7] Surgeon A. W. HEISE, 100th Illinois, who observed twelve cases of comminuted fractures of the thigh at the 1st division, Twenty-first Corps, field hospital, of whom six had recovered with union, two would probably recover, and four had terminated fatally, remarks, in a communication to the Medical Director of the Twenty-first Corps, dated February 4, 1863: "In all these cases the principal vessels had escaped injury. Primary sequestra, or those directly and completely separated by the force of the projectile, were carefully removed by making a liberal incision over the parts. But sequestra retaining connection by periosteal, muscular, or other attachment, I did not interfere with. In only two cases I found that during the process of suppuration sequestra were thrown off. In the majority of these comminuted compound fractures I find that the removal of splinters retaining any connection with periosteum is unnecessary and often injurious, as is also, in my opinion, the practice of sawing off the broken ends of the bones projecting from the comminuted parts. I am strengthened in the belief, from observation made here, that by proper treatment, and under favorable circumstances, splinters become impacted in callus, and, in time, unite with the other fragments of the bone, and, in this manner, a cure is completed without operative interference. Whether the splinters which have thus become impacted in callus will lead to mischief, or are subsequently discharged as if they were so many foreign bodies, the future will determine." Surgeon A. J. PHELPS, U. S. V., in his observations after the battle of Chickamauga, recommends that "loose spicula only should be removed, and resections of the shaft be eschewed." Surgeon H. S. HEWIT, U. S. V., in his *Report on the Military Med-*

The plans adopted for the mechanical support of the fractured thigh bone, for maintaining proper extension, for retaining the fractured ends in accurate apposition, and for facilitating the necessary dressings, during transport as well as in hospitals, were manifold and ingenious, and doubtless contributed to the success achieved in the saving of useful limbs. The extended position, which may be traced back to Hippocrates,[1] but for the systematic and rational application of which we are indebted to Desault,[2] as well as the

icine, Surgery, and General Conduct of the Medical Department of the Army of the Ohio, from May, 1, 1864, to September 8, 1864 (*Appendix to Part I, Med. and Surg. Hist. of the War of the Rebellion*, p. 311), declares "the principle of removing fragments primarily when detached is obvious and has been recommended to the surgeons of the department." Surgeon W. W. BLAIR, 58th Indiana, in *Report of the Medical Staff of the 1st division of the Twenty-first Corps, at the Battle of Stone's River* (*Appendix to Part I, Med. and Surg. Hist. of the War of the Rebellion*, p. 263), states that "all fragments of bone completely separated by the force of the projectile were carefully removed by making an incision if necessary; but fragments retaining connection by the periosteum were not removed, and in only two cases were sequestra thrown off during the process of suppuration." Surgeon HENRY J. CHURCHMAN, U. S. V., in charge of the hospital at Fayetteville, Arkansas, insists that "the comminuted fragments, if small and detached, should in all cases be removed at once under chloroform, and the thigh put in splints so as to keep parts in proper apposition and invite callus—the amount of extension or counter-extension to be regulated by the amount of comminution or loss of substance. It seems to me that the inflammation and suppuration necessitated by an unreduced compound comminuted fracture detach the periosteum from fragments, and not from fragments alone but from bone generally, while the system wastes from suppurative exhaustion and pyæmia. Should even a useless limb result from effort to save, amputation could subsequently be performed under far more favorable circumstances than are generally found in the crowded wards of a general hospital."

[1] HIPPOCRATES, *Oeuvres complètes par* É. LITTRÉ, Paris, 1841, T. III, *Des Fractures*, Par. 19, p. 483.

[2] DESAULT (P. J.) (*Oeuvres chirurgicales*, éd. par XAVIER BICHAT, Paris, 1813, T. I, p. 249, and PLATE II) employed a straight outer splint to reach from the hip to some distance beyond the foot; an inner splint extending from the perinæum and terminating opposite the end of the outer splint; an anterior splint reaching from the abdomen to the knee; and an extending and counter-extending band, the former secured to the foot and lower extremity of the long splint, the latter to its upper extremity after being passed under the perinæum. Junkbags and the SCULTETUS bandage completed the apparatus (see FIG. 207). H. J. BRÜNNINGHAUSEN (*Ueber den Bruch des Schenkelbeinhalses überhaupt, und insbesondere eine neue methode, denselben ohne Hinken zu heilen*, Würzburg, 1789) fastened the broken thigh to the sound one, a principle followed by HAGEDORN (M.) (*Abhandlung von dem Bruch des Schenkelbeinhalses, nebst einer neuen Methode, denselben leicht und sicher zu heilen*, Leipzig, 1808) in his apparatus, which makes the sound limb the extending power, both feet being secured to the foot-board, and the splint to the sound thigh. The apparatus was extensively used on the continent of Europe as well as in England, and was considered a most simple and effectual apparatus. To obviate the principal objection to DESAULT'S splint, that it does not act in the line of the axis of the broken limb, but obliquely, drawing the upper fragment outwards, PHILIP SYNG PHYSICK (JOHN SYNG DORSEY, *Elements of Surgery*, Philadelphia, 1813, Vol. I, p. 163) lengthened the outer splint (see FIG. 208) until it reached nearly to the axilla, and attached to its inner side, at about two inches above its lower end, a block grooved on its inner margin, and broad enough to reach the line of the middle of the foot. Counter-extension was thus made more in the line of the body. If the patient experienced any difficulty in bearing pressure upon the top of the foot, Dr. PHYSICK used a buckskin gaiter laced around the ankle, with straps for extension. Dr. HUTCHINSON added a notched block, over which the extending band is stretched, throwing the direction of the extension in the line of the limb. The apparatus of BRÜNNINGHAUSEN as well as of HAGEDORN prevented the lateral movements of the pelvis. This defect was partially overcome by WILLIAM GIBSON, of Philadelphia (*Reflexions on the Treatment of Fractures of the Thigh, with an Account of a New Apparatus*, in the *Philadelphia Jour. of the Med. and Phys. Sciences*, 1821, Vol. III, p. 230, etc.), who, in a case of oblique fracture of the femur, had applied DESAULT'S splint; but, owing to the obesity of the patient, found it impossible to keep up extension and counter-extension sufficient to prevent the overlapping of the fractured ends of the bone, and tried the method of HAGEDORN: "I soon found, however, that simple and ingenious as it was, and calculated to effect extension and counter-extension to a much greater degree than that of DESAULT, that it was still imperfect, but susceptible of such changes as would make it a most valuable acquisition." Dr. GIBSON constructed two splints five and a half feet in length, reaching from the axilla beyond the feet. Both feet were confined by gaiters to a foot-board, which was firmly supported upon the ends of the long splints through mortises near its edges. But as both feet are imprisoned, the confinement is apt to become irksome to the patient, and it is difficult to prevent bedsores, to give the patient a stool, or to use a urinal. Subsequently, Dr. GIBSON recommended (*Philadelphia Journal of Med. and Physical Sci.*, 1822, Vol. V, p. 372) a triangular frame presenting a single inclined plane, on which both extremities were extended; the feet were confined to a foot-board, and counter-extension was made by the weight of the body. In a similar manner Dr. E. MICHENER (*Remarks on the Treatment of Fractures of the Femur*, in the *American Medical Recorder*, 1822, Vol. V, p. 430) raised the limb on a single-inclined plane to receive counter extension by the weight of the body. A further modification of DESAULT'S splint was that of LUKE HOWE (*Observations on the various methods of treating the fractures of the Os Femoris, with Cases, in which a new apparatus was successfully used*, in *The New England Journal of Medicine and Surgery*, 1824, Third Series, Vol. III, p. 234). The extension was made at the foot with weight and pulley; counter-extension by a band over the groin and ischium, connected by a strap with the headboard of the bed, and a waist band was buttoned or sewed on the pelvis and fastened to the side pieces of the bedstead by bandages or tape. The pulley and weight was also employed by WILLIAM C. DANIELL (*Method of Treating Fracture of the Thigh Bone*, in *Am. Jour. Med. Sci.*, 1829, Vol. IV, p. 330) attached to a handkerchief passed around the ankle. BOYER'S splint (*Traité des Maladies Chirurgicales et des Opérations qui leur conviennent*, Paris, 1831, T. III, p. 305, and Pl. III, opposite p. 640) is composed of a long splint for the external side of the limb, with a foot-board, which was moved up and down by means of a screw for the purpose of making extension; of an inside splint from the perinæum to the foot, and of an anterior splint reaching from the groin to the ankle. A padded leather band through the perinæum and buckled into the upper end of the outer splint made the counter-extension. A modification of BOYER'S DESAULT was used by Dr. JOSEPH E. HARTSHORNE, of Philadelphia. The counter-extension was made against the perinæum at the upper end of the inside splint, and both splints were connected at the lower end by a transverse piece through which a long wooden screw passed having a foot-board attached to it. By this arrangement the outer splint could be detached from the inner one without disturbing either the extending or counter-extending force. The splint is figured, after nature, by H. H. SMITH (*The Principles and Practice of Surgery*, Philadelphia, 1863, Vol. I, p. 625). LISTON'S modification of DESAULT (R. LISTON, *Practical Surgery*, London, 1840, p. 88) consists of a straight splint from the axilla to about six inches below the foot, perforated with two holes at the upper extremity and with two deep notches in the lower end, and an opening to receive the external malleolus. The perineal band is tied to the upper end of the splint; the foot is secured to the processes at the lower end of the splint by a roller passing from one to the other, and then junkbag,

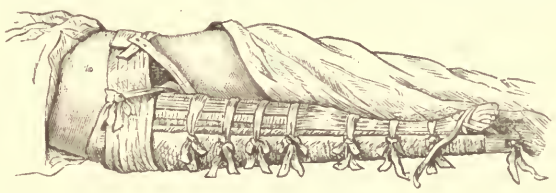

FIG. 207.—DESAULT'S splint.

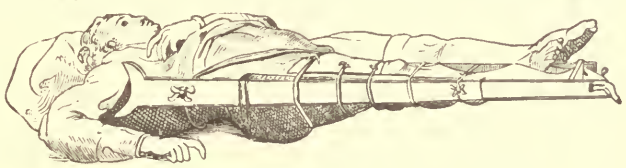

FIG. 208.—PHYSICK'S modification of DESAULT'S splint.

semiflexed position, which was brought into practice chiefly by Percival Pott, found their advocates, although the former was perhaps better known to American surgeons through its modifications by Physick, Gibson, and others. An apparatus on the plan of the double-

splint and thigh are all bound together by continuing the roller up the limb. The apparatus keeps up a moderate extension and counter-extension. The splint employed by W. E. HORNER, of Philadelphia (H. H. SMITH, *The Principles and Practice of Surgery*, Philadelphia, 1863. Vol. I, p. 627) is similar to PHYSICK'S, but the upper extremity of the inside splint is slightly carved out like a crutch head, and has stretched across it a soft leather strap. On the inside of the upper portion of the splint two leather loops are nailed to serve for the attachment of the counter-extending band. Extension was made by adhesive strips. The mode of making extension by adhesive strips and weight is said to have been first employed by Dr. JOSEPH SWIFT, of Easton, Pennsylvania. It was suggested, in 1843, by Dr. ENNIS, a pupil of Dr. SWIFT, to Dr. E. WALLACE, of Philadelphia, and was by the latter successfully employed in a case of simple fracture of the thigh (WM. HUNT, *Extracts from Clinical Lectures*, in *Pennsylvania Hospital Reports*, 1869, Vol. II, p. 273). The same mode was employed by Dr. FREDERICK D. LENTE in 1851, in the New York Hospital (F. D. LENTE, *A statistical and critical Account of the Fractures occurring in the New York Hospital, etc.*, in *New York Jour. of Med.*, 1851, Vol. VII, p. 179). It consisted in the employment of broad strips of adhesive plaster (2½ or 3 inches), which were applied to the limb previously shaved, on either side of it, from a little above the knee to below the foot, where it was secured to the ring at the end of the screw. The straps are confined by a single roller bandage. To prevent slipping of the plaster the extension is not applied until some hours after the application of the strips to the limb. In 1853, Dr. JOSIAH CROSBY (*New Mode of Extension in Fractures*, in *Am. Jour. Med. Sci.*, 1854, Vol. XXVII, p. 76) published a description of his mode of procuring extension by adhesive strips, which he "used, for the first time, in 1849," and which he believed had never been suggested to the profession in a manner to attract the attention of surgeons until it appeared in Professor MUSSEY'S Surgical Report to the American Medical Association at their session in 1850 (*Transactions of the Am. Med. Association*, 1850, Vol. III, p. 382). Dr. D. GILBERT (*Cases in Surgery*, in *Am. Jour Med. Sci.*, 1851, N. S., Vol. XXI, p. 70) substituted a movable for HUTCHINSON'S permanent block, which he attached to the straps of a common tourniquet, close to the sole of the foot, placing the instrument upon the distal side of the block and regulating the extension by the screw of the tourniquet, using adhesive plaster as a counter-extending bandage. Similarly, JOHN NEILL (*New Means for making Extension and Counter-Extension in Fractures of the Leg and Thigh*, Philadelphia, 1855, p. 4) made counter-extension by means of adhesive plaster. The ends of the extending and counter-extending strips were carried through their respective holes at the upper and lower ends of the splint and secured to each other about the middle of the outer splint. By twisting these united bands by a small stick the extension could be increased and maintained. J. McF. GASTON (*Counter-Extension with Adhesive Plaster*, in *Southern Med. and Surg. Jour.*, 1859, N. S., Vol. XV, p. 672) adapts adhesive plaster to counter-extension in the manner of GILBERT, but claims superiority in this, that he makes the attachment of the strips over the spinous process of the ilium and the trochanter, thus giving more fixed resistance to the force of extension. Dr. L. A. DUGAS (*On the Best Plan of Treating Fractures in Country Practice*, in *Southern Med. and Surg. Jour.*, 1854, Vol. X, p. 69) employs 4 wooden splints, a little shorter than the femur, secured around the thigh with many-tailed bandages, a long splint from the side of the thorax to a little below the foot secured by separate ties around the abdomen, pelvis, thigh, leg, and foot, a weight fixed to the ankle and hung over the foot-board, and an arch of crossed hoops to protect the toes from the bed clothes. Dr. H. LENOX HODGE (*Counter Extension in Fractures of the Femur*, in *Am. Jour. Med. Sci.*, 1860, N. S., Vol. XXXIX, p. 565) devised a modification of PHYSICK, with adhesive strip extension and counter-extension. He dispenses with the perineal band, and prevents the patient from rising or sitting during treatment by a piece of iron attached to the long splint which extends over the patient's shoulder, terminating in a blunt hook. A broad piece of adhesive plaster placed on the front and back of the chest, and secured by strips around the body, is looped over a small block of wood which is attached to the hook at the end of the metal bar, thus making counter-extension. To prevent excoriation or sloughing in parts under pressure, the groin, or the perinæum and the ankle, Dr. B. E. COTTING (*Simple Apparatus for Fractures of the Thigh*, in the *Boston Med. and Surg. Jour.*, 1861, Vol. LXV, p. 129, etc.) recommends a band of stout cotton or linen cloth made to fit the pelvis and upper part of the hips closely, and a stocking on the leg, with side straps of strong cotton cloth, which should hang free for a few inches below the foot. By these straps extension is made on the DESAULT splint, the whole leg being brought down with great steadiness, and without the slightest danger from undue pressure on any particular portion. Dr. J. H. PACKARD (*On the Employment of India-Rubber in obtaining Continuous Extension in the Treatment of Fractures of the Femur*, in *Am. Jour. Med. Sci.*, 1862, Vol. XLIV, p. 90) added to the inner and lower end of PHYSICK'S long outer splint a pulley, through the groove of which he ran an India-rubber cord, secured to the leg and ankle by adhesive plaster. The rubber cord was drawn until a sufficient degree of tenseness had been obtained, when the end was tacked to the outer side of the long splint. Two or three inches of the India-rubber cord should be free between the adhesive plaster and the pulley in order to make the elastic force operative. A similar apparatus is figured by R. BARWELL (*A Treatise on Diseases of the Joints*, London, 1865, p. 266, etc.). Dr. T. H. BACHE (F. W. SARGENT, *On Bandaging and other Operations of Minor Surgery*, Philadelphia, 1862, p. 179) cut a long narrow fenestrum in PHYSICK'S outer splint, extending upwards from near its lower extremity; in this fenestrum slides an iron arm, capable of being firmly fixed by screw clamps at any point, so as virtually to lengthen or shorten the splint in adaptation to limbs of different lengths. An ingenious apparatus is described and figured by Dr. HENRY N. HEWIT (*Original Adaptation of Received Principles of Treatment in Fracture of the Thigh*, in *The Medical Record*, 1868–69, Vol. III, p. 217): "It consists of two light flat lateral bars of steel connected by a cross-bar below the sole of the foot. The exterior bar or splint extends from its angle with the cross-bar, six or eight inches below the foot, to the side of the chest opposite the nipple. Two flat bands of steel well padded secure it to the chest and body. The inner bar reaches nearly to the perinæum, but does not impinge, and the floor of the splint is of flexible metal, carefully padded by a continuation of the bands, which secure it to the limb and buckle in front. The two lateral bars opposite the thigh are fenestrated, and nuts are inserted capable of sliding longitudinally, through which play the screws, which can be used for the exact application of detached moulded metallic 'splints of coaptation.'"

[1] POTT (PERCIVAL) (*Chirurgical Works*, Dublin, 1778, Vol. II, p. 304) ascribed the cause of the retraction of the bone in fractures of long bones to the tension of the muscles: "In the thigh, the case is still more obvious, as the muscles are more numerous and stronger. The straight posture puts the majority of them into action, by which action that part of the broken bone which is next to the knee is pulled upward, and by passing more or less underneath that part which is next to the hip, makes an inequality or rising in the broken part, and produces a shortness of the limb." He discarded all machinery for extension in use, and relied on the relaxation of the muscles by placing the knee "in a middle state, between perfect flexion and extension," supporting the leg and foot by smooth pillows, and inclining the patient's whole body to the outside of the fractured femur. The same position was recommended by ROBERT WHITE (*The Present Practice of Surgery*, London, 1786, p. 147) in fractures toward the middle or lower part of the thigh bone, in "order to moderate the subsequent tension; but as soon as the swelling and tightness of the muscles are subsided, the limb should be carefully and gradually brought down, and the toe, knee, and groin kept in a direct line with each other." A double-inclined plane suspended by ropes and cross-bar from a ring was advised by J. N. SAUTER (*Anweisung, die Beinbrüche der Gliedmassen, vorzüglich der complicirten, und den Schenkelhalsbruch nach einer neuen, leichten, einfachen und wohlfeilen Methode ohne Schienen sicher und bequem zu heilen*, Konstanz, 1812). The apparatus is figured by MATTHIAS MAYOR (*Bandages et Appareils à Pansements ou Nouveau Système de Déligation Chirurgicale*, Paris, 1838, 3me éd., PL. 11, FIG. 72). Sir ASTLEY COOPER (*Surgical Essays by* ASTLEY COOPER *and* BENJAMIN TRAVERS, London, 1819, Part II, p. 49, and FIG. 5 of PLATE VIII) placed the patient on his back, brought the thigh over a double-inclined plane composed of three boards, one below to reach from the tuberosity of the ischium to the patient's heel, and the two others above, with a joint in the middle by which the knee may be raised or depressed. Sir ASTLEY COOPER, who had employed this double-inclined plane for near twenty years, ascribed its construction to Mr. WHITE, of Manchester, "who had one made of iron, and hollowed to adapt it to the form of the leg and thigh, but this machine was too heavy and too complicated for use. Mr. JAMES, of Hoddesdon, improved upon Mr. WHITE'S idea, by having the instrument made of wood, with movable splints upon the sides." CHARLES BELL (*Observations on Injuries of the Spine and of the Thigh Bone*, London, 1824, p. 45) also placed the patient on his back instead of the side as advised by POTT: "It is now about eighteen years since I have been accustomed to show the application of the double-inclined plane to fractures of the thigh bone, that it relaxes the muscles inserted into the inner trochanter, and at the same time relaxes all the muscles on the back part of the thigh by the bending of the knee; in short, that it

inclined plane of Pott, introduced, in 1854, by Professor N. R. Smith,[1] and known as Smith's anterior splint, was largely employed in shot fractures of the femur in the early part of the war, the reports indicating that it was used in at least two hundred and eighty-eight instances. Surgeon J. T. Hodgen, U. S. V., in charge of the City General Hospital, St. Louis, forwarded,

humours the natural position of the limb; and that instead of having to restrain and bring down the upper portion, the lower part is raised to correspond with it." The apparatus is figured on p. 346 of Vol. II of C. BELL'S *System of Surgery*, London, 1841, and is copied in the adjoining wood-cut (FIG. 209). A modification of BELL'S apparatus by J. AMESBURY (*Observations on the Nature and Treatment of Fractures of the Upper Third of the Thigh Bone*, London, 1828, p. 132) was found objectionable on account of its cost and complicated character. It consists of three parts, exclusive of straight splints and straps: one part for the thigh, one for the leg, and the third for the foot. The thigh plane again consists of two pieces arranged to make the upper part of the plane conformable to that of the thigh. Hinge joints connect the thigh and leg pieces, and the foot-board is fitted upon the leg plane by means of a screw, allowing it to be moved at a greater or less distance from the angle of the two planes. A steel rod connects the two planes underneath, by which the angle of the plane may be altered at pleasure. The apparatus can only be prepared by the manufacturer. The apparatus of MATTHIAS MAYOR (*loc. cit.*, p. 6, and PL. 10, FIGS. 66, 67, and 68) consists of two planes made of wire and connected by a hinge, with cords to suspend the limb from the bed or ceiling. In 1828, NATHAN SMITH (*Observations on Fractures of the Femur, with an Account of a New Splint*, in *The Philadelphia Monthly Journal of Medicine and Surgery*, 1828, Vol. II, p. 51) perfected an apparatus similar in principle to AMESBURY'S but of simple construction and material. It consisted of two thin broad pieces of bass wood, so warped that the concavity of one corresponded to the convexity of the under surface of the thigh, and the other to that of the leg. Both were joined by hinge-like rivets. A strap passing from the upper extremity of the thigh-piece to the lower extremity of that of the leg, allowed the limb to be fixed at any angle. His son, NATHAN R. SMITH (*Description of an Apparatus for the Treatment of Fractures of the Thigh and Leg*, in *The Baltimore Monthly Journal of Medicine and Surgery*, 1830, Vol. I, p. 305), substituted for bass wood thick binder's board, which he slightly moistened with wetted sponge and shaped into a semi-cylindrical form with the hand. To meet certain requirements, which N. R. SMITH deemed indispensably necessary in the treatment of fractures of the femur (*Observations on Fractures of the Thigh and Leg; with a Description of an Apparatus applicable to the treatment of such injuries*, in *Baltimore Medical and Surgical Journal*, 1833, Vol. I, p. 13), he devised, in 1833, a new apparatus, consisting of four pieces, viz: two concave planes, the one adapted to the inferior surface of the thigh, the other to that of the leg. These are united by a hinge corresponding to the knee. The third piece is for the foot, and the fourth is connected with the thigh piece, and extends upward beside the body. To allow the patient to change his position, Dr. SMITH suspended the limb by means of a cord attached to some fixed point, as already indicated by SAUTER and MAYOR. In LONSDALE'S apparatus (E. F. LONSDALE, *A Practical Treatise on Fractures*, London, 1838, p. 295) the thigh and leg planes were joined at a point corresponding to the knee by a hinge. A horizontal plane, joined also by a hinge to the upper part of the thigh plane, was serrated at the foot end, allowing the leg plane to be fixed at any angle. This simple apparatus was very generally used in the Middlesex Hospital, London. JOSIAH C. NOTT (*Description of a Modification of the Double Inclined Plane, with an exposition of its advantages over other apparatus for fractures of the lower extremity*, in *Am. Jour. Med. Sci.*, 1839, Vol. XXIII, p. 21) describes and figures an apparatus similar to LONSDALE'S, with the addition of a foot-board. Three narrow slits are cut through on each side of the thigh plane, two inches from the edges. Through these are drawn leather straps, long enough to pass around the limb after the pads and splints are applied. By means of buckles at the end of the leather straps the limb is firmly secured to the plane. The apparatus of MCINTYRE, of Newcastle (WM. FERGUSSON, *A System of Practical Surgery*, London, 1842, p. 282), is better known in its simplified form by R. LISTON (*Practical Surgery*, London, 1840, p. 96). It consists of a foot-board of wood, and a thigh and a leg piece of sheet-iron made to fit the limb, and capable of being elongated, by means of screws, to suit any limb, or of being adjusted to any angle. A cross plate of iron is attached to the foot end of the apparatus, which is so arranged that it will always rest flat on the bed, whether the limb be raised or depressed.

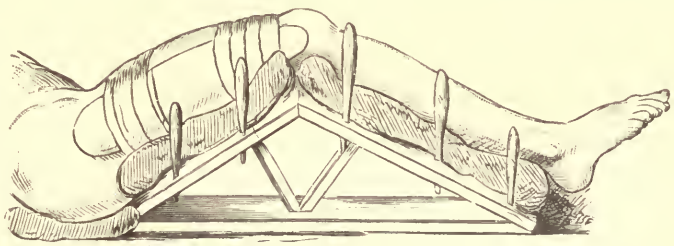

FIG. 209.—Double-inclined plane of C. BELL. [After BELL.]

[1] SMITH (N. R.), *A New Instrument for the Treatment of Fractures of the Lower Extremities*, in the *Maryland and Virginia Medical Journal*, January, 1860, Vol. XIV, p. 1, and *The Anterior Suspensory Apparatus for the Treatment of Fractures of the Lower Extremity*, in *Am. Jour. Med. Sci.*, April, 1861, N. S., Vol. XLI, p. 346, and *Treatment of Fractures of the Lower Extremity by the Use of the Anterior Suspensory Apparatus*, Baltimore, 1867. On page 11, etc., of the latter work, Professor SMITH describes the apparatus as follows: "A single splint constitutes the whole of the rigid, or supporting, part of the apparatus. It may be made of wood or wire (FIG. 210). The first employed by me was of wood. It was three inches broad half an inch thick, and long enough to extend from above the spine of the ilium to the toes. It had an angle corresponding to that of the ankle, another at the knee more obtuse, allowing the leg to be very slightly flexed, and a third corresponding to the hip, still more obtuse, slightly flexing the thigh on the pelvis. Two staples, by which to suspend it, were attached to the upper surface, one a little above the knee and the other about the middle of the leg. The splint may be sawed, in one piece, out of thick pine plank, or may be made of three pieces united at the angles by nails or screws. I now employ a splint of tinned wire. The size of the wire should be that of a No. 10 bougie. If lighter than this it is apt to spring too much. It is constructed of one piece of wire bent twice at right angles, at each extremity, in the form of a long parallelogram (FIG. 210), being, however, three inches and a half wide at its upper extremity and two and three-fourths at its lower. It must be long enough to extend from a point a little above the anterior spinous process of the ilium to an inch beyond the toes when the leg, foot, and thigh are extended. Three feet eight inches will be sufficiently long for most adults. A little excess of length, above or below, is unimportant. The side pieces are to be sustained by curved cross-pieces at distances of about five inches, firmly clinched and soldered upon them, and having loops in their centres for the attachment of the hooks. The wire frame is then to be bent by the surgeon to suit the case. The lower angle corresponds to the ankle, and is one of about 120°, to secure an easy posture of the foot. The angle at the knee is very obtuse, about 160°. The angle at the hip should be of about the same degree. The angle at the ankle should be about five inches from the extremity; that of the hip seven. The middle bend corresponds to the knee. The angles are easily made by bending the splint over the margin of a strong chair or table. It will often be necessary to vary these angles to suit particular fractures. The wire frame is now to be tightly wrapped with a muslin bandage, and it is ready for application. The suspensory apparatus

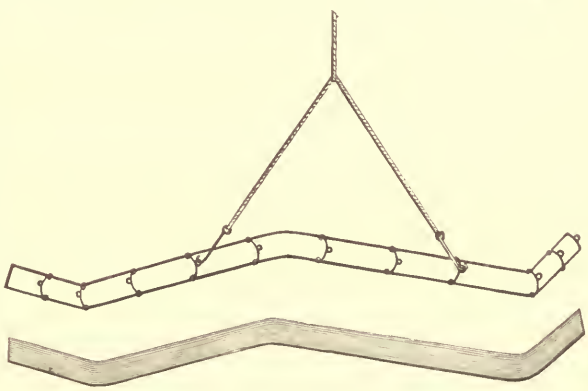

FIG. 210.—SMITH'S anterior splint.

in October, 1862, to the Surgeon General a description of a cradle splint,[1] which had been successfully employed by him in the hospital under his charge. "By this arrangement," he writes, "we have succeeded in saving thirty-seven out of fifty-three cases admitted, or

is simple and easy of application. A small iron pulley is to be screwed into the ceiling, over the bed of the patient, perpendicularly over the middle of the shin, or nearly so. A cord, about as thick as the wire of the splint, passes over the pulley, and is reeved through a small tent-block, by which, slipping it upward or downward, we elevate or depress the limb. The eccentric pressure prevents the weight of the limb from causing it to slip; if not, rub the cord with chalk. This single cord, which depends from the block, has a loop at its end, about two feet or more above the limb. Through this another cord, about five feet long, passes and hangs double from the loop, by its centre. Each end has a hook attached to it of the form represented in the cut (FIG. 211). It is made of much smaller wire. When everything is ready for suspension, these hooks are to be attached to the loops in the cross-bars. The application of the apparatus is extremely simple. The limb (we are now supposing a fracture of the thigh) is to be carefully adjusted and laid on pillows still supported by the hands of assistants. The splint is now to be laid along the upper surface of the limb, the foot portion an inch remote from the instep, the middle angle nearly corresponding to the knee. I formerly placed a long narrow compress under the splint, but it is generally superfluous. One may, however, be placed on the instep, and one under the hip extremity of the splint. I now pass a piece of wet bandage, long enough to embrace the limb and overlap, under the foot and over the splint, so as to embrace both, not tightly. I pass another, also wet, around the ankle, another beneath the knee, a fourth above the knee, and a fifth around the thigh near the hip. Button-hole slits may be made near the end of each sling, and these be buttoned on to the loops in the cross wires of the splint. The limb being still kept extended by the hands of assistants, the hooks are now to be applied. It is very important to select properly their points of attachment so as to adjust well the centre of gravity of the limb. In fractures of the middle of the thigh, I attach the upper hook nearly over the seat of the fracture; the other a little above the middle of the leg. By pulling upon the tent-block the limb is now gently raised from the pillows and hangs suspended in the slings. Observe now whether the upper portion of the splint presses down too much upon the thigh, or springs up too much from it. If the former occurs, then attach the upper hook higher; if the latter, attach the lower one lower. But this may be corrected, if slight, by slipping the cord, with the hooks attached, through the loop of the single cord so as to correct the bearings, and securing it with a piece of twine just below the loop to keep it thus. The limb being now raised, so that one may pass his hand under every part of it, the application of the roller is made. The surgeon commences with the foot, the splint being held steady. Three or four turns are to be made loosely around the foot, care being taken not to press it upward against the splint, which it must never touch. Then figure-of-8 turns are made around the ankle and foot, and the roller is carried upward along the leg and thigh, reversing, where necessary to make perfect adaptation, and great care being taken not to crowd the limb too firmly against the splint. On reaching the hip with the roller, a few spica turns are to be made obliquely through the groin and around the pelvis, concluding with two direct turns around the pelvis (FIG. 212). I often besmear the whole under surface of the bandage thus applied with starch. This prevents the slipping of the bandage, and preserves a uniform and accurately adapted surface of support." Fleet Surgeon JAMES C. PALMER, U. S. N., applied, in a case of fracture of both thighs (HERBERT SMITH, Assistant Surgeon, U. S. N., *Case of Fracture of Both Thighs*, in *Am. Jour. Med. Sci.*, 1865, Vol. L, p. 58), a modification of SMITH'S anterior splint. It consisted of two continuous parallel rods of No. 9 iron wire, passing over the anterior surfaces of both limbs, from the toes upward, arching over the pubes clear of the anterior spinous processes, and bent at the groins at an angle of about 30 degrees. The abdominal arch was well padded. Roller bandages were employed as usual, and the limbs, slung separately, were suspended by a single cord passing over a pulley at the ceiling, and making extension at an angle of about 30 degrees.

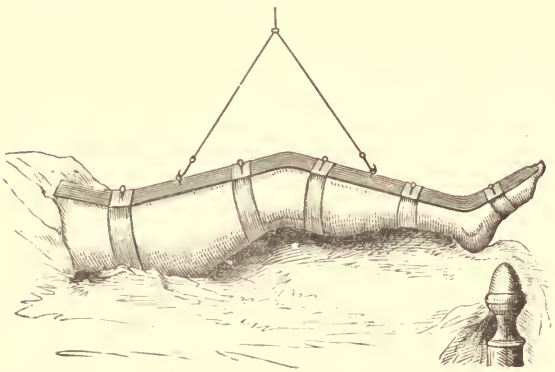

FIG. 211.—Shows suspension apparatus and the member attached to the splint by the slings at four points, preparatory to the application of the bandage. [After SMITH.]

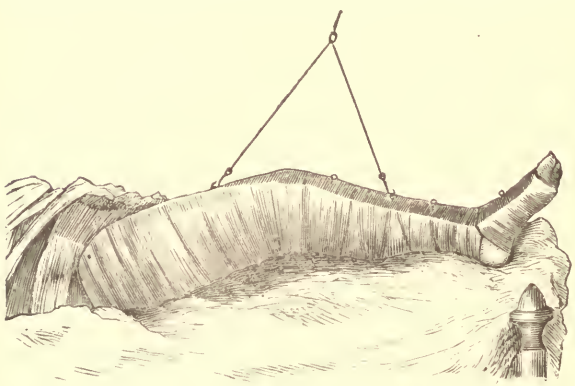

FIG. 212.—Represents the member as completely dressed and suspended. [After SMITH.]

[1] Dr. HODGEN published a description of the cradle splint in the *American Medical Times*, New York, January to July, 1863, Vol. VI, p. 245: "Having experienced great difficulty in dressing compound fractures of the femur when the wound was on the posterior part of the limb, I at length devised the apparatus to meet this difficulty. The wood-cut (FIG. 213) shows the construction of the cradle, so that I need only give the measurements and mode of application. The foot-board is four inches and a half wide, one inch thick, and fourteen inches high (or long), supported on a base fifteen inches long and one inch square. The centre support is seven inches high, eight inches on the base, and one inch thick. The uprights of this portion are one inch wide at the top and one inch and a half wide at the base; this piece is placed twenty-one inches from the foot-board. The longitudinal strips are forty-two inches long, one inch and a quarter wide, and half an inch thick; one end of each of the four is fastened by screws to the foot-piece, two at the base, the remaining two above them, leaving spaces of four and a half inches between the lower and upper pieces. The lower strips are fastened to the outside of the centre support at its base, the upper at the inner side of the upright portion, thus forming the frame represented in the cut (FIG. 213). This may be adapted to either limb by binding the ends of the pieces designed for the perinæum and pubes, the lower one from above and the upper from below, and shortening them so that the foot will come near the foot-board—the upper strip passing in front of the pubes and the lower a short distance from the perinæum. Strips of cotton or linen cloth, two and a half inches wide, are now placed on the upper longitudinal bars, and pinned, so that they form a double-inclined plane on which the limb may rest. These suspension strips are placed in contact with each other, and, being distinct, any one may be removed and replaced to insure cleanliness, when necessary, without disturbing the limb. The limb is then prepared by placing broad strips of adhesive plaster on either side of the leg and securing them in the usual manner by a roller. It is then placed on the suspension

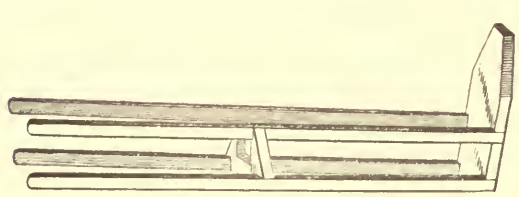

FIG. 213.—HODGEN'S cradle splint for fractures of the femur.

of 66 per cent." Surgeon J. H. Brinton,[1] U. S. V., to whom Dr. Hodgen's paper was referred by the Surgeon General for examination and report, recommended that a "certain number of these cradles be issued to the surgeons in charge of the Washington hospitals, in order that this mode of treatment be fairly tested. I do not anticipate for it a failure." In the campaign before Richmond, in 1862, Acting Assistant Surgeon J. Swinburne[2] proposed a plan for counter-extension available on the field, whereby the stretcher becomes the splint, and the system of extension can be carried into effect immediately after the receipt of the injury. In 1863, Dr. Hodgen[3] proposed a second apparatus, "a combination of the

strips, and the free ends of the adhesive plasters placed around the foot-board and secured to it. A strong cord is fastened to the middle of the foot-board at a proper height, and passed over a pulley which is to be screwed into the foot-board of the bedstead. A bag containing from five to twenty pounds of sand is attached to the cord, and this weight serves as an extending force. Two or more bricks are placed under each of the legs of the bedstead at the foot, thus elevating it four or six inches and allowing the weight of the body to serve as the counter-extending force. Thus the limb is suspended so that the air circulates freely under and about it."

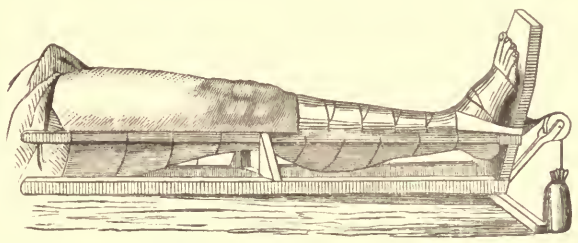

FIG. 214. - HODGEN'S splint applied.

[1] Surgeon J. H. BRINTON, U. S. V., to whom the paper of Dr. HODGEN was referred by the Surgeon General for examination, reports: "The essential portions of this treatment seems to be that the fractured limb is suspended in a cradle formed by strips of bandages attached laterally to a framework. These strips are so arranged as to form a double-inclined plane. Extension is obtained by the attachment to the foot of a sand bag of from five to twenty pounds weight. By raising the foot of the bed from six to eight inches, the weight of the body is made the counter-extending force. Surgeon HODGEN also suggests that the same result may be obtained by the use of SMITH'S anterior splint, widened at its upper end, with an oblique suspension for procuring counter-extension. In other words, this latter modification is almost identical with this apparatus as it is applied in our eastern hospitals in the treatment of compound fractures. The only difference in the application, according to the views of Dr. HODGEN, is the absence of redundant bandages. The advantages which Surgeon HODGEN claims for his cradle splint is the increased ventilation, the cleanliness, and the ease with which portions of the dressings may be changed; all of these ends are, however, attained by the use of SMITH'S anterior splint, judiciously applied, and suited to the exigencies of each individual case. From a careful study of very many cases of gunshot fractures of the thigh, both in our western and eastern hospitals, I have come to the conclusion that the treatment by suspension, in some form or other, is preferable to the use of the DESAULT or other immobile apparatus. I believe that the methods of Surgeon HODGEN and Dr. SMITH will alike be productive of good results, when properly applied and carefully attended to. The success which has been obtained by Dr. HODGEN I do not attribute so much to the new form of dressing employed as to the care, time, and attention which he personally bestows upon the cases under his charge. . . I would state, that when it is decided to try and save the limb, I should be inclined to regard the treatment suggested by Dr. HODGEN as a valuable one. It possesses, I think, all the advantages of the anterior splint, and, in the hands of a young and inexperienced surgeon, is, perhaps, more manageable. The extension can be more readily graduated, and the limb of the patient is equally open to the inspection of the surgeon. The chief objection to its employment is the mobility of the counter-extending point. This fact, which would lessen its value in the treatment of a simple fracture of the thigh, is of little moment in the class of cases resulting from gunshot injuries. In the latter, the life of the patient and the consolidation of the fracture are the chief points at stake; shortening or deformity matter but little. I would, therefore, respectfully suggest that a certain number of these cradles be issued to the surgeons in charge of the Washington hospitals, in order that this mode of treatment may be fairly tested. I do not anticipate for it a failure."

[2] The plan was explained in a paper read before the New York State Medical Society, in February, 1864 (*Transactions of the Medical Society of the State of New York*, 1864, p. 159), and a MS. copy thereof was sent to the Surgeon General U. S. A., by Dr. J. V. P. QUACKENBUSH, Surgeon General of the State of New York, on April 11, 1864: "As soon after the injury as practicable, to place the patient on a bed or stretcher, extend the limb as near as possible to its normal length, without giving too great pain, retain it in that position by fastening the patient's foot to the foot of the bed or stretcher by means of adhesive plaster, as I am in the habit of doing in ordinary fractures of the thigh (FIG. 215). Of course there should be no bandaging of the leg or thigh. Make the counter-extension by the use of a large perineal belt fastened to the head of the bed or stretcher. In order more fully to make the *stretcher a splint*, I propose to place two sliding iron rods, 4, 4, the length of which should be from 8 to 12 inches, and placed upon the handles of the stretcher, which are to be provided with thumb screws, 3, 3, to keep them in any desirable position, and allow of their being depressed, elevated or extended, as the case may require. The foot-strap or cord can be fastened to the sliding iron rod, 4, 4, at the foot of the stretcher, while the perineal belt, 2, can be fastened to the sliding iron rod or arm, 4, 4, at the opposite end. Thus making an apparatus for the treatment of this fracture as complete and perfect as can possibly be produced in private practice; and since the majority of these fractured bones suffer no loss of substance, why should we not then succeed in effecting as good results by this method in army practice as in private practice?"

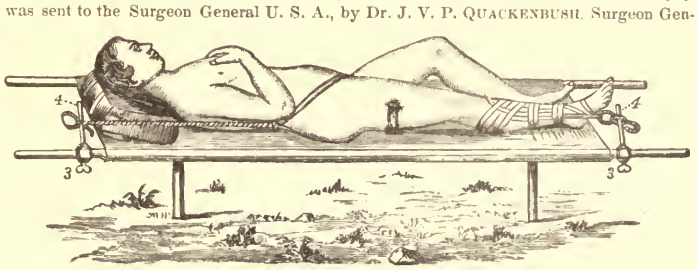

FIG. 215.—SWINBURNE'S plan of applying early extension. [After SWINBURNE.]

[3] HODGEN (J. T.) (*On the Treatment of Gunshot Fractures of the Femur and Tibia*, in *American Medical Times*, 1863, Vol. VII, p. 169, and in *The St. Louis Medical and Surgical Journal*, January and February, 1864, Vol. I, p. 20): "The body of the splint is made of No. 2 iron wire, which is sufficient to support the limb, all of one piece, bent as seen in the cut (FIG. 216). The dimensions are as follows: Four inches across the bottom of the foot; twenty-two inches from the foot to the bend at the knee; twenty inches from the bend of the knee to the upper ends of the wire (corresponding to the pubes and hip when applied). These upper ends are eight or nine inches apart, being separated by a bow of thick wire; another similar bow is placed at the knee, having a span of six inches. These two bows are made so as that they can be put on or taken off without disturbing the dressings, and are put in position after all else is arranged—the one at the hip having a loop at each end to receive the upper end of the splint wires, the other simply hooks, to be looped on at the knee. A roller bandage may be placed around the hips and upper end of the external limb, the splint to keep the latter in place, if required. How applied: A bandage is applied to the foot; an adhesive strap, three inches wide, is applied to each side of the leg, extending four or five inches below the foot, and up to the knee in case of fracture of the femur; or to the fracture, in case the tibia is the injured part. The roller is then extended smoothly over the adhesive plasters. That limb of the splint designed to pass next the pubes is bent upward, at a point

principles of Smith's anterior splint, Swinburne's extension, and the strip bandage supports used in the cradle splints," which he had found in some respects more desirable than the cradle splint. Dr. Gurdon Buck's apparatus,[1] a modification of Physick's Desault, in which the long splint was dispensed with, and constant and uninterrupted extension was kept up

from the bend of the knee in the splint, corresponding to the distance from the bend of the knee to the pubes on the sound side of the body. Strips of bandages three inches wide are now looped over one limb of the splint, continuously from the upper to the lower end, and allowed to belly downward a distance equal to two-thirds of the diameter of that part of the extremity designed to rest upon each one; the other ends of these strips are pinned over the other limb of the splint, thus forming a double-inclined trough in which the extremity is now to be placed on these strips of muslin. The free ends of the adhesive strips are next fastened to the cross-piece at the foot, three inches apart, and the whole suspended from a pulley fixed to the ceiling or a frame; the pulley should be almost over the foot if the ceiling be eight or ten feet high, giving the suspending cords an oblique direction, that in this way we may have sufficient extension. If the patient is disposed to slide toward the foot of the bed, this must be elevated on two bricks under each of the legs at the foot of the bedstead."

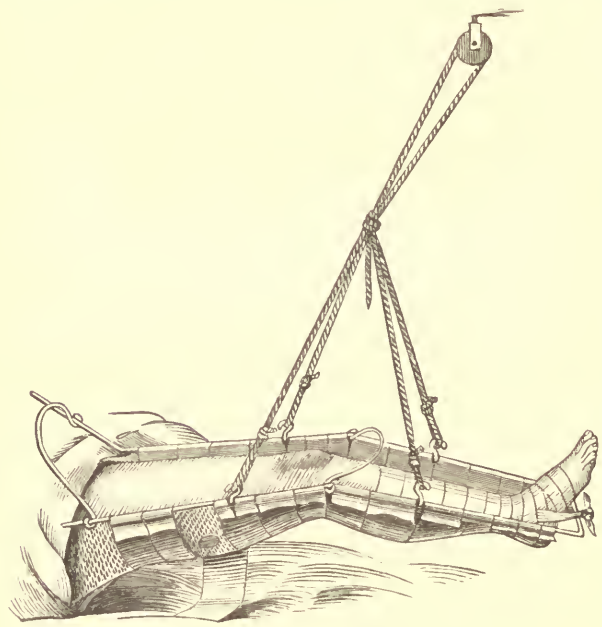

FIG. 216.—J. T. HODGEN'S suspension apparatus.

[1] The apparatus used in the New York hospitals since 1859 (G. F. SCHRADY, *Report of the Proceedings of the Medical Society*, in *New York Journal of Medicine*, 1859, Vol. VI, 3d series, p. 239) is explained in the *Am. Med. Times*, 1861, Vol. II, p. 214. The following description is taken from BUCK (GURDON), (*Description of an Improved Extension apparatus for the Treatment of Fractures of the Thigh*, in *The Medical Record*, 1867–68, Vol. II, p. 49): "Articles composing the apparatus: Two bands of adhesive plaster spread on Canton flannel or thick twilled cotton; each band being two inches and a half wide and two feet long. At the end of one of the bands a piece of elastic rubber webbing, two inches wide and ten long, is attached. At one end of the other band a buckle of corresponding width is fastened. A thin block of wood three inches and a half wide transversely and three inches vertically. The perineal portion consists of rubber tubing of one inch calibre, having inside of it a tube of muslin stuffed with bran and left an inch longer than the rubber tube at both ends. At each end of the muslin tube a metallic ring is first fastened, and then shoved within the rubber tube, to the end of which it is also fastened. This arrangement prevents the rubber tube from being over-stretched. Two straps fastened to the rings at the ends of the perineal portion serve to lengthen it and allow it to be made fast to the head of the bedstead. A belt that passes around the opposite side of the body, and maintains the bearing of the perineal band in a line with the axis of the body and limb. The perineal portion should be wound with a narrow strip of Canton flannel or other soft material, and this should be changed as often as soiled. Four guttered coaptation splints, covered with flannel, are intended to surround the fracture and be secured in place by three elastic bands, each having a buckle at one end. An upright supporting a pulley wheel, to be fastened to the floor by three screws, opposite the foot of the bed. Mode of application: The bands of adhesive plaster are first to be applied, one on either side of the limb from a point above the ankle upwards as high as the seat of fracture. The limb is then to be bandaged in the usual manner, beginning at the toes and covering the plasters, but leaving their lower ends free. The band of elastic webbing is next passed around the sole of the foot and fastened to the buckle on the other side of the foot. The block of wood should then be interposed between the loop of webbing and the foot. A cord fastened to the block thus adjusted is passed over the pulley, and has a weight suspended from it. This arrangement combines elasticity with the extending force, keeps the bands stretched out smooth, and prevents pressure upon the ankles. The amount of weight required must be proportioned to the resistance to be overcome and the toleration of the patient. Sometimes five or six pounds only can be borne at the outset, and an increased weight subsequently. After a fracture has taken place the sooner the limb is put up and subjected to treatment the better. Spasmodic twitchings of the muscles are controlled, and the patient made comfortable from the outset. To permit the application of lotions to the seat of injury during the first few days, the bandage should not be carried above the knee, and the ends of the plaster should be rolled up and kept in reserve. At the end of six or eight days the plasters may be extended up on the thigh and the bandage continued over them. The coaptation splints are now to be applied around the thigh and secured by the three elastic bands. To complete the apparatus the perineal band should be adjusted and its ends fastened to the head of the bedstead so as to be in a line with the axis of the body and limb. The limb should be raised on a hair cushion sufficiently to keep the heel from pressure. In the employment of this method of treatment, experience has shown that in a large majority of cases the use of the perineal band may be dispensed with, the weight of the body being sufficient to resist the extending force. This resistance may be further increased by raising the foot of the bedstead five or six inches above the floor. The advantages claimed for this method over others heretofore in use are its great simplicity of arrangement, facility of management, and especially the comfort it affords the patient during a long confinement in bed. The efficiency with which uninterrupted extension of the limb can safely be kept up secures, it is believed, better results than have been obtained

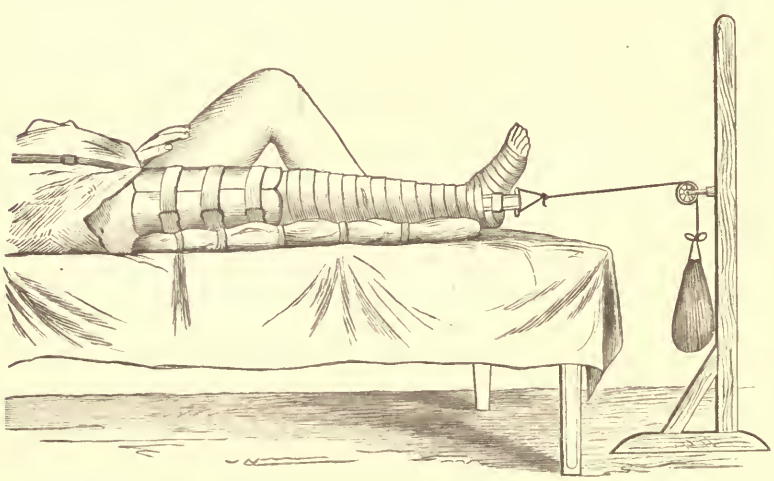

FIG. 217.—GURDON BUCK'S apparatus.

by means of a weight and pulley, was frequently employed during the war.[1] Dr. Vedder,[2] in 1862, recommended a long straight splint, which by a mechanical arrangement may be folded in the middle when not in use, and securely straightened when desired. Extension is made by a rachet pulley, a drawing of which has already been given in FIGURE 570, on page 812 of the *Second Surgical Volume*. During the last year of the war a combined splint and fracture bed, constructed by Dr. I. Langer,[3] was used with favorable results by

by any other method. The sitting posture may be allowed without disturbing the action of the apparatus; an indulgence for which patients are always very grateful, and one which greatly alleviates the irksomeness of their condition. The materials required for employing this treatment are obtainable under almost any circumstances, the only indispensable article being adhesive plaster. If this is of the ordinary description it is better to use it of double thickness. All the other articles requisite may be improvised. The elastic band may be dispensed with, and a round stick properly placed across the foot of the bedstead may serve instead of a pulley."

[1] In a report to the Surgeon General, in February, 1863, Surgeon H. J. CHURCHMAN, U. S. V., speaks favorably of BUCK'S pulley: "In regard to mechanical appliances I much prefer BUCK'S pulley with side splints rolled in muslin, which may be so tacked to splints as to permit their being easily thrown down for dressing or inspection. Of course when there is a discharging wound the splint must be so shaped as to leave wound readily accessible. In lieu of the usual counter-extending adhesive strips or the galling perineal band, I propose to substitute, when attainable, the old-fashioned ribbed corset, lacing up in front with side buckles, by which, with strong tapes, the body may be secured to the bunk or bedstead. The tape might be tightened or loosened as deemed necessary. This apparatus would relieve materially the vexation of spirit to both surgeon and patient necessarily incident to the old plan. I propose this in connection with BUCK'S pulley, while the side splints, arranged as I have stated, give uniform support to the limb in its whole extent and keep it in proper line. In the absence of the corset, I have heretofore advantageously employed in several instances BUCK'S pulley, with side splints as described, and elevation of foot of bed, as described in case 5. The corset will relieve a position found more or less uncomfortable to patient. The only objection in theory is the difficulty of defecation when bound down by the side straps. In practice there is no serious difficulty when using the bed-pan. If deemed necessary, however, the men can readily unbuckle the straps for the time."

[2] VEDDER (JOSEPH H.), *New Apparatus for the Treatment of Fractures of the Long Bones*, in *American Medical Times*, 1862, Vol. IV, p. 254.

[3] Under the direction of the Medical Director of the Army of the Potomac, Colonel T. A. MCPARLIN, Dr. LANGER'S apparatus was tried by Surgeon W. L. FAXON, 32d Massachusetts, who reports, on March 28, 1865: "I have the honor to report that on the 7th and 8th days of March, 1865, I witnessed the application of Dr. I. LANGER'S combined splint and fracture bed, in two cases of compound fracture of the thigh, one near the trochanter major, the other at the middle third, in consequence of gunshot injuries. Each of the patients were transferred and located comfortably, in ten minutes, from the beds on which they were lying to Dr. LANGER'S beds, with the aid of two assistants. Extension and counter-extension were applied from the beginning. No anæsthetics were given, and the patients have evinced no suffering. The changing of the sheets lying under the patients and the evacuations from the bowels during their confinement were effected without the necessity of lifting the patients from the beds they were first put on. The discharge of the matter from three wounds in the first case—the bullet entering at the edge of the nates on the left side, penetrating the left thigh, and entering the right limb one inch below the tuberosity of the ischium—as well as from the two wounds in the second case, has not at any time made the patients uncomfortable, as the matter and the water used for cleansing ran off freely. The position as well as the axis of the limbs are nearly straight, and the shortening in neither case exceeds one inch. I consider Dr. LANGER'S combined splint and fracture bed as I have seen it in operation at this hospital as the best appliance I have used, or seen used in the army. The patient can always be made comfortable; he seldom requires opiates to procure sleep (in neither of the cases above quoted were any bed-sores); the patients can always be kept clean, the bed clothing is not at all soiled, one nurse can take care of as many cases as of simple wounds, and the operation of lifting and shifting the patient in dressing of the wound is entirely avoided, an object of great importance to all concerned; and I respectfully request that fifty of Dr. LANGER'S beds be furnished for use of this hospital, if possible." This report received the favorable endorsement of the Acting Chief Medical Officer of the Depot Field Hospital at City Point, Surgeon G. B. PARKER, U. S. V., and was forwarded to the Surgeon General of the Army for favorable consideration by the Medical Director, Colonel T. A. MCPARLIN. Dr. LANGER'S apparatus consists of a triple-inclined plane, on which extension and counter-extension of the fractured femur is kept up by the weight of the body and the leg: "It is constructed of iron and covered with duck-cloth; its weight is twenty-six (26) pounds, including the straps to swing the apparatus in an ambulance wagon or anywhere else. It consists of: *a*. One head piece. *b*. Two trunk bars. *c*. One cross piece. *d*. Two thigh pieces. *e*. Two leg pieces. *f*. Two bows under the knees. The thigh as well as the leg piece, for the injured limb, has pins to support the straps on which the limb rests. *a*. Head piece connected with the trunk bars, arranged to change its relative position, when vertical, to form a shelter to the head, when horizontal, to make an elongation to the trunk part for the head to rest on, or serving instead of legs, when set down, with a strip of wood at its opening to keep it spread; it is covered with double cloth, which is to be stuffed if chosen. *b*. Two trunk bars, connected with the head piece by bolts and thumb-nuts; to the necks of the bolts straps are fastened to swing the apparatus. On each of the bars is a loop for an additional strap, to support the arm, or if the wounded man is exposed to the weather, to attach there a storm hood. Between these bars cloth is stretched for the patient to rest on. A blanket and a sheet doubled up and spread over the cloth before the patient is laid on it will enhance the comfort. These trunk pieces are connected with the cross piece in a manner as to allow the change of their relative position from a level with the thigh pieces to an angle of 45°. *c*. Cross bar, with a bend nine inches, opening to receive a bed-pan with a neck on each end, to rest on a fulcrum having a head to secure against slipping. Near the angles of the bend are two holes to receive the screws of *d*. *d*. Two thigh pieces, rotating in a loop connected, movable, with a screw and thumb-nut, with the cross-piece so as to allow either of the two thigh pieces to elevate or lower nearly three-fourths of a circle; also to allow to separate one from the other; but if wanted stationary they are fastened together by a

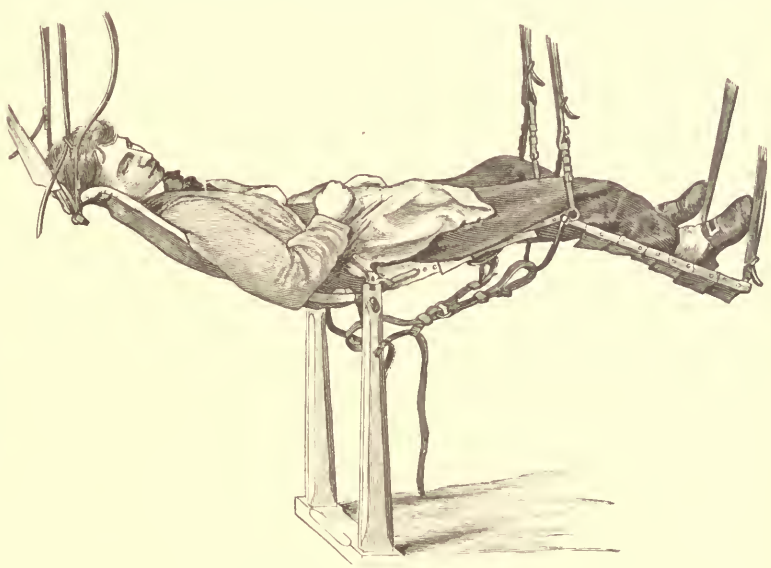

FIG. 218.—Dr. I. LANGER'S apparatus.

surgeons of the Army of the Potomac. In a few instances the single long splint of Dr. Kimball[1] was preferred. Assistant Surgeon W. Thomson, U. S. A., substituted the "bran box for Hodgen's splint, which had become uncomfortable and difficult to adjust."[2] Surgeon J. T. Woods, 99th Ohio, employed the double-inclined plane in fractures of the femur near the trochanters, and Desault's splint, or some modification thereof, in fractures of the middle third of the femur.[3] Surgeon E. McDonnell, U. S. V., advised that in fractures of the upper third of the femur all extension apparatus be dispensed with as liable to produce a hiatus between the fractured ends, leaving, on account of the absence of periosteum and nourishing vessels, no chance for repair, and that the limb be simply placed in an easy position regardless alike of deformity and shortening.[4] The danger of producing such a separation of the ends of bone as might delay if not interfere with the union of bone was pointed out by Dr. J. R. Lothrop, at the Buffalo General Hospital,[5] and other surgeons.

The method of wiring together the fractured ends of long bones proposed by Assistant Surgeon B. Howard,[6] already referred to in the *Second Surgical Volume*, at page 819, found

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key; four holes on each end, to adjust the length and to connect with the spreading bows under the knee and the leg pieces. On each end of the thigh pieces are slats for the straps to swing the apparatus; when the two thigh pieces are connected by key there is still a place left for defecation. *e.* Two leg pieces, with four holes on each end, to be adjusted and connected outside of the end of the thigh pieces; the cross bars of each have a hole for a cord to pass through, to fasten a weight to the foot if required; to the cross bar is a strap fastened to swing the apparatus. The inner corner to be connected with a cord. One of the thigh as well as one of the leg pieces has pins to fasten the straps stretched across for receiving the injured limb to rest on. The other is covered with cloth; both of them have a well padded cushion secured at the end near the cross piece. *f.* Bows under each knee, to connect by a bolt and thumb-nut, inside of the ends of the thigh pieces, to keep the thigh and leg piece from drawing together by the weight of the limb resting on them. To these two bows a strap is attached, which fastens to the floor, preventing side motions or raising the whole apparatus."

[1] SARGENT (F. W.), *On Bandaging and other Operations of Minor Surgery*, Philadelphia, 1862, p. 182. Dr. KIMBALL'S splint extends from the axilla to below the foot, but is so contrived as to be capable of being lengthened at each extremity by sliding bars. The upper sliding bar terminates in the manner of a crutch; to the lower is secured at right angles a transverse bar, which is moved up and down by screw, thus regulating extension at will. The perineal band is used, but may be discontinued with safety by moving the upper crutch-like sliding bar into the axilla.

[2] Report of Assistant Surgeon WM. THOMSON, U. S. A., in charge of Douglas Hospital, Washington, for June, 1863 (*File A, No.* 103): "It is difficult to conceive of a more suitable apparatus for compound gunshot fractures of the thigh than the Bran Box, properly arranged. The limb is supported at every point; the skin is kept cool and dry, and the profuse discharge easily removed at each dressing. Where extension is desired, it can readily be made by fastening the adhesive strips attached to either side of the leg to the box and then adding a sufficient weight to a cord fastened to the foot-board."

[3] In his report from the hospitals at Chattanooga, Surgeon WOODS remarks: "The limbs were placed in positions most comfortable to the patient for some time, when, suppuration having at last become much reduced in quantity and the reparative callus was being thrown out, they were (usually under chloroform) placed in some form of splint with moderate extension and counter-extension. My observation led me to conclude that the double-inclined plane is inferior save where the fracture is within a short distance of the trochanter, and the tilting of the upper fragment requires the adaptation of the lower fragment to it by changing the position of the leg from the straight line, and possibly when the fracture is so low down that the condyles are drawn backward and downward. SMITH'S anterior splint failed to meet my expectations in every particular. If it be applied as Dr. SMITH directs, the parts are hidden from view, sacculation of pus occurs, drainage is imperfect, and filth accumulates in the bandage. If the leg be simply suspended in the wire frame, sufficient quietude of the parts is not maintained, and the extension is neither sufficient nor reliable, and, if the fracture be in the upper third, the motions of the body produce movement in the fractured extremities—just what a splint is designed to prevent. The splint of DESAULT, modified in various ways to suit particular cases, can be so applied as to secure the desired immobility, extension, drainage, exposure, and cleanliness. My impression from observing these cases leads me to conclusions briefly summed up thus. . . The proper dressing of a limb is really of great importance and very much underrated. That 'supporting' diet in the early stages of these injuries is over-estimated. That an object of the first importance is to secure an abundance of fresh air, cleanliness, and perfect drainage. A very great error consists in excessive bandaging—a limb is better off without bandaging or splints until reparation has commenced. The covering of gunshot wounds with lint, either picked or patent, is objectionable; the pus drying at the edges glues it fast and is not permitted to drain away. The best splint for fracture at the trochanter major or immediately above the condyles is some form of the double-inclined plane, and, for fractures in the middle of the femur, some modification of the DESAULT splint."

[4] Surgeon E. MCDONNELL, U. S. V., who had charge of a field hospital after the battle of Antietam, remarks, in a special report, transmitted in February, 1863, of a fatal case of fracture of the upper third of the femur treated by BUCK'S apparatus: "It appears to me the lessons most practically deducible from the foregoing case are two, viz: 1st, that there was such a destruction of bone that when the limb was extended by BUCK'S plan a hiatus was produced between the fractured ends, as left by the absence of periosteum and any nutrient vessels no chance for repair—hence I think this or any apparatus separating the fractured bones destructive of our hopes of a good result. This case, with many others in the hospitals of Sharpsburg, gave ample scope for contemplation on the different methods devised by distinguished members of our profession to advance conservative surgery. The result of my observation is that, should I ever have charge of as many wounded men as those in the Sharpsburg hospitals, over which I had control, I should in all cases of badly compound comminuted fractures of the femur in the upper third dispense with *all* extension apparatus, and simply place the limb in an easy position regardless alike of deformity and shortening (amputation being out of the question). This I am persuaded is the treatment to save most lives."

[5] LOTHROP (J. R.), *A Case of Gunshot Wound of the Femur*, in *Buffalo Med. and Surg. Jour.*, 1860, Vol. V, p. 470.

[6] In his article (*The Application of Sutures to Bone in Recent Gunshot Fractures*, in the *Medico-Chirurgical Transactions*, London, 1865, Vol. XLVIII, p. 252) Dr. HOWARD defends this expedient: "The shock of the operation involved in this plan of treatment, superadded to that of the original wound, immediately suggests itself, of course, as an objection to its adoption. Over against this, however, we must weigh the immediate dangers previously enumerated from the pressure and constriction of tight dressings attending the use of simple splints. Those from the enclosed fragments and spiculæ during transportation being in continual motion, and afterwards awaiting tedious extrusion by the slow processes of nature, keeping the patient in a condition which renders him continually susceptible to various intercurrent diseases, and, should union be ultimately effected, the degree of effort called forth for its accomplishment has left behind such a surplus of provisional callus, and other pathological changes in the parts adjacent, as seriously to diminish the usefulness of the limb for a long period, with a still further danger that after apparent recovery tertiary sequestræ, as mentioned by DUPUYTREN, may continue to be extruded for ten, fifteen, or even twenty years thereafter. In the operation described the chief causes of the evils above enumerated are removed. Its advantages consists mainly in this: 1st. Negatively: In the absence of everything which may act as a foreign body and dangerous

even less favor in shot fractures of the femur than in those of the humerus, and it seems that in one instance only this plan was attempted:

CASE 497.—Private H. Ingalls, Co. B, 6th Ohio Cavalry, was wounded during the engagement near the Pamunkey River, May 28, 1864. He was admitted to the field hospital of the 3d division, Fifth Corps, whence Surgeon L. W. Reed, U. S. V., reported the injury as a "severe shell wound of the left thigh." From the field hospital the patient was moved to White House Landing, where he died from the effects of his injury on June 2, 1864. This case has been identified as one published by Dr. Benjamin Howard, late Assistant Surgeon, U. S. A. (*Medico-Chirurgical Transactions*, London, 1865, Vol. XLVIII, p. 251), as follows: "On May 29, 1864, I was called in consultation on the field to see the patient, who was sixty years of age and of broken down constitution; he had received a severe fracture of the femur from a large fragment of shell, which I found firmly wedged into the bone about three inches above the knee. From this point there proceeded a long oblique fracture, running upwards and outwards, with some comminution of the inner aspect of the bone in the vicinity of the piece of shell. The sharp pointed lower fragment was overriding the upper, causing a shortening of about three inches, reduction of which, with such a wound, could not possibly be maintained with splints alone during transportation. Having made the requisite incision and extracted the impacted piece of shell, I proceeded to remove the looser fragments; then causing steady extension to be kept up while I kept my finger and thumb in the wound, I guided the fractured ends so that the corresponding serrations were accurately refitted to their original position for about two thirds of the circumference of the bone. Having somewhat enlarged the incision, I directed the limb to be so bent upon itself as to slightly reopen the fracture, while I drilled the requisite holes and passed a suture, which firmly secured the interlocked fragments, rendering shortening or shifting impossible. A straight splint was then applied, the wound being left exposed for the repetition of cold-water dressings. After the operation the patient ceased to complain of pain and seemed very comfortable. The next morning he was hurried away in an ambulance train, and I saw no more of the case. In consideration of his age, the nature of the wound, and his broken-down constitution, I was not surprised when subsequently I incidentally heard that he died on the road three days afterwards."

The amount of shortening[1] of the injured limb was indicated in seven hundred and thirty-two[2] of the sixteen hundred and eighty-nine cases of recovery after shot fractures of the femur treated by conservation, varying from one-quarter of an inch to eight inches, and averaging 2.31 inches.[3] In fifty-two cases the reports indicated shortening, but the precise amounts were not stated. In twelve instances it was recorded that there was no shortening whatever, and in eight hundred and ninety-two this point was not noted. One instance is reported in which the limb was found lengthened:[4]

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source of irritation. 2d. Positively: In securing complete coaptation and perfect rest. This plan of treatment is new only in its application. Substantially the same operation, including the use of the wire suture, has for a long time been practised, and still meets with general approval, as a *secondary* operation for ununited fracture. Other things being equal, why should it be less advisable as a *primary* one, where, in the absence of all pathological changes, we have a healthy condition of all the parts, with sound bone in apposition and at rest. These considerations led me to hope for a healthy process of uninterrupted repair, with speedy use of the limb after union. The selection of the cases (which at most must be quite limited in number, either on the field or in civil practice), the amount of bone which may be with propriety removed, etc., must, of course, be a matter of careful judgment."

[1] The exact amounts of shortening in the 732 cases in which this point was ascertained are: ¼ of an inch in 1 instance; ½ in 1; ⅝ in 20; ¾ in 17; 1 in 77; 1¼ in 19; 1½ in 1; 1⅝ in 80; 1¾ in 13; 2 inches in 179; 2⅛ in 2; 2¼ in 5; 2⅜ in 82; 2½ in 14; 2⅞ in 1; 3 in 111; 3¼ in 5; 3½ in 23; 3¾ in 3; 4 in 42; 4½ in 6; 4¾ in 1; 5 in 16; 5½ in 3; 6 in 5; 6½ in 1; 7 in 2; 7½ in 1; 8 in 1.

[2] Assistant Surgeon DEWITT C. PETERS, U. S. A., in a letter to Medical Inspector JOHN M. CUYLER, U. S. A., dated Jarvis U. S. A. General Hospital, Baltimore, January 11, 1864, remarks: "Recently I had the opportunity of hurriedly examining twenty-five rebel prisoners who were wounded at Gettysburg, and had, up to a late period, been treated in hospitals near the field. They were lying side by side and had compound gunshot fractures of the femur. My time was limited, as they were under orders to embark for exchange; but I measured their injured limbs and found the greatest amount of shortening to be four inches, and the least about one inch. Average near two and a quarter inches. I believe you were instrumental in having these bad cases retained near the battle field, also many others, and the happy results prove your wise forethought. I have long argued that many of these cases were killed by transportation employed too early. The cases I saw fully show how much nature can do; but I cannot say so much about the treatment, for some of them were strangely crooked, bowing every way. I think with proper extension and counter-extension they might have been greatly improved. I thought the mention of them might be interesting, as they were prisoners and depressed in spirits; it further adds to our knowledge of nature's reparative powers when aided."

[3] The instances in which the shortening of the limb after recoveries from shot fractures of the femur has been recorded in military surgery are few: STROMEYER (L.) (*Maximen der Kriegsheilkunst*, Hannover, 1855, p. 724) remarks that he has notes regarding the length of the limb in 12 of the 15 cases of shot fractures of the femur that he observed. In one of these the shortening was 5 inches; in 1, 4 inches; in 4, 3 inches; in 5, 2 inches; and in 1, 1 inch, averaging 2¾ inches. CHENU (J. C.) (*Rapport, etc., pendant la Campagne d'Orient en* 1854–55–56, Paris, 1865, p. 375 *et seq.*) cites 126 cases of recovery after shot fractures of the femur. The amount of shortening is ascertained in 32 cases, varying from 3 to 11 centimetres, and averaging 5.7 centimetres, or about 2¼ inches. WILLIAMSON (GEORGE) (*Military Surgery*, London, 1863, p. 138) reports, from the mutiny in India, in 1857–58, 13 cases, viz: "Limb 3 inches shorter in 3; 2½ inches shorter in 1; 1½ inch shorter in 4; and 1 inch shorter in 5 instances;" an average of 1.7 inch. CHENU (J. C.) (*Stat. Méd. Chir. de da Camp. d'Italie en* 1859 *et* 1860, Paris, 1869, p. 715 *et seq.*) reports, among 118 cases of recovery, 25 cases with shortening varying from 2 to 15 centimetres, the average being 7 centimetres, or 2¾ inches. BECK (B.) (*Chirurgie der Schussverletzungen*, Freiburg, i. B., 1872, p. 694 *et seq.*) ascertained the shortening in 23 instances varying from 1 to 4½ inches, averaging 2.25 inches. CHENU (J. C.) (*Aperçu Hist. Stat. et. Clin.*, Paris, 1874, p. 453 *et seq.*) records 705 invalids after shot fractures of the femur treated by conservation. Shortening is stated to have existed in 426 instances; in 201 cases the amount of shortening is definitely stated, and varies from 3 to 23 centimetres, averaging 7.4 centimetres, or very nearly 3 inches. According to these limited statistics the average shortening in shot fractures of the femur is 2.7 inches.

[4] Professor F. H. HAMILTON (*A Practical Treatise on Fractures and Dislocations*, Philadelphia, 1875, p. 516) relates the following case as an example of lengthening of the limb after shot fracture of the femur: "Melchior Briétel, Private, 12th N. Y. V., was wounded in June, 1862, at the battle of White Oak Swamp, Virginia, by the fragment of a shell, which struck the left leg three inches above the condyles. He was taken to Richmond as a prisoner, and about a month later he was exchanged and sent within our lines. January 1, 1864, I found him in the United States General Hospital, at Newark, under the charge of Surgeon Taylor. The wound was still discharging matter occasionally, and several fragments of bone had been removed. Splints were not applied until after his exchange. No extension was ever employed. At the end of four months he began to walk about with crutches.

CASE 498.—Lieutenant J. Davis, Co. G, 73d Ohio, aged 35 years, was wounded at New Hope Church, May 25, 1864, and admitted to the field hospital of the 2d division, Twentieth Corps. One week after receiving the injury the patient was moved to Chattanooga, where the wound is described as an "injury to the trochanter major." He was subsequently sent to the Officers' Hospital at Nashville, whence he proceeded to his home on leave of absence, August 10th. He was mustered out of service May 5, 1865, and pensioned. Examiner O. J. Phelps, of Piketon, Ohio, certified, July 25, 1865: "The ball entered at the groin, passed through, shattering the trochanter major, and as yet rendering the limb entirely useless. It is still unhealed." Examiner J. Arnold, of Waverly, December 12, 1871, stated: "The hip joint is rendered entirely useless. There are two ulcerating sores that discharge very much all the time, and small pieces of bone are taken out. Has to use crutches to get about." Examiner W. Scarlock found no improvement in the pensioner's condition in September, 1873, and reported, two years later: "One running sore still exists on the outer side, over the great trochanter. There are four tender cicatrices that have recently healed, two on the inner and two on the posterior side, ranging from four to six inches below the original wound. The limb is lengthened some three inches, and its movements are painful and limited. The wound still requires dressing once or twice a day." At a subsequent examination, in 1877, the limb was still found to be in the same condition, lengthened, etc., and the pensioner was reported as wholly unfit for any occupation requiring manual labor. The pensioner was paid Sept. 4, 1879.

The side of the injury was recorded in three thousand and thirty-six instances; fourteen hundred and thirty-one were on the right, and sixteen hundred and five on the left side. Of the former, six hundred and sixty-one, or 46.1 per cent., and of the latter seven hundred and forty-three, or 46.2 per cent., were fatal. Here, as well as in the cases of shot injuries of the shoulder joint and arm (*Second Surgical Volume*, pp. 610, 806), the left extremity seemed to have been most frequently interested; but here, also, the number of cases in which this point could not be ascertained (four hundred and thirty-one) prohibited definite conclusions on this subject. In two hundred and eighty-four cases the fractures of the femur were accompanied by lesions of other portions of the body: fractures of the bones of the head in nine instances, penetrating wounds of the chest in five, penetrating wounds of the abdomen in three, fractures of the pelvic bones in thirteen, fractures of the upper extremities in thirty-three, fractures of the opposite lower extremity in twenty-five, and in one hundred and ninety-six instances the fractures of the femur were accompanied by shot flesh wounds of the upper or lower extremities. Pyæmia was noted in one hundred and fifty-one instances with one hundred and forty-seven deaths; tetanus in eighteen with seventeen deaths; gangrene in fifty-three with thirty-two deaths; erysipelas in forty-six with twenty-six deaths; and hæmorrhage in one hundred and thirty-three with one hundred and eighteen deaths. The external iliac artery was unsuccessfully ligated in one instance:

CASE 499.—Private M. Teel, Co. C, 73d Indiana, was wounded through the upper third of the right thigh, at Stone River, December 31, 1862. Assistant Surgeon F. L. Town, U. S. A., reported that the wounded man was admitted into hospital No. 4, Nashville, six days after receiving the injury, where, by reason of secondary hæmorrhage, the external iliac had to be ligated, resulting fatally on January 19, 1863; also that the severity of the original injury was sufficient to produce death.

The femoral artery was ligated in twenty-one instances, of which two proved successful. Socin[1] has remarked that in a shot fracture of the femur "accompanied by an injury of the artery alone, conservation might yet be attempted after an utmost early ligation;" but a most careful examination of all the cases of shot fractures of the femur treated by conservation during the American civil war has failed to disclose a single instance of recovery after fracture of the femur accompanied by an unquestionable primary lesion of the femoral artery. In the following instance the femur had been fractured and the femoral artery severed by a minié ball; the artery was promptly ligated. The patient survived nine months and eleven days, but finally perished from the effects of the injury:

On measuring I found this limb lengthened half an inch, and this measurement was confirmed by Surgeon TAYLOR and others. There was no anchylosis at the knee joint." Professor HAMILTON must have been mistaken as to the name of the patient. The name of Melchior Brictel is not borne on the rolls of the 12th New York Volunteers. A private, Melchior Breitel, I, 12th New Jersey Volunteers, wounded at Chancellorsville, Virginia, May 3, 1863, was admitted to the Newark U. S. A. General Hospital with a gunshot wound of the thorax and the left arm, September 9, 1863. He was discharged March 28, 1864, and has been a pensioner since. The records of the Newark hospital, as well as the soldier's certificate of disability, and the certificates of two pension examining surgeons, agree in the diagnosis: "Gunshot wound of chest and left arm," but no mention is made of a shot fracture of the femur or its treatment, and Professor HAMILTON himself, in his *Lectures on Gunshot Injuries of the Chest*, in *American Medical Times*, 1864, Vol. VIII, p. 182, cites the case as an example of perforating wound of the lung followed by empyema, without mentioning an injury of the femur.

[1] SOCIN (A.), *Kriegschirurgische Erfahrungen*, Leipzig, 1872, p. 128.

CASE 500.—Private *B. M. Dunn*, Co. D, 1st Louisiana, was wounded in the right thigh, at Gettysburg, July 2, 1863, and admitted into Camp Letterman four weeks after the injury. Assistant Surgeon W. F. Richardson, C. S. A., reported: "He was wounded by a minié ball, which entered at the inner anterior portion of the thigh about the middle third, and made its exit at the posterior and outer portion, severing the femoral artery and fracturing the femur in its course. The femoral artery was ligated in Scarpa's space on the day of the injury. When admitted in my ward the patient was suffering intolerable pain, occasioned by moving him four miles in an ambulance over a rough road, without splints, sand-bags, bandages, or any other appliance to the limb, and with the ends of the bones overlapping each other. I administered chloroform and placed the bones in apposition, attaching a twenty-pound weight to the leg. Three days afterwards I reduced the weight to ten pounds, and on August 8th Smith's anterior splints were applied. One ounce of whiskey was given three times a day. The patient improved under the treatment adopted. On August 16th, the splint was readjusted, and again on September 1st, when the wound was found to look well and healthy and to be still discharging laudable pus. After this, tincture of iron in doses of fifteen drops was given in addition to the whiskey, and on September 6th the ligature was removed. On September 8th, the patient complained of sharp shooting pains around the wound, extending downward to the knee; he was placed under chloroform, and an incision one and a half inches long was made behind the exit wound, through which four or five small pieces and one large piece of bone were removed. Considerable hæmorrhage ensuing, persulphate of iron was injected in the wound, after which the leg was again placed in a splint. By September 12th, the patient was again improving. On October 10th, the wound was still discharging freely, and the thigh was much swollen and very painful. The patient was also suffering from a rather troublesome diarrhœa. On November 10th, when he was transferred to Baltimore, his wound was still suppurating freely, but his general health was improving and union of the fractured bone was firm, so that he could bear about one-twelfth of his weight on the injured limb." In Baltimore, the patient was admitted to West's Buildings Hospital, and two months later he was transferred to Point Lookout. Surgeon A. Heger, U. S. A., in charge of the latter hospital, reported that the man died, from the effects of the fracture of the femur, April 13, 1864.

TABLE XLIX.

Summary of Twenty-one Ligations of the Femoral Artery in Cases of Shot Fractures of the Femur treated by Conservation.

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATE AND DESCRIPTION OF INJURY.	HÆMORRHAGE.	LIGATION AND OPERATOR.	RESULT AND REMARKS.
1	Union Lieutenant.	Comminuted fracture upper third of femur. Harrisburg, Miss., July 14, 1864	Femoral artery sloughed.	Ligation of femoral artery.	Complete recovery. Exch'd. *C.S.A.Med.and Surg.Jour.*, Jan., 1865, Vol. II, p. 9.
2	*Smith, F. A.*, Pt., G, 4th Alabama, age 24.	Conoidal ball fract're of lower third of left femur. Gettysburg, July 2, 1863.	.....	Ligation of femoral.	Exchanged April 27, 1864.
3	Wright, M., Pt., F, 25th Indiana, age 18.	Conoidal ball fractured portion of external condyle of right femur and passed thro' popliteal space. Savannah, Dec. 11, 1864.	Suppuration fetid; severe hæmorrhage from vessels in neighborhood of popliteal space; controlled temporarily by plugging.	January 2, 1865, ligation of femoral artery; Scarpa's triangle, by Acting Ass't Surgeon E. L. Mola.	Incision healed: ligatures came away on January 14. Discharged July 8, 1865. *U. S. San. Com. Memoirs*, Surg. Vol. I. p. 263.
4	*Brooks, A. M.*, Lieut., A, 26th Virginia.	Pistol ball fracture of lower third right femur. Burksville, April 6, 1865.	April 17, hæmorrhage caused by a sharp spicula of bone piercing the popliteal art'ry.	April 17, ligation of femoral artery below origin of profunda.	Died April 20, '65. *Post-mortem:* ant. wall of artery had sloughed $\frac{3}{8}$ths of an inch. *A. M. M., Specs.* 4084, 4085.
5	*Campbell, J. W.*, Pt., A, 17th Virginia, age 23.	Conoidal ball fracture of upper middle and lower thirds of femur. August 4, 1864.	August 13, hæm. amounting to 60 ounces from femoral.	August 13, ligation of femoral artery in continuity in Scarpa's space.	Hæm. did not recur, but patient died of exhaustion from loss of blood, Aug. 13, '64.
6	Campbell, S., Pt., H, 140th Penn., age 30.	Conoidal ball fractured upper third right femur, also wound of the left thigh, etc. May 29, 1864.	June 10, hæm. 8 oz.; profunda ligated and ligature placed under the femoral. June 13, hæm. recurred, 2 oz.	June 13, ligature around the femoral artery by Assistant Surg. W. Thomson, U.S.A.	Died June 13, 1864; asthenia. *A. M. M., Spec.* 3557.
7	Cox, T. C., Pt., G, 88th New York.	Conoidal ball comminuted fracture of upper third of left femur. Fredericksburg, Dec. 13, 1862.	January 9, 1863, severe hæmorrhage, controlled by cold water and compress. January 10, recurred.	January 10, ligation of femoral artery by Acting Ass't Surgeon R. Carroll.	Died Jan. 10, 1863; autopsy; artery torn for an inch or more, apparently by sloughing.
8	Coder, D., Corp'l, F, 16th Pennsylvania Cavalry, age 23.	Shot entering immediately over femoral artery, right thigh, splintering trochanter minor. Hanover C. H., May 28, 1864.	June 8, hæmorrhage amounting to 5 oz. from femoral. June 9, hæmorrhage recurred, 8 ounces.	June 9, ligation of femoral artery below profunda by Ass't Surgeon W. Thomson, U. S. A.	Died June 10, 1864; exhaustion and gangrene; autopsy.
9	Detweiler, C., Pt., A, 47th Pennsylvania, age 24.	Conoidal ball wound of left thigh, injuring femur in the middle third. Cedar Creek, Oct. 19, 1864.	Extensive sloughing March 5, 1865; hæm. 8 ounces from branch of ext. circumflex; lig. of profunda. March 9, femoral sloughed; hæmorrhage 20 oz.	March 10, 1865, ligation of femoral artery in continuity in Scarpa's triangle, one inch below origin of profunda, by A. A. Surgeon W. P. Moon.	Died March 10, '65; exhaustion. *A. M. M., Spec.* 1357.
10	*Dunn, B. M.*, Pt., D, 1st Louisiana.	Conoidal ball severing femoral artery and fracturing middle third of right femur. Gettysburg, July 2, 1863.	.....	July 2, ligation of the femoral in Scarpa's triangle.	Sept. 6, ligature rem'd; considerable hæm., arrested by persulp. iron. Died April 13, 1864.
11	Floyd, J., Serg't Major, 13th Pennsyvania Cav., age 32.	Conoidal ball comminuted fracture upper third of left femur. May 28, 1864.	June 19, neighborhood of wound much disorganized; hæmorrhage from profunda, 30 ounces.	June 19, ligation of femoral in continuity just below Poupart's ligament by Act. Ass't Surg. J. Newcombe.	June 20, 21, bleeding recur'd. Died June 25, 1864; hæmorrhage.
12	Freeman, A., Pt., H, 61st New York, age 19.	Partial fracture in the upper third of the left femur by conoidal ball. Antietam, Sept. 17, 1862.	Nov. 3, profuse hæmorrhage from femoral artery.	November 3, ligation of femoral artery.	Died November 24, 1862; exhaustive suppuration. *A. M. M., Spec.* 740.
13	Geitz, H., Pt., C, 15th New York Heavy Artillery, age 26.	Conoidal ball fracture right thigh. May 18, 1864.	May 29, hæmorrhage from profunda artery.	May 30, ligation of femoral artery in continuity by Surgeon D. W. Bliss, U. S. V.	June 7, hæm. recurred. Died June 8, 1864.
14	Harper, J., Pt., B, 16th Infantry.	Shot fracture of right thigh. Stone River, Dec. 31, 1862.	.....	Ligation of femoral artery.	Died February 14, 1863.

No.	Name, Military Description, and Age.	Date and Description of Injury.	Hæmorrhage.	Ligation and Operator.	Result and Remarks.
15	Johnson, V., Pt., I. 13th Indiana, age 22.	Conoidal ball fracture upper third of left thigh (also wound right). Petersburg, May 9, 1864.	May 19, hæmorrhage from profunda; ligated in continuity; hæm. recurred May 22; 26 ounces.	May 22, ligation of femoral artery above profunda.	May 24, hæmorrhage recurred. Died May 26, 1864.
16	*Kelly, J. A.*, Lieut., C., 9th Missouri.	Shot fracture upper third left femur. July 4, 1863.	July 12, 13, hæmorrhage, 7 ounces, from profunda.	July 13, ligation of the femoral artery.	Died July 13, 1863.
17	Parker, J., Corp'l, H, 58th Mass., age 38.	Conoidal ball fracture of middle third of the left femur.	Hæmorrhage.	June 27, ligation of femoral artery.	Died July 2, 1864.
18	Root, J. L., Pt., H, 77th New York, age —.	Conoidal ball fracture, splintering left thigh. Cedar Creek, Oct. 19, 1864.	.....	October 19, ligation of the femoral artery.	Died November 1, 1864.
19	*Sexton, J. M.*, Pt., A, 4th Virginia Cavalry, age 22.	Conoidal ball comminuted fracture mid. third of right femur. Monocacy, July 9, 1864.	August 5, femoral artery sloughed; hæmorrhage 10 ounces.	August 5, ligation femoral in continuity below profunda, above wound, by Act. Ass't Surgeon J. H. Coover.	Aug. 6, hæm. recur'd, 12 oz.; ligation of profunda. Died from exhaustion and loss of blood. *A.M.M., Spec.* 3971.
20	Smith, D. R., Pt., I, 93d Illinois.	Shot fracture of the right femur. Mission Ridge, November 25, 1863.	.....	November, 1863, ligation of femoral art'y by Ass't Surg. J. S. Prout, 26th Missouri.	Died December 5, 1863.
21	Walter, V., Pt., E, 8th Ohio, age 24.	Conoidal ball fracture upper third of right femur. Spottsylvania, May 10, 1864.	June 7, hæmorrhage, 16 oz., from femoral artery.	June 9, ligation of femoral artery above profunda.	Died June 17, 1864.

The profunda was successfully tied in one case, and the circumflex of profunda and the popliteal arteries[1] were unsuccessfully ligated in one instance each. In one case it is stated that the femoral vein was successfully ligated on the day of the injury; but unfortunately neither the records of the field hospital nor of the Columbian Hospital at Washington, where the patient was treated during the first five months after the injury, allude to the ligation of the femoral vein, and not until the soldier reached the hospital at Madison, Wisconsin, is the operation, said to have been performed on the field, mentioned, probably upon the patient's own statement. A brief account of the case is appended:

Case 501.—Corporal G. Bulman, Co. G, 36th Wisconsin, aged 22 years, was wounded through the upper third of the left thigh, at Hatcher's Run, October 27, 1864. He was sent from the field to Columbian Hospital, Washington, several days after the injury, and five months later he was transferred to Harvey Hospital, Madison. Surgeon H. Culbertson, U. S. V., in charge of the latter, reported that the femur was fractured by the missile, and that the femoral vein had been ligated on the day of the injury. The patient was discharged from service May 22, 1865, and pensioned. Examiner W. H. Walker, of Fond du Lac, certified, August 11, 1865: "He was wounded by a ball through the upper third of the thigh from without inward, fracturing the femur. The muscles are adherent and the thigh is diminished in circumference two and a half inches. The circulation of the limb is much impeded from extensive loss and induration of the soft parts from hospital gangrene." Several years after the same examiner reported "deep and extensive varices and ulceration on the outer aspect of the calf" from the obstruction of the circulation of the limb. The pensioner was paid December 4, 1879.

A fatal instance of ligation of the femoral vein and the profunda artery for secondary hæmorrhage is reported by Acting Assistant Surgeon T. J. Dunott:

Case 502.—Private E. Gilkey, Co. C, 17th Maine, age 27 years, was wounded at Petersburg, June 18, 1864, and admitted into Campbell Hospital, Washington, ten days afterwards. Surgeon A. F. Sheldon, U. S. V., reported: "Shot fracture of upper third of right femur. Hæmorrhage to the amount of twelve ounces occurred on July 5th, when the femoral vein and the profunda artery were ligated, the ligature of the former being applied at the seat of the injury. Hæmorrhage recurred on July 7, 1864, when the case resulted fatally."

Among the three thousand four hundred and sixty-seven cases of shot fracture of the femur treated by conservation referred to in this Section, were two thousand eight hundred and thirty-nine Union and six hundred and twenty-eight Confederate cases. The ratio of

[1] Surgeon G. M. B. Maughs, P. A. C. S. (*Conservative Treatment of Compound Comminuted Fracture of the Femur, with Cases*, in *Confederate States Med. and Surg. Jour.*, 1865, Vol. II, p. 9), reports that Private *W. T. Ivy*, 19th Mississippi Cavalry, aged 40, was wounded at Harrisburg, July 14, 1864; compound comminuted fracture of femur, upper third; ligation of arteria profunda; treated by position; union complete; shortened one inch. Acting Assistant Surgeon T. J. Dunott reports that Private E. H. Gibson, Co. A, 14th New Jersey, aged 15, was wounded at Monocacy, July 9, 1864. A conical ball perforated the right thigh in the upper third, on the anterior aspect, fractured the femur without producing much comminution, and emerged near the anus. The patient was admitted into the hospital at Frederick, and, on July 13th, the limb was placed upon a double-inclined plane. On July 19th, hæmorrhage set in, a large and continuous stream flowing out of the anterior wound. Dr. Dunott immediately enlarged the wound and tied the circumflex of the profunda above and below; on July 20th, violent hæmorrhage occurred from the wound. Compression was made at once, and a plug of lint introduced. A hot-air bath was ordered and stimulants given, but the patient died July 19, 1864, two hours after the recurrence of the hæmorrhage. Surgeon R. Nicolls, U. S. V., reports that Private C. A. Knight, Co. L, 2d Illinois Cavalry, aged 24, was accidentally wounded at Sikeston, Missouri, May 4, 1862, by a pistol ball, which fractured the left femur three inches above its lower extremity. He was admitted into the hospital at Quincy on May 10th, and the popliteal artery, which was wounded, was ligated above and below the wound. Buck's apparatus was applied. The ligatures came away on the fourteenth day. The wound of operation had nearly closed by the latter part of August, but the patient was reduced by diarrhœa and died September 29, 1862.

mortality of the completed cases was 51.1 per cent. on the Union, and 44.0 per cent. on the Confederate side, as exhibited in the following table:

TABLE L.

Numerical Statement of Union and Confederate Soldiers treated by Conservation after Shot Fracture of the Femur.

POINT OF FRACTURE.	TOTAL CASES.	UNION SOLDIERS.					CONFEDERATE SOLDIERS.				
		Cases.	Recoveries.	Deaths.	Undetermined.	Ratio of Mortality of Determined Cases.	Cases.	Recoveries.	Deaths.	Undetermined.	Ratio of Mortality of Determined Cases.
Fracture of Upper Third	1,254	1,036	551	480	5	46.5	218	118	92	8	43.8
Fracture of Middle Third	855	699	421	274	4	39.4	156	79	68	9	46.2
Fracture of Lower Third	620	502	304	192	6	38.7	118	71	40	7	36.0
Point of Fracture not specified	738	602	85	480	37	84.9	136	60	58	18	49.1
Aggregates	3,467	2,839	1,361	1,426	52	51.1	628	328	258	42	44.0

The rate of fatality among the Confederates as exhibited in this table is remarkably low; but it must be taken into consideration that in the enumeration of the Union cases, made up to a large extent from the casualty lists of the various corps, are included even those patients who died within the first few hours after the reception of the injury, before means of transportation could reach them, while the Confederate cases of a similar nature do not appear in these statistics.[1]

Excisions in the Shaft of the Femur.—Although the number of excisions in the shaft of the femur practised was comparatively large, little need be said about the operation, which, as already stated, was generally considered with disfavor by the American surgeons, and frequently those who had practised it became its strongest opponents.[2]

Amputations in the Thigh.—While the experience acquired during the War of the Rebellion indicates that the attempts to save the limb after shot fractures of the femur have, in many instances, met with favorable results, there are a large number of cases in which primary amputation remains the only alternative. When the fracture of the femur is accompanied by great comminution, or by extensive longitudinal fissuring, or by grave laceration of the soft parts, or by primary injury of the femoral artery or vein, the limb should be removed at once. Furthermore, the crowded condition of the field hospitals after large engagements, the infectious diseases likely to arise, the scarcity, and sometimes

[1] In the *Confederate States Medical and Surgical Journal*, Richmond, June, 1864, Vol. I, p. 89, will be found a consolidated statement of compound fractures of the femur treated without operation, compiled from the records of the Confederate Surgeon General's Office from June, 1862, to February 1, 1864, inclusive. The total number of cases treated was 221, of which 116 recovered, and 105 or 47.5 per cent., had a fatal termination.

[2] Surgeon C. A. COWGILL, U. S. V., who excised a portion of the shaft of the femur in the case of Private I. W. Hall, 92d New York (TABLE XXVI, No. 17, p. 210, *ante*), writes, in a letter to the editor dated Dover, Delaware, July 12, 1866: "The result of this case determined me never to attempt again to save a femur fractured by a gunshot wound by excising any portion of its continuity. The extraction of fragments almost entirely detached and displaced is all that I would do in a similar case. In severe injuries where there is no hope of saving the limb, the fracture involving the upper third, I would prefer waiting for some weeks until all primary irritation had subsided, and a degree of tolerance acquired by the system, and then *amputate*, believing that *secondary* amputations are more frequently followed by successful results when performed in the upper third of the femur than is the case when operations are performed immediately following the injury. The result has been equally unfavorable in formal excisions of the continuity of the humerus where there has been much shattering of bone and injury to the soft parts. There is danger of extensive sloughing, secondary hæmorrhage, and pyæmia following these operations, causing loss of life or necessitating a subsequent amputation. Conservative surgery is very popular in theory, but frequently dangerous to life when permitted to be the sole guide in practice." Surgeon A. F. SHELDON, U. S. V., who operated in Cases Nos. 12, 18, 22, and 25 of TABLE XXVI, p. 210, *ante*, in a letter to the editor dated July 5, 1866, remarks: "The prospects of recovery would have been much better in the enlisted men had no operation been performed. I should now excise very seldom in any part of the body, and I have never seen a case where excision of a portion of the femur in the continuity was performed, where I think the patient was benefitted by it." Surgeon W. H. TWIFORD, 27th Indiana, who excised in the cases of Private Wishmire, 27th Indiana (TABLE XXIV, No. 61, p. 206, *ante*), and Private Wilson, 13th New Jersey (TABLE XXV, No. 9, p. 208, *ante*), in a letter to the Surgeon General dated July 27, 1866, advises primary amputation rather than excision, providing the patient is able to bear up under the shock of the amputation, and remarks: "I am therefore opposed to excision of the shaft of the femur unless the exigencies of the case demand it." Surgeon A. J. PHELPS, U. S. V., in his *Report of the Operations of the Medical Department of the Left Wing of the Fourteenth Corps at the Battle of Murfreesboro'*, in *Appended Documents to Part I, Vol. I, Med. and Surg. History of the War of the Rebellion*, Washington, 1870, p. 260, says: "I consider exsections in the case of the shaft of the femur should very generally give way to amputation."

entire want, of surgical appliances to make the patient with a fractured thigh bone comfortable, the rough transportation to which the wounded man is liable to be exposed, are circumstances which will sometimes urge the military surgeon to forego all conservative inclination and prefer to sacrifice the limb rather than to expose the patient to the risks attending the attempts at preservation. Here, as well as in all questions of surgical interference, medical officers in the field will always be guided by the circumstances surrounding each case.

The modes of operating employed were the flap method[1] and its various modifications—the anterior, posterior, antero-posterior, and lateral flaps—in one thousand one hundred and forty-one, the circular method in eight hundred and sixty-three, the oval flap with circular division of muscles in one hundred and eight instances; but it is difficult to draw correct conclusions from the recorded cases regarding the value of the modes practised. Surgeon E. Batwell,[2] 14th Michigan Volunteers, observes: "The sort of operations performed is worthy of comment, and has been very closely watched, to try and give a preference to either circular or flap operations, based on observations as to their relative merits as far as healing was concerned; but no difference was discernible, except in lateral flaps, where the protrusion of the bone through the incision prevented the rapid union that took place in the antero-posterior ones. The only cases in which the healing process seemed retarded were those in which the operation urged by Malgaigne was performed—oval flaps with circular division of muscular tissue. The chief points in which they seemed to be deficient was the small anterior flap being unable to support the weight of the posterior larger one. This again granulated very freely, and thereby prevented approximation of the edges, and a large granulating surface was the result, instead of the nicely adjusted linear mark observable in either the flap or circular operations. From the observations made on the subject, I would urge that no modifications are worthy of being noticed by surgeons, and that the circular or flap operations amply fulfil all the requirements necessary." The Army Medical Museum possesses seventy-nine casts of stumps after amputations in the femur, six of which are shown in the accompanying plate (PLATE LXXIII). FIGURES 1, 2, 3, and 5 represent stumps after the anterior, posterior, antero-posterior, and lateral flap methods, FIGURE 4, after the circular method, and FIGURE 6, after an operation by the flap of skin and circular division of muscles method. An amputation after the method of Gritti,[3] of Milan, is reported by Surgeon W. Child,[4] 5th New Hampshire Volunteers, to

[1] Surgeon A. J. PHELPS, U. S. V., in his *Report of the Operations of the Medical Department of the Left Wing of the Fourteenth Corps, at the Battle of Murfreesboro'*, remarks: "The method of amputation employed was, very generally, the flap. Those cases of flap operation, however, that approached nearest to the circular method did best, and I have thought that our success would be greater if the circular method was adopted more generally. The only hope we have of an entire success is union by the first intention in the flap operation, and this depends upon the subsequent attention of the surgeon. We can seldom expect to realize it while we have to depend upon inexperienced nurses for dressers. The weight of an unsupported flap will invariably break those tender bonds of union that nature so readily attempts. (*Appended Documents to Part I, Vol. I, of the Med. and Surg. Hist. of the War.* Washington, 1870, p. 262.)

[2] Extract from a *Report on the Surgical Operations performed after the Engagement at Jonesboro', Georgia*, in *Appended Documents to Part I, Vol. I, of the Med. and Surg. Hist. of the War*, Washington, 1870, p. 304.

[3] R. GRITTI (*Dell amputazione del femore al terzo inferiore e della disarticolazione del ginocchio. Valore retativo di cadanna coll' indicazione di un nuovo metodo denominato amputazione del femore ai condili con lembo patellare*, in *Annali Universali di Medicina*, Milano, 1857, Vol. CLXI, p. 5. This operation will be referred to in the succeeding section.

[4] CHILD (W.), GRITTI'S *Supra-condyloid Amputation of the Thigh*, in the *Boston Med. and Surg. Jour.*, 1879, Vol. CI, p. 783. Dr. CHILD says: "After the battle of Antietam (September 17, 1862) it was determined to establish upon that battle-field a hospital for such severe cases as could not be conveniently removed to the general hospitals. Dr. BERNARD VANDERKIEFT, United States volunteer surgeon, was detailed surgeon in charge of this hospital. Among the patients was a soldier with an amputation of the right leg. After some weeks it was found that the leg must be amputated at or above the knee joint. Dr. VANDERKIEFT decided to amputate at the knee joint by "*a new operation*" (as he said), and the operation was certainly new to his associates and assistants. He made a circular incision from the internal tuberosity of the tibia across the leg below the patella to the head of the fibula, dissected this flap up to about the middle of the patella, cut through the ligamentum patellæ close to the lower border of the bone, and turned back the flap. He then made the posterior flap by passing the knife beneath the femur and cutting outward and downward. He then sawed through the femur just above the condyles, and removed a section from the posterior or internal surface of the patella by the saw. Next he adjusted the sawn surface of the patella to the sawn extremity of the femur and adjusted the flaps in the usual manner. The patient died in about sixteen hours, on account of previous exhaustion."

PLATE LXXIII. THIGH STUMPS

1. Stump after amputation by anterior flap. Spec. 367
2. Stump after amputation by posterior flaps. Spec. 417
3. Stump after amputation by anterior and posterior flaps. Spec. 1317
4. Stump after amputation by circular flap. Spec. 3022
5. Stump after amputation by anterior flaps. Spec. 3515
6. Stump after amputation by flap of skin and circular of muscles. Spec. 2306

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have been performed by Surgeon B. A. Vanderkieft, U. S. V., who was in charge of the Smoketown Hospital after the battle of Antietam, September 17, 1862. Another operation of this character was performed by Assistant Surgeon J. W. S. Gouley, U. S. A., December 16, 1862, three days after the battle of Fredericksburg:[1]

FIG. 219.—The lower half of right femur amputated above the condyles. *Spec.* 536.

CASE 503.—Private Grey Y. Barrett, Co. F, 5th New Hampshire, aged 20 years, was wounded at Fredericksburg, December 13, 1862, by a musket ball, which entered at the outer condyle of the femur, passed inward and upward, and, escaping posteriorly in the middle of the lower third of thigh, left the bone much comminuted at its exit. He was admitted to the hospital of the 1st division, Ninth Corps, where, on December 16th, Assistant Surgeon J. W. S. Gouley, U. S. A., amputated the femur a short distance above the wound of entrance, the patella being included in the anterior flap; the line of section not having escaped the wound, another third of an inch was removed (FIG. 219); the femoral surface of the patella was then sawn off, and the two cut surfaces of the bone were brought in apposition (FIG. 220). The laminated portion of the femur, however, was fractured half an inch above this point, and fissures extended two inches further. The operation was well borne, and the case continued to do well until the sixth day, when sloughing commenced; on the eighth, signs of gangrene were noticed; and, on the ninth, December 25th, Surgeon J. P. Prince, 36th Massachusetts Volunteers, amputated the femur in the middle third, on account of the burrowing of pus, for secondary hæmorrhage from the popliteal. No plastic deposit could be observed immediately after the operation. On the next day he was transferred to Washington, and admitted to the Douglas Hospital, where he died on December 27, 1862. The pathological specimen, which was contributed to the Army Medical Museum by Dr. Prince, with a history of the case, is numbered 536 of the Surgical Section.

FIG. 220.—The same with the sawn surfaces of the patella and femur in apposition.

Extension as a means of covering protruding bones after amputation of the thigh was successfully employed at the City General Hospital, St. Louis, after a plan[2] devised by Acting Assistant Surgeon A. S. Barnes.

How far the size of the thigh presented for amputation influences the result of the operation cannot be ascertained from the cases recorded in the preceding pages. M. Brasdor,[3] in 1774, observed that "plus la plaie de l'amputation a de surface, plus, toutes choses, égales, le danger que court le malade est grand," and Surgeon M. Goldsmith, U. S. V.,[4] in a letter to this Office notices the influence of the size of the limb upon the mortality of

[1] An account of this case by Surgeon JAMES P. PRINCE, 36th Massachusetts Volunteers, has been published in the *Boston Medical and Surgical Journal*, 1863, Vol. LXVIII, No. 4, p. 69, and by Dr. ROBERT F. WEIR in his excellent paper *On* GRITTI'S *Supra-Condyloid Amputation of the Thigh*, in *The Medical Record*, New York, 1879, Vol. XV, p. 338.

[2] HODGEN (J. T.). Letter to the Surgeon General, dated April 30, 1863: "The accompanying drawing (FIG. 221) shows its application to the thigh. The same is also applied to the arms, forearms, or legs. From three to six adhesive strips are applied, extending from the end of the stump up the limb to near the next joint; this is then covered by a smoothly applied bandage. The free ends of plaster are brought together several inches below the end of the stump and fastened by a cord, to which is attached a bag of sand weighing from 1 to 3 or 4 pounds; the cord, passed over a pulley placed at a proper point on the bedstead, the bag is suspended, thus making gradual constant extension on the flaps, which soon elongate and cover the protruding bone. Great numbers of such stumps have been brought to this hospital, in many the bone protruding three inches or more, and in but one case have we thought it best to saw off the end of the bone; and that was done before this method of treatment was practised. There have been very few cases in which the ends of bones have exfoliated, and then only a small part of what would have been lost if the usual course had been pursued. The credit of introducing this new method of covering protruding bones is due to Acting Assistant Surgeon A. S. BARNES of this city." Dr. W. W. KEEN, jr., in a letter to the Surgeon General's Office, dated U. S. A. General Hospital, West Philadelphia, May 26, 1863, ascribes this plan to Assistant Surgeon A. H. SMITH, U. S. A: "Assistant Surgeon A. H. SMITH, U. S. A., who was with me at Frederick, and afterwards here and now at Nashville, while at Frederick devised a very ingenious apparatus, which was afterwards adopted at hospitals nearer the battle-fields, and there claimed as original, and now, I learn, is claimed by J. T. HODGEN, Surgeon U. S. V., of St. Louis. The apparatus is the application of adhesive strips to the flaps after amputation (especially in the thigh), and the attaching to them of a weight running over a pulley, very much after the plan of BUCK'S apparatus for the thigh, the object being to prevent retraction of the flaps, and to overcome it if already established."

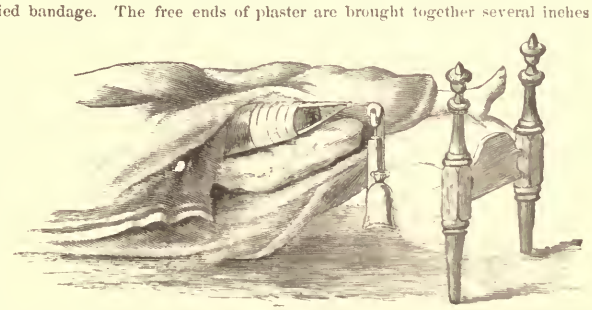

FIG. 221.—Dr. A. S. BARNES'S method of treating amputations with retracted flaps.

[3] BRASDOR. *Essai sur les amputations dans les Articles*, in *Mém. de l'Acad. Roy. de Chir.*, Paris, 1774, T. V, p. 757.

[4] GOLDSMITH (M.). Letter to the Surgeon General, dated Jeffersonville, Indiana, October 18, 1865: "It has been a subject of general remark in the Army that a much larger proportion of the lean, lithe, active men—hardy men, without a particle of encumbering fat, recovered from amputation, than equally hardy men—men oftentimes of much more muscular development and strength, with a larger accumulation of fat. Or, in other words, that small, light, active men, bore amputation of the thigh better than larger, stronger, and stouter men did. That other things being equal, the general

amputations, especially in the thigh, a subject which seems to him of "importance enough to challenge the attention of medical men."

Considering the results of the amputations according to the ages of the patients, as represented in TABLE LI, the mortality rate of four hundred and seventy-six patients under twenty years of age was 41.0 per cent.; of thirteen hundred and fifty-one patients

TABLE LI.

Statement of the Ages of Six Thousand Two Hundred and Nine Patients who submitted to Amputation of the Thigh for Shot Injury.

AMPUTATION OF THIGH.		UNDER 20.			20-1-2-3-4.			25-6-7-8-9.			30-1-2-3-4.			35-6-7-8-9.		40 AND OVER.			AGE UNKNOWN.		
		Recovery.	Fatal.	Result Unknown.	Recovery.	Fatal.	Result Unknown.	Recovery.	Fatal.	Result Unknown.	Recovery.	Fatal.	Result Unknown.	Recovery.	Fatal.	Recovery.	Fatal.	Result Unknown.	Recovery.	Fatal.	Result Unknown.
PRIMARY.	Upper Third	29	9	....	60	35	....	39	19	1	23	16	....	9	8	10	7	....	90	174	4
	Middle Third	72	28	....	179	84	1	110	56	....	67	31	....	28	20	25	16	....	205	226	7
	Lower Third	111	60	....	276	160	1	155	93	....	77	57	....	41	35	32	46	1	279	470	12
	Third not specified	1	5	....	....	13	....	1	6	....	2	4	1	.....	1	1	6	....	34	245	20
INTERMEDIARY.	Upper Third	2	6	....	7	20	....	6	8	....	5	8	....	4	6	....	5	....	26	44	....
	Middle Third	12	21	....	58	86	....	19	30	....	11	16	....	8	9	7	14	....	90	90	....
	Lower Third	25	34	....	64	140	....	25	49	....	18	35	....	7	24	11	21	....	67	154	....
	Third not specified	....	2	....	....	1	....	....	3	....	....	....	....	.....	.....	....	....	....	7	13	....
SECONDARY.	Upper Third	4	4	....	7	10	....	5	....	....	....	....	....	.....	2	1	1	....	13	8	....
	Middle Third	6	6	....	32	16	....	16	13	....	4	8	....	9	3	1	3	....	34	16	....
	Lower Third	10	10	....	39	21	....	16	15	....	10	10	....	4	5	2	6	....	26	33	....
	Third not specified	....	1	....	....	3	....	....	1	....	....	2	....	.....	1	....	....	....	....	4	....
PERIOD UNCERTAIN.	Upper Third	....	....	....	1	3	....	....	1	....	....	2	....	.....	2	....	1	....	11	12	....
	Middle Third	1	3	1	2	6	....	4	3	1	3	2	....	.....	.....	3	....	1	21	15	4
	Lower Third	5	2	....	7	3	1	1	6	....	....	2	....	1	1	....	1	....	23	46	5
	Third not specified	2	4	....	6	9	....	2	2	....	....	4	....	1	1	....	4	....	68	187	19
Aggregates		280	195	1	738	610	3	399	305	2	220	197	1	112	118	93	131	2	994	1,737	71

between twenty and twenty-five, 45.2 per cent.; of seven hundred and six between twenty-five and thirty, 43.3 per cent.; of four hundred and eighteen between thirty and thirty-five, 47.2 per cent.; of two hundred and thirty between thirty-five and forty, 51.3 per cent.; and of two hundred and twenty-six above forty years of age, 58.4 per cent.

health of the two classes being alike, the injuries and subsequent exposures being the same, the mere size of the limb, controlling as it does the area of the traumatic surfaces, came to be the ruling element in the determination of the question of amputation in line cases. Professor BUSH, of the Transylvania University, was sent by the Governor of Kentucky to the succor of the wounded at the battle of Shiloh. He tells me that among those with amputated thighs, very few large fleshy men recovered, while much the larger proportion of those having small, lean, muscular limbs, arrived at Louisville in good condition. He was so much struck with this observation, that out of it he has drawn for himself a clinical rule, in determining the question of amputation, not a dominating rule, but one having much to do with the question. Dr. BUSH'S observation is all the more pertinent that it was an independent one. All of the leading surgeons with whom I have conversed upon the subject have made concurrent observations. For myself, I have been so impressed with the influence of the mere size, volume, or thickness of the limb presented for amputation, that in cases where the question was debatable the decision in the wavering balance was determined by the extent of traumatic surface necessarily incident to the operative procedure required. This consideration had all the more weight as the line of the contemplated division approached the trunk."

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Section IV.

WOUNDS AND INJURIES OF THE KNEE JOINT.

The injuries of the knee joint to be considered in this Section number three thousand four hundred and forty-nine. Twelve were punctured, thirty-nine incised, and three thousand three hundred and ninety-eight shot wounds. Of the latter, forty-three were shot contusions and three thousand three hundred and fifty-five shot fractures. The injuries of the knee from blows, falls, or railroad accidents are reserved for a future chapter. The number of cases of injuries of the knee joint followed by amputations of the thigh is very large. Of the thirty-nine patients with incised wounds, six submitted to amputation; of the forty-three shot contusions, ten, and of the three thousand three hundred and fifty-five shot fractures, two thousand three hundred and eighty-nine were succeeded by amputation in the thigh. The two thousand three hundred and ninety-nine cases of amputation in the thigh for shot contusion or shot fractures of the bones of the knee joint have already been cited in the amputation tables of the preceding section, and will therefore be only briefly alluded to in the concluding remarks of this Section.

PUNCTURED AND INCISED WOUNDS OF THE KNEE JOINT.—The instances of punctured and incised[1] wounds of the knee joint reported on the records number fifty-one—twelve punctured wounds and thirty-nine incised wounds. In some of the cases, undoubtedly, the cavity of the joint was directly implicated, but the meagre evidence

[1] Examples of punctured and incised wounds of the knee joint by bayonet, sword, or sabre, in military surgery, are not frequent. RAVATON (*Chirurgie d'Arm'e ou Trait' des plaies d'armes à feu et d'armes blanches*, Paris, 1768, p. 522. *Obs.* XXXVI) cites the case of Cuirassier Til, of Lulliers Company, who received, in 1761, a sabre puncture of the right knee opening the joint. The patient recovered. The author adds: "The bones of the thigh and the leg were anchylosed on account (doubtless) of the little attention paid to passive motion of the extremity." BRUNEAU (P.) (*Diss. sur les plaies des articulations*, Paris, Thèse, An XI [1802] p. 14) reports the case of a young man who received a sabre wound of the knee, dividing the patella and laying open the articular surfaces. The wounded parts were brought together, but tumefaction and fever, with intense pain, swelling, and abscesses followed, and death ensued. RABASSE (L. J.) (*Considérations Générales sur les plaies des articulations faites par les armes à feu ou les instrumens tranchans*, Paris, Thèse No. 84, 1811, p. 20) records two cases of sabre wounds of the knee joint: Maker, 84th line, who received, near Utrecht, in 1804, a sabre wound which cut the upper ligament of the right patella and penetrated the articulation. The parts were brought together and cataplasms employed. Abscesses formed on the interior and exterior sides of the knee, which were opened, and a seton was introduced to allow the escape of pus. The wounds healed and the patient recovered, but with complete anchylosis of the knee joint. A grenadier of the 54th regiment received, in a duel, a sabre wound just above the knee, running transversely and a little upward, and dividing the tendons of the extensor muscles of the leg near their insertion on the upper part of the patella: the articulation was opened. The wound was about three inches long and presented an opening into which a finger could be readily introduced. Union of the parts was maintained by bandages and a splint applied to prevent flexion. Union took place, and the patient recovered without accident. BLONDEAU (JEAN) (*Propositions de l'athologie fondées sur des Observations*, Thèse, Paris, 1815, No. 64. p. 21) describes the case of a sergeant of the 122d regiment, who received, in a duel near Salamanca, a sabre wound of the knee, which cut the patella transversely and penetrated to the middle of the condyles of the femur. A splint was placed at the posterior part of the limb and the wounded surfaces brought together. He had nearly recovered when he fell a victim to an adynamic fever. LARREY (D. J.) (*Mémoires de Chirurgie Militaire et Campagnes*, Paris, 1812, T. II, p. 475) records the following: Grenadier J. Grandi received an incised wound of the right knee, which divided the patella through the whole of its thickness and involved the condyles of the femur. Extravasation of blood into the joint and suppuration and disorganization of the soft parts took place; the femur was denuded and the cartilages destroyed; death resulted. Jean Lepaix, a grenadier, aged 30, received a sabre wound of the right knee. He walked two leagues to the hospital. The incision was about three centimetres long, running obliquely downward, opening the joint and allowing synovia to escape. Amputation was proposed but refused by the patient. The edges of the wound were united to exclude the air and prevent extravasation of blood. The usual remedies were employed without benefit. The soldier demanded amputation, which was performed on the fifth day. The patient died on the fifteenth day. LARREY adds that he saw several patients with similar wounds, who perished because amputation had not been risked. DEGUISE (J. F. C.) (*Dissertation sur les plaies des articulations*, Paris, 1815, Thèse No. 4, p. 10) cites the case of Adju't Major M. Des—, 41st regiment, who received, during the Russian campaign, in 1812, a sword thrust of the knee joint, allowing the escape of synovia. The parts were drawn together and the wound healed by first intention, without pain; "in spite of the cruel fatigues experienced on the retreat through Silesia, the healing was complete in a few days." EHRLICH (J. A.) (*Chirurgische Beobachtungen*, Leipzig, 1815, B. II, pp. 106, 109) records two cases of sabre wounds of the knee: A soldier of the 21st Chasseurs, aged 16, received, on August 4, 1813, a sabre wound of the knee. There was considerable hæmorrhage, and synovia escaped freely.

and the fact that the injuries in several of the cases healed with very slight inflammatory action render it possible that they were periarticular wounds only.

Punctured Wounds of the Knee Joint.—The twelve punctured wounds of the knee joint terminated in recovery. Seven were caused by bayonets, two by knives, two by falls on nails, and one by a fall on a pair of scissors. The seven cases of bayonet wounds are:

CASE 504.—Private C. Smith, Co. H, 30th Iowa, aged 17 years, received, September 20, 1862, a bayonet puncture of the left knee joint. He was discharged from service at Benton Barracks Hospital, October 5, 1863, Surgeon J. H. Grove, U. S. V., certifying to "anchylosis and chronic synovitis" resulting from the wound. His claim for pension was rejected.

CASE 505.—Private J. S. Oldscamp, Co. K, 16th Maine, aged 22 years, was wounded and captured at Spottsylvania, May 8, 1864. He was subsequently exchanged, and ultimately discharged for disability June 22, 1865. Examiner C. Rowland, of Brooklyn, New York, reported: "A bayonet wound penetrated the right knee; also a shot wound of right thigh, and of right foot injuring the little toe. The result is lameness and inability to labor." The man was a pensioner until March 4, 1866, when he was dropped, his disabilities, in the opinion of the examiner, having ceased.

CASE 506.—Surgeon W. O'Meagher,[1] 37th New York, reports: "Private ——— received an accidental wound of the knee joint between the border of the patella and the internal condyle of the femur. At first little was thought of it, a few adhesive straps and a roller bandage being applied, and the patient returned to duty. In a few days, owing, doubtless, to imprudence and over exercise, inflammation, accompanied by pain, fever, swelling, and effusion, set in, while the wound assumed an angry fungoid appearance; but by means of rest in the recumbent position, elevation of the extremity, and water dressing, the pain and other symptoms slowly abated at the end of three weeks, leaving the patient, however, lame and stiff at the joint."

CASE 507.—Musician J. H. Getman, Co. E, 115th New York, aged 19 years, was wounded at Fort Fisher, January 16, 1865. He was conveyed to McDougall Hospital, New York, and subsequently to Troy. Surgeon George H. Hubbard, U. S. V., in charge of the latter hospital, reported that the patient's injuries consisted of "a bayonet wound of the posterior portion of the right knee joint." Getman was furloughed April 28th, and was mustered out of service May 19, 1865; he is a pensioner.

CASE 508.—Sergeant S. M. Ingraham, Co. K, 64th New York, aged 34 years, received a bayonet wound of the left knee, at Spottsylvania, May 12, 1864. He was mustered out and pensioned October 13, 1864. Examining surgeons represent him as suffering from permanent weakness of the knee as a result of a bayonet wound of the patella followed by suppuration.

The remaining two cases of bayonet wounds of the knee joint have already been cited, viz: cases of Private C. A. Ball, Co. K, 89th New York (CASE 3, page 6, *ante*), and Private Lewis Francis, Co. I, 14th New York (CASE 331, page 154, *ante*). The former recovered without any bad results; the latter after amputation in the middle third of the thigh and subsequent disarticulation at the hip.

Amputation above the knee was advised, but refused by the patient. The arteries were ligated and the edges of the wound drawn together by sutures, care being taken that synovia and blood were allowed to escape. August 6th, inflammation, swelling, and pain. Synovia continued to escape until August 10th. Death from exhaustion August 23, 1813. A soldier of the 7th line, aged 27, received, on August 16, 1813, near Dresden, a sabre cut through the left patella. He secured the wound with bandages, and was received into the military hospital on August 24th, very much exhausted. An examination revealed a cut about 4 inches in length, splitting the patella and opening the joint; blood and synovia escaped freely and symptoms of tetanus appeared. August 28th, escape of synovia diminished. September 19th, cut edges of patella were united and the escape of synovia had ceased. The patient recovered. LEFRANCOIS (JEAN) (*Dissertation sur les plaies pénétrantes de l'articulation du genou*, Paris, 1820. Thèse No. 28, pp. 17, 18) cites two cases: A soldier of the 7th chasseurs à cheval received, in December, 1814, a sabre wound across the anterior part of the right knee, extending from the internal to the external part of the knee and opening the joint. Simple dressings were applied. The limb was painful during the first eight days; tetanus appeared on the fifteenth day and death resulted. A soldier of the 18th line received a sabre wound on January 15, 1815. The cut was transversely across the upper part of the knee joint and opened the cavity of the joint about an inch. There was copious hæmorrhage. The edges were brought together and simple dressings applied. There was little pain during the first three days; but on the fourth there was some fever and gastric disturbance. Numerous abscesses appeared, which were incised. The patient recovered in 27 days. FOURNIER (JULES) (*Essai sur les plaies des articulations*, Paris, 1823, Thèse No. 150, pp. 11, 14): Bottari, 8th guards, received, November 6, 1822, a sabre puncture over the left patella and two others on the anterior and upper portion. Considerable swelling ensued and synovia escaped through the small wound. By November 15th the wound had cicatrized and the patient was able to walk; there was very little stiffness in the articulation. A young chasseur received, in 1815, a sabre wound of the external portion of the right knee. The wound was three inches long and penetrated the synovial capsule, from which there was considerable effusion. The wounded surfaces were brought together and the limb permanently extended. On the tenth day cicatrization was complete. MALLE (P.) (*Clin. Chir. de l'hôpital Mil. d'instruction de Strasbourg*, Paris, 1838, p. 622): V——, fusilier, 26th line; entered hospital at Strasbourg March 25, 1830, with a sabre wound of the right knee. The tendons of the extensor muscles of the leg were divided near the insertion at the upper border of the patella. The wound was about three inches long. Clots were removed by the finger, the wounded surfaces brought together, and immobility secured by splints. Inflammation and suppuration ensued and the patient suffered from nausea and insomnia, but his condition improved; he had recovered on June 12, 1830. CHENU (J. C.) (*Rapport, etc., pendant la Campagne d'Orient en* 1854, 1855, 1856, Paris, 1865, p. 410) tabulates 5 cases of recovery after sabre, bayonet, and lance wounds of the knee, but gives no details. GARDEN (A. M.) (*Conservative Surgery—Treatment of Sword Wound of the Knee*, in *The Lancet*, 1859, Vol. I, p. 631): On September 13, 1857, a woman received sword cuts of both knees; the left was only slightly injured; the right knee was opened and a portion of the head of the tibia severed; the muscles and ligaments attached to the patella were cut through, leaving the patella itself attached by a very small piece of integument. Limb placed in position; patella replaced; union with anchylosis in about four months. WILLIAMSON (GEORGE) (*Military Surgery*, London, 1863, p. 173): Private John Cunnell, West York Rifle Regiment, was stabbed in the left knee by a bayonet on February 5, 1858. The wound was small and deep and just beneath the level of the patella; the pus was excessive; delirium and great agony followed; knee became swollen; abscesses formed outside of the joint and were opened. Profuse purulent discharge continued. April 6th, amputation of thigh; patient recovered. The specimen is preserved in the Museum of the Army Medical Department, at Netley, and is numbered 3633. VOLKMANN (R.) (*Penetrirende Kniegelenkswunde, Zweimalige Gelenkpunction, Heilung ohne Ankylose*, in *Deutsche Klinik*, B. XIII, 1861, p. 411): A mason, on June 23, 1861, received a sabre wound of the left knee joint; escape of synovia, fever, and extensive burrowing of pus; incisions, ice; recovery.

[1] O'MEAGHER (WILLIAM), *Cases in Military Surgery—Bayonet Wound of Knee Joint—Synovitis*, in *Am. Med. Times*, 1862, Vol. IV, p. 7.

The instances in which the penetrations of the knee joint were caused by falls on nails or scissors or by knife stabs are:

CASE 509.—Private S. Galliway, Co. B, 32d Ohio, was injured March 18, 1863, at Lake Providence, by falling on a nail, which entered the right knee joint at the external and inferior border of the patella, and penetrated downward and inward about an inch. Surgeon J. T. Hodgen, U. S. V., reported the case, and that the man entered the City Hospital at St. Louis three weeks after the reception of the injury. He was transferred to the Veteran Reserve Corps July 15, 1863; he is not a pensioner.

CASE 510.—Musician B. Williams, Co. C, 1st New York, aged 17 years, is reported by Acting Assistant Surgeon P. B. Goddard as having been treated at the Master Street Hospital, Philadelphia, from August 12 to November 26, 1862, for "synovitis of the knee joint from puncture by a nail of a cracker box on which he fell." There is no record of his ever having applied for a pension.

CASE 511.—Private T. A. Jackson, Co. H, 1st Rhode Island Cavalry, aged 23 years, entered Satterlee Hospital, Philadelphia, May 7, 1863. Acting Assistant Surgeon W. W. Keen, jr., reported: "The case is one of punctured wound of the knee joint followed by partial anchylosis. The patient states that in December, 1862, he fell from his horse, and that a pair of scissors in his knapsack punctured the right knee joint and broke off; that the points were removed three days after the accident, being three inches deep, and that severe inflammation followed, and a large number of abscesses formed about the joint. When admitted the injured joint was smaller than the sound one, the hamstrings were contracted, and motion was limited from complete flexion to an angle of 135° with the thigh. On motion there was marked crepitation, the movement of the patella being much restricted. The cicatrix of the wound is located just to the inside and above the tubercle of the tibia, and all about the joint are old cicatrices from abscesses. The evidence of penetration of the joint is manifest, both by the position of the cicatrix as well as the escape of synovia, which took place according to the patient's statement. The patient walks about on crutches, and is unable to bear weight on the limb." He was discharged from service June 1, 1863. There is no record of his ever having applied for pension.

CASE 512.—Private E. Rice, Co. E, 100th Indiana, was discharged from service February 28, 1863, by reason of anchylosis of the right knee joint. Medical Inspector G. T. Allen, U. S. A., reported that the disability arose from a wound inflicted, September 16, 1862, by a pointed knife entering beneath the patella and penetrating the knee joint. The man is not a pensioner.

CASE 513.—Private D. R. Ewell, Co. G, 39th Massachusetts, received a knife wound of the left knee in April, 1864. He was successively admitted to the regimental, Harewood, and Portsmouth Grove hospitals, and returned to duty May 26, 1864. He is not a pensioner.

Incised Wounds of the Knee Joint.—The thirty-nine cases of this group were axe or hatchet wounds with the exception of perhaps one, in which the instrument with which the injury was inflicted is not named. Thirty-three cases were treated without operative interference and six were followed by amputations in the thigh.

Incised Wounds of the Knee Joint treated without Operative Interference.—Thirty-three cases, of which four proved fatal, are included in this category. In the majority of the cases the reports are brief, and the evidence regarding the penetration of the joint is very vague. A few cases of recovery are cited:

CASE 514.—Private N. Bacon, Co. C, 11th Michigan, aged 17 years, entered Cumberland Hospital, Nashville, May 17, 1864, with an incised wound of the left knee joint, caused accidentally by an axe two weeks previously. Surgeon B. Cloak, U. S. V., reported the case and that the patient was returned to duty June 4, 1864. The man is not a pensioner.

CASE 515.—Private J. H. Fuller, Co. K, 3d Massachusetts, age 28 years, received, October 20, 1862, an injury of the left knee joint by a hatchet, which penetrated outside of the patella and made quite a deep cut, causing much arterial hæmorrhage. The patient recovered, and was discharged April 1, 1863. He was pensioned on account of lameness and anchylosis of the joint. The case is reported by Surgeon Z. B. Adams, 32d Massachusetts.

CASE 516.—Private L. H. Hudson, Co. K, 1st Missouri Engineers, received an accidental blow from an axe in the left knee joint, at Waverly, June 3, 1864. The patella, half the capsular, and all the lateral ligaments were severed, allowing the synovia to escape from the joint. The patient passed through various hospitals, and was discharged January 11, 1865, and pensioned. Examining surgeons describe him as very badly disabled and suffering from looseness of the joint, the consequence of loss of parts of the outer side of the knee.

CASE 517.—Private W. Trahey, Co. H, 71st New York, was discharged from service May 31, 1862, by reason of lameness and partial anchylosis of the knee joint. Surgeon A. J. McKelway, 8th New Jersey, certified that the disability was caused by a wound made with an axe in February, 1862, which laid open the joint. The man is not a pensioner.

CASE 518.—Sergeant A. E. Waterman, Co. H, 1st Michigan Light Artillery, is reported by Acting Assistant Surgeon D. O. Farrand as having been admitted into St. Mary's Hospital, Detroit, August 20, 1864, with an "accidental incised wound of the right knee, penetrating the joint," and that he was returned to duty October 3, 1864. He is not a pensioner.

CASE 519.—Private J. Williams, Co. H, 2d Sharpshooters, aged 32, received an accidental wound of the right knee by an axe, April 3, 1864. Assistant Surgeon W. Webster, U. S. A., in charge of De Camp Hospital, reported that the joint was penetrated and that the patient was returned to duty May 27, 1864. He is not a pensioner.

The evidence in the remaining twenty-three cases[1] of recovery after incised wounds of the knee is of a similar nature. The fatal cases are:

CASE 520.—Private G. M. Sadler, Co. B, 22d Michigan, was admitted into hospital No. 3, Nashville, where he died February 8, 1864 Surgeon S. D. Turney, U. S. V., reported that the cause of death was "an accidental incised wound of the left knee joint, caused by an axe, and inflicted during the previous month.

CASE 521.—Sergeant J. A. Wynkoop, Co. E, 39th Iowa, aged 26 years, was accidentally wounded at Athens, Georgia, April 30, 1864. He was admitted into hospital No 19, Nashville, whence Surgeon W. H. Thorn, U. S. V., reported: "An axe wound of the left knee, penetrating the joint. Death on May 26, 1864."

CASE 522.—Private A. Hatfield, Co. I, 129th Illinois, aged 25 years, was admitted into the hospital of the 3d division, Twentieth Corps, October 7, 1864, with an accidental incised wound of the right knee, inflicted with an axe. On October 31st, he was transferred to hospital No. 1, Chattanooga, whence Surgeon J. H. Phillips, U. S. V., reports that he died on December 7, 1864, "of incised wound of right knee."

CASE 523.—Private A. G. Hill, Co. G, 43d New York, aged 25 years, was admitted into Finley Hospital, Washington, March 25, 1864, with an incised wound of the right knee, inflicted with an axe, accidentally, at Brandy Station, Virginia, February 19, 1864. Surgeon G. L. Pancoast, U. S. V., reports that he died May 21, 1864, from the effects of the wound.

Amputations in the Thigh after Incised Wounds of the Knee Joint.—Burrowing of pus, extensive sinuses above or below the knee, and sloughing, necessitated amputation in the thigh in six cases of incised wounds of the knee joint. Only one of the patients survived the operation:

CASE 524.—Private F. O'Brien, Co. A, 4th New York, aged 24 years, was cut in the left knee by an axe during a fight in a private house near Baltimore, February, 1862. He was admitted to hospital in Baltimore, where, on account of the diseased condition of the injured joint and adjacent parts, the limb was subsequently amputated about the middle of the thigh by Surgeon G. Taylor, U. S. A. The patient was discharged from service April 28, 1863, and supplied with an artificial limb. A cast of the stump was contributed to the Army Medical Museum by Assistant Surgeon J. W. S. Gouley, U. S. A., and constitutes specimen 919 of the Surgical Section. The man subsequently served in the Veteran Reserve Corps, and was discharged December 15, 1864. His application for pension was rejected.

CASE 525.—Corporal M. J. Allen, Co. I, 33d Indiana, aged 22 years, while putting up a tent on June 17, 1865, received an axe wound of the right knee joint. He was admitted to Brown Hospital, Louisville, several days afterwards, and on July 27th to Crittenden Hospital. Assistant Surgeon J. C. G. Happersett, U. S. A., in charge of the latter, reported that the injured knee was affected with synovitis; also that pus had penetrated the joint and was burrowing in the tissues above and below, necessitating amputation of the thigh, which was performed July 31st, by Acting Assistant Surgeon D. J. Griffiths, at the middle third. The patient died of diarrhœa August 11, 1865.

CASE 526.—Private H. C. Frazer, Co. A, 40th New York, while cutting wood, on June 20, 1862, accidentally struck the left knee. He entered Ascension Hospital, Washington, July 4th, whence Acting Assistant Surgeon J. W. Bulkley reported that the cut ran obliquely across the outside of the joint and had nearly healed when the patient was admitted. About ten or eleven days afterwards, however, the leg and joint became greatly swollen and inflamed, the skin rapidly assuming a bright red color. This was attended with excessive pain in the joint upon motion. Ice, cold irrigations, and tincture of iodine were applied, and salines, small doses of tartar emetic, and sweet spirits of nitre were administered. Bandages were applied from the foot to the knee joint with good effect. On July 26th, a small incision was made inside the ligamentum patella and gave exit to a large amount of sanious and highly offensive pus. About July 27th, the pus was noticed to be accumulating in the joint and burrowing above it in the muscles of the thigh. The bandage was still used, and cold, alternated with warm, applications were continued. Quinine and tincture of iron was now given, and beef tea and brandy punch freely. About the beginning of August an incision, made in the calf of the leg, gave exit to still more offensive pus. After August 5th the patient was slowly sinking. A small blackish discoloration was then seen on the inside of the leg, midway between the knee and the ankle; the foot, which from the first had remained œdematous, was puffed and pitting on pressure. On August 13th the black spot was noticed to be rapidly increasing and was recognized as gangrene, when a lotion of nitric acid was applied. On the following day, the necessity of amputation becoming manifest, two doses of one-half grain of morphia each were administered, after which the limb was removed about six inches below the trochanters by the antero-posterior flap method. The operation was performed by Surgeon J. C. Dorr, U. S. V., assisted by others, the patient being under the influence of chloroform, and losing but a slight amount of blood. Dead and disorganized tissues were found in the flaps and dissected out, after which the lips of the wound were closed by silver sutures and adhesive plaster. Stimulants were freely given, but the patient sank rapidly, and died at 5 P. M. on the same day. An examination showed that the soft parts were extensively disorganized nearly to the trochanters; also that the original wound had communicated with the knee joint.

CASE 527.—Private R. B. Swift, Co. H, 1st Regiment Michigan Engineers and Mechanics, aged 23 years, was accidentally cut in the right knee joint by an axe, while engaged on duty on the Northwestern Railroad in Tennessee, November 24, 1863.

[1] The cases are: 1. Pt. D. Bird, Co. G, 107th New York; 2. Pt. G. Blucher, Co. C, 119th New York; 3. C. Bradley, Government employé; 4. Pt. A. Capp, Co. H, 13th Illinois; 5. Pt. J. M. Condon, Co. B, 3d New York Cavalry; 6. Pt. H. Coon, Co. F, 143d New York; 7. Pt. T. Decker, Co. D, 15th New Jersey; 8. Pt. J. Elliott, Co. E, 4th California; 9. Pt. D. Geigheimer, Co. B, 131st New York; 10. Corp'l J. Howard, Co. D, 78th Illinois; 11. Pt. M. Kelley, Co. B, 59th Illinois; 12. Pt. J. Kimball, Co. A, 1st Wisconsin Cavalry; 13. Pt. L. B. Lewis, Co. C, 11th New Hampshire; 14. Pt. H. T. Marsh, Co. I. 8th Ohio; 15. Pt. J. Martin, Co. D, 159th New York; 16. Pt. R. M. Morris, Co. C, 84th Indiana; 17. Serg't J. L. Morse, Co. D, 21st N. York Cavalry; 18. Pt. G. W. Proctor, Co. D, 16th Illinois; 19. Pt. H. A. Smith, Co. G, 141st New York; 20. Pt. E. S. Spangler, Co. F, 145th Pennsylvania; 21. Pt. D. A. Stephens, Co. B, 2d Penn. Cavalry; 22. Pt. A. M. Sutton, Co. L, 4th New York Artilley; 23. Pt. J. Wood, Co. G, 79th Ohio.

On the following day he was admitted to hospital No. 3, Nashville, where the limb was amputated on January 5, 1864, by Surgeon S. D. Turney, U. S. V., at the lower end of the middle third of the thigh. The operation was performed by the circular method with little loss of blood, chloroform and ether being used and four ligatures applied. At the time of the operation the knee was greatly swollen and very painful, the internal condyle was laid bare by sloughing, and the joint had opened extensively, the discharges being very offensive. There were also extensive sinuses above the joint, and below it free incisions had been made to effect drainage. The patient had become quite reduced and was unable to sleep without opiates. He slept some during the night following the operation. Milk punch and beef tea were freely given, but the patient died from exhaustion January 7, 1864. The case was reported by the operator.

CASE 528.—Private R. H. Turner, Co. E, 1st Maryland, aged 23 years, was admitted to hospital at Frederick, October 3, 1864, having received an axe wound of the left knee joint. Acting Assistant Surgeon P. O. Cornish reported that the patient was not a very strong man and apprehensive of a fatal result from the first. Two and a half hours after the injury the wound was firmly closed with a stitch and adhesive plaster, after which cold lotions were used. Two days afterwards the joint became swollen and painful, and, on October 12th, synovia was flowing from the wound, the patient's tongue was coated, and his appetite poor. On October 15th, pus having formed in the joint, it was freely opened on both sides, also an abscess located above the knee but not communicating with the joint. Diarrhœa now set in and indications of pyæmia came on, and all the symptoms growing worse, amputation of the thigh at the middle third, by the circular method, was performed by Assistant Surgeon R. F. Weir, U. S. A., on October 18th. An examination of the amputated limb disclosed abscesses above and below the knee and in the popliteal space, and showed that the cartilages of the joint had commenced to break down. The treatment consisted of tonics, opiates, and stimulants. The stump having commenced to discharge unhealthy pus, it was opened on October 21st, and washed with bromine solution. Subsequently iodide of starch was administered, and iodine was applied to the stump. The patient died October 25, 1864. The *post-mortem* examination confirmed the existence of the pyæmic infection. The stump showed no reparative process around the bone, numerous small abscesses being present in the cellular tissues nearly to the hip joint. The fascia surrounding the femoral vein was closely adherent from inflammatory action, the coats of the vein being much thickened and filled with broken down clots. The valves of the vein and the coats of the femoral artery were also thickened and very friable. No pus was found in the hip joint.

In the next case the external wound had partly healed by first intention so that a probe could not be made to enter the joint, but insidious burrowing of pus and disorganization of the tissues finally rendered amputation unavoidable:

CASE 529.—Private O. F. Reams, Co. B, United States Engineers, aged 23 years, accidentally cut his right knee joint open with an axe while in the act of chopping down a tree in camp, on March 12, 1864. He was admitted to hospital in Alexandria, March 21st, at which time there was but little suppuration, the external wound having partly healed by first intention, so that a probe could not be made to enter the joint. The patient was doing very well and had a good appetite, and hopes were entertained that the joint might be saved. On April 12th, the limb was somewhat swollen and painful, and his appetite began to fail. On April 22d, fluctuation was distinctly detected, when an opening was made and two ounces of pus escaped On April 24th, the thigh was amputated in the upper third by lateral flaps, by Surgeon E. Bentley, U. S. V. The tissues below the point of amputation were found to be infiltrated with pus and badly disorganized. The patient reacted well, though not very promptly. Pyæmic chills began two days afterwards, and secondary hæmorrhage set in on April 28th, when the femoral artery was ligated just below Poupart's ligament. The patient died from the effects of pyæmia, May 1, 1864. At the autopsy large quantities of serous fluid were found in the pleural cavities and a number of pyæmic abscesses in the left lung. One abscess was also discovered in the spleen. The latter organ, together with the bones of the amputated knee, were contributed to the Museum, with the history, by the operator, and constitute specimens 2253 and 2234 of the Surgical Section.

SHOT INJURIES OF THE KNEE JOINT.—Of the three thousand three hundred and ninety-eight cases of shot wounds involving one or more bones of the knee joint, forty-three were designated on the reports as shot contusions, and three thousand three hundred and fifty-five as shot fractures.

SHOT CONTUSIONS OF THE KNEE JOINT.—Contusions of the knee joint[1] involving the condyles of the femur, the patella, or the head of the tibia by small projectiles or fragments of shell, were noted in forty-three instances. Thirty-three were treated without operative interference, and ten were followed by amputation.

[1] Examples of shot contusions of the knee joint are reported by JOBERT DE LAMBALLE (*Plaies d'armes à feu*, Paris, 1833, p. 265), who cites two successful cases. CHENU (J. C.) (*Rapport, etc., pendant la Campagne d'Orient*, Paris, 1865, p. 410) tabulates 70 cases of shot contusions of the knee joint, of which 4 proved fatal. CHENU (J. C.) (*Stat. Méd. Chir. de la Campagne d'Italie en* 1859 *et* 1860, Paris, 1869, T. II, p. 766) records 21 cases of shot contusions of the knee joint; 17 patients recovered and 4 died. HEINE (C.) (*Die Schussverletzungen der Unteren Extremitäten*. Berlin, 1866, p. 57) cites a case in which a bullet struck the lower third of the thigh on the inside just above the knee, passed over the knee, hugging the bone closely, and escaped on the outer side of the knee. On the third day after the injury a viscid fluid escaped from the wound of entrance. During the first days the symptoms were slight, and the wounds looked well, but they soon assumed an angry appearance. Immense infiltration and pyæmia supervened, and death occurred 14 days after the injury. At the *post-mortem* examination the bone was found entirely intact; no roughening was noticeable, the periosteum only being partially destroyed where the ball had passed along the bone. . . The synovial sac was opened at its inner and upper circumference and was filled with pus. STROMEYER (L.) (*Erfahrungen über Schusswunden im Jahre* 1866, Hannover, 1867, p. 55) tabulates 8 shot contusions of the knee joint, but gives no results. RUPPRECHT (L.) (*Militärärztliche Erfahrungen während des Deutsch-Französischen Krieges im Jahre* 1870–71, Würzburg, 1871, p. 10) tabulates 8 cases of shot contusions of the knee joint and patella but does not indicate the results in the cases.

Shot Contusions of the Knee Joint treated by Conservation.—Of the thirty-three cases of this group, eleven, or 33.3 per cent., were fatal. More or less swelling, extensive inflammation often involving the synovial membranes, necrosis, and exfoliations of small pieces of bone, abscesses, and effusions into the joint were the most prominent symptoms following shot contusions of the bones of the joint, and the cases of recovery were followed by wasting of the limb, partial or complete anchylosis, and, in a few instances, by permanent enlargement of the joint and exacerbations of pain and swelling during damp seasons.

Recoveries after Shot Contusions of the Knee Joint treated by Conservation.—Twenty-two cases of this group are reported. The patella was the seat of the contusion in nine, the condyles of the femur in seven, the patella and condyles of the femur in two, and the head of the tibia in one instance; in three cases the parts injured are not specified. Four were Confederate and eighteen were Union soldiers. Of the latter, one was returned to duty and afterwards killed in battle; fifteen became pensioners, of whom one died of phthisis four years after the injury; two have not applied for pensions.

CASE 530.—Private C. Bowers, Co. D, 84th Pennsylvania, aged 23 years, was wounded in the left knee, at Winchester, March 23, 1862, a ball striking the patella, passing upward one and a half inches, and lodging. He was admitted to St. Joseph's Hospital, Philadelphia, April 2d, where the missile was extracted by an incision. Considerable pain and inflammation ensued, and an abscess formed above the wound, discharging itself through the opening made for the removal of the ball. The patient was discharged July 16, 1862, and pensioned. Examining surgeons report him suffering from weakness in walking.

CASE 531.—Private G. W. Clark, Co. G, 126th Ohio, aged 27 years, was wounded at Winchester, September 19, 1864, by a musket ball, which passed through the right knee, grazing the patella. He was treated at various hospitals, and was ultimately mustered out June 25, 1865, and pensioned. Examining surgeons report partial anchylosis of the knee, difficulty in walking up and down hill, and considerable wasting of the limb.

CASE 532.—Private *G. Deacon*, Co. G, 14th Virginia Cavalry, aged 25 years, was wounded at Boonsboro', July 8, 1863, by a spent ball, which entered the outer and lateral surface of the right knee, passed inward and forward, striking the patella and lodging. He entered Frederick Hospital one week afterwards. The patient stated that he worked the ball out with his fingers on the field. About July 25th, an abscess formed at the point where the ball had lodged, when the external opening was enlarged, allowing the escape of about half an ounce of pus. Though no synovial fluid escaped, marked evidence of the joint being involved existed, the swelling being more extensive on the following day and fluctuation well marked. Tincture of iodine was then freely applied and the limb was placed in Smith's anterior splint. By August 10th the wound was nearly closed, the effusion within the joint had almost entirely subsided, and the patient was comfortable. On August 20th the wound was entirely healed, the appearance of the joint being natural, though considerable anchylosis existed, partly perhaps from deposit and partly owing to long continuance in one position. About a week later the splint was removed, and, on September 1st, passive motion was exercised without producing much pain or tenderness. On September 5th, the patient was transferred to Baltimore, having considerable and daily increasing motion of the knee. The man was paroled for exchange September 25, 1863.

CASE 533.—Private J. Hammond, Co. B, 98th Ohio, aged 25 years, was wounded in the left knee by a musket ball, at Chickamauga, September 20, 1863. He was admitted to hospital at Chattanooga, whence Surgeon J. T. Woods, 99th Ohio, reported: "The missile entered at the inner hamstring precisely opposite the centre of the patella, and emerged an inch from the inner border of the patella." The patient was transferred to hospital No. 1, Nashville, where he was discharged from service March 3, 1864, by reason of "chronic synovitis and anchylosis of the knee joint." His name was subsequently admitted on the Pension Rolls, examining surgeons certifying to his disabilities, and reporting some enlargement of the bone and also swelling of the leg.

CASE 534.—Sergeant J. Hendricks, Co. F, 105th Pennsylvania, aged 32 years, was wounded in the right knee, at Gettysburg, July 2, 1863. He was admitted to hospital at Annapolis two weeks after the injury, and several months later he was transferred to Philadelphia. Surgeon I. I. Hayes, U. S. V., in charge of Satterlee Hospital, reported that the wound was caused by "a rifle ball striking the inner portion of the patella and involving the knee joint. The patient recovered with an anchylosed joint. He was assigned to the Veteran Reserve Corps December 11, 1863." On September 16, 1865, the man was discharged from service, and subsequently he became a pensioner. In 1878, the examining surgeons reported: "The power to extend and flex the injured knee is still slightly impaired."

CASE 535.—Private G. Hodges, Co. B, 7th Michigan, aged 25 years, was wounded at Gettysburg, July 2, 1863, and entered Satterlee Hospital, Philadelphia, one week afterwards. Acting Assistant Surgeon M. J. Grier noted: "A shot wound of left knee by a minié ball passing over the patella, cutting through the outer laminæ of the ligamentum patella and scratching the surface of the bone." A portion of the patella became necrosed during the progress of the case. The wound closed about October 1st, but reopened some ten days later, when a small piece of bone exfoliated. The wound healed about November 1st. Some days afterwards, however, the patient, while wrestling, fell on his injured knee, breaking open the tissues down to the tendon over the patella for an inch and a half in length. After this rupture reclosed the patient had an attack of facial erysipelas, which was cured, and subsequently he suffered with otorrhœa. On March 24, 1864, the patient was returned to his regiment for duty. He was killed at the battle of the Wilderness, May 6, 1864.

CASE 536.—Corporal L. P. Miller, Co. G, 124th New York, aged 27 years, was wounded at Chancellorsville, May 3, 1863, by a minié ball, which entered the left knee one-half inch external to the inner condyle of the femur and emerged two inches anteriorly, bruising the bone. Surgeon D. W. Bliss, U. S. V., reported his admission to Armory Square Hospital, Washington, May 8th, with the knee joint in a swollen condition. Irrigation was made by water dressings, and subsequently tincture of iodine was applied to the knee. By June 6th the wound had nearly healed, but there was considerable effusion in the joint and contraction of the flexor tendons. The patient subsequently passed through several hospitals, was assigned to the Veteran Reserve Corps March 2, 1864, and ultimately discharged August 13, 1865, and pensioned. Examining surgeons report swelling of the knee, owing partly to enlargement of bone and partly to œdematous condition of the tissues; also anchylosis from injury of the bony structures and from contraction of the tendons and ligaments.

CASE 537.—Private M. Piggott, Co. K, 88th New York, aged 19 years, was wounded at Savage Station, June 29, 1862, by a minié ball, which grazed the right knee joint between the patella and the inner condyle of the femur. He was captured and remained a prisoner for nearly a month, when he was exchanged and conveyed to Philadelphia. Acting Assistant Surgeon J. B. Bowen reported that the patient was admitted to Fourth and George Streets Hospital, suffering from synovitis and a very painful wound as well as a much swollen knee. The treatment consisted of cold-water dressings, and afterwards fly blister and solution of lead and opium was used. On August 24th, the adhesions were broken up by Acting Assistant Surgeon S. D. Gross, and splints were applied. This was followed by more severe painfulness and enlargement of the knee. The patient was discharged from service and pensioned February 10, 1863, Assistant Surgeon L. D. Harlow, U. S. V., certifying to the "wound causing an external communication with the knee joint and resulting in permanent anchylosis. Surgeon E. P. Vollum, U. S. A., reported that the pensioner subsequently served in the 43d Infantry (Invalid Regiment), his injured knee being free of pain, but perfectly anchylosed and considerably bent inward, and flexed so that the heel did not reach the ground by about four inches. On May 10, 1869, the man was again discharged and re-admitted on the Pension Rolls.

CASE 538.—Brigadier General T. G. Pitcher, U. S. V., was wounded at Cedar Mountain, August 9, 1862, by a musket ball, which entered the right knee at the internal condyle of the femur, striking the bone perpendicularly upon its anterior face. The result of the injury, as apparent nine months after its reception, was recorded by Surgeon R. S Satterlee, U. S. A., before whom the patient appeared for examination in April, 1863, as follows: "There is an unusual accumulation of fluid in the joint, enlargement of and more or less painfulness generally of the knee, and inability to extend the leg completely. The knee is subject to pain and swelling during cloudy weather, and the General is, at all times, required to use a crutch and cane. It would be exceedingly imprudent for him to travel. It is not known whether the missile remains in the knee or came out." General Pitcher was mustered out of the Volunteer service April 30, 1865, returned to the Regular Army, and was ultimately retired June 28, 1878.

CASE 539.—Adjutant *J. R. Youre*, Caswell's Georgia Sharpshooters, was wounded at Liberty Gap, June 25, 1863, and admitted to hospital at Murfreesboro' the following day. Assistant Surgeon W. P. McCullough, 78th Pennsylvania, in charge, recorded the following history: "A gunshot wound of left knee by a minié ball. The missile struck the outer condyle of the femur, glancing downward and opening the capsular ligament of the joint, and making its exit at the middle of the fibula. The wound looked healthy and there was no inflammation. Ice was applied to the knee. One-half ounce of whiskey was given three times a day, and anodynes at bedtime. On July 27, 1863, the patient was sent to the prison at Nashville, his wound being entirely well, and there being but partial anchylosis of the joint."[1]

Fatal Cases of Shot Contusions of the Knee Joint treated by Conservation.—Ten cases of shot contusions of the knee joint terminated fatally. The patients survived the injury from twenty to seventy days, experiencing extensive burrowing of pus and ulceration of the joint, erysipelatous swelling, arterial bleeding, and, in one instance, gangrene. A few cases are detailed:

CASE 540.—Private G. W. Perkins, Co. G, 1st Massachusetts Cavalry, aged 22, was wounded at Beverly Ford, June 9, 1863, by a pistol ball, which entered the left knee at the lower outer edge of the patella, passed downward, and came out over the head of the fibula. Three days after the reception of the injury he was admitted to Douglas Hospital, Washington, where he was etherized and an incision made to examine the wound, when the head of the tibia was found to be grazed and the joint opened, allowing synovia to escape on motion of the limb. Ice-water dressings were applied for a couple of days. It was then resolved by Assistant Surgeon W. Thomson, U. S. A., in charge of the hospital, to lay the knee joint freely open by means of liberal incisions on either side of the patella and through the original track of the wound. By this means it was hoped to give free exit to pus, which was already filling the joint, and to save the limb with anchylosis, the operation being adopted as the only alternative to amputating the thigh. A large quantity of bloody pus and synovia escaped when the lateral incisions were made; two or three cutaneous vessels were tied, and by means of a syphon the limb was kept constantly under the effect of ice water. The patient, though having some fever and retention of urine, had very little pain in the knee and felt comfortable. Morphia and sweet spirits of nitre were prescribed. On June 17th, there was some fluctuation along the base of the internal condyle, for which a free horizontal incision was made, and flaxseed poultices were applied. All the incisions about the knee continued to discharge freely. About one week later an erysipelatous swelling was noticed, a deep-seated abscess having apparently formed and fluctuation being detected below the head of the tibia. A large quantity of pus was then liberated by a careful dissection, and the painful tension of the leg was thereby relieved. On June 26th, the patient had a severe chill for the first time, and his stimulants were at once increased and quinine and capsicum added to the prescription of morphia. On the following day the fever had disappeared, but pneumonic symptoms were detected, and a mustard plaster was applied over the left chest.

[1] This case has been noted by Surgeon I. MOSES (*Surgical Notes of Cases of Gunshot Injuries, etc.*, in the *American Journal of Medical Sciences*, 1864, Vol. XLVII, p. 340).

Suppuration still continued freely from all the openings. On the morning of July 1st, a large amount of arterial blood was found to have escaped through the incision along the gastrocnemius muscle, and compression was at once made in the groin and the wound was cleaned out carefully, the source of the bleeding being apparently the anterior or posterior tibial artery near the bifurcation, and too deeply seated to be reached without careful dissection. Meanwhile the patient, already moribund, was stimulated, but without avail. He died within a half hour, from the immediate effects of the hæmorrhage. At the autopsy a diffused abscess was found following the course of the vessels in the popliteal space into Hunter's canal but not otherwise involving the thigh; all the connecting tissue in the ham was in a sloughing condition. When the artery was dissected out the perforation was found in the anterior tibial, about three-fourths of an inch from its origin, the vessel being much thickened, soft, and tough, though not materially diseased. The left lung was found firmly adherent and much congested. The bones comprising the injured knee joint were contributed by Dr. Thomson (*Cat. Surg. Sect.*, 1866, p. 323, *Spec.* 1339), and the history of the case was furnished by Assistant Surgeon C. C. Lee, U. S. A.

CASE 541.—Private J. McAllister, Co. C, 72d Pennsylvania, was wounded in the right knee, at the Wilderness, May 6, 1864, by a minié ball, which entered four inches above the external condyle and lodged on the outside of the patella, without perforating the capsular ligament. Surgeon D. Prince, U. S. V., reports that the following treatment was resorted to in the case: "The bone was cut down upon and the missile pulled out. No inflammation of the joint ensued until the eleventh day after the injury, when the joint swelled and became excruciatingly painful, attended with free discharge of synovia from the wound in front, on the outer side of the patella. On May 18th, this opening was enlarged and a counter-opening was made behind the external lateral ligament and tendon of the biceps, the patient being under the influence of ether. The limb was subjected to moderate extension for the following purposes: 1st, to separate the opposing joint surfaces and obviate the ulceration attending contact and pressure, at the same time lessening the amount of irritation; 2d, to obviate the caries and necrosis of bone apt to follow, and making bony anchylosis impossible; 3d, to preserve the limb in a position to be afterwards useful. The patient was relieved of suffering by the incision and experienced a feeling of comfort from the moderate extension." The records in this case show that the patient was admitted to the field hospital of the 2d division, Second Corps, with "shot wound of knee," and Surgeon T. R. Crosby, U. S. V., reported that the man entered Columbian Hospital, Washington, May 28th, with "shot wound of right knee joint," of which he died on the following day, May 29, 1864.

CASE 542.—Private A. D. Seelye, Co. A, 136th Pennsylvania, was wounded at Fredericksburg, December 13, 1862, by a musket ball, which entered the right knee over the external condyle of the femur and passed out in the popliteal space. He was admitted to Lincoln Hospital, Washington, ten days after the injury. Cold-water dressings and afterwards iodine tincture were applied at first; subsequently warm dressings. The wound did badly; the joint became inflamed, and unhealthy pus was secreted in large amounts. On January 16, 1863, an incision was made extending six inches from the wound of entrance up the thigh. Considerable bleeding followed and several small vessels were tied, after which the wound was packed with cotton bandages soaked in persulphate of iron. Another lateral incision, two and a half inches long, was made below the popliteal, opening an abscess. On January 25th, an opening was made opposite the large one for the purpose of better drainage. Up to this time his appetite had been good, but now it failed, and the patient became delirious and had a troublesome diarrhœa. The wound remained open and exposed the blackened surface of the femur for the space of three inches. Death supervened on February 3, 1863. At the *post-mortem* examination the internal condyle was found to be injured in its posterior aspect. The cartilages of the joint were destroyed and the surfaces of most of the bones roughened and honey-combed. An abscess in the thigh had dissected the femur half way up the limb. The history of the case was recorded by Acting Assistant Surgeon T. H. Dearing.

CASE 543.—Private J. Tetlow, Co. F, 23d New Jersey, was wounded at Fredericksburg, December 13, 1862, by a ball entering the outer side of the popliteal space of the right leg. The patient, a strong healthy man, was admitted to hospital at Alexandria six days after receiving his wound. The knee was tender and the inflammation slight at first, but soon grew worse. On December 23d, the patient had a chill and there was high constitutional fever, with great swelling and pain in the knee. On the following day the ball was discovered lying loose in the wound and was removed. On December 29th, pus was detected and let out by free incision, giving much relief. Subsequently the patient became delirious at times, and on December 31st he again had a chill, with pain in the stomach. He died January 2, 1863. At the autopsy it was ascertained that the ball had impinged upon the under side of the internal condyle, killing the periosteum for over a space of half a dime. The other articulating bones were also found bare of periosteum, and pus had filled the knee joint and dissected up the lower third of the femur. The case was reported by Acting Assistant Surgeon G. F. French.[1]

CASE 544.—Private L. D. Wells, Co. D, 74th Indiana, aged 22 years, was wounded at Chickamauga, September 20, 1863, by a musket ball, which entered about two inches above the inner condyle of the right femur, passed obliquely under the bone between the two condyles, grazing the inner, and emerged about three inches below the head of the fibula. He was admitted to hospital at Chattanooga, and thence transferred to hospital No. 8, Nashville, on October 30th. There was little swelling of the parts, and the relative constitutional condition of the patient was good until he became greatly prostrated from hæmorrhage, the precise seat of which could not be determined. On November 17th, the femoral artery was ligated at Scarpa's space by Surgeon W. C. Otterson, U. S. V. Reaction was perfect by the following day. The limb was wrapped in cotton batting. No particular change occurred until November 24th, when the wound suppurated excessively and injections of solution of sulphate of iron were ordered. The leg and foot were œdematous. On the next day the wound made by the operation broke open and suppurated freely. On November 27th, the patient was worse in every respect and marks of gangrene appeared. Remittent hæmorrhage from the anterior tibial artery caused death on December 1, 1863. The autopsy showed that the ligature had not yet cut away. The femoral was obliterated on the cardiac side for about one inch; the profunda was greatly enlarged. The femoral vein was discolored and contained a clot three or four inches long and not entirely obstructing the circulation. The structures at the seat of the hæmorrhage were greatly disintegrated. The history of the case was reported by the operator.

[1] BELLANGER (J. B.), *Report of Five Cases of Gunshot Injury of the Knee Joint treated at Mansion House Hospital, Alexandria, Virginia, May 16, 1863*, in *American Journal Medical Sciences*, 1863, Vol. XLVI, p. 44.

CASE 545.—Private C. Werth, Co. K, 1st New York, aged 22 years, was wounded in the left knee and right ankle, near Richmond, June 30, 1862. Acting Assistant Surgeon J. B. Bowen reported: "A ball entered one inch above the knee, and emerged at the inner portion of the leg one inch below the patella, grazing that bone and the head of the tibia; the other ball entered at the external malleolus and comminuted the tarsal bones. The wounded man was taken prisoner and sent to Richmond. He was received at the Fourth and George Streets Hospital, Philadelphia, July 25th, in a debilitated state and with both wounds in a very bad and painful condition, there being synovitis of the knee and purulent discharges. Linseed poultices and solution of sulphate of copper were applied to the ankle, and cold-water dressing and subsequently blister, followed by solution of lead and opium, were used to the knee. The patient gradually sank, and died from exhaustion August 8, 1862."

Amputations after Shot Contusions of the Knee Joint.—The ten instances comprising this group have already been cited in the tables of amputations in the thigh in the preceding section of this Chapter. Five were intermediary and five secondary operations.[1] Eight of the ten operations terminated fatally.

SHOT FRACTURES OF THE KNEE JOINT.—The cases to be considered in this group are those involving primarily the bones composing the knee joint. They number three thousand three hundred and fifty-five, and are classified in the subjoined table:

TABLE LII.

Numerical Statement of Thirty-three Hundred and Fifty-five Cases of Shot Fractures of the Bones of the Knee Joint.

PARTS INJURED.	MODE OF TREATMENT.																				
	CONSERVATION.					EXCISION OF KNEE JOINT.				EXCIS. OF KNEE J'T FOLLOWED BY AMPUTAT'N OF THIGH.			AMPUTATION AT KNEE JOINT.				AMP. AT KNEE J'T FOLLOWED BY AMPUTAT'N OF THIGH.			AMPUTATION OF THIGH.		
	Cases.	Recovery.	Death.	Undetermined.	Mortality Rate of Determined Cases.	Cases.	Recovery.	Death.	Undetermined.	Cases.	Recovery.	Death.	Cases.	Recovery.	Death.	Undetermined.	Cases.	Recovery.	Death.	Cases.	Recovery.	Death.
Condyles of Femur	159	69	89	1	56.3	10	3	7	....	2	....	2	4	1	3	....	....	....	....	419	178	241
Patella and Condyles of Femur	17	9	8	....	47.0	4	....	3	1	....	....	....	....	....	....	....	....	....	....	68	26	42
Cond. of Femur and Head of Tibia	22	7	15	....	68.1	2	....	2	....	1	1	....	1	1	....	....	1	1	....	59	23	36
Cond. of Femur, Patella, and Head of Tibia	4	1	3	....	75.0	3	1	2	....	....	....	....	....	....	....	....	....	....	....	20	9	11
Patella, not opening joint primarily	117	84	30	3	26.3	8	1	7	....	1	....	1	1	1	....	....	....	....	....	21	9	12
Patella, opening the joint primarily	47	22	25	....	53.1	2	....	2	....	....	....	....	1	1	....	....	....	....	....	85	55	30
Patella and Head of Tibia	10	6	4	....	40.0	1	....	1	....	....	....	....	4	1	2	1	1	1	....	17	7	10
Head of Tibia	137	56	80	1	58.8	5	2	3	....	....	....	....	12	7	5	....	1	1	....	285	115	170
Part not specified	355	84	267	4	76.0	14	1	11	2	3	....	3	26	13	13	....	2	1	1	1,403	744	659
Aggregates	868	338	521	9	60.6	49	8	38	3	7	1	6	49	25	23	1	5	4	1	2,377	1,166	1,211

It will be seen that the table embraces a great variety of injuries. In two hundred and eighty-three instances the bony lesion interested the patella only; in five hundred and ninety-four the condyles of the femur were fractured; in eighty-nine the condyles of the femur and the patella; in eighty-six the condyles of the femur and the head of the tibia; in twenty-seven the condyles of the femur, the patella, and the head of the tibia; in thirty-three the patella and the head of the tibia; in four hundred and forty the head of

[1] The cases of intermediary operations are: Pt. J. Kimm, E, 152d New York, recovery (No. 99, TABLE XXXV, p. 281); Pt. C. Berkey, A, 10th Pennsylvania Reserves, fatal (No. 221, TABLE XXXV, p. 283); Serg't J. Walker, F, 2d Maryland, fatal (No. 453, TABLE XXXV, p. 286); Serg't M. Akeman, I, 13th Indiana, fatal (No. 220, TABLE XXXVI, p. 296); Pt. J. Wright, D, 7th New York Heavy Artillery, fatal (No. 676, TABLE XXXVI, p. 303). The secondary operations are: Pt. *I. Bradley*, D, 25th North Carolina (No. 32, TABLE XXXVIII, p. 308); Pt. J. Jones, K, 13th Tennessee Cavalry, recovery (No. 46, TABLE XXXIX, p. 314); Corp'l *R. H. McCann*, G, 13th Mississippi, fatal (No. 141, TABLE XXXIX, p. 315); Pt. T. Nevins, F, 63d New York, fatal (No. 172, TABLE XL, p. 322); Corp'l J. D. Touhey, B, 14th New York, fatal (No. 196, TABLE XL, p. 323).

the tibia was involved; and in one thousand eight hundred and three the fractured portion of the articulation was not specified. Eight hundred and sixty-eight were treated on the expectant conservative plan; forty-nine by excision; seven by excision and subsequent amputation of the thigh; forty-nine by amputation through the articulation; five by amputation at the knee joint and subsequent amputation of the thigh; two thousand three hundred and seventy-seven[1] by amputation of the thigh, six of which were followed by amputation at the hip.[2]

SHOT FRACTURES OF THE BONES OF THE KNEE JOINT TREATED BY CONSERVATION.—Of the three thousand three hundred and fifty-five cases of shot fractures of the bones of the knee joint, eight hundred and sixty-eight, or about one-fourth, were treated throughout without operative interference.[3] The results in nine instances

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[1] There are noted in this table 2,389 amputations of the thigh for shot fractures of the bones of the knee joint, of which 12 had been preceded by excisions or amputations at the knee joint, and 6 had been followed by disarticulation at the hip. To these 2,389 amputations should be added 10 operations for shot contusions of the knee joint, making the total of 2,399 cases of thigh amputations for shot injuries of the knee joint, as indicated in TABLE XLVI, on page 332, *ante*.

[2] Cases of Pt. Julius Fabry, Co. K, 4th Artillery (CASE 330, p. 153, and No. 2 of TABLE XVII, p. 159); Pt. Eben E. Smith, Co. A, 11th Maine (CASE 332, p. 155, and No. 4 of TABLE XVII, p. 159); Serg't E. D. Ulmer, Co. G, 15th New Jersey (CASE 333, p. 156, and No. 5 of TABLE XVII, p. 159); Pt. *R. A. Vick*, Co. E, 43d North Carolina (CASE 334, p. 157, and No. 6 of TABLE XVII, p. 159); Henry Campbell, sutler's clerk (CASE 335, p. 157, and No. 7 of TABLE XVII, p. 159), and Pt. Lewis Larry, Co. A, 1st New Orleans Regiment (CASE 336, p. 158, and No. 9 of TABLE XVII, p. 159).

[3] Examples of shot wounds of the knee joint treated without operative interference have been cited by FRAMBESARIUS (N. A.) (*Canonum et Consultationum*, Libri III, *quibus aphoristica methodus medendi omnibus affectibus corporis continetur*, Paris, 1565): A ball lodged in the knee joint appeared afterwards on the surface and was cut out. SCHMIDT (J.) (*Speculum Chirurgicum oder Spiegel der Artzney*, Augspurg, 1656, pp. 153 *et seq.*): On December 12, 1632, a Swedish dragoon was shot through both knees; both patellas were fractured; the patient recovered, but could walk only poorly on crutches. In October, 1647, a Bavarian soldier was shot through the right knee; he remained for three days without assistance; a "jury of six" recommended amputation; Dr. SCHMIDT refused to operate, dressed the wounds, and placed the limb in a straight position; pieces of bone came away; recovery in six weeks. G. Basch, shot through the left knee joint, May 18, 1648; fracture of bones; recovery. Th. Rosen, shot through right knee; recovery. Z. Neschin, shot through right knee, May 20, 1648; swelling; suppuration relieved by incision; recovery. GUILLEMEAU (J.) (*Les Oeuvres de Chirurgie*, Rouen, 1649, Chap. IV, p. 652): M. de la Tour received, in the barricades of Paris, a shot wound of the left knee joint; ball entered above the crest of the tibia, fractured "*le petit fossile*" in several pieces. Barber-surgeon Habicot made an incision and removed the spiculæ; recovery. WISEMAN (R.) (*Severall Chirurgicall Treatises*, London, 1676, p. 430): A page of Lieut. General D. L—— was shot through the knee, the ball fracturing the joint; excessive pain and aneurismal bleeding; putrefaction, delirium, spasms, death. BELLOSTE (*Le Chirurgien d'Hôpital*, Paris, 1710, p. 216): A captain, shot through the right knee, at Pignerol, in 1691; extensive suppuration; wound of entrance enlarged by incision; recovery in five months. MORAND (*Opuscules de Chirurgie*, Paris, 1768, T. II, p. 252): General Keith, shot at the siege of Okzakow, in 1738, through the right knee; extensive suppuration followed; two pieces of cloth escaped; the General recovered and was afterwards killed at the battle of Chemnitz. DESPORT (*Traité des plaies d'armes à feu*, Paris, 1749, p. 222 *et seq.*): A cannonier, at the siege of Milan, in 1733, received a shot wound of the knee joint, fracturing the inferior extremity of the femur; wound enlarged and the ball, found embedded in the femur, removed. The patient recovered in two months.—A soldier, shot in the right knee, at the battle of Parma, in 1733; the ball lodged in the joint. The external condyle of the femur was fractured; the ball was extracted, and the patient recovered with complete anchylosis. A volunteer was shot, in Corsica, in the outer and anterior part of the knee. The wound was enlarged and fragments of the outer condyle of the femur and of the patella were removed, and the ball extracted; the patient recovered in two and a half months. THEDEN (J. C. A.) (*Neue Bemerkungen und Erfahrungen zur Bereicherung der Wundarzneykunst*, Berlin, 1782, B, I, p. 78): Major Kamke, wounded at Striegau, in 1745; the ball perforated both condyles of the femur; the wound was enlarged and a large number of spiculæ removed from the extremity of the femur; recovered with a stiff knee joint. BOUCHER (*Observations sur des playes d'armes à feu, etc.*, in *Mém. de l'Acad. Roy. de Chir.*, Paris, 1753, T. II, p. 295): A drummer, wounded May 2, 1749, at Lille, through the internal condyle of the femur; wound enlarged and fragments removed; recovery, with stiff knee and one and a half inch shortening. BELMAS (BORDENAVE) (*Précis de plusieurs observations sur les playes d'armes à feu, etc.*, in *Mém. de l'Acad. Roy. de Chir.*, Paris, 1753, T. II, p. 527): A captain of an Algerian vessel was shot through the knee, the ball carrying away about three inches of the upper part of the tibia, a small portion of the patella, the head of the fibula, and a portion of the condyle of the femur. Dr. BELMAS removed several fragments, and the patient recovered with anchylosis of the knee joint. Two similar cases are detailed by MEIHÉE (J.) (*Traité des plaies d'armes à feu*, Paris, An. VIII (1800), p. 175): A cavalier, wounded at Ludzerberck; the ball passed through the right knee from before backwards, shattering the patella and the condyles of the femur; extensive incisions were made and numerous pieces of bones, some loose, some partly attached, were removed; recovery, with complete anchylosis. A laborer of Meaux was shot through the right knee from the outer to the inner side, shivering the articulation; swelling of the thigh and gangrene; large incision to allow the escape of fetid pus; a piece of bone the size of a dollar, and of the thickness of the little finger, from the condyles of the femur, was removed, and other sharp points of bone were cut off; 15 days later another piece of bone, an inch long, from the loose portion of the shaft of the femur, was removed; recovery, with hardly any defect of the articulation. HUNTER (JOHN) (*A Treatise on the Blood, Inflammation, and Gunshot Wounds*, London, 4to, 1794, p. 531): A French soldier at Bellisle, in 1761, shot through the knee, the ball traversing the joint without fracture of bones; recovery. L. J. RABASSE (*Sur les plaies des articulations faites par les armes à feu ou les instrumens tranchans*, Thèse à Paris, 1811, No. 84, pp. 10, 18): General Charles de Lameth, wounded at the siege of New York 1783,[?] the ball traversing the left knee through the condyles in its greatest diameter from the right to the left. The patient, who was treated by Surgeon-Major ROBILLARD, of the French army in the United States, recovered without the least immobility of the limb. In a second case the condyles of the femur were fractured, and the ball lodged. The missile could not be found. Extensive swelling followed, but the patient recovered in about three months, with anchylosis of the knee. The author regrets that the man's pantaloons were not examined, as the ball might have been found. DESAULT (*Journal de Chirurgie*, Paris, 1791, T. I, p. 321): V. Viry, aged 15 shot in the right knee on January 6, 1790; fracture of the patella and the condyles of the femur; recovery without anchylosis. GERMAIN LEVIELS (*Essai sur les avantages qu'il peut y avoir à amputer la cuisse, lorsqu'un coup de feu a traversé l'articulation du genou, ou lorsque la balle y est demeurée profondément engagée*, Paris, Thèse, Vol. XXXII, An XI–1803, p. 40 *et seq.*) cites six fatal cases: J. Bourdon, wounded in Italy, November 22, 1793; shot wound of knee joint; bones not fractured; fatal. Young man, aged 20; shot through knee joint in June, 1797; bones crushed; amputation refused; fatal. Two soldiers shot in the knee joint in October, 1793. The patella and the condyles of the femur were fractured in one case; the ball lodged; erysipelatous swelling; death. In the other case the ball passed through the joint, perforating the condyles of the femur; several spiculæ were removed; suppurative fever and death. Captain Milet, 72d Grenadiers, shot through the knee joint June 27, 1798; no bony lesion; suppuration relieved by incision; fever; death. Barot, 72d Grenadiers, shot in the right knee on October 2, 1799; extreme pain, swelling, inflammation, and death. PERCY (*Manuel du Chirurgien-D'Armée*, Paris, 1792, p. 164) alludes to the case of M. d'Almons, an engineer;

could not be ascertained. Three hundred and thirty-eight were successful, and five hundred and twenty-one fatal, a mortality of 60.6 per cent.

Recoveries after Shot Fractures of the Bones of the Knee Joint treated by Conservation.—Examples of the three hundred and thirty-eight recoveries after shot injuries of the bones of the knee joint treated throughout on the expectant plan, will be cited in the order of the groups indicated in TABLE LII. In the following five cases the joint was opened and the condyles of the femur injured:

CASE 546.—Captain A. P. Fisk, Assistant Adjutant General, U. S. V., was wounded at Fair Oaks, June 1, 1862, by a conoidal musket ball, which entered the inner side of the right knee and was cut out from beneath the skin on the outer aspect. The hæmorrhage following the injury was slight. The case was reported by Surgeon G. Grant, U. S. V., who, together with Surgeons J. A. Lidell and A. N. Dougherty, was satisfied that the joint was implicated. Immediate amputation was advised but rejected by the patient. The pain in the joint was excruciating. Surgeon Grant dressed the wound, after which the patient

the ball encrusted itself in the condyle of the femur, and the patient recovered. WEDEKIND (GEORGE) (*Nachrichten ueber das Französische Kriegs-spitalwesen*, Leipzig, 1798, B. II, p. 205): J. H. Barzon, Corporal, 10th demi-brigade of Light Infantry; shot comminution of right knee, in 1795, near Rastadt; tetanus; death. CHEVALIER (T.) (*A Treatise on Gunshot Wounds*, 1804, p. 116): J. T——, aged 19, August 27, 1799, external condyle of femur split; October 1st, a piece of bone removed; 10th, amputation proposed but abandoned as the patient fainted on moving; death in a few days. At the *post-mortem* the ball was found in the internal condyle of the femur. LARREY (D. J.) (*Mém. de Chir. Mil. et Camp.*, Paris, 1812, T. III, p. 256): Ibrahim, a mameluke, received, in August, 1799, a shot fracture of the patella; the ball traversed the knee joint; the patient recovered. FENECH (E.) (*Obs. recueillies à l'armée d'Espagne sur les plaies d'armes à feu aux extremites*, Paris Thesis, 1813, pp. 13, 19): Obs. XIII, soldier of 62d regiment, wounded at Vimeira, in Spain, August 17, 1808; fracture of inner condyle of femur; recovery. Obs. XXVII, Gracieux, Adjutant, 62d regiment, wounded August 17, 1808; fracture of patella and inner condyle of femur; fatal. MÉALONIER (*Sur les plaies de l'articulation du genou faites par les armes à feu*, Paris, Thèse No. 16, 1814, pp. 19, 22, 24): Lecoeur, 50th line, shot through the right knee, at Salamanca, July 12, 1812; the ball traversed the joint; no bony lesion; death. A dragoon, 15th line, in Galitzia, in 1806, was shot in the left knee; ball lodged in the external condyle of the femur; incision made, and ball and large fragment of bone removed; death. A soldier, at Pultusck, December 26, 1806, received a shot fracture of the inner condyle of the femur, the ball traversing the joint; tumefaction; death. DEGUISE (CH.) (*Dissertation sur les plaies des articulations*, Paris Thèse, 1815, No. 4, p. 17): A sub-lieutenant of the 80th line; shot in Spain, through the knee; no lesion of bone; complete recovery. BLONDEAU (J.) (*Propositions de pathologie fondées sur des observations*, Paris, 1815, Thèse No. 64, p. 21, Obs. X): A soldier at the battle of Aropiles, in Spain, in 1810, was shot in the right knee, the ball lodging under the patella, whence it was removed; he recovered. BELL (C.) (*Report on Gunshot Wounds of the Knee Joint in Surgical Observations; being a Quarterly Report of Cases in Surgery treated in the Middlesex Hospital*, London, 1816, p. 429): D——, shot in the knee September 6, 1812; ball lodged in condyle of femur; recovery. TROWBRIDGE (A.) (*Gunshot Wounds*, in *Boston Medical and Surgical Journal*, 1838, Vol. XVIII, p. 342): Colonel McNeil, shot in the knee, at the battle of Bridgewater, July 25, 1814; the ball entered above the patella and injured the condyles of the femur; recovery, with partial anchylosis. MANN (JAMES) (*Medical Sketches of the Campaigns of* 1812–13–14, *etc.*, Dedham, 1816, p. 211): A soldier of the 33d regiment, admitted into hospital at Burlington with a shot wound through the knee; amputation proposed but refused; sinuses laid open and a spiral bandage applied from foot to trunk; recovery, with a stiff joint. EHRLICH (J. A.) (*Chir. Beobachtungen*, Leipzig, 1815, B. II, p. 115): A soldier of the 5th Italian regiment, aged 22, shot at Lützen, May 3, 1813, through the right knee joint, fracturing the external condyle of the femur and internal condyle of tibia; recovery, with anchylosis of joint. CHAMPION (L.) (*Traité de la Résection des os cariés dans leur continuité ou hors des articulations*, Paris, 1815, No. 11, p. 77, Obs. XIV): Chauveau, 42d demi-brigade, shot in the right knee, at Lützen, May 2, 1813; ball struck internal condyle of tibia and lodged, and was removed in April, 1814, by chiseling away the carious surface of the bone; recovery, with good use of limb. BLENKINS (G. E.) (Article *Gunshot Wounds*, in COOPER'S *Dictionary of Practical Surgery*, London, 1861, Vol. I, p. 816): A soldier of the 95th regiment was shot through the knee joint, at Merksam, near Antwerp, in 1814; he died after several months' suffering. CAMBRAY (*Journal de Chirurgie*, par M. MALGAIGNE, 1846, T. IV, p. 361): A young man, aged 15, shot through the patella, at the storming of Cambria, near Waterloo, in 1815; recovery. HENNEN (JOHN) (*Principles of Military Surgery*, London, 1829, p. 147 *et seq.*): A soldier, shot in the knee joint at the storming of Nivelle, Nov. 10, 1813, the ball perforating the joint; inflammation, and death on the fourth day. Lieutenant-Colonel R——, shot in the right knee joint, June 18, 1815; the patella was fractured; the missile lodged; recovered, with good use of limb, in about five weeks. Major B——, aged 28, received a shell wound of the right knee, June 18, 1815; the patella was fractured and the femur grazed; fever; swelling of lower part of thigh; incision on external part of thigh four inches deep; a pint of pus evacuated; July 6th, portion of patella removed; recovery, with complete anchylosis. BEGIN (L. J.) (*Mémoire sur le traitement des plaies des articulations*, in *Rec. de Mém. de Méd. de Chir., etc.*, 1825, T. XVI, 1st sér., p. 6): J. A——, chasseur, wounded at Barcellona, Spain, September 15, 1823; fracture of patella and condyle of femur; recovery. JOBERT DE LAMBALLE (*Plaies d'armes à feu*, Paris, 1833, p. 266 *et seq.*) gives brief details of 11 penetrating wounds of the knee joint from the revolution in Paris, in 1830; 10 recovered and 1 proved fatal. In the fatal case the femur and tibia were interested; of the 10 cases of recovery the condyles of the femur were injured in 5, and in 5 there was no bony lesion. LARREY (H.) (*Rel. chir. des événemens de Juillet*, 1830, Paris, 1831, p. 110): C——, 50th line, in July, 1830, received a shot in the left knee; the internal condyle of the tibia was fractured; swelling, pain, and infiltration, and death on August 25, 1830. MENIÈRE (P.) (*L'Hotel Dieu de Paris en July et Aout*, 1830, Paris, 1830, pp. 314–320) briefly cites 5 cases; 4 were fatal and the result in 1 is not indicated. In one case the head of the tibia was fractured; in the other 4 cases no mention is made of fracture of the bony structure. ARNAL (*Mém. sur quelques particularités des plaies par armes à feu*, in *Jour. univ. et hebd. de Med. et de Chir.*, Paris, 1831, T. III, p. 38) alludes to 8 cases of shot wounds of the knee joint, with injuries of the bony structure; all recovered with false anchylosis. DE MORTAIN (*Observation d'un coup de feu ayant traversé l'articulation tibio-fémorale droite; guérison avec ankylose*, in *Rec. de Mém. de Méd. de Chir. et de Phar. Mil.*, 1839, 1st sér., T. XLVI, p. 99): C——, 48th line; perforation of knee joint; articular surfaces ploughed through; recovery, with anchylosis. ALCOCK (R.) (*Observations on injuries of Joints*, in *Med.-Chir. Transactions*, 1840, Vol. XXIII, pp. 260, 261) tabulates 18 cases of shot wounds of the knee joint: 3 recovered, 15 were fatal. HOME (WILLIAM) (*Report on various cases of Gunshot Wounds received in actions in Upper Canada, in* 1838, in *Edinburgh Med. and Surg. Jour.*, 1840, Vol. LIV, p. 28) relates a case of fracture of condyle of femur, the ball traversing the joint; recovery, with anchylosis. WARD (BRANSBY COOPER, *The History of a Gunshot Wound in which the Patella was carried away and the Knee Joint completely laid open*, in GUY'S *Hospital Reports*, 1840, Vol. V, p. 88): E. M——, patella shot away, November 2, 1838; joint opened; recovery, with considerable motion of joint; walks without a cane. BAUDENS (L.) (*Clinique des Plaies d'Armes à feu*, Paris, 1836, p. 446): A sergeant, 20th regiment, in 1831, was shot through the condyles of the right femur; small fragments of bone removed from osseous channel; recovery, with slight anchylosis. WILLIAMSON (G.) (*Military Surgery*, London, 1863, p. 172) cites a case from the war in India, in 1833: E. Marr, 20th regiment; patella fractured, joint opened October 21, 1833; recovery, with anchylosis; died 19 months later, of disease of the liver. LEBERT (*Obs. Cliniques sur les plaies d'armes à feu et sur quelques autres blessures*, in *Arch. Gén. de Méd.*, 1845, T. VII, IV sér., p. 327): Ottwiller, aged 24, wounded at Trient, May 21, 1844; joint perforated; recovery, with good use of limb. Coudray, aged 35, ball passed through the joint behind the patella; several pieces of the patella and head of the tibia removed; severe pain and inflammation; death. The space assigned to this section of Chapter X will not permit a detailed reference to the cases of shot wounds of the knee joint treated by conservation during the last 30 years. A numerical statement of these cases will be given in the concluding remarks of this section of Chapter X.

was sent to the rear, where he was examined by Assistant Surgeon A. J. Baxter, U. S. A., who stated that he found the inner condyle of the femur fractured and that he passed his finger into the joint. The patient was subsequently sent to New York, where he came under the care of Dr. Willard Parker. Surgeon J. F. Hammond, U. S. A., August 19, 1862, certified to a description of the wound and stated: "The knee is swollen and the joint semiflexed. The orifices of the wound are healed, but one retains the crust. It is subjected to passive motion and gradual extension." In a certificate dated three months later, Surgeon Hammond reported: "He is gradually convalescing from the gunshot wound of the knee joint described in my former certificate. He cannot flex his leg quite to a right angle, and the knee becomes painful and swollen when exercised," etc. Surgeon Grant added to his report that Captain Fisk ultimately recovered, and served as Assistant Adjutant General in the Department of the East. He was mustered out of service November 22, 1865. He did not apply for pension until nearly thirteen years afterwards, when the New York City Examining Board described his condition as follows: * * * "Circumference of right knee over patella one-half inch larger; loss of bone probably from both the femur and tibia; bony projection on one side of aperture of exit. Motion of extension nearly complete; flexion one-third impaired. External curvature of the limb at knee joint. Crepitus on motion in joint; pain from effort always, from change of weather, and also from maintaining one position; walking and standing particularly irksome," etc. Captain Fisk was paid as a pensioner, September 4, 1879.

CASE 547.—Private P. Stuck,[1] Co. E, 116th Pennsylvania, aged 18 years, was wounded in the right knee, at Spottsylvania, May 12, 1864, and entered Douglas Hospital, Washington, six days afterwards. Acting Assistant Surgeon H. Gibbons, jr., described the case as follows: "The missile, probably a minié ball, entered at the inner border of the patella and escaped a little external to the center of the popliteal space, going directly through the joint and grooving the articular surface of the internal condyle, but passing mainly through the intercondyloid notch. The patient was a man of delicate organization. He had but little constitutional disturbance and not much inflammation in the joint, which, however, was somewhat swollen. Simple water dressings were applied. The discharge was free, abundant, and thin, the pus being mixed with synovial fluid. On June 9th, there was some loss of appetite, with small, frequent pulse, and the patient complained of pain in the knee, which was swollen considerably. Flaxseed poultices, applied for two or three days, procured a free discharge from the posterior wound (the anterior wound having healed), when the symptoms immediately abated. In the latter part of August the patient began to walk about on crutches, the leg being flexed at an angle of about 135° with the thigh. The discharge was now not so copious, nor the pain at all severe; his appetite was fair, bowels regular, sleep refreshing, etc., as had indeed been the case during the greater part of the time. In the latter part of October, in order to reduce the flexion, the limb was bandaged to a double-inclined plane splint, which resulted in almost entire extension without occasioning any bad symptoms in the joint or confining the patient to his bed. For the following eight months nothing of special interest occurred, though there were several inflammatory attacks, moderate in degree and readily subdued by poulticing. On these occasions abscesses sometimes formed on the posterior thigh. The case is doubly interesting from the fact that the wound only received the ordinary dressing of cold water on cloths, with charpie to absorb the discharge. Tincture of iodine and poultices, or hot fomentations with flannel covered with oiled silk, were used when signs of inflammation showed themselves. No ice was used in the treatment. A photograph (*Surg. Phot. Series*, No. 63, A. M. M.) of the patient, taken July 9, 1865, is represented in FIG. 2 of PLATE LXVIII. The soldier was discharged from service July 13, 1865, in good health, the posterior wound being still open and permitting the introducing of a probe for three inches. There was also a large deposit of new bone, and the patella was firmly anchylosed to the femur. Some motion of the joint remained." Examiner H. Brubacker, of Somerset, Pennsylvania, certified, September 23, 1867: "The knee is very much enlarged, and the muscles of the thigh are gradually shrinking away. The wound is still discharging pus very freely, and there is evidently some disease of the bones about the joint, which keeps up the discharge." In January, 1876, the same examiner reported: "The joint is completely anchylosed and the leg flexed upon the thigh, so that the heel cannot be made to touch the ground. He walks on the front of the foot. The ball of the foot behind the great toe is enlarged, hardened, and tender, which renders walking very difficult. The leg, including the thigh and hip, is becoming atrophied. His condition is gradually growing worse." The pensioner was paid March 4, 1880.

CASE 548.—Private J. C. Simmerman, of the Marine Corps, aged 21 years, while serving on board of the U. S. Steamer Minnesota, was wounded in the knee during the attack on Fort Fisher, January 15, 1865. He was treated at the Naval Hospital at Portsmouth, whence he was discharged June 19, 1865, and pensioned, by reason of "shot wound of left knee joint, causing compound fracture, and resulting in anchylosis of the joint with incapacity to use the leg, which may ultimately require amputation." In the succeeding year, while at Philadelphia, the pensioner presented himself for treatment to Dr. G. H. Napheys, formerly connected with the Navy and with the Army, who made the following report of the case (*Medical and Surgical Reporter*, Vol. XVI, 1867, p. 307): "He was struck, while lying down, by a grapeshot entering the inner condyle of the femur and passing through the articulation. When discharged from hospital his knee was perfectly stiff and flexed at right angle. Afterwards there was a constant discharge and the passage from time to time of pieces of bone from the part, the last fragment coming away in June, 1866. When he presented himself at the clinic he had bony anchylosis of the wounded knee, and the leg was flexed at such an angle with the thigh that the distance between the heel and the corresponding buttock was only seven and a half inches. The operation consisted in breaking up the extensive osseous adhesions by means of perforators and other instruments. The hamstring muscles were divided subcutaneously. The limb was then bandaged throughout its whole length. It was afterwards placed upon a double-inclined plane with a screw arrangement, so that it could be gradually brought down. About two months after the operation the limb was straightened sufficiently to enable him to rest on the ball of the foot, which is all that can be desired. The heel is somewhat elevated; it will be brought down at some future time by dividing subcutaneously the tendo-Achilles. He walks readily by the aid of a cane. On April 1, 1867, the patient writes that he has good motion of the ankle joint and walks with increasing ease and comfort." The Philadelphia Examining Board, in 1873, and at subsequent dates, certified to the injury and to firm anchylosis as resulting therefrom, together with dislocation of the tibia backwards. In 1873, the leg was described as being flexed at an angle of 25°, and two years later at 40°, with the heel drawn up two and a half inches. An operation on account of necrosed bone is also alleged to have been performed.

[1] *Circular* No. 6, War Department, Surgeon General's Office, Washington, 1865, p. 37.

Ward phot.

T. Sinclair & Son, lith.

PLATE LXVIII.—RESULTS OF SHOT INJURIES OF THE KNEE-JOINT.

1. Case of Lieutenant T. W. Robertson
29 9th New York.

2. Case of Private Peter Stuck
116 Pennsylvania

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Examiner J. A. Armstrong, of Camden, reported, September 17, 1877: "At present the leg is in a straight position, the knee joint anchylosed, and the parts surrounding it calloused and indurated." At a subsequent examination by the Board the thigh and leg were represented as being much wasted, and the condition of the foot was described as that of a case of "talipes equinus." The pensioner was paid December 4, 1879.

CASE 549.—Private N. Gray, Co. H, 4th Maine, aged 24 years, was wounded in the right knee joint, at the Wilderness, May 5, 1864, and entered Harewood Hospital, Washington, three weeks afterwards. Surgeon R. B. Bontecou, U. S. V., contributed the following history: "The ball entered in the middle of the internal condyle three-fourths of an inch above the inferior margin, passing in an oblique direction inward and downward. At the time of his admission the general state of his health was good and color of skin normal; knee joint a little swollen. The patient complained of a fixed pain right below the centre of the patella, which was increased by pressure upon the patella. The thigh was swollen, especially on the inner side, about five inches upward, and fluctuating. On enlarging the opening upward a quantity of pus was discharged and the ball was discovered and removed. The hole made by the ball was one inch deep; its direction inward and downward. An ice bag was applied to the joint. On June 2d, an incision was made in the fossa poplitea three inches long, and the lower third of the posterior side of the femur was found to be surrounded with pus, but the bone was yet covered with periosteum. The discharge was free and copious; the ice was still kept on. On July 20th, there was œdema of the right leg, which was bandaged from the toes to the knee joint; discharge healthy and copious. Solution of chlorinate of sodæ was now used in the dressing. By September 1st, the wound was doing well, discharging but little, and the incision in the fossa poplitea being healed. Exudation below the patella had disappeared, and the movements of the knee joint were perfectly free and painless. The patient went on furlough, and returned on September 14th. Small pieces of bone were coming from the wound in the condyle; movement of the joint perfect. On December 1st, erysipelas of the right leg commenced below the patella, attended with high fever, vomiting, and headache. For this ten drops of muriated tincture of iron were given every three hours. By December 10th, the erysipelas had disappeared and the patient was doing well. The process of exfoliation was going on slowly on January 1, 1865. On February 13, 1865, the patient was discharged from service, the process of exfoliation not yet having terminated, but the knee joint being of normal size and color, and its movements perfectly free and painless in every direction." Examiner I. H. Harding, of Ellsworth, Maine, February 1, 1867, certified to the injury and added: "The joint and leg are weakened and atrophied so much that he walks quite lame." The Boston Examining Board reported, September 13, 1875: "There are two large adherent cicatrices in the popliteal space, which impair the motions of the hamstrings." The pensioner was paid December 4, 1879. The wood-cut (FIG. 222) is a copy of a photograph contributed by Surgeon Bontecou (*Card Photographs*, Vol. 3, p. 22).

FIG. 222.—Shot fracture of internal condyle of right femur. [From a photograph.]

In the next instance a conoidal ball struck the left knee, passing through the centre of the patella and through the inner condyle of the femur:

CASE 550.—Private J. T. Long, Co. G, 16th Wisconsin, aged 26 years, was wounded at Shiloh, April 6, 1862. Acting Assistant Surgeon J. A. Murphy, in charge of Third Street Hospital, Cincinnati, described the injury as "wound of the left knee joint," and reported: "A ball entered the centre of the patella and passed inward and backward, escaping through the inner condyle of the femur. The patient entered this hospital May 2d, having been brought here on a hospital boat from Pittsburg Landing. He was free from fever and diarrhœa, and his general health on admission was excellent. In stature six feet and two inches, well and strongly developed in every respect, he was a man who had always enjoyed very good health and never indulged in ardent spirits. The injured joint was much swollen and very red when he arrived here; a copious discharge of pus and synovial fluid was escaping from the wounds. A few days afterwards a large abscess, exterior to the joint, developed itself and was opened, discharging about one pint of pus. After this, from time to time until the wounds healed, sixteen abscesses formed around the joint and in the leg as low down as the middle third. They were opened and healed readily. Cold-water dressings and fomenting poultices were the only applications used to the wounds. He was kept on low diet throughout the treatment. Tonics were given for a very short time and then discontinued, as the inflammation about the wound seemed to increase under their use. On the subsidence of the inflammation about the joint crepitation could be heard in moving the patella; a fissure could also be felt in the patella. On July 16, 1862, the patient was discharged from service. At that time he had mobility of the joint and was able to walk with great ease to himself. Just before completing extension or flexion, however, he would feel a slight obstruction, causing him to make an increased effort to complete the extension or flexion, when the former or the latter was accomplished." The man subsequently became a pensioner, the nature of his injury being corroborated by various examining surgeons, the last of whom, Dr. W. T. Nichols, of Menomonee, stated November 17, 1877, that "the wounded joint is weak and the leg a little lame." The pensioner was paid June 4, 1879.

CASE 551.—Sergeant P. H. McGrew, Co. F, 17th Ohio, aged 22 years, was wounded in the left knee while on picket near Corinth, May 22, 1862. He was discharged from service at Camp Chase, March 18, 1863, Surgeon D. Stanton, U. S. V., certifying to "partial anchylosis and necrosis of head of tibia resulting from a shot wound through the knee joint." Dr. W. L. Schenck, late Surgeon 17th Ohio Volunteers, who personally treated the case, communicated the following history: "The missile, supposed to have been a small conical ball, entered just above the outer tuberosity of the left tibia and passed diagonally through the joint, slightly fracturing the articulating surface of both condyles of the femur and the spine of the tibia. I was at

the Brigade Hospital at the time, a mile or two in the rear, and did not see the wound for two days. The knee had become very painful then and was greatly swollen, so I concluded there was no time to consider the propriety of an operation, and put the patient upon active antiphlogistic treatment with irrigation to the parts. The next day Medical Directors Smith and Strew, with several other surgeons, called to see the case, and all, excepting Surgeon I. A. Coons, 38th Ohio, and myself, decided in favor of exsection or amputation; but I was allowed to use my own judgment, declined to operate, and continued the treatment. When the acute stage had passed and suppuration was well established, I used water dressings and prescribed a liberal diet, with some preparation of iron—hydrochlorate of the sesquioxide, iodide, citrate with quinine, or phosphate with lime, etc. When the pain was intense or destructive metamorphosis greatly in excess, opium and brandy was administered. On the 15th of June, I received a leave of absence, and was permitted, through the kindness of the General Commanding and the Medical Director, to take the patient with me to Ohio. He was carried on a stretcher over all the bad roads from Corinth to Pittsburg Landing and there placed on a cot, from which he was not removed until he reached my home in Franklin, Ohio, where I treated him until the expiration of my furlough. During that time several small pieces of bone were removed, and when I left him the outer wound had healed and he was able to go about his room on crutches. I left him in charge of the Ladies' Aid Society, who cared for him until he was able to go to his home in Lancaster, Ohio. On the 15th of December following he wrote to me: 'Since leaving Franklin there have two tolerably large and twenty-three small pieces of bone come out of my knee. It is getting along fine. I can put out my foot and take a good old-fashioned step, such as I used to take in the long marches down in Dixie. I do nothing for it now but wash it in salt water. I am in a hurry for it to get well that I may get satisfaction out of those rebels,' etc. After McGrew had been discharged from service for disability, he recovered sufficiently to again enter the army, and accepted a commission as 1st Lieutenant of the 178th Ohio. On April 2, 1865, he wrote to me from Shelbyville, Tennessee: 'Thanks to you this leg of mine, which so many predicted would have to come off or be worthless, is worth a good many cork legs yet. I can do anything with it but run, and that is not in our line. I was at a ball the other evening and danced several sets. That is better than even you expected.' By this time the injured joint was sound and the leg could be straightened or bent to a right angle." Lieutenant McGrew left the service in April, 1865. He had been a pensioner under his former designation until his re-entry into the service in September, 1864, since when he has not communicated with the Pension Bureau. Drawings of the wounds of entrance and exit, shown in the wood-cuts (FIGS. 223, 224), were contributed by Dr. Schenck.

FIG. 223.—Wound of entrance at left knee. [From a sketch by Dr. SCHENCK.]

FIG. 224.—Wound of exit at left knee joint. [From a sketch by Dr. SCHENCK.]

In the following remarkable case the ball passed diagonally through the left elbow, entered the left knee joint, and lodged in the outer condyle of the femur, where it remained innocuously for over fifteen years:[1]

CASE 552.—Lieutenant E. B. Blake, Co. F, 35th Massachusetts, aged 25 years, was wounded at the battle of Antietam, September 17, 1862. While he was stooping down to tie his handkerchief around the thigh of a bleeding comrade whose leg had been carried away by a cannon ball, he received a shot which passed diagonally through the left elbow and entered the outer aspect of the left knee joint. Copious bleeding from the exit wound in the elbow denoted injury in the large vessel. The bleeding was checked by a strap around the arm. He limped off on his injured leg to the nearest ambulance station, where the wound in the knee joint was examined by a surgeon. The probe entered the joint freely; but the ball could not be detected. From the strongly bent position of the limb, it had apparently escaped the tibia and passed in between the condyles of the femur, where it was securely lodged and concealed. His arm and leg had water dressings applied, and were put in splints; and he was immediately placed in the cars and transported to Boston, where he arrived in the course of a week, with many other soldiers, some of whom had received equally serious wounds, and to whom the danger of transportation, except under existing circumstances, would have been considered almost a fatal movement. The foregoing account is taken from J. Mason Warren's *Surgical Observations, with Cases, etc.*, Boston, 1867, p. 563. Dr. Warren attended Lieutenant Blake on his arrival in Boston. He was then in a feeble condition, having an almost constant diarrhœa. Dr. Warren remarked: "It is probable that to this condition he owed his safety." The knee joint was free from pain and inflammation, but the wound on the outside suppurated slightly. It was dressed with a ham splint and kept in a state of entire rest. The elbow joint was quite loose, both condyles broken off, the joints swollen, with an effusion on

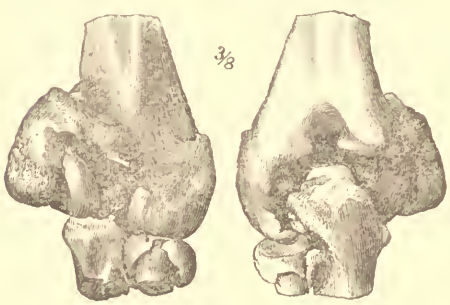

FIG. 225.—Anterior and posterior views of the left elbow joint. *Spec.* 6811.

[1] Examples of missiles remaining lodged in the bones of the knee joint have been reported by PERCY (*Manuel du Chirurgien d'Armée ou Instruction de Chir. Mil.*, Paris, 1792, p. 164), who alludes to a case in which the missile became incrusted in the condyles of the femur "hasard heureux dont on a eu un exemple dans la personne de M. d'Almons, ingénieur employé dans la dernière guerre." RABASSE (L. J.) (*Considérations générales sur les plaies des articulations faites par les armes à feu ou les instrumens tranchans*, Paris, 1811, Thèse No. 84, p. 18) reports that Weber, a miner at the siege of Dantzig, in April, 1807, was struck by a ball at the outer portion of the left knee joint. From the depression and cavity in the external condyle of the femur the ball was believed to have lodged in the articulation, as there was no wound of exit. Futile searches for the missile were made; extensive swelling followed, but the patient recovered in about three months with anchylosis of the knee. BELL (C.) (*Report on Gunshot Wounds of the Knee Joint in Surgical Observations; being a Quarterly Report of Cases in Surgery treated in the Middlesex Hospital*, London, 1816, p. 429): Russian General Baron Driesen, wounded at Borodino, September 6, 1812; musket ball struck the inner condyle of the left femur; ball remained in condyle; improved in spring of 1813. Wound closed and reopened in 1816; inflammation, abscess, incision; amputation January 7, 1817; recovery. ALCOCK (R.) (*Observa-*

Ward phot.

T Sinclair & Son lith

PLATE LXVII.—BALL LODGED IN OUTER CONDYLE OF LEFT FEMUR OVER 15 YEARS.

Case of Lieutenant E.B., Co F, 35th Massachusetts

Specimen 6812 Surg. Section A.M.M.

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the inside, a bullet hole below the joint on the outside and above it on the inside. The elbow was made immovable with splints, and, after a moderate amount of inflammation, which at no time amounted to anything threatening, both the knee joint and the elbow joint did perfectly well; and at the end of two months he was able to go out of doors. He finally recovered all the motions of the elbow joint; he could walk without the least sign of lameness, the ball still remaining in the knee. The power of entire flexion only of the leg was wanting. He continued actively engaged in business until February 11, 1878, when he died of pneumonia. An autopsy was made by Dr. J. Foster Bush,[1] of Boston, who presented the specimens of the injured elbow and knee to the Army Medical Museum, where they are numbered 6811 and 6812, respectively, of *Section I.* There was not a trace of caries in the cancellated structure around the ball. The articulated cartilages were perfectly smooth, and the foreign body had apparently remained innocuously in the outer condyle for over fifteen years. The bones of the elbow are shown in the wood-cut (FIG. 225); the articular extremities of the femur and tibia (*Spec.* 6812, and *Photo. Series*, No. 366, A. M. M.) are represented in PLATE LXVII, opposite p. 372, a vertical section of the femur bisecting the ball.

CASE 553.—Private J. McDonnell, Co. C, 124th Ohio, was wounded at Chickamauga, September 19, 1863, by a conoidal ball, which entered over the inner crest of the left tibia, passed upward through the inner condyle of the femur and lodged. He was made a prisoner, and confined at Richmond, Danville, and Andersonville. Treatment: Two stitches in the wound and cold-water dressings. A portion of the ball was removed, also sixteen spiculæ of bone at various times. He suffered from scurvy whilst in prison; was exchanged March 28, 1865, and finally discharged from service July 8, 1865, from Camp Chase, Ohio. He received a pension of six dollars per month. Mr. McDonnell called at the Army Medical Museum September 17, 1872, made the above statement, and exhibited his wound, when the photograph (No. 329, *Surg. Phot. Series*, A. M. M.) was taken, of which the annexed wood-cut (FIG. 226) is a copy. His general health was indifferent. There was a large cicatrix on the inner side of the knee joint, and several smaller ones about three inches above the outer condyle; there was tenderness and preternatural mobility about the joint; it seemed to have undergone a spontaneous dislocation, the femur and patella projecting forward over the tibia. The foot could be inverted and everted much farther than usual, and the limb was shortened about two inches. He could walk with comparative ease, and could readily ascend a stairway. A plaster cast of the injured knee was made and numbered 6199 of the Surgical Series. His pension was paid December 4, 1879.

FIG. 226.—Appearance of knee joint nine years after injury. [From a photograph.]

In the next case a round musket ball passed through the middle of the patella and, perforating the joint, crushed the articular ends of the femur and the tibia:

CASE 554.—Private X. Gauter, Co. D, 14th Missouri Home Guards, aged 18 years, was wounded in the right knee, at Lexington, September 18, 1861, and was conveyed to St. Louis one month afterwards. Assistant Surgeon S. M. Horton, U. S. A., in charge of the New House of Refuge Hospital, reported: "This is a case of gunshot wound through the knee joint, which at present (September 17, 1862) is discharging sanious pus at the point of entrance, from which pieces of necrosed bone are being extracted every few days. The use of the limb is but partial, the joint being rendered immovable. The patient came here from the City General Hospital on 5th Street seven months ago. He had been wounded by a round musket ball, which penetrated the patella through its centre, going right through the joint and escaping through the popliteal space, crushing in its course the articulating ends of the femur and the tibia." The patient was discharged from hospital June 3, 1863, and pensioned, his term of service having expired one month after being wounded. Examiner W. P. Boulware, of Lexington, Missouri, at successive dates certified to the injury and reported anchylosis of the knee joint as resulting therefrom. Dr. F. Cooley, of the Kansas City Examining Board, reported September 17, 1875, that he found "depression with adherent cicatrix over the patella, and also adherent cicatrix with considerable loss of bone on outer condyle of femur, so that I can pass my fingers into it for three-fourths

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tions on Injuries of Joints and their Treatment, in *Medico Chirurgical Tranasactions*, London, 1840, Vol. XXIII, p. 298) records a case in which the ball remained in the condyle for four years: "A sailor of a man-of-war steamer, in 1836, received a musket shot while rowing a boat employed in the disembarkation of troops. He was immediately forwarded to one of the hospitals, under my direction, in San Sebastian. Although there was every reason to believe that the ball had lodged in the cancellated structure of the femur, yet, from the absence of any detached portion of bone, or rough fracture in the articulating surface of the bone, so far as I could ascertain, I felt warranted in an endeavour to save the limb. In a few weeks the wound healed, and the knee, to all appearance, was undiseased,—the patient only complaining of some weakness and difficulty in walking, with occasional pain; he was invalided home. Three months ago he came to me with a request that I would amputate his leg, for that, to use his own expression, 'it so bothered him' in walking, and gave him occasionally such acute pain, that he would infinitely rather stump about on a leg of wood. Not being attached to any metropolitan hospital, I sent him down to the Westminster, to my friend, Mr. GUTHRIE, who removed the leg, which externally presented a cicatrix, but no other mark of injury or disease, past or present. The ball was found to have passed through the internal condyle, and presented a somewhat flattened, yet convex, smooth surface, on a level with the articulating surface, resembling a piece of metal let in. It had fissured the bone (as may be seen in a very slight and hasty sketch I made at the time) and this fissure *had been nearly entirely filled up with osseous matter.* In four years the only mischief done to the joint was some thickening of synovial membrane and a partial absorption of cartilages. No very active, acute, or destructive disease had been developed either at the time of the accident or since." ROCCO GRITTI (*Nuovi Documenti in favore della cura conservativa nelle fratture del femore per arma da fuoco*, in *Annali Universali di Medicina*, Melano, 1868, Vol. CCV, p. 524, case 37): Pompeo Morandi, 3d Volunteers, wounded at Monte Suello; wound of knee joint with lodgement of the ball in the condyle; recovery. The ball remains in the joint, which is anchylosed. STROMEYER (L.) (*Erfahrungen über Schusswunden im Jahre* 1866, Hannover, 1867, p. 58) remarks: "Among the noteworthy cases of shot fractures of the knee joint treated by conservation, is the case of a young officer, the bullet yet remaining in the outer condyle of the left femur. . . At present there is no exudation into the capsule, and the ball lies so near the surface that it can be felt through the soft parts covering it. But as it is nearly immovable, and causes hardly any suppuration, it has been considered the wisest course to avoid operative interference." GROSS (S. D.) (*A System of Surgery*, Philadelphia, 1872, 5th ed., Vol. I, p. 1039): Knee joint opened by a pistol ball, which lodged permanently in one of the condyles of the femur; recovery with slight lameness.

[1] BUSH (J. F.), *Penetrating Gunshot Injury of the Elbow and Knee Joints*, in *Boston Medical and Surgical Journal*, 1879, Vol. C, p. 144.

of an inch. There is also loss of portion of the tibia some four inches below the patella, and I find very large varicose veins of the leg and thigh. The knee is entirely anchylosed. Just below the condyle, on the outer part, there is a small hard substance, the size of a goose-shot, floating under the skin. The muscular tissues on the outer and lower part of the thigh are destroyed. I also find shortening of the limb one and a half inches, and the old cicatrices look as though they might break out at any time," etc. Subsequently the same Board found increase of size and number of varicose veins, tumefaction of limb, etc. The pensioner was paid December 4, 1879.

In the following four cases the patella was fractured. In two of the cases the synovial sac was involved; in one instance both knees were injured:

CASE 555.—Private W. H. Hirst, Co. A, 118th Pennsylvania, aged 22 years, was wounded through the left knee, at Shepherdstown, September 20, 1862. Surgeon J. Neill, U. S. V., reported: "The wounded man was admitted to Broad and Cherry Streets Hospital, Philadelphia, September 27th, with a compound comminuted fracture of the patella involving the knee joint. The injury was produced by a minié ball, which entered in front, one inch above the patella, passed downward and outward, and made its exit on the outer side of the leg just below the head of the fibula. At the time of admission the patient's general condition was good, but the knee was very much inflamed and the wound suppurated freely. Flaxseed poultices were applied around the joint, and the limb was kept at rest in a fracture box; the patient was ordered a good diet, with tonics and stimulants. A few days afterwards a large abscess formed on the outer side of the thigh a short distance above the joint, which was opened and discharged freely. Under the treatment adopted the patient improved rapidly, the limb bidding fair to be a useful one. One fragment of bone was extracted." The fragment of the patella removed from the wound is *Specimen* No. 670 of the Army Medical Museum. The patient was subsequently transferred to Haddington Hospital and thence to Christian Street. On July 4, 1864, he was discharged from service and pensioned, Acting Assistant Surgeon R. J. Levis certifying to "wound of knee joint, resulting in great lameness from anchylosis." The Philadelphia Examining Board at various intervals certified to the injury and its results, and described the limb as wasted and the veins varicosed. The pensioner was paid December 4, 1879.

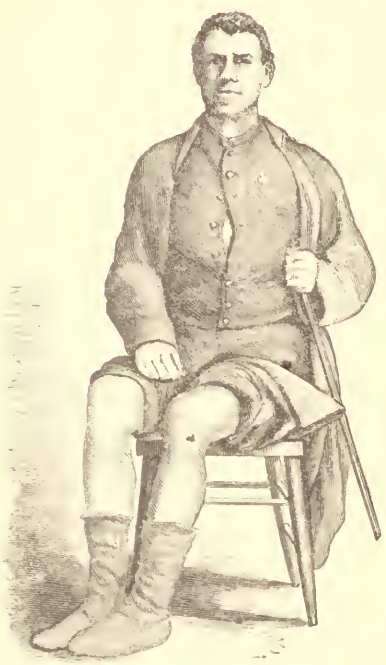

FIG. 227.—Appearance of knee joint a few months after injury. [From a photograph.]

CASE 556.—Corporal D. Golden, Co. M, 14th New York Artillery, aged 33 years, was wounded at Petersburg, June 17, 1864. He was admitted to the field hospital of the 1st division, Ninth Corps, where Surgeon M. K. Hogan, U. S. V., noted: "Wound of left knee by minié ball; simple dressings applied." From the field the wounded man passed to the Depot Hospital at City Point, and thence, on July 2d, to Harewood Hospital, Washington. Surgeon R. B. Bontecou, U. S. V., in charge of the latter, described the injury as "a wound through the patella," and reported that the patient was discharged from service April 14, 1865, for total disability. Examiner C. C. Bates, of Potsdam, N. Y., April 29, 1865, certified: * * "He can flex but cannot extend the leg, except enough to touch the toe to the floor. Thigh and leg much atrophied; knee much swollen and painful." Examiner G. R. Baldwin, of Fort Scott, Kansas, reported November 13, 1877: "The pensioner received a wound of the left knee. The ball entered at the lower border of the patella, passed outward and upward, and made its exit at the outer border of the patella. Synovial fluid escaped. There is a large, irritable, and tender cicatrix. The patella is immovably attached to the tibia. The leg requires rest, motion and strength being very much impaired. Pain is a prominent symptom." The pensioner was paid September 4, 1879. A photograph (*Card Photographs*, Vol. I, p. 17), represented in the annexed wood-cut (FIG. 227), was contributed by Surgeon R. B. Bontecou, U. S. V.

CASE 557.—Private W. Patterson, Co. K, 6th Wisconsin, aged 36 years, was wounded through both knees, at Gainesville, August 28, 1862. He was treated at Carver Hospital, Washington, whence he was discharged and pensioned December 9, 1862, Surgeon O. A. Judson, U. S. V., certifying to: "Shot wound of both knee joints, involving a fracture of the right patella and causing extensive effusion in the left knee joint." Examiner J. Hobbins, February 18, 1863, certified to "imperfect flexion and limited and difficult extension," resulting from the wounds. Examiner D. C. Green, of Mauston, Wisconsin, reported, April 28, 1870: "The wound was caused by a ball which entered the left knee at the left side and passed through, striking the bone. The missile then, being slightly turned in its course, struck the right knee and passed through it anteriorly, fracturing the patella and lacerating the muscles badly. At present both knee joints are stiff." Subsequent examiners report no additional information. The pensioner was paid December 4, 1879.

CASE 558.—Private J. W. Warrington, Co. C, 110th Ohio, was wounded on April 2, 1865, at Petersburg, by a round ball from a spherical case shell. The ball entered the centre of the patella, and, producing a stellate fracture of that bone, passed downward, backward, and inward, and was cut out, on the field, one and a half inches below the tuberosity of the tibia. On April 12, 1865, the patient was admitted into Judiciary Square Hospital. There was no pain in the knee joint, and but little swelling. The treatment had been limited to dressings of cold water, which were continued for a few days, and followed by applications of ice. The patient was removed to Douglas Hospital June 19, 1865, when three small necrosed fragments of the patella were removed. A photograph of the patient, taken July 9, 1865, is No. 64, *Surg. Phot. Series*, A. M. M. The wounds had healed and the patient walked about with a cane. There was at no time any indication of the formation of pus within the joint. The facts of the case were communicated by Acting Assistant Surgeon H. S. Colton. Warrington was discharged July 24, 1865, and pensioned. He was paid September 4, 1879.

Fracture of the head of the tibia and of the patella was noted in the next example:

CASE 559.—Corporal G. L. Keyser, Co. B, 8th Pennsylvania Cavalry, aged 21 years, was wounded at Snieker's Gap, November 1, 1862, and admitted to hospital at Knoxville two days afterwards. Surgeon B. Beust, U. S. V., reported: "A gunshot wound through knee joint. The patient, a man of small stature and delicate appearance, was in a kneeling posture when he was struck by a conical ball, which entered the right knee at the inner side of the patella, near the lower border, striking against the inner condyle of the tibia, producing considerable injury by shivering to some extent the epiphysis, and emerging on the outer side of the leg two inches below the joint. When the patient was brought here the knee was much swollen and painful. Applications of cold water were immediately made and continued for four weeks. When the active inflammation had entirely subsided, a small quantity of healthy pus was discharged from both openings. The patient, feeling strong and quite well at this time, became careless and moved his leg, in consequence of which very active and extensive inflammation set in. The cold-water dressings were then (December 3d) changed to warm flaxseed poultices. From the 15th to the 31st of December the patient suffered much from irregular chills, delirium, sleepless nights, and loss of appetite, and showed great symptoms of exhaustion. Large quantities of fœtid pus were discharged from both openings. On December 31st, an examination was made with the finger, which proved the upper portion of the tibia to be much fissured. Amputation was then proposed but objected to by the patient, who wished to save his limb if there was any possible chance. He continued to fail, and his night vigilance and loss of appetite persisted undiminished. On January 6, 1863, the fever assumed a periodical character, coming on in the afternoon. For this he was treated with quinine and morphine, followed by wine and cinchona bark. Since then he has improved rapidly. By January 31st, the patient had regained a good appetite, slept well, and was improving in strength; the discharge of pus was now very slight and healthy. He will undoubtedly recover if no unexpected change or accident occurs to intercept or impede the restorative progress." Three weeks later the patient was transferred to Camden Street Hospital, Baltimore, whence Acting Assistant Surgeon E. G. Waters reported the following result in the case: "When admitted his condition was moderately good, the knee being much swollen and inflamed, however, for which solution of lead and opium was applied. Small fragments of bone came away at various times from the external opening. Absolute rest was maintained, and mercurial ointment, with camphor, was used locally to diminish the swelling. On May 30, 1863, the patient was discharged from service, with his knee joint permanently anchylosed and some deformity consequent upon a partial dislocation of the extremity of the femur inwardly." The man became a pensioner; but in the following year he re-entered the army as Lieutenant of the 195th Pennsylvania, and while belonging to that organization sustained an additional injury to his wounded limb by a railroad accident in October, 1864. He was ultimately mustered out February 26, 1865, when his name was again placed on the Pension Rolls. Examiner J. S. Crawford, of Williamsport, at successive dates certified to the injury and its results, and added, in January, 1867, that the injured joint was very much enlarged. On July 16, 1873, he reported: "The leg is flexed on the thigh at an angle of about forty degrees, with an enlargement on the inside of the joint. The flexion of the knee shortens the limb, which throws the weight in walking on the toes and necessitates a high heel to the boot. The thigh and leg are both very much atrophied and he complains of soreness in the joint." No changes were reported in the condition of the patient in September, 1875, since when he has been exempted from further examinations. His pension was paid June 4, 1879.

In the succeeding six cases the seat of fracture appeared to be confined to the head of the tibia:

CASE 560.—Private John O'Neil, Co. M, 1st Artillery, aged 26 years, was wounded at Pocotaligo, October 22, 1862. On the following day he was admitted to hospital at Hilton Head, where Assistant Surgeon J. Bell, U. S. A., recorded: "Gunshot wound by a ball from a spherical case, in left side of left knee, entering deeply and lodging." The patient was subsequently transferred to hospital No. 1, at Beaufort, whence Surgeon F. L. Dibble, 6th Connecticut, reported that he was discharged March 7, 1863, by reason of "a gunshot wound involving the left knee joint." Examining Surgeon J. E. King, of Buffalo, certified May 19, 1863: "The ball entered near the head of the tibia, passing through and lodging in the popliteal space, whence it has been extracted by incision. The wound is healed, leaving the leg useless. There is complete anchylosis, and wasting of leg," etc. In February, 1867, the pensioner enlisted in the 44th Infantry (Invalid), in which organization he served until March 29, 1869, when he was again discharged. Examining Surgeon J. W. Toward, of Augusta, Maine, at various subsequent dates examined the pensioner, and described the injury by the ball "breaking both bones and remaining embedded in the joint. Leg quite crooked, appearing as if upper ends of bone had been pushed outward; knee slightly bent and perfectly stiff, swelling badly after walking; limb painful to hip joint." The pensioner was paid December 4, 1879.

A case in which the missile was extracted from the head of the tibia six months after the injury and the patient finally recovered with a useful limb, is reported by Surgeon R. A. Kinloch,[1] P. A. C. S. A brief abstract is appended:

CASE 561.—Private *L. C*——, 6th South Carolina, aged 17 years, was wounded at Seven Pines, May 31, 1862. The ball entered upon the inner side of the right knee, apparently, a line or two below the articulation; there was no orifice of exit. When wounded he was lying on his back, reloading his gun, with his knee slightly flexed. The patient walked some distance after he was shot without experiencing very great pain. On the following day he was sent to the St. Charles Hospital, at Richmond. The limb was then much tumefied and very painful. In the opinion of most of the examining surgeons the ball had lodged; but a few of them, after the progress of the case, were inclined to believe that it had escaped through the orifice of entrance. He remained in hospital until August 3d, never leaving his bed, and scarcely ever changing from the supine position; he suffered continually from fever, and a portion of the time from traumatic delirium. About the middle of October he tried the

[1] KINLOCH (R. A.), *Case of Gunshot Wound of the Knee Joint. Ball lodged in the Head of the Tibia—Extracted through the Joint Six Months after the Accident—Recovery with a Useful Limb*, in *Confederate States Medical and Surgical Journal*, 1864, Vol. I, p. 102.

use of crutches, but was compelled to take to bed again, and was a week in recovering from a very painful and inflamed condition of the limb engendered by the efforts he had made. The patient enjoyed the comforts of a home and good nourishing diet, and gained flesh and strength; but the irritation of the knee persisted in a sub-acute form, and the wound continued to discharge, the suffering being always less when the discharge was free. On November 23, 1862, he was seen by Dr. Kinloch. The limb was flaccid and attenuated. A fistulous opening upon the inner side of the joint, just below the articular margin of the tibia, indicated the original orifice of entrance, which was discharging a thin pus. The joint was imperfectly anchylosed; the leg very slightly flexed upon the thigh. Dr. Kinloch believed the ball had lodged in the head of the tibia and determined to search for it. On November 29th, the patient was fully chloroformed. A semi-lunar flap of integuments, including the fistulous opening, was dissected and turned up from the deeper tissues over the inner side of the joint; with the finger, and afterwards with a large probe, the track of the ball could be traced through the lateral ligament of the joint to the depth of several inches. The lateral ligament was incised freely and a piece of necrosed bone, a portion of the articulating surface of the tibia about the size of the last phalanx of the finger, was discovered and turned out. As the joint was but slightly flexed the finger could only advance to a certain depth because of the inner condyle of the femur. Forcible flexion of the joint was instituted and the finger pushed on into a deep cavity in the outer portion of the head of the tibia, where it rested upon the foreign body, which was seized with a pair of bullet forceps and extracted with great ease. It proved to be a large minié, much flattened, and having a piece of the patient's pantaloons attached. A sponge full of warm water was thrown two or three times into the joint to wash out the debris from the cavity in which the ball had rested. The tegumentary flap was brought into position and secured by three points of suture, only the dependent corner of the wound being kept open by a tent; the limb was extended upon a bolster, cold-water dressing applied, and a full anodyne administered. The wound healed kindly, and in three weeks the patient experienced a feeling of relief that he had not known since the accident. In a letter to Dr. Kinloch, dated April 23, 1864, the patient states: "The only drawback to my convalescence was an attack of erysipelas, in January 1863, which I attributed to imprudence in eating. On the 17th of February, 1863. I began to move about on crutches, the wound having entirely healed before this. Since then, the limb has gained rapidly in strength. In May, I laid aside my crutches and took to using a stick. I can now walk a mile without resting, and often walk some without my stick. My joint is stiff, but I think I shall some day be able to run. I can now run a few steps, and can truly say the leg is well. I practise walking without my stick as much as I can."

CASE 562.—Private M. Hoffman, Co. H, 8th New Jersey, aged 21 years, was wounded at Williamsburg, May 5, 1862. He was admitted to the field hospital at Allen's Farm, where his injury was recorded as "a serious wound of the left knee joint." From the field the wounded man was moved to Hygeia Hospital at Fort Monroe, whence he was sent to his home on furlough May 21st. Surgeon R. B. McCay, U. S. V., reported that the patient was discharged from Chesapeake Hospital September 6, 1862, by reason of "partial stiffness of the knee joint resulting from the wound." The man was subsequently admitted on the Pension Rolls, his physicians certifying to the following description of his injury: "A ball entered the popliteal space, passed into the knee joint, and produced partial anchylosis, within all probability obliterating the synovial sac; perceptible crepitation resulted, together with inability to extend the limb." Assistant Surgeon R. B. Browne, U. S. V., who contributed the photograph of the patient (*Contributed Photographs*, Vol. XII, p. 5) shown in the adjoining wood-cut (FIG. 228), reports the following history: "The missile entered about one inch below and behind the knee, directly in the median line of the limb, passed upward, forward, and inward through the head of the tibia, and lodged, as was surmised at the time, somewhere in the centre of the joint, between the head of the tibia and the internal condyle of the femur. After his admission into hospital the patient was strongly advised to submit to amputation of the thigh. To this he stoutly objected, however, and shortly afterwards he was sent to his home on furlough, where I saw him and commenced the treatment of his case somewhere about the 1st of June, 1862. I searched carefully for the bullet but was unable to reach it. The patient had but little pain, was in good health, strong and robust, and the wound suppurated nicely. There was little or no inflammation of the joint, nor could I detect any synovia in the discharge. The treatment was therefore simple. I made use of emollient applications and enjoined rest, but not perfect rest, as I permitted him to move carefully about the house. The wound healed about the middle of July, from which time he was able to go about on crutches, the limb being flexed at an angle of 135°, or rather incapable of extension beyond that point. About the middle of the following September I entered the army as Surgeon of the 31st New Jersey, and consequently lost sight of the patient until the summer of 1863, when I was mustered out. At this time he had regained some mobility of the joint and could, by giving the limb a peculiar twist, make apparent the position of the bullet. He himself at least was so confident of its whereabouts that I concluded to cut down to the point indicated with a narrow-bladed bistoury. This operation I performed on September 7, 1863, being aided by Dr. Edward Swift, of Easton, Pennsylvania, who put the patient under the influence of an anæsthetic. I entered the knife immediately over the middle and inside of the joint and fortunately struck the bullet in its centre, about an inch below the integuments. I then enlarged the opening just far enough to enable me to extract the missile with the aid of a forceps, and quickly closed the wound so as to admit as little air as possible. A small quantity of synovial fluid made its escape. The ball, which proved to be a spherical one, five-eighths of an inch in diameter, was slightly battered, and appeared to have embedded itself between the articulating extremities of the femur and the tibia, being fairly covered by the synovial sac. The limb was then placed in a splint and kept at perfect rest until all fear of inflammation of the joint had subsided. The wound healed by first intention, and in one month the patient was again able to get about with the aid of crutch and cane, both of which he dis-

FIG. 228.—Shot perforation of the head of the left tibia. [From a photograph.]

pensed with after a period of five months. When last I saw him, in July, 1868, the man was walking with scarcely a limp, free from all pain, in perfect health, and without deformity excepting a slight bony prominence where the ball had been extracted. The joint retained all its motions except that of extension, which was limited, the leg assuming an angle of about 170° when fully extended." Various examining surgeons at successive dates have certified to the pensioner's disability, which is rated one-half. His pension was paid June 4, 1879.

The following interesting case was reported to this Office as an illustration of controlling inflammation of the knee joint through ligation of the femoral artery. The details were given by Assistant Surgeon A. A. Woodhull, U. S. A., in an essay on "*Ligation of Arteries as a Means of modifying Traumatic Inflammation of the Joints*," read before the Atlanta Academy of Medicine, at its meeting,[1] June 1, 1874. The subject of preventing or controlling inflammation of the joints through cutting off the supply of blood was, in the early part of the present century, considered by D. L. Rogers:

CASE 563.—Captain W. H. Jordan,[2] 9th Infantry, was wounded in the right knee, at the battle of Gaines's Mill, on the afternoon of Friday, June 27, 1862. "I saw him not far from the line of battle shortly after he was shot, and had him conveyed to my field station hard by. By examination with the little finger I satisfied myself that the joint was perforated and that the articulating surface of the tibia was grooved as if by a round ball or buckshot. He was immediately put into an ambulance wagon and sent across the Chickahominy to the field hospital at Savage Station, a few miles distant. This was the general rendezvous for the disabled of General McClellan's army, and in addition to the commissioned medical officers there were present a few civil surgeons who had volunteered their temporary services. Among them was Dr. David L. Rogers, of New York, who had long been an advocate of the control of traumatic inflammation of the joints by the ligation of the main artery of supply.[3] As I am informed, the wounded officer would not consent to primary amputation as was proposed, and Dr. Rogers then suggested the ligation of the femoral at the apex of Scarpa's triangle, with the view of preventing, or at least of modifying, the inevitably ensuing inflammation of the joint. This was acceded to, and it was at once done I believe by Dr. Rogers himself. The operation must have been performed within forty hours of the reception of the injury, and was probably done on the succeeding day, for the hospital was abandoned on Sunday, the 29th, the second day after the battle. The general belief that the serious operation of ligating the femoral would add to instead of detracting from the perils already due to the wounded joint, the fact, as it was understood, that the severely wounded whom the Army of the Potomac was obliged to leave at Savage's were conveyed to Richmond, a distance of about fifteen miles, over rough roads, and the unfortunate condition of that city as to temperature, supplies, and general accommodations, precluded, in my mind, the possibility of this officer surviving the double injury, as we were tempted to call it. Accordingly, in writing to his friends at the north, he was reported as having probably died of his wounds in the hands of the enemy; for, at that time, there was no exchange of prisoners. Between three and four weeks after the battle, however, an exchange or release on parole of the wounded was negotiated, and, with the first boat load from Richmond that passed Harrison's Landing, I was sent north for a few days. To my great surprise, on this boat I found my friend, greatly emaciated and suffering; but the ligature had come away successfully, and the primary violence of the joint inflammation was fairly overcome. At that time, although both wounds were suppurating, the incision over the artery gave quite as much apparent trouble as the original injury. His general strength was much prostrated and he appeared to be in a condition of hectic irritation. He was carried to Baltimore, and I saw no more of him until the following December, when, on being ordered out of the field, it so happened that I was for a time placed in charge of sick and wounded officers in that city. At this date his general health was good, the wound in the knee had healed, the incision in the thigh, singularly, had not entirely cicatrized, and, which was of the most inconvenience, the leg was partly flexed upon the thigh and was fixed by false anchylosis. This condition must be attributed to the position that the limb had naturally assumed under the influence of whatever inflammation had occurred at the time of the severest suffering, and which his medical attendant had neglected or feared to alter while the healing was in progress lest the inflammation might be again excited. Fortunately there was no torsion, whence it may be inferred that the morbid action was not severe. In a week or two he passed from under my charge to that of Surgeon Thomas P. Gibbons, U. S. V., but I saw him frequently during the winter of 1862–63. By the repeated application of force, sometimes with the hands and

FIG. 229.—Appearance of limb 18 years after injury. [From a photograph.]

[1] The essay is only briefly adverted to on page 288 of the *Atlanta Medical and Surgical Journal*, 1874–75, Vol. XII. A manuscript copy of the lecture was forwarded to the Surgeon General's Office by its author.

[2] The case is identical with the case referred to at the meeting of the New York State Medical Society in February, 1863, by Dr. JOHN SWINBURNE (*Resection of Joints and Conservative Surgery*, in *Transactions of the Medical Society of the State of New York*, for the year 1863, Albany, 1863, p. 170, and *Medical and Surgical Reporter*, 1863, Vol. IX, p. 401): "A captain in the Regular Army was wounded by a ball passing through the knee joint. We could not ascertain to a certainty that the same was injured, as the course of the ball was directly through the centre of the joint, from side to side, so it is possible that only the cartilage was wounded. Dr. ROGERS tied the femoral artery, so as to interrupt and break the current of blood to the injured parts. When I last saw him, thirty days after the injury, there had been little inflammation, and the prospects were good for entire recovery. I have since learned that he *has* entirely recovered, with a good limb."

[3] ROGERS (DAVID L.), *A memoir on the utility of tying Large Arteries, in preventing Inflammation in wounds of the principal joints and important surgical operations, illustrated by cases*, in *New York Medical and Physical Journal*, 1824, Vol. III, p. 453.

sometimes with a screw apparatus, the adhesions were gradually broken up, and he gained a fair passive use of the joint; in the spring he was able to go on sick leave to his home in Ohio, and in the summer of 1863 was, I believe, assigned to duty as a mustering officer. He saw no more campaign service, but, while the war was still in progress (I think in 1863), joined his regiment on the Pacific coast. It is now nearly twelve years since he was shot, and it is more than eleven years since I have seen or heard directly from him; but I have seen officers who have served with him in garrison who were not aware that he had been wounded. I should suppose that he is practically a sound man, although it is probable that he cannot discharge the more fatiguing duties of the field." A letter of inquiry by the editor, in March, 1880, elicited the following response from Captain Jordan: "Recruiting Rendezvous, U. S. Army, No. 9 South Clark Street, Chicago, Illinois, April 2d, 1880. Dear Doctor: Your letter of the 29th ult. was received yesterday. In reply thereto, I would inform you as follows—viz: The ball (spherical) with which I was wounded entered just below the patella through the left side of the ligament of the same and the head of the tibia, and passed out a little below the centre of the popliteal space. The synovial sac, I think, was injured, although I did not have synovitis, as the doctors feared, but am under the impression that some synovial fluid escaped from the joint. There was profuse bleeding; so much so, that my pantaloon leg and stocking had to be cut off on account of being so stiff from the blood. I have never had any pain in the knee except when I have hurt it. There is no stiffness except after using the limb in marching or much dancing. The joint is nearly as good as the other one, although I cannot flex the wounded limb quite as much as the other one. No bone came out of or was removed from the wounded joint. The patella of the wounded limb is one inch and a half lower than the other one. The femoral artery was ligated a little over half way up from the knee, to prevent inflammation. I am not certain whether Dr. Rogers or Dr. A. K. Smith did it. Dr. Woodhull attended me in hospital in Baltimore as late as February, 1863, and saw me on the ferry boat between Oakland and San Francisco in September, 1877. A few days after I was wounded I was taken prisoner and remained so about three weeks. I was then taken to Baltimore, Maryland, where I remained in hospital until, in February, 1863, I was granted a sick leave, and was on crutches thereafter for about six months. When my wound had healed while in hospital, my limb was stiffened with the lower part of the leg at right angles to the upper part. Dr. Woodhull and another surgeon placed me under the influence of chloroform and partially removed the stiffness. I then wore an apparatus for about six months until the limb had become very nearly as straight as the other, *i. e.*, straight enough, my other leg being a little knock-kneed. * * Very respectfully, your obed't servant." (Signed.) Wm. H. Jordan, Captain, 9th Infantry. The letter was accompanied by a photograph, a copy of which is shown in Fig. 229.

Ligation of the femoral artery for secondary hæmorrhage was successfully performed in two instances of shot fracture of the head of the tibia:

Case 564.—Lieutenant Thomas W. Robertson, 79th New York, was wounded, on June 16, 1862, in the assault on the works on James Island, by a musket ball, which struck the outer side of the head of the left tibia and passed upwards and lodged, as was believed, in the intercondyloid notch of the femur, or somewhere about the knee joint. Amputation of the thigh was advised but refused by the patient. The limb was then placed in an easy position and cold-water dressings were applied. The patient was treated in the regimental hospital until June 28th, when he was sent to New York. On July 6th, there was profuse hæmorrhage from the anterior tibial artery. On July 8th, the femoral artery was tied by Professor Willard Parker. At this date the knee joint was excessively swollen, and there was free suppuration from the wound. After a very protracted confinement the patient ultimately recovered, with complete anchylosis of the knee joint, the straight position of the limb being preserved. Lieutenant Robertson was transferred to the Veteran Reserve Corps on February 29, 1864, and was on duty at Emory Hospital in 1865. On July 18, 1865, the photograph (*Surg. Phot. Series*, No. 78, A. M. M.) was taken, a copy of which is shown in Fig. I of Plate LXVIII, opposite p. 370. The facts of the case were communicated by Surgeon N. R. Moseley, U. S. V., who reported that Professor Parker and the other surgical advisers of Lieutenant Robertson entertained no doubt that the knee joint was primarily involved in this case. The exact location of the ball was never ascertained. Lieutenant Robertson was discharged and pensioned. Examining Surgeon E. Bradley, of New York, reported October 24, 1866: "Ball shattered upper third of left fibula; resection of a portion followed. The femoral artery had to be tied. Knee is anchylosed, foot atrophied, cold, paralyzed, and limb of little more use than an artificial limb." Examiner Th. F. Smith, in September, 1873, states: "Ball entered outside of upper part of left leg and has never been removed; there is a large cicatrix on the opposite side of the leg, the result of an abscess; complete anchylosis of the knee joint." Drs. J. F. Ferguson and M. K. Hogan report, September 7, 1875: "The femoral artery has been tied. The knee joint is solidly anchylosed." The Examining Board, consisting of Drs. S. S. Burt, A. B. Judson, and Wm. O. McDonald, state, September 14, 1877: "Left knee anchylosed, nearly straightened; femoral artery tied on left side." Pension paid March 3, 1880.

Case 565.—Private A. J. Scott, Co. A, 9th Maine, aged 24 years, was wounded at Deep Bottom, August 16, 1864, and admitted to hospital at Beverly six days afterwards. Assistant Surgeon C. Wagner, U. S. A., reported: "Shot wound of right leg, injuring the head of the tibia. Secondary hæmorrhage took place from the anterior tibial artery and sixteen ounces of blood was lost on December 17th, when the femoral artery was ligated in its continuity at the lower third of the thigh by Acting Assistant Surgeon J. C. Morton. Chloroform was used and the patient reacted promptly. Two weeks after the operation he had recovered." He was discharged from service June 6, 1865, and pensioned. Examiner C. E. Snow, of Calais, Maine, March 7, 1866, certified to the wound and to its being "well healed; but there is considerable lameness as yet, the weakness of the joint forbidding any continued use of the limb." Examiner E. H. Vose in his report, April 15, 1874, stated that the ball lodged and remained in the bone for four months; also that when it was extracted hæmorrhage occurred and necessitated ligation of the femoral. "Head of tibia enlarged and somewhat tender to the touch. Rheumatism from the joint downwards. Leg weak, and he cannot bear his weight upon it when at work; foot slightly extended; walks lame with a peculiar swinging gait." In the following year the same examiner described the joint as stiff; circulation feeble; considerable numbness on inner side of leg, etc., and added: "He has been under my personal observation for eight years and the disability has largely increased." The pension was paid December 4, 1879.

The series of recoveries after shot fractures of the knee joint will be concluded with three examples, in which particular bones injured were not specified:

CASE 566.—Private H. W. Pomroy, Co. F, 1st Maine Heavy Artillery, aged 36 years, was wounded at Laurel Hill, May 19, 1864, and entered Mount Pleasant Hospital, Washington, three days afterwards. Assistant Surgeon H. Allen, U. S. A., reported: "The wound was apparently through the knee joint. A conoidal ball entered at the inner border of the right patella and made its exit posteriorly at the external central part of the popliteal space, on a line with the inferior border of the condyles. The progress of the case has been imperfectly recorded. All that can be ascertained is to the effect that the patient was bed-ridden for eight weeks; that in the third week two pieces of bone were removed from the posterior wound, and in the fifth week two others were taken out; also that he suffered greatly, and according to his account had marked rigors. The patient came under my notice in January, 1865, when presenting himself for discharge. At this time the appearance of the limb was as follows: The entire extremity was rigid, the knee joint permanently anchylosed, and the region of the joint much swollen: all original contour of the outline was destroyed, and the integuments were semi-œdematous up to the hip joint. The skin was of a dead purplish red color and extremely sensitive, especially around the knee joint. The surgeons at the field hospital were desirous of amputating the limb, but the patient refused to give his consent, and the case was then treated conservatively. The patient was discharged from service January 26, 1865, and asserted, prior to his departure for his home, that should the limb continue to be so excessively painful he would have it amputated. Thus it is shown that, should conservative treatment be successful in this class of cases, the limb resultant of months of suffering is apt to be worse than useless." Examiner R. K. Jones, of Bangor, October 8, 1866, certified: "The wound is healed and he retains the power of flexing the leg slowly and feebly to an angle of 135°. He walked with crutches till the fall of 1865. He now walks with one cane, flexing the body on the left thigh and swinging with much effort the right limb forward—not flexing the knee. The foot and leg swell much after use and are now œdematous. The outside of the leg and foot are numb. He suffers much from pain after use," etc. Subsequent examiners substantially show the same disabling effects, and the Bangor Board in September, 1876, described the exit wound as very tender, and stated that a solid substance like a buckshot or a spicula of bone could be felt under the cicatrix. The pensioner was paid June 4, 1879.

FIG. 230.—Appearance of left knee joint about 2 months after injury. [From a photograph.]

CASE 567.—Allison Shutter, Drummer, Co. C, 7th Pennsylvania Reserves, received, in one of the earlier of the seven days' battles before Richmond, in June, 1862, a shell wound of the left knee joint. He was taken prisoner, and while he was in the enemy's lines it was decided that primary excision of the knee joint should be performed on the field. The operation was commenced, but was interrupted by an advance of the Union troops, who regained the ground they had lost earlier in the day. The parts were brought in apposition and the limb secured to a splint, and the patient was sent to Fort Monroe, and admitted to Hygeia Hospital on June 30th. On July 6th, he was sent to Philadelphia on the steamer Daniel Webster. He was admitted, on July 7th, to the Satterlee Hospital. The wound cicatrized and left a comparatively useful limb. This soldier was discharged February 5, 1863, by Surgeon I. I. Hayes, U. S. V., for "lameness resulting from a shell wound of the left knee." His name does not appear on the Pension List. The photograph of the patient (*Surg. Phot. Series*, No. 204, A. M. M.), represented in FIG. 230, was contributed by Surgeon R. B. Bontecou, U. S. V.

CASE 568.—Private C. Volgel, Co. F, 14th Connecticut, aged 37 years, was wounded before Petersburg, October 2, 1864, and admitted to the field hospital of the 2d division, Second Corps, where Surgeon I. Scott, 7th West Virginia, recorded: "Shot fracture of right knee." Surgeon J. C. McKee, U. S. A., reported that "the patient was admitted to Lincoln Hospital, Washington, October 8th, with shot wound of right knee joint, the ball entering antero-posteriorly, severing the capsular ligament on its internal aspect and opening the joint. When admitted, the parts were highly inflamed and synovial fluid was constantly discharging from the wound. The limb was placed in a box splint and surrounded with bran. Improvement followed the treatment. In the course of three months recovery had taken place with complete anchylosis of the joint." On June 2, 1865, the patient was discharged from service and pensioned. Examiner H. L. Burritt, of Bridgeport, Connecticut, at successive periods certified to the character of the wound and to the leg being fixed "in a nearly straight position; joint painful and whole limb swollen on motion and useless." The pensioner was paid December 4, 1879. A photograph of the injured limb, taken at Lincoln Hospital, was contributed by Surgeon McKee (*Contributed Photographs*, Vol. 3, No. 34), and is represented in the wood-cut (FIG. 231).

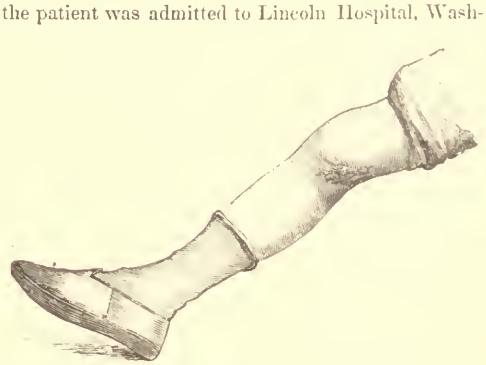

FIG. 231.—Anchylosed knee joint, about 6 months after injury. [From a photograph.]

The records in the cases of recovery after shot fracture of the bones of the knee joint treated by conservation show that of the three hundred and thirty-eight patients, fifty-nine recovered with complete, and one hundred and sixty-five with partial anchylosis; in twenty-three instances impaired motion, with lameness or weakness of the limbs, or partial

paralysis with atrophy of muscles, was indicated; in eight instances the motions of the joint were reported perfect, and in eighty-three cases the condition of the limb has not been ascertained. Thirty-two of the patients were Confederate and three hundred and six Union soldiers. Two hundred and thirty-six of the three hundred and six Union soldiers became pensioners; but twenty of them have died, since the close of the War, of phthisis and other diseases, and one has committed suicide.

Fatal Cases of Shot Fractures of the Bones of the Knee Joint treated by Conservation.—This group comprises five hundred and twenty-one cases. The graver complications were pyæmia in seventy-seven instances, tetanus in two, gangrene in seventeen, and erysipelas in eighteen instances. Forty-three of the patients were Confederate and four hundred and seventy-eight Union soldiers.

CASE 569.—Private S. Kisner, Co. E, 7th Michigan,[1] aged 29 years, was wounded on picket near Chantilly, June 19, 1863, by a carbine shot, which entered the left thigh anteriorly at about its middle, passed downward and inward, and lodged beneath the integument on the inner side of the knee joint. He was brought to Washington and admitted to Stanton Hospital six days after being wounded. On June 27th, a conical ball was readily extracted through an incision, its situation being superficial. The joint at this time was neither swollen nor tender and did not appear to be involved in any way. On July 2d, some pain and swelling was noticed for the first time, when an ice-bag was applied to the knee. Two days later the swelling had extended up the thigh, and by July 6th there was well-marked erysipelas as well as effusion in the knee joint. Tincture of iodine was applied and tincture of muriate of iron was administered; stimulants were given freely. By July 8th, the erysipelas had extended clear up to the groin. On July 12th, the discharge of pus was free, and in consequence the tension and swelling of the thigh were sensibly diminished. The patient, however, was manifestly failing. On July 18th, he was seized with diarrhœa, and death supervened in the evening. The autopsy showed that the bullet had lacerated the sartorius muscle extensively and splintered the internal condyle of the femur. The joint and the cellular tissues of the thigh were filled with dark colored and very offensive pus, and the articular surfaces of the femur and tibia were denuded of cartilage. Surgeon J. A. Lidell, U. S. V., who furnished the history, with the pathological specimen (FIG. 232) and the missile (*Specimen* 3074, *Surgical Section*, A. M. M.), remarks: "The case interested me greatly, because when the bullet was extracted there was not the slightest evidence of injury to the inner condyle, nor indeed to any other bone whatever. The bullet was located quite superficially and not in relation with the injured condyle. During the eight days which elapsed between the receipt of the wound and the extraction of the missile said bullet must have slipped away from the bone into a new position. When, therefore, on July 2d, some inflammatory trouble in the knee appeared, we thought it was not due to an injury of the bone, but that the involvement of the joint originated from the soft parts. The case also affords a good illustration of the obscurity of the symptoms and the difficulty of diagnosis which may attend a serious gunshot injury of an articulation so thinly covered with soft parts and so easy of examination from every side as the knee joint."

FIG. 232.—The bones of the left knee; the posterior portion of the internal condyle is split off. *Spec.* 1309.

CASE 570.—Private *A. Simms*, 19th Georgia, was wounded in the right knee, at Antietam, September 17, 1862, and treated at a hospital near Sharpsburg. Surgeon J. H. Rauch, U. S. V., forwarded the specimen (FIG. 233), with the following history: "This was a robust young man, 19 years old. The surgeon who first attended him could not find the ball, the external opening of the wound being about four inches below the knee joint, but was satisfied that it had passed obliquely in the direction of the knee joint. Acting Assistant Surgeon H. De Young called my attention to this case five weeks after the man was wounded. His limb was much swollen, and his constitutional symptoms such that I decided against amputation, which was proposed, and placed him on a stimulating and nourishing diet, hoping that we thus might get him into a fit condition for an operation. For a week he seemed to improve, but after this he lost his appetite, and gradually sank from exhaustion, and died on November 10, 1862. This man's life would no doubt have been saved had an immediate amputation of his limb been made." The specimen consists of the bones of the knee, with the outer condyle shattered, and shows that there has been a trivial deposit of callus, with much caries and destruction of the articular surfaces of the joint.

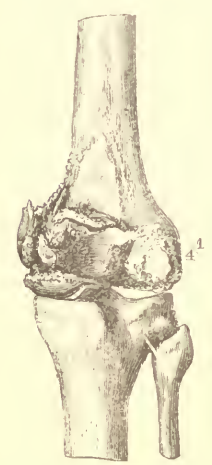

FIG. 233.—The right knee with outer condyle of femur shattered. *Spec.* 351.

CASE 571.—Private I. N. Sarvis, Co. C, 131st Pennsylvania, was wounded at Fredericksburg, December 13, 1862, and was admitted to Mount Pleasant Hospital, Washington, four days afterwards. Acting Assistant Surgeon J. C. Wyer forwarded the pathological specimen (FIG. 234) and reported the following detailed history: "Sarvis received his wound by a ball perforating the patella of the left leg, passing through the knee and making its exit at a point nearly opposite in the popliteal space. When admitted his whole constitution was suffering from the effects of the injury; the pulse quick and frequent (120), denoting irritability; the skin dry and hot; appetite poor; sensibility of the joint extreme, the patient shrieking on account of the pain occasioned by the slightest motion of the limb. The discharge from the wound consisted of synovia and

[1] A brief abstract of this case was published in *Circular* No. 6, War Department, S. G. O., Washington, 1865, p. 36.

thin unhealthy pus. There was nothing peculiar about the aspect of the limb except a general tumefaction. The tongue was furred lightly, and the expression anxious; bowels constipated. On the tenth day after admission he was attacked with a severe chill, which was followed by fever, and from this period the hectic flush began to appear upon the cheeks periodically. Subsequently there were recurrences of the rigors. Occasionally the mind wanders. The features are pinched, the skin is sallow, and countenance exhibits the icteroid appearance always present in pyæmia. There is great thirst, and the respiration is quick and irregular. On December 28th, he was attacked with a cough, the expectoration being tough, gelatinous, and streaked with blood. Auscultation revealed crepitant and sibilant rales through both lungs. On the 5th of January, 1863, Surgeon J. H. Brinton, U. S. V., visited the hospital and his attention was called to the case. At this period the case was one of well-marked pyæmia; the lung complication Dr. Brinton pronounced as multiple or metastatic abscess. 6th, no abatement in any of the symptoms. 7th, rales and rhonchi still audible through the lungs; pulse continues 120 beats in the minute; skin dry and hot; tongue dry and fissured; appetite much impaired; patient lies drowsy and dull most of the time. The discharge from the knee is profuse, ichorous, and of a sickening odor. From the 8th to 13th the symptoms have continued the same: respiration quick, pulse 130; tongue dry and crusty; discharge from the knee ichorous and extremely offensive; expectoration rusty and gelatinous. Has had slight rigors. Rales and rhonchi still present. Complains of pain on the least motion of his body. Urine scanty and turbid; bowels constipated; loss of appetite. Continues in a semi-comatose, dull condition. 14th: This morning he is unable to protrude his tongue; the features are pinched and sunken; pulse very feeble and rapid; deep hectic flush. Evening: has been moaning all day and refused his stimulants. The peculiar odor is very evident. Died at 4.30 A. M. on January 15, 1863. Autopsy eight hours after death: Rigor mortis was still present; emaciation extreme. The thorax being laid open revealed the superior lobes of the lungs apparently healthy, but upon removing them the inferior lobes were found to be consolidated and studded with abscesses varying in size from a pea to larger ones, the diameter of which measured about half an inch. The consolidation and effusion extended also to the dependent portions of the superior lobes. There was considerable effusion in the left pleural cavity. The heart was perfectly normal; no deposit upon the valves. A small clot was discovered in the right ventricle; there was also some of the separated fibrin; no effusion in the pericardium. The inferior lobes of both lungs sank readily in water. On making the incision to resect the knee joint, pus escaped from beneath the muscles of the lower third of the thigh. There was a good deal of disintegration of the tissues. The extremities of the femur and tibia were entirely separated, the crucial ligaments having been destroyed by the ball in its passage through the joint and the capsule ulcerated through at several points. The patella was perforated about its centre, dividing it into several fragments, which, however, were retained in position by the ligamentum patellæ. The internal condyle of the femur was crumbled into small fragments, and a deep furrow marked the course of the ball." In addition Dr. Wyer remarks that "at no period since his admission has an operation been admissible," also that the patient had likewise a wound of the right shoulder, involving the joint. The specimen consists of the bones of the injured knee.

FIG. 234.—Bones of the left knee. Patella and condyles of femur perforated. *Spec.* 700.

CASE 572.—Private E. Overman, Co. H, 1st Ohio Cavalry, received a shot wound of the right knee joint, at Mission Ridge, October 24, 1863. Surgeon I. Moses, U. S. V., contributed the pathological specimen (*Cat. Surg. Sect.*, 1866, p. 352, *Spec.* 2137), with the following history: "A ball entered the external condyle of the femur, penetrating the joint and lodging in the cancellated structure. He was taken to hospital in Chattanooga, where the missile was extracted, and where he remained for nearly two months. On December 20th, I saw him for the first time in hospital at Murfreesboro', to which place he had been removed by railroad, a distance of a hundred miles. The knee was very much swollen, the joint and surrounding tissues infiltrated with pus, and there was general prostration of vital force. Incisions were freely made to evacuate pus, and the symptoms generally improved. But on January 10, 1864, the patient was attacked with vomiting and prostration, and the left leg as far as the knee became gangrenous. He died on the following day." The specimen comprises the bones of the injured knee joint and shows the articulating surfaces to be completely destroyed by suppurative action.

CASE 573.—Private W. J. Lowry, Co. E, 25th Ohio, was wounded at Bull Run, August 30, 1862, and admitted to hospital at Alexandria several days afterwards. Surgeon E. Bentley, U. S. V., reported: "A minié ball passed through the right thigh antero-posteriorly, terribly shattering the lower third of the femur, opening the knee joint, and driving fragments of bone into it. The wounded man laid exposed on the battle field for two days and was then removed in an army wagon. He was treated by rest and stimulants. The patient died from pyæmia and exhaustion October 3, 1862, not having been in condition for an operation at any time before his death."

In a case of grapeshot wound of the left knee an abscess was found, at the *post-mortem* examination, which extended from two inches below the greater trochanter to a point two inches below the articular surface of the tibia:

CASE 574.—Private T. J. Barnett, Co. I, 40th Illinois, aged 24 years, was wounded at Mission Ridge, November 25, 1863, and admitted to the field hospital of the 4th division, Fifteenth Corps. Surgeon W. W. Bridge, 46th Ohio, described the injury as "a severe grapeshot wound of the left knee joint," and reported that the patient was transferred to the General Field Hospital at Chattanooga, December 20th. Acting Assistant Surgeon C. E. Ball communicated the result of the case from the latter hospital as follows: "When admitted the patient was very much emaciated, his injured knee and leg being badly swollen and the knee very painful on the slightest touch or movement; pulse 110. About a pint of pus, thin, very fetid, and of greyish color, was discharged daily. The wound ceasing to suppurate sufficiently, I made an incision just above, and by keeping the whole extent of the leg bandaged reduced the swelling in a few days. The discharge of pus, however, continued the same in amount and character. The patient was kept on nourishing diet, tonics, stimulants, and anodynes the whole time he was in hospital; but he gradually grew weaker, and died January 14, 1864. The autopsy disclosed a large sloughing wound on the

anterior surface of the knee joint; the patella fractured in four fragments. On laying open the thigh an abscess was found extending from two inches below the great trochanter to a point two inches below the articular face of the tibia, containing ichorous pus with masses of cheesy appearance and consistence. The knee joint was opened posteriorly as well as anteriorly, and the ligaments and cartilages were somewhat softened. A portion of the articular surface of the tibia was laid bare; the limb generally infiltrated with serum." The lowest third of the femur of the wounded limb, being also injured, was forwarded to the Museum by Dr. Ball, and constitutes specimen 2168 of the Surgical Section, showing a longitudinal fissure to the extent of four inches on the posterior surface of the shaft, the articulating surface being destroyed by suppuration.

FIG. 235.—The bones of the right knee, with the inner condyle and the head of the tibia fractured posteriorly. *Spec.* 983.

CASE 575.—Private W. J. D. Parks, Co. H, 132d Pennsylvania, was wounded at Fredericksburg, December 13, 1862, and entered the Harewood Hospital, Washington, on December 18th. Surgeon T. Antisell, U. S. V., recorded as follows: "Gunshot wound in right knee, opening the joint. Ball entered on the inner side of the patella on a level with it, and emerged at the popliteal space. Patient in general poor health and anæmic. Cold-water dressings were used December 22d; irritative fever; tongue dry; pulse 100. He continued to decline, there being no time at which he could bear an operation. He died on December 28, 1862. *Post-mortem:* Inner condyle of femur fractured. Ball passed directly into the joint, cutting a part of the crucial ligament and emerging from below into the popliteal space. Suppuration and burrowing of pus existed on outer side of thigh, extending four inches above the joint." The bones of the injured knee are shown in the annexed cut (FIG. 235). The specimen was contributed by Acting Assistant Surgeon W. A. Harvey, and shows that, besides the injury to the inner condyle of the femur, the head of the tibia was fractured posteriorly.

CASE 576.—Private J. Traverse, Co. I, 7th Michigan, aged 26 years, was wounded at Antietam, September 17, 1862, and admitted to hospital No. 1, Frederick, twelve days afterwards. Acting Assistant Surgeon R. Davies furnished the following minutes of the case: "Wound in the left knee by a bullet. No inflammation followed. The missile was first perceived October 27th, being situated at the outside of the patella, two inches from the tubercle of the tibia and directly under the integument. On extracting it about half a dozen drops of synovia escaped, the joint being opened to a very small extent by the edge of the base of the bullet. Wound closed by plaster. October 29th, inflammation of the joint having set in, cupping to the amount of six ounces was resorted to; ice applications and opiates; low diet. October 30th, measurements around the left or affected knee show, above the patella, thirteen and a half inches; across the patella, fourteen and three-quarter inches; and below the patella, eleven and a half inches; while at the right or sound knee they show thirteen, fourteen, and eleven inches respectively. November 4th, patient had a sleepless night and pain, notwithstanding a dose of morphia. There is an opening on the outer side of the patella, from which pus is freely escaping. The injured knee now measures fourteen inches above, sixteen and a half inches across, and thirteen and a half inches below the patella. 13th, measurement shows fourteen, fifteen, and thirteen inches above, across, and below the patella. Two openings have been made on the inner side, one opposite the upper border of the patella and the other four inches above. Pus of a healthy character exudes. Complains of much startling pain at times, in the intervals is not in much pain; pulse 100. 14th, there was a chill, and again the next day. 16th, another chill. Burrowing of pus on the inside of the thigh. Discharge thin in quality, like dirty greenish water. The slightest pressure above and below the patella, especially on the inner side, induces an immediate escape of pus. No pain or redness in course of the saphena vein. Has hiccough; skin hot; pulse 120. 20th, discharge as thin and watery as possible, emerging upon the slightest pressure at any part of the thigh; surface of body and extremities bathed with perspiration; pulse too fast to be counted. Patient evidently sinking. Died on November 21, 1862. *Post-mortem:* A collection of partially fluid dark blood was found in the thigh, corresponding to the attachments of the inner and outer layers of the fascia. The periosteum was easily detached over the lower two-thirds of the femur, on the anterior, interior, and external portions; bone laid bare for about the size of a sixpence at the lower portion of the femur. The articular surface of the femur was entirely bare, as was also its anterior and lateral borders. The borders and the articular surface of the head of the tibia were bare and the bone roughened, and there was fracture and bony separation of the patella into three portions. There was a sequestrum about the size of a nut on the left side of the tubercle of the tibia." The bones of the knee were contributed to the Museum by Acting Assistant Surgeon Davies, and are represented in the annexed wood-cut (FIG. 236).

FIG. 236.—The bones of the left knee; the patella is fractured and the head of the tibia involved. *Spec.* 753.

CASE 577.—Private *W. West*, Co. C, 51st Georgia, aged 17 years, was wounded at South Mountain, September 14, 1862, and admitted to hospital at Frederick three days afterwards. Acting Assistant Surgeon W. W. Keen, jr., reported: "Gunshot wound of left knee joint, a ball passing through the head of the tibia, involving the joint. There was also a flesh wound of the right leg just below the knee joint. Irritative fever ensued and continued for one week after the patient's admission. The treatment was supporting and poultices were applied to the joint, which improved in external appearance. Pieces of the articular surface of the tibia were nearly detached on September 25th. Two days later suppuration was free and of a flocculent character; tongue dry and furred; pulse 116. On October 4th, the joint was laid open by free incisions on each side of the patella, when the pus was found to be burrowing up the thigh to a very great extent. On October 8th, the condition of the thigh was apparently improved, but the pulse was no better and the patient had a severe chill. He continued to grow weaker. On October 13th, there was some hæmorrhage from the wound, and on the following day the patient died. At the *post-mortem* examination a broad abscess was discovered to extend from the knee to the groin. The ball was found to have passed directly through the joint from side to side, knocking off pieces of the internal condyle of the femur and the articular surface of the tibia. This patient had been told at an early stage of the treatment that his limb ought to be amputated. But he expressed his certainty of recovering without amputation and begged off, declaring his readiness and willingness to incur all risks of that

course. He was therefore not operated upon." The bones of the injured knee joint, showing the articular surfaces to be eroded, were contributed to the Museum by Acting Assistant Surgeon J. H. Bartholf, and constitute specimen 825 of the Surgical Section.

CASE 578.—Private *J. W. Skettles*, 2d Mississippi, was wounded at Antietam, September 17, 1862, and admitted to a hospital near Sharpsburg. Surgeon J. H. Rauch, U. S. V., contributed the specimen represented in the annexed wood-cut (FIG. 237), and reported: "This man was wounded through the knee joint, from the effects of which he died on November 9, 1862. Had this man been operated upon, I am satisfied his life would have been saved." The specimen consists of the bones of the left knee with the inner tuberosity of the tibia perforated obliquely downward by a round ball. The articular surface is eroded by suppuration. The bullet is seen at the point of entrance, whither it appears to have gravitated through its own track and where the fragments are necrosed. The partial fracture of the shaft of the tibia has been slightly consolidated by effusion of callus.

FIG. 237.—Shot perforation of inner tuberosity of the left tibia. *Spec.* 356.

CASE 579.—Private P. Gregory, Co. H, 1st Delaware, was wounded in the right knee, at Antietam, September 17, 1862. Surgeon I. Scott, 7th West Virginia, noted his admission to the field hospital of the 3d division, Second Corps, with "wound of leg." On September 27th, the wounded man was transferred to hospital No. 1, Frederick, where he died October 16, 1862. The specimen, shown in the cut (FIG. 238), was preserved at the *post-mortem* examination and contributed to the Museum by Acting Assistant Surgeon W. W. Keen, jr. It consists of the upper portion of the bones of the leg, with the head of the tibia shattered by a ball passing through it transversely. The fragments are necrosed.

FIG. 238.—Shot comminution of head of right tibia. *Spec.* 760.

CASE 580.—Private J. McNulty, Co. E, 22d Michigan, was wounded in both knees, at Chickamauga, September 19, 1863, and admitted to hospital at Chattanooga some days afterwards. Surgeon J. T. Woods, 99th Ohio, reported: "Fracture of head of each tibia; patient suffering from chronic diarrhœa; simple treatment. Hæmorrhage occurred; popliteal artery and branch, with popliteal vein, ligated. Gangrene set in below the location of the ligatures, and death supervened October 15, 1862."

CASE 581.—Sergeant J. McCarthy, Co. C, 149th New York, was wounded at Wauhatchie, October 27, 1863, and admitted to the field hospital of the 1st division, Fourteenth Corps. Surgeon W. M. Wright, 79th Pennsylvania, reported: "He was wounded by a conical leaden bullet, which entered on the posterior aspect of the right leg about four inches below the knee, taking an upward course, and passing out just one inch beneath the patella. The wound was probed by a competent surgeon, who concluded that it was not a case warranting amputation, although in the end it might prove to have been judicious. Two or three days afterwards the patient complained of severe pain in the knee which required large doses of anodyne to alleviate. The pus assumed a thin watery consistence of a brownish coffee-like appearance and discharged quite freely; odor somewhat unpleasant though not fetid. The limb was greatly increased in size throughout its whole extent, and to the touch it gave evidence of œdema. Several days later pressure upon the knee gave a crackling sensation to the hand, giving unmistakable evidence that the joint was implicated. The patient died on the morning of November 8, 1863, after extreme suffering during the previous twenty-four hours. During the period succeeding the first three days there was great gastric irritability which remedies failed to correct. During the last two days the discharges from his bowels were black, and for twelve hours previous to death a black substance, resembling thin coffee grounds somewhat and amounting to a pint probably, was discharged from the mouth. An examination of the limb after death showed a fracture of the head of the tibia behind, external to the popliteal notch, extending into the articulating surface from an inch and a half below it. Necrosis of the bone had commenced to a slight degree. The femur and fibula were untouched."

FIG. 239.—Destruction of left knee by a shell explosion. *Spec.* 709.

CASE 582.—Private B. Madden,[1] Co. A, 28th Massachusetts, was wounded at Fredericksburg, December 14, 1862, by a shell in the left knee joint. He was admitted to Douglas Hospital, Washington, twelve days afterwards. Medical Cadet S. T. Kingston, U. S. A., contributed the pathological specimen, represented in the annexed wood-cut (FIG. 239), and reported that "the patient died December 29, 1862, from the effects of a shell wound in the left knee." The specimen consists of a ligamentous preparation of the injured knee, showing fearful laceration and complete destruction by the missile, two fragments of which are mounted with the preparation.

CASE 583.—Private F. L. Mellott, Co. K, 12th Pennsylvania Reserves, was wounded at South Mountain, September 14, 1862. Acting Assistant Surgeon G. W. Corey reported: "He was wounded by a musket ball entering the left knee near the lower border of the patella, a little to the outer side of the ligamentum patella, passing obliquely backward and outward through the outer tuberosity of the tibia and through the head of the fibula. The man was brought to the temporary hospital at Middletown some time in the night following the battle, and the second day after the injury the femoral artery of the wounded limb was tied by the Surgeon in charge for the purpose of keeping down the inflammation and saving the limb. Water dressings were applied and stimulants and anodynes freely administered. About six days after the battle the hospital was permanently established and the patient came under my care. At this time I found him suffering from severe pain, the redness and swelling

[1] This case has been alluded to and the specimen figured in *Circular* No. 6, War Department, S. G. O., Washington, 1865, pp. 37, 38, FIG. 50.

of the joint being moderate, suppuration profuse, and the temperature of the parts below as I expected to find it. In fact so marked was this latter symptom that I feared the occurrence of gangrene of the part and immediately discontinued the water dressing. Gangrene, however, did not set in; but the soft tissues, wherever the limb rested on the pillow, sloughed very rapidly, indicating the low vitality of the parts. The treatment from this time consisted of emollient applications and stimulant and astringent lotions, with a free use of alcoholic stimulants internally. The case went on for some time without any marked change, the discharge becoming more profuse and the sloughs extending and presenting no disposition to granulate. Finally diarrhœa, loss of appetite, night-sweats and delirium supervened, and death resulted on October 28, 1862,—forty-three days after the reception of the injury. An examination of the joint after death showed the most perfect destruction of the synovial membrane and of the articular cartilages and other soft tissues." The bones of the fractured knee joint were contributed to the Museum by Dr. Corey, and constitute specimen 915 of the Surgical Section. The specimen shows the condyles to be split vertically, the inner one being broken posteriorly and nearly detached, and the articular space eroded by suppuration. The fractured extremities of the tibia and fibula are thoroughly carious.

Four hundred and seventy-eight of the five hundred and twenty-one fatal cases of shot fractures of the knee joint treated by conservation were Union and forty-three were Confederate soldiers. Specimens illustrating the nature of the various injuries of the bones of the knee are preserved in the Army Medical Museum in ninety-nine cases.

The side of the injury was reported in seven hundred and ninety-seven of the eight hundred and sixty-eight cases of shot fractures of the knee joint. The right side was involved in four hundred and thirty-one, the left in three hundred and sixty-six. Of the former, one hundred and seventy-four were successful, two hundred and fifty-four were fatal, and three undetermined, giving a mortality rate of 59.3 per cent.; of the latter, one hundred and fifty-two were successful, two hundred and thirteen fatal, and one undetermined—a mortality rate of 58.3 per cent., or 1 per cent. in favor of the injuries of the left side. Of eight hundred and sixty-eight patients, seven hundred and eighty-seven were Union soldiers. Three hundred and six recovered; four hundred and seventy-eight proved fatal, and in three cases the result was not ascertained—a fatality of 60.9 per cent. Of eighty-one Confederate soldiers, thirty-two recovered, forty-three died, and six cases were undetermined—a mortality of 57.3 per cent., or 3.6 per cent. less than the percentage of deaths among the Union soldiers. In forty-four instances, with twenty-four recoveries and twenty deaths, fragments of the patella or of the articulating ends of the femur or tibia were removed.

EXCISIONS AT THE KNEE JOINT FOR SHOT INJURY.—As far as the records of this Office indicate, fifty-seven excisions at the knee joint for shot injury were performed during the American civil war, the first operation having been done on September 15, 1862, at the Fairfax Seminary Hospital, near Alexandria, Virginia. It is to be regretted that the name of the operator in this instance is not reported. Prior to that time there were recorded eighteen examples of this operation for shot injury,—fifteen in Europe,[1] and

[1] Excision of the patella for shot fracture is mentioned by J. CH. A. THEDEN (*Neue Bemerkungen und Erfahrungen zur Bereicherung der Wundarzneykunst*, Berlin und Stettin, 1782, B. I, p. 101): "I cannot, therefore, approve of the excision of the patella fractured by shot, which I have seen undertaken by somebody but very unfortunately, as gangrene and death supervened." No particulars are recorded. KAJETAN V. TEXTOR (LUDWIG FUCHS, *Ueber Resection im Kniegelenke*, Inaug. Diss., Würzburg, 1854, p. 9, No. 13) resected, on November 4, 1847, the fractured condyles of the femur of a laborer, aged 37, shot in the left knee while poaching; death from pyæmia, November 11, 1847. KNORRE, of Hamburg (L. STROMEYER, *Maximen der Kriegschirurgie*, Hannover, 1861, p. 522, *note*, and GURLT (E.), *Die Gelenk-Resectionen nach Schussverletzungen*, Berlin, 1879, p. 1189), resected the joint in the case of Carl Kunseh, aged 21, wounded August 13, 1849; missile entered the upper part of the right leg, at the inner side of the crest of the tibia, and emerged at the same height posteriorly; inner half of upper portion of tibia shattered. On August 15th, decapitation of tibia and fibula, sawing off 2½ inches of each. By November 1st, firm union between femur and leg. Left hospital in June, 1850. Seen by the operator in the summer of 1859, carrying a heavy basket, entirely well, and, with the exception of stiffness, not suffering from any inconvenience from the leg. On January 17, 1875, the operator reports the patient as having a blooming complexion, being well fed, and having maintained his family without assistance. He was able to carry 150 pounds; for the past two years the strength of the leg has diminished, compelling him to earn his bread as a night-watchman. He was able to walk two or three miles (German) a day without tiring. He has continuously used a linen bandage two inches wide and four yards long to support the leg since leaving hospital. Cicatrix sound, pale, and movable. The limb is 6 centimetres shortened. FAHLE (F. ESMARCH, *Ueber Resectionen nach Schusswunden*, Kiel, 1851, p. 133) operated in the case of Philip Blumenthal, volunteer, 2d Chasseur Corps, 2d Co., wounded in a reconnoissance, December 31, 1850, a ball entering the outer side of the left knee. On January 3, 1851, by Dr. STROMEYER'S advice, the patella, 1½ inches of the condyles of the femur, and portions of the tuberosities of the tibia were excised; death February 3, 1851. J. H. LAKIN (T. P. MATTHEW, *Med. and Surg. Hist. of the British Army which served in Turkey and the Crimea*, London, 1858, Vol. II, p. 379, and GURLT (E., *loc. cit.*, p. 126): Case of H. Gribbins, 77th British Regiment, aged 19, wounded Sept. 8, 1855, during the retreat from the Redan, in the left knee; Sept. 30, 1855, excision of about 1¾ inches of the condyles of the femur and

three on this continent.[1] Eight of the operations had been successful, nine fatal, and in one instance the result had not been ascertained. The results of the fifty-seven cases of excision of the knee joint of the American civil war are indicated in the following table:

TABLE LIII.

Classified Statement of Fifty-seven Cases of Excisions at the Knee Joint for Shot Fracture.

PARTS EXCISED.	TOTAL CASES.					TIME OF OPERATION.												
						PRIMARY.				INTERMEDIARY.			SECONDARY.			TIME NOT SPECIFIED.			
	Cases.	Recovery.	Death.	Undetermined.	Ratio of mortality of determined cases.	Cases.	Recovery.	Death.	Undetermined.	Cases.	Recovery.	Death.	Cases.	Recovery.	Death.	Cases.	Recovery.	Death.	Undetermined.
Condyles of the Femur	5	1	4	....	80.0	2	....	2	....	1	....	1	1	1	....	1	....	1	....
Condyles of the Femur and Patella	3	1	1	1	50.0	2	1	....	1	1	....	1	....	....	....	....	....	....	....
Condyles of the Femur, Patella, and Head of Tibia	19	3	16	....	84.2	10	....	10	....	6	1	5	3	2	1	....	....	....	....
Condyles of the Femur and Head of Tibia	7	3	4	....	57.1	6	3	3	....	1	....	1	....	....	....	....	....	....	....
Patella or portion thereof	9	....	9	....	100.0	5	....	5	....	2	....	2	1	....	1	1	....	1	....
Head of Tibia	4	1	3	....	75.0	1	....	1	....	1	....	1	2	1	1	....	....	....	....
Parts not specified	10	1	7	2	87.5	6	....	5	1	1	....	1	....	....	....	3	1	1	1
Aggregates	57	10	44	3	81.4	32	4	26	2	13	1	12	7	4	3	5	1	3	1

In three instances the terminations were not ascertained; ten operations were followed by recovery and forty-four by death, a fatality of 81.4 per cent. As indicated in TABLE

a thin slice of the head of the tibia; patella removed; death Oct. 28, 1855. JOHN BROWN, Assistant Surgeon Bengal Medical Service (*Edinburgh Med. Jour.*, 1860, Vol. VI, p. 320): Case of Mahun Singh, aged 30, wounded Jan. 16, 1858, in an attack on the English at Alumbaugh. Wound over the left knee; limb severed and hanging by a shred of skin; also compound fracture of patella of right knee. Left femur immediately amputated at middle third, and right knee resected by an H-incision; no hæmorrhage, no anæsthetic used; death on the evening of Jan. 17, 1858, from the effects of shock. J. NEUDÖRFER (*Handbuch der Kriegschirurgie und der Operationslehre*, Leipzig, 1872, Zweite Hälfte, p. 1545 *et seq.*) gives details of six operations performed by himself: Johann Zelenka, Austrian Infantry Regiment E. II. Rainer, wounded at Solferino June 24, 1859. Shot fracture of left hand, causing amputation of index and middle fingers, and shot wound of thoracic parietes, and a shot fracture of the left knee joint. November 20, 1859, resection of about 2½ inches of the end of the femur, a thin slice of the head of the tibia, and part of the patella. Wound healed in three months, leaving several fistulas. He could bend the joint to an angle of from 5 to 8 degrees. Johann Dubon, Prince Hohenlohe Austrian Infantry Regiment. Shot fracture of the right knee joint. September 8, 1859, secondary operation, by reason of progressive caries; death September 24, 1859. Michael Fonta, 5th Austrian Infantry Regiment. Wounded at Solferino June 24, 1859. Shot fracture left knee joint. Resection February 10, 1860; death from exhaustion February 28, 1860. Abraham Maksa, Prince Wasa Austrian Infantry, 3d Co., wounded at Solferino June 24, 1859, in the right knee joint. Resected February 11, 1860. Complete recovery. Antonio Mazzini; shot fracture of right knee joint. Resection March 20, 1860, of condyles of femur (about nine months after injury), in hospital at Verona. Sent home six weeks after the operation in a fair way of recovery. Not heard of afterwards. Anton Potesch, Austrian Infantry Regiment "Kaiser." Wounded in right knee joint. Resection May 18, 1860 (about a year after injury); death from pyæmia May 22, 1860. D. W. CROMPTON, of Birmingham (*Medical Times and Gazette*, 1861, Vol. I, p. 518): George W., aged 19, wound in left knee joint by accidental discharge of gun, December 26, 1860. Admitted the same day into Birmingham General Hospital. Resection of the joint, sawing off a thin portion of the head of the tibia and corresponding thin portion of the condyles, after which nearly the entire shattered condyle of the femur was sawn off diagonally, and numerous shot were removed. The patella, as well as the articular cartilage of the parts not resected, was left intact. April 5, 1861, discharged from hospital cured. Could walk with ease with the aid of a cane. Limb from ½ to ¾ inch shortened. HUTCHINSON, of London (*Lancet*, 1861, Vol. I, p. 386): A healthy young man, who had been severely wounded February 13, 1861, in both legs, at a distance of twelve paces, by the accidental discharge of a gun loaded with No. 6 shot and a pasteboard stopper. The charge penetrated just over the right knee, going diagonally downward through the condyles of the femur, and entering the inner side of the left leg below the knee and behind the inner margin of the tibia, lodging superficially on the outer side of the left leg. Admitted into London Hospital February 13, 1861. Resection an hour after injury, removing about an inch and a half of the femur, a very thin slice of the tibia, and extirpating the entirely intact patella; death February 23, 1861, of tetanus. HENRY SMITH (*Medical Times and Gazette*, 1863, Vol. II, p. 376): John H., aged 29, private, English Fusileer Guard, wounded at the battle of Inkerman, November 10, 1854, in the left knee joint. Ball lodged in popliteal space and extracted in hospital at Scutari. Resection September 6, 1862, at King's College Hospital, London. Discharged from hospital December 9, 1862, cured. The cases of LARREY, PERCY and LAURENT, and CHAMPION, cited by OSCAR HEYFELDER (*Lehrbuch der Resectionen*, Wien, 1863, p. 135) and by H. CULBERTSON (*Excision of the Larger Joints*, Prize Essay, Philadelphia, 1876, p. 188, in *Trans. Am. Med. Assoc.*, Supplement to Vol. XXVII), have been omitted. In LARREY'S case (D. J. LARREY, *Mém. de Chir. Mil. et Camp.*, Paris, 1812, T. III, p. 256) of an Arab, named Ibraham, only loose fragments of the patella were removed. The cases ascribed to PERCY and LAURENT are evidently the operations referred to by them in their article *Resection*, in *Dict. des Sci. Méd.*, Paris, 1820, T. XLVII, p. 555: the operations were for disease of the knee joint and were performed by MOREAU. In the operation ascribed to CHAMPION, which is found in his *Traité de la Resection des os caries dans leur continuité, ou hors les articulations*, Paris, 1815, No. II, p. 77, carious bone was chiseled away from the tibia to allow the removal of the ball.

[1] GURDON BUCK (*Excision of the Knee Joint for Anchylosis*, in *New York Med. Times*, March, 1854, Vol. III, p. 205): Gunshot wound of knee joint, received about April 20, 1853; healed with anchylosis at an angle of about 135 degrees upon the thigh. August 9, 1853, adhesions broken up; a slice removed from the inferior surface of the condyles of the femur, including the pulley-like surface intervening between, and the articular surface of the tibia on a level with the upper extremity of the fibula; coaptation of cut surfaces, which were held together by a wire; the wound healed in nine weeks. Dr. BUCK exhibited the patient to the New York Academy of Medicine, February 1, 1854. E. S. COOPER (*Case of Exsection of the Knee Joint in consequence of Disease of Bones caused by a gunshot wound*, in *The Cleveland Medical Gazette*, 1861, Vol. III, p. 604): N. F., aged 24, shot through the

LII, page 367, the articulation was primarily involved in fifty-six instances; in the remaining case the operation was performed for shot fracture of the upper thirds of the bones of the leg.

Primary Excisions at the Knee Joint.—In thirty-two of the fifty-seven cases of excision of the knee joint performed during the American civil war the operation was done within forty-eight hours after the reception of the injury. The results in two of the thirty-two cases could not be ascertained; four of the patients survived the operation, and in twenty-six instances death resulted, a mortality rate of 86.6 per cent.

Recoveries after Primary Excision of the Knee Joint.—Portions of the condyles of the femur and the head of the tibia were removed in three of the four cases of this group; in the remaining case the extremity of the tibia and the patella were excised. Three operations involved the right limb and one the left. Two were Confederates and two Union soldiers. In one of the four instances amputation of the thigh became necessary on the fifth day, and, although the patient survived both operations, the case cannot well be cited as an instance of recovery after primary excision at the knee joint:

CASE 584.—Surgeon A. W. Bailey, 1st South Carolina Infantry, of Barnwell District, reports[1] the following remarkable example of successful partial excision of the right knee: "Lieutenant *J. W. Harlee*, Co. I, 1st South Carolina Regiment, Bratton's Brigade, aged about 27 years, and of robust constitution, was wounded in the battle of the Wilderness, May 6, 1864. A minié ball passed laterally through the right knee joint, fracturing the head of the tibia. A curved incision was made, extending from one condyle to the other, reaching just below the inferior border of the patella. All the ligaments, with the synovial sac, were divided, and the semilunar cartilages removed. A transverse section of the head of the tibia, embracing the fractured portion, was made above the articulation with the fibula. The patella was not ablated. The wound was closed with sutures and adhesive straps, and the limb secured to a long outside splint. The next day he was transported about twenty-five miles over a rough road to the rear, and two of the sutures cut out, thereby exposing the internal condyle. In a short time the exposed surface was covered with healthy granulations and the space soon filled up. In the course of six or eight weeks true anchylosis had taken place, and the wound healed, except a small place where the condyle was exposed, leaving a small fistula, which healed in a short time afterwards. This officer, who returned to his command to be retired on the Invalid Corps, gives the following account of the treatment carried out after being sent to the General Hospital: He was furnished with a quart of good whiskey daily, and requested to drink as much as he could, and use the balance on his leg. He says he drank the quarter portion each day, and dressed his wound twice daily with one part of whiskey to three of water. His leg is about three inches shorter than the other; he wears a high heel and thick sole to his boot, by which means he is enabled to walk without crutches, and even dance with ease."

CASE 585.—Private *W. F. Jackson*, Co. G, 6th South Carolina, aged 21 years, received a shot fracture of the left knee joint, near Richmond, October 7, 1864. He underwent the operation of excision on the day of the injury, at the hands of Surgeon Stony, C. S. A., who removed the condyles of the femur and the detached fragments of the patella through a straight incision in the line of the wound. Fragments of bone continued to discharge for about twelve months after the operation, after which time the wound remained perfectly healed. The case was reported by Dr. C. H. Ladd, late Surgeon 56th North Carolina, who stated that when last heard from, in December, 1872, the man had very limited motion of the injured joint. The records of Jackson Hospital (Confederate), Richmond, show that the patient was admitted with "shot wound of knee joint, treated by ablation of patella," and that he was furloughed March 13, 1865. In a letter, written and forwarded in 1868, the man represented his wounded limb—which, in the opinion of all who examined it, had undergone "one of the most remarkable surgical operations"—as "a good sound leg, which answers every purpose."

CASE 586.—Private A. Rider, Co. G, 76th Pennsylvania, aged 25 years, was wounded in the right knee, at Pocotaligo, October 22, 1862, and admitted to hospital No. 1, Beaufort, two days afterwards. Surgeon R. B. Bontecou, U. S. V., contributed the pathological specimen (FIG. 240) and the following report: "The missile was a rough leaden canister ball of ordinary size, which entered the limb over the front of the external condyle, passing through the posterior margin of it, opening the capsule and lodging in the popliteal space. The circulation and appearance of the limb was good, but there was some swelling of the knee and pain on motion or to the touch. The bullet was removed from beneath the integuments by incision on the morning of his admission. Resection of the lower portion of the condyles of the femur was done the same day, at 3 P. M., and the semilunar cartilages removed from the tibia. The H-incision was employed, and the transverse cut united by lead wire accurately. Morphia was applied to the wound, and wet lint and the ice bag kept constantly in use. On the next day, the patient's bowels not having

knee joint, in June, 1857; fracture of condyle of femur and upper part of tibia. October 25, 1857, excision of condyles of femur, of more than an inch of the head of the tibia, and of the patella; complete recovery. CHARLES A. POPE (*Complete Osseous Anchylosis of the Knee Joint. Successfully operated on by Barton's method*, in *Am. Jour. Med. Sci.*, 1861, Vol. XLII, p. 298, and *St. Louis Med. and Surg. Journal*, May, 1861, Vol. XIX, p. 211): Mr. A., a healthy man, aged 40, received, when about 10 years old, an accidental shot wound of the knee, the ball passing just below the right knee joint. The articulation became secondarily involved and complete osseous anchylosis resulted. For long years he wore a wooden peg with the knee resting in a socket at its upper extremity, for purposes of locomotion. March 14, 1861, resection of knee by Dr. POPE, assisted by Drs. SMITH, GREGORY, and DEWEY. Recovery; walks without a stick ordinarily.

[1] *Bailey (A. W.), A case of Knee-joint Resection*, in *Southern Medical and Surgical Journal*, 1866, Vol. XXI, p. 460.

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PLATE LXV_SUCCESSFUL EXCISIONS OF THE KNEE JOINT AFTER SHOT INJURY.

Fig.1. Captain C.Knowlton. 10th Louisiana

Fig.2. Private A.Rider 76th Pennsylvania

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been moved for some days, an ounce of sulphate of magnesia was administered. October 30th, diarrhœa having been troublesome for twenty-four hours, pills of argentum, opium, and camphor were given, and on the following day, the diarrhœa still continuing and there being some febrile symptoms, spirits of mindererus was prescribed and milk porridge for diet. Wet dressings with ice were continued until November 2d, when cerate dressings and dry lint with ice bag were ordered. Starch and laudanum injections arrested the looseness. The limb had been kept on a pillow, and great pain was experienced on the slightest movement until I constructed a rest for it out of two parallel cushions of hay tacked on a plank, leaving a space under the knee unstuffed. When laid on this, on October 27th, the limb was very comfortable. Before that time the poor fellow had frequently regretted that it was not removed. The transverse incision healed without suppuration, and no swelling of the limb, above or below the knee, took place. The only ligature employed was on the azigos artery, which came away November 16th. Scarcely any inflammation about the knee took place until November 18th, when I observed that the line of incision, which had healed many days ago, reopened in places and discharged pus. Cerate dressings were applied and straps to approximate the lateral wound; the limb exposed and a wet napkin kept on the knee. December 1st, the bones have apparently united and there is very little discharge, the incisions having healed, with the exception of a point on either side of the joint, from which a few drops of pus are escaping. The patient suffers no pain, and I shall to-day flex the knee a trifle permanently. The leg was kept on a straight plank and between the hay cushions until December 20th, when I put the limb in a starch bandage, well stiffened by strips of pasteboard. On December 26th, I slit the bandage open from the toe to the hip and discovered some erythematous blush on the skin, also a slight general disturbance, accompanied by dry tongue. The febrile symptoms yielded readily to acidulated drinks and a little spirits of mindererus. On December 28th, the patient was sent to a Northern hospital by the steamer Star of the South. I saw the man in hospital at Fort Wood in July following. He was not able to walk then, but subsequently he did so with the assistance of a cane, and was discharged."

FIG. 240.—Condyles of right femur primarily excised. *Spec.* 2030.

The records of Fort Wood Hospital, Bedloe's Island, show that the patient was admitted December 31st, and that he was discharged August 28, 1863, Acting Assistant Surgeon O. W. Gibson certifying to the disability arising from "resection of knee joint." Five months afterwards, when making an application for pension, the man was examined by Surgeon J. A. Wolf, 29th Pennsylvania, who certified to the following disabilities as resulting from the wound: "He has anchylosis of the injured joint, also paralysis of both inferior extremities. He is now permanently confined to his bed, being entirely unable to move his body or inferior extremities." The reports of different examining surgeons show no improvement in his condition up to September, 1874, at which time the pensioner was exempted from further examinations. The photograph represented in FIGURE 2 of PLATE LXV, opposite page 386, was obtained from Dr. Bontecou, who mentioned that the paralysis came on some time after the patient's recovery from the operation and after his arrival at home. He also suggested that the attack "may have been caused by malarial poison." In several letters received from the pensioner, the last one being dated April 14, 1877, he depicts his condition as that of "a poor wreck," and states that owing to "the lower portion of his body being entirely powerless from the effects of the wound" he is obliged to keep in his bed all the time. His pension was paid December 4, 1879.[1]

In the following instance the primary excision was followed five days later by a successful intermediary amputation of the thigh at the junction of the middle and lower thirds of the femur:

CASE 587.—Private W. M. Constable, Co. H, 1st U. S. Cavalry, aged 26 years, was wounded in the right knee, at Dinwiddie Court House, March 31, 1865. He was admitted to a Cavalry Corps field hospital, whence Assistant Surgeon E. J. Marsh, U. S. A., reported: "Severe fracture of external condyle of femur and of head of tibia by a bullet; treated by excision; missile removed; chloroform used." Five days after the date of the wound the limb was amputated by the circular method at the junction of the middle and lower thirds of the thigh. This operation was done at Judiciary Square Hospital, Washington, by Acting Assistant Surgeon F. H. Colton, who also, three months later, at Douglas Hospital, performed a second operation, removing a sequestrum, two inches long and one-fourth inch wide, from the stump. By August 29th the stump had entirely healed, and one week afterwards an artificial limb was fitted by the Jewett Patent Leg Co. The patient was subsequently discharged from Harewood Hospital, November 18, 1865, and pensioned. Several years afterwards he served for a period in the 44th Regiment (Invalid) of Infantry. The pensioner was paid March 4, 1880.[2]

Fatal Cases of Primary Excision at the Knee Joint.—Twenty-six primary excisions of the knee joint terminated fatally. In ten instances, the condyles of the femur, the head of the tibia, and the patella; in two, the condyles of the femur; in three, the condyles of the femur and head of tibia; in one, the head of the tibia; and in five, the patella were the parts excised; in five instances the excised portions were not specified:

CASE 588.—Private J. F. Black, Co. H, 26th Illinois, was wounded in the left knee, at Jonesboro,' September 2, 1864. Surgeon W. M. Cake, 53d Ohio, reported his entrance into the field hospital of the 4th division, Fifteenth Corps, with "a fracture and comminution of the patella by a bullet; exsection of patella by Surgeon D. Halderman, 46th Ohio, six hours after the injury, under chloroform." Two days after the operation the patient was transferred to the general field hospital of the Fifteenth Corps, where he died September 11, 1864.

[1] See *Circular* No. 6, War Department, S. G. O., Washington, 1865, p. 58. LYON (I. W.), *Excision of the Knee and Hip Joints*, in *Am. Jour. Med. Sci.*, 1865, Vol. XLIX, N. S., p. 64; CULBERTSON (H.), *Excision of the Larger Joints of the Extremities*, Prize Essay, in *Transactions of the Am. Med. Assoc.*, Philadelphia, 1876, Supplement to Vol. XXVII, p. 182. [2] See TABLE XXXV, No. 43, p. 280.

CASE 589.—Private T. Clark, Co. D, 2d New Hampshire Cavalry,[1] was wounded near Alexandria, Louisiana, May 4, 1864. Surgeon C. Powers, 160th New York, in charge of the Alexandria Hospital, reported his admission with "a wound of the right knee joint, a ball entering the inner condyle of the femur, passing behind the blood-vessels, and emerging two inches above the joint on the outer side. The internal condyle was shattered, but there was no appearance of injury to the blood-vessels. Prostration was not great, the pulse being 90, but not strong. Amputation was immediately advised, but the patient positively refused to submit to it, preferring rather to lose his life than his limb. Chloroform was then administered and excision was performed by Assistant Surgeon J. Homans, jr., U. S. A., removing two inches of the femur and half an inch of the tibia through a horizontal incision. The patient reacted slowly. The wound was brought together with sutures and the limb was placed in a fracture-box. A full anodyne was administered to enable the patient to sleep. Next morning all that part of the limb below the incision was found to be cold and without pulsation in any of the arteries. On May 5th, the patient was moved on board of a transport for the purpose of being conveyed to hospital at New Orleans. He continued to sink, and died." The records of the Hospital Steamer Laurel Hill show that the patient's death occurred on May 7, 1864. Four years afterwards the operator communicated the following additional information in the case: "My view of the cause of death is this: The bullet in its course lacerated somewhat the coats of the popliteal artery. The anastomosis was cut off by the division of the arterial branches of the popliteal in the incision, which was the usual semilunar one, running from the posterior edge of one condyle to the other. The dorsalis pedis beat strongly for several hours following the operation, after which pulsation gradually ceased in it, and the limb became cold and then gangrenous below the line of the incision and the bullet wound. Undoubtedly a clot formed in the popliteal, and, afterwards, the coats of the artery gave way more or less, thus causing the hæmorrhages. The weather was very hot and the hospital boat very crowded and on a narrow river; but these circumstances had nothing to do with the patient's decease, which was caused, I believe, by occlusion of the popliteal artery."

CASE 590.—Corporal S. B. Carlton, Co. I, 4th Maine, was wounded at Chancellorsville, May 3, 1863, and admitted to the field hospital of the 1st division, Third Corps. Surgeon E. L. Welling, 11th New Jersey, recorded: "Shot wound of left knee; resection of internal condyle of femur;" and reported the patient's death May 9, 1863.

CASE 591.—Private C. Crowley, Co. C, 8th New Hampshire, was wounded at Port Hudson, May 27, 1863, and entered the field hospital of the Nineteenth Corps. Surgeon M. D. Benedict, 75th New York, reported: "Shot wound of right knee by musket ball; resection." Surgeon A. H. Van Nostrand, 4th Wisconsin, recorded that the wounded man was admitted to hospital at Baton Rouge, May 30th, with a "shot injury to the right knee joint," of which he died June 17, 1863.

CASE 592.—Corporal C. Dewell, Co. F, 74th Indiana,[2] aged 27 years, was wounded by a round ball, at the taking of Missionary Ridge, November 25, 1863, the missile entering the inner aspect of the right knee joint, fracturing the inner condyle of the femur, passing obliquely downward and outward, and lodging in the head of the tibia. He was conveyed to hospital No. 6, at Chattanooga, where, on the next day, he was placed upon the operating table, when the wound was examined. On consultation it was determined to practise exsection as affording the best means of saving the man's life. A semilunar flap was resorted to, the incision including the wound made by the ball as well as the opening made in examining the wound. The patella, seven-eighths of an inch of the femur, and five-eighths of an inch of the tibia were removed; no arteries were tied—two or three were twisted with the forceps. The patient did well until about Christmas, when he began to show marked symptoms of nervous exhaustion, which continued to increase in spite of the most sustaining treatment. He gradually sank until January 18, 1864, when he died. The operation was performed by Surgeon J. Haller, 38th Ohio, and the history was communicated by Surgeon J. R. Arter, 31st Ohio.

CASE 593.—Private J. Forster, Co. C, 15th New York Artillery, was wounded before Petersburg, July 9, 1864, and entered the field hospital of the 2d division, Fifth Corps. Surgeon T. M. Flandrau, 146th New York, reported: "Severe shell wound of both legs. Exsection of left and part of right patella." Three days after the reception of the injury the patient was moved to the corps hospital at City Point, where he died July 25, 1864.

CASE 594.—Private *J. P. Goforth*, Co. K, 11th South Carolina, aged 25 years, was wounded near Petersburg, and sent to the division hospital in the city about two hours after the injury, June 24, 1864. Surgeon Samuel Logan, C. S. A., reported:[3] "A gunshot wound, penetrating the left knee joint obliquely, tearing away both articular surfaces, but producing no splintering of the cancellated structure or shafts, merely grooving the articular surfaces and fracturing the patella. The pulse was at 90, and there was slight shock or constitutional disturbance." As the general hospital where he could be permanently treated was less than a quarter of a mile from the place where he was wounded, and the excellent state of the patient's general health and nature of the wound were encouraging, Dr. Logan considered the case as one in which excision was justifiable, the patient preferring any risk to the loss of his limb. He was placed under chloroform a few hours after the injury, June 24, 1864, and the operation was performed by **H**-incision, the cross cut including both orifices of the wound. The contused soft parts were removed with the patella after the articular surfaces of the femur and tibia had been sawn off. The parts seemed to present favorable conditions for a speedy union. A long splint was applied to the wound. On June 28th, Dr. Logan found the patient comfortable, the pulse at 110, skin warm and moist. The wounds were slightly swollen but not painful. The limb was dressed with Smith's anterior wire splint and suspended, water dressing being employed by irrigation. July 1st, the patient was found restless, the pulse at 120; tongue dry; the wounds were erysipelatous in appearance and swollen. The patient sank and died. Surgeon Logan could not ascertain the precise date, but it was prior to July 14, 1864.

CASE 595.—Private G. Gregory, Co. K, 57th New York, aged 28 years, was wounded at Fredericksburg, December 13, 1862. Surgeon C. S. Wood, 66th New York, reported that he was admitted to the field hospital of the 1st division, Second

[1] See *Circular* No. 6, War Department, Surgeon General's Office, Washington, 1865, p. 59, and CULBERTSON (H.), *Excision of the Larger Joints of the Extremities*, Prize Essay, in *Transactions of the American Medical Association*, Philadelphia, 1876. Supplement to Vol. XXVII, p. 184, Case No. 15.

[2] See *Circular* No. 6, War Department, S. G. O., Washington, 1865, p. 58, and CULBERTSON (H.), *Excision of the Larger Joints of the Extremities*, in *Transactions of the American Medical Association*. Philadelphia, 1876. Prize Essay. Supplement to Volume XXVII, p. 182, Case 10.

[3] LOGAN (SAMUEL), *Report of Two Cases of Primary Resection at the Knee Joint for Gunshot Wounds*, in *Southern Med. and Surg. Jour.*, 1866, Volume XXI, p. 293.

Corps, with "exsection of the left knee joint, performed by some unknown surgeon," and that the limb was placed in a long padded splint, bandaged in its whole length, and dressed with cold-water applications. Surgeon W. Clendenin, U. S. V., reported that the patient was admitted to Emory Hospital, Washington, December 26, 1862, with gunshot wound, and that he died the same day.

CASE 596.—"Private *E. M. Hogston*, Co. D, 4th Virginia, aged 29 years, was wounded in the right knee joint, at Chancellorsville, May 3, 1863, a ball entering through the patella, fracturing the inner condyle and lodging. In addition there was a flesh wound of the same leg. The patient positively and persistently declined amputation, which was urgently recommended. As a final resort, resection was advised and accepted in preference to amputation. The operation was performed on May 5th, the joint being opened by an H-incision, and the fragments of the fractured patella removed with the ball lodged in the inner condyle. The synovial membrane and articular cartilages of the articular surfaces were carefully dissected out, and, in addition, a thin slice of bone was removed from the contiguous surfaces of the condyles and upper surface of the tibia, so that when the parts were brought into apposition an obtuse angle was formed at the joint site. The limb was firmly fastened to a well padded and suitably arranged posterior angular splint; the joint was dressed with dry lint and oiled silk covering. On May 10th, the wound was suppurating freely. 12th, still doing well. 14th, weaker, with tendency to diarrhœa. 15th, gangrene of thigh. 17th, patient died." The history was contributed by Dr. I. W. Walls, late Surgeon P. A. C. S., in November, 1877.

CASE 597.—Private J. Lambert, Co. E, 1st Michigan Cavalry, aged 33 years, was wounded in the left knee joint, at Cold Harbor, May 31, 1864. Surgeon W. H. Rulison, 9th New York Cavalry, reported that resection was performed at the field hospital of the 1st division, Cavalry Corps. Acting Assistant Surgeon S. Graham reported that the patient was admitted to Emory Hospital, Washington, June 7th, in a weak and debilitated condition, caused by a "shot fracture of the knee joint, the head of the tibia having been excised" before admission. Tonics, stimulants, and nourishing diet constituted the treatment, and water dressings and bandages were applied locally. The patient became delirious June 12th, and died June 16, 1864.

CASE 598.—Private E. Lewis, Co. B, 87th Pennsylvania, was wounded at Winchester, September 19, 1864. Surgeon R. Barr, 67th Pennsylvania, described his injury as a "severe wound of the right thigh by a minié ball, fracturing the condyles" of the femur, for which "resection" was performed at the field hospital of the 3d division, Sixth Corps. Acting Staff Surgeon N. F. Graham reported that the patient was admitted to the general field hospital at Sandy Hook six days after the date of the battle, and that he died of his injury, a "shot wound of the right knee," on October 10, 1864.

CASE 599.—Sergeant Henry J. Moore, Co. F, 7th Maine, aged 24 years, received, May 12, 1864, a shot wound of the left knee joint, at the battle of Spottsylvania. Surgeon F. M. Everleth, 7th Maine,[1] practised a primary total excision on the morning of the reception of the injury "by making an anterior incision across just below the joint, curving up over the external condyle, and joining at right angles an incision extending over the internal condyle; one inch and a half of the femur, with a conoidal ball implanted, was removed by sawing squarely through the condyles, and the articular surface of the tibia was removed, being bruised. No ligatures were required. The specimen was sent to the Museum at Washington with an account of the case." The patient was admitted May 24, 1864, to the Third Division Hospital, at Alexandria, with the left lower extremity in a fracture box, the wound being partially closed by sutures and discharging little pus. The patient was prostrated by the fatigues of transportation, and he died of exhaustion May 26, 1864.

CASE 600.—Private *I. Moore*, Co. B, 44th Alabama, received a shot fracture of the right knee joint October 1, 1864, for which resection by a semilunar flap was performed on the following day. The record of the case was found on the Confederate register of Howard Grove Hospital, Richmond, where the patient died October 22, 1864.

CASE 601.—Lieutenant *G. W. Pettigrew*, Co. A, 26th Georgia, was wounded and captured at Fredericksburg, December 13, 1862. Surgeon C. J. Nordquist, 83d New York, recorded his admission to the field hospital of the 2d division, First Corps, with "shot wound of left knee; patella removed." Acting Assistant Surgeon J. D. Robinson reported that the patient was admitted to the Patent Office Hospital, Washington, December 25th, and that he died of his injury, "a shot wound of left side and knee," December 30, 1862.[2]

CASE 602.—Dr. J. J. Knott, late Surgeon of the Confederate army, in a letter from Griffin, Georgia, November 6, 1868, makes mention of the following: "I practised excision of the knee joint in one case only. This was performed on a German, belonging to the Federal army, after the battle of the Wilderness, in May, 1864. The patient died from the effects of chloroform."

CASE 603.—Private J. Wheeler, Co. E, 97th New York, was wounded at Fredericksburg, December 13, 1862. Surgeon C. J. Nordquist, 83d New York, recorded his admission to the field hospital of the 2d division, First Corps, with "shot wound of knee; patella removed." On December 25th, the wounded man was admitted to the Patent Office Hospital, Washington, whence Assistant Surgeon G. W. Hoover, 132d Pennsylvania, reported that the patient died from the effects of a "wound of the left knee joint," February 1, 1863.[3]

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[1] At the date of the publication of this case in *Circular* No. 6, S. G. O., 1865, p. 59, the operator's name and the date of the excision were unknown; but these particulars were communicated in a letter to Assistant Surgeon General C. H. CRANE, dated Waldoboro,' Maine, March 26, 1868, by Dr. F. M. EVERLETH. The specimen, with the impacted ball in the condyles, and the account of the case, alluded to by Dr. EVERLETH, it has been impossible to trace in the Museum. See also CULBERTSON (H.), *Excision of the Larger Joints of the Extremities*, Prize Essay, in *Trans. Am. Med. Assoc.*, Philadelphia, 1876. Supplement to Vol. XXVII, p. 184, Case 16.

[2] A letter of inquiry was addressed, in February, 1868, by the editor to Dr. R. S. Dana, formerly Surgeon 107th Pennsylvania, who, in an answer dated March 23, 1868, states: "I have written to several of the surgeons who were there, to learn if possible more of the case than I can recollect; one answer only has been returned. From all that I can learn or remember of the case, Lieutenant Pettigrew was operated on by Dr. E. G. Chase, Surgeon 104th New York, and Dr. J. F. Hutchinson, at that time Surgeon of the 107th Pennsylvania. The operation was the resection of the head of the fibula, which was destroyed by a ball, the operation not involving the knee joint proper."

[3] In response to the editor's letter of inquiry, Dr. R. S. Dana, of Morrisville, Pennsylvania, formerly Surgeon 107th Pennsylvania, wrote under date March 23, 1868: "Private Jerome Wheeler I cannot be so positive about, but think that he was operated on by Drs. Nordquist and Coxe, Surgeons of New York regiments, and that in his case the joint was penetrated by a ball, and the operation consisted in the removal of the upper portion of the head of the tibia and the opposing surface of the condyles of the femur, calculating that bony union and a fixed knee would result, shortening the limb from 1 to 1½ inches. The result of the operation we know nothing about, as the hospital was cleared as rapidly as possible."

CASE 604.—Corporal *J. White*, Co. I, 21st South Carolina, aged 25 years, was wounded June 24, 1864, at Petersburg He was conveyed to the division field hospital in the city, and, two or three hours after the injury, was examined by Surgeon Samuel Logan,[1] C. S. A., who found that the missile, probably a conical musket ball, had passed through the external condyle of the right femur, laying open the joint freely and carrying away a portion of the articular surface. There was a slight flesh wound in the right arm. The case was considered favorable for excision, and the operation was done immediately by Dr. Logan, through an H-incision, removing an inch from the condyles of the femur, slicing off the top of the tibia, and removing all contused soft parts. The limb was bound to a long external splint. June 26th, the wounds were somewhat swollen, and the dressing had caused pain by undue pressure. The patient was restless, with pulse at 115. June 27th, general symptoms unaltered. The limb is as much swollen but is more comfortable since the dressings have been arranged. June 28th, the flesh wound in the arm is painful and swollen. The leg is less swollen, and union appears to be taking place. July 8th, general condition favorable; pulse 110; leg somewhat swollen. All retentive apparatus was removed; every movement of the body or limb thus disturbed the relations of the osseous surfaces. Dr. Logan did not see the patient again, but he heard that death occurred prior to July 15, 1864.

In three instances of primary excision at the knee joint recourse was had to amputation of the thigh. Death ensued in two, four, and thirty-nine days, respectively:

CASE 605.—Private J. W. Derr, Co. E, 7th Maryland, aged 18 years, was wounded at Hatcher's Run, March 31, 1865, and admitted to the field hospital of the 2d division, Fifth Corps. Surgeon A. A. White, 8th Maryland, reported: "A musket ball struck the patella of the right knee laterally, shattering the patella into a number of fragments, but not involving the knee joint proper. I excised the entire patella, carefully dissecting it from its covering." Surgeon A. F. Sheldon, U. S. V., reported that the patient was admitted to Campbell Hospital, Washington, April 5th, with the incised wound of the operation healing by first intention. After doing well for three weeks, inflammation commenced and suppuration became very great. Circular amputation through the lower third of the thigh was performed on May 15th, by Acting Assistant Surgeon F. Hall, after which there was favorable progress for a time. On June 10th, there were signs of morbid poisoning, and on June 15th the stump was opened, allowing a canal filled with pus to discharge. Death resulted from exhaustion June 23, 1865. The amputated part of the femur, together with the upper portions of the tibia and fibula, were contributed to the Museum by Surgeon Sheldon, and constitute specimen 4199 of the Surgical Section.

CASE 606.—Corporal A. Glazier, Co. B, 1st Minnesota, aged 29 years, was wounded at Reams's Station, August 25, 1864. Surgeon N. Hayward, 20th Massachusetts, reported the injury as a "shot fracture of the left knee joint," for which he performed excision at the field hospital of the 2d division, Second Corps. Surgeon D. W. Bliss, U. S. V., reported that the patient was admitted to the Armory Square Hospital, Washington, August 28th, in a low condition and suffering severe pain from nervous spasms of the limb, caused by a wound of the knee joint with slight fracture of the external condyle, the patella having been removed on the field. Circular amputation at the lower third of the thigh was performed by Acting Assistant Surgeon D. W. C. Van Slyck on the day after admission. Chloroform inhalation induced alarming symptoms, and electricity was resorted to. Opium and alcoholic and diffusible stimulants were administered. Gangrene appeared in the stump the second day and spread rapidly. Death resulted on September 2, 1864.

CASE 607.—Private W. E. L. Morrison, Co. I, 29th Connecticut, aged 21 years, was wounded near Richmond, October 27, 1864, and admitted to the Flying Hospital of the Tenth Corps. Surgeon M. S. Kittinger, 100th New York, recorded: "Shot wound of left knee; excision of knee by Surgeon A. C. Barlow, 62d Ohio." The subsequent progress and the result was reported by Assistant Surgeon E. McClellan, U. S. A., as follows: "The patient was admitted to hospital at Fort Monroe, October 30th, with shot fracture of knee joint. Circular amputation at the middle third of the thigh was performed on November 10th by Acting Assistant Surgeon J. Pitkin. Chloroform and ether constituted the anæsthetic. The patient died November 12, 1864, of exhaustion."

To the primary cases of excision at the knee here detailed should be added six instances observed by Professor Hunter McGuire,[2] of Richmond, formerly Surgeon of the Confederate States Army:

CASES 608–613.—"In May, 1864, at Spottsylvania Court House, the operation was performed in six cases by some surgeons sent from this city to our assistance. Not to subject them to the danger of transportation, I left these cases, with others too badly hurt to be moved, in a hospital, prepared for them near the field of battle, and in charge of one of the best surgeons in the army, Dr. Taylor, who gave them every possible attention. Three of them died before the end of the third day. In two of the cases, secondary amputation was performed with a view of preserving life, but unsuccessfully, and the sixth lingered for about four weeks, I think, and proved fatal from sheer exhaustion. Such, as far as I can gather, is the melancholy record, and although the number is too small to justify a comparison with amputation, I do not think there is any one who saw the six patients I have reported—men who a day or two before were stout, strong and brave soldiers—who would not agree with me in saying, this operation for wounds occurring upon the battle field is nothing more nor less than butchery."

Primary Excisions at the Knee Joint of Undetermined Result.—The results of two of the thirty-two primary excisions at the knee joint could not be ascertained:

CASE 614.—Private *A. McDowell*, Co. K, 1st North Carolina, received a shot fracture of the patella and the external

[1] LOGAN (S.), *Report of two cases of Primary Resection at the Knee Joint for gunshot wound; death resulting in both cases*, in *Southern Medical and Surgical Journal*, 1866, Vol. XXI, p. 295.

[2] MCGUIRE (HUNTER), *Clinical Remarks on Gunshot Wounds of Joints*, delivered January 10, 1866, at Howard's Grove Hospital, in *Richmond Medical Journal*, 1866, Vol. I, p. 263. CULBERTSON (H.), *Excision of the Larger Joints of the Extremities*. Prize Essay, in *Trans. Am. Med. Assoc.*, Philadelphia, 1876. Supplement to Vol. XXVII, pp. 184, 186.

condyle of the femur by a minié ball, at Hanover Junction, May 24, 1864. He was admitted to the Receiving and Wayside Hospital, Richmond, where, on May 26th, he was placed under the influence of chloroform, and excision of the fractured parts was performed by Surgeon C. B. Gibson, C. S. A. Splints and water dressings were used after the operation. Reaction was fully established on the following day. On May 30th, the wound looked well, and the patient was transferred to another hospital at the request of Dr. Gibson. The record of the case was obtained from the Confederate register of the Receiving and Wayside Hospital, Richmond.

CASE 615.—Among the names of wounded men admitted to the Nineteenth Corps field hospital from the battle of Port Hudson, May 27, 1863, Surgeon M. D. Benedict, 75th New York, includes that of "Private A. W. Mousky, Co. B, 4th Wisconsin," whose injury was reported as follows: "Shot wound of right leg; excision of knee joint." It has not been practicable to ascertain the termination of the case.

Intermediary Excisions at the Knee Joint.—Thirteen cases were referred to this group; one only proved successful, a ratio of fatality of 92.3 per cent. The operations were practised on ten Union and three Confederate soldiers.

Recovery after Intermediary Excision at the Knee Joint.—A successful intermediate operation[1] was performed on a captain of the Confederate army wounded at Mine Run, November 27, 1863. He was last heard from in 1877, fourteen years after the operation. He then experienced only little disability, principally due to shortening, and he could walk for miles without fatigue.

CASE 616.—Captain *Charles Knowlton*, 10th Louisiana, of Ewell's Corps, aged 26 years, was wounded at Mine Run, Virginia, November 27, 1863, by a conoidal musket ball, which grooved the outer condyle of the right femur, barely touched the cartilage, opened the synovial sac, was deflected, and lodged near the upper edge of the patella, whence it was removed, on the field, through an incision, after the wounded man had walked half a mile to the rear leaning on the shoulder of one of his men. He was then transported over rough roads in an ambulance to the nearest railway station, and conveyed to Richmond, and entered general hospital No. 4 two days after receiving the injury. His condition on admission was good. There appeared to have been no hæmorrhage. The movements of the knee joint were perfect. Moist dressings, absolute rest, and saline aperients were ordered. On December 2d, a serous or synovial discharge from the wound was observed. This became slightly puriform on the following day. Still there was no mark of inflammatory reaction. On December 8th, there was much pain in the joint and the discharge was increased. Warm fomentations were substituted for the cold dressings. His pulse rose to 104. On the 9th, the joint was excessively inflamed and the pulse was 128. Surgeon James B. Read, P. A. C. S., in consultation with Surgeons C. B. Gibson and M. Michel, decided that excision of the joint was expedient. The operation was performed by Surgeon Read. An elliptical incision with its concavity upward was made to extend from one condyle to the other, passing below the patella and dividing its ligament. The joint was then laid open, and an inch and a half of the condyles of the femur and an inch of the tibia were sawn off. The patella was also removed. No ligatures were required. The section of the femur was made obliquely downward and backward; the section of the tibia was the reverse of this, so that when the extremities were approximated the limb was slightly flexed. The synovial sac was reddened and contained a turbid flocculent fluid. The sawn ends of the bones were then wired together. The limb was then placed in a long well padded fracture box. After a few days a long bracketed splint was substituted for the fracture box. He had a liberal stimulating diet of eggs, oysters, and beef tea, with half an ounce of brandy every two hours. The patient was restless and irritable, and on December 16th, and again on the 20th, had venous hæmorrhage to the extent of a few ounces, the bleeding being arrested on both occasions by the use of persulphate of iron. There was tumefaction about the joint and burrowing of pus, until Acting Assistant Surgeon Howell L. Thomas suggested a suspension of the limb by Smith's anterior splint. By January 3d, the internal half of the horse-shoe incision had closed. The patient enjoyed an excellent appetite, which was appeased by venison, turkey, partridges, and other hearty food, and a pint of porter daily. By the middle of February there was only a small fistulous orifice remaining of the wound, which discharged a thin, sero-purulent matter. A starch bandage was now applied, with an aperture over the unhealed portion of the wound. All the wires had been removed at this date except one. In March, the patient sat up daily and attempted to walk on crutches. In April, he was discharged from the hospital; his limb was supported by a leathern splint. There was still slight motion between the femur and tibia, but the ligamentous union appeared quite firm. He subsequently went to the West Indies. At Nassau, Dr. Hunt, of New Orleans, removed the starch bandage and found the consolidation was very firm. In a few months Captain *Knowlton* laid aside his crutches and walked very satisfactorily. He returned to Louisiana in 1866. He was able not only to walk almost as well as ever, but to dance even the round dances. His address as a purser on the steamship "Senator," one of the Pacific mail steamers plying between San Francisco and San Luis Obispo, having been discovered, Surgeon Charles McCormick, U. S. A., at San Francisco, examined his limb, December 17, 1868, and had prepared the photograph from which FIGURE 1 of the lithographic plate (PLATE LXV) opposite p. 386 was taken. There was no evidence of disease about the cicatrix. The muscular development of the limb was good; and the inability to flex it at the knee was the only inconvenience suffered, a result as gratifying as it is unusual. A letter from Surgeon Charles C. Keeney, U. S. A., Medical Director at San Francisco, dated April 20, 1877, mentioned that he had met Captain *Knowlton* about a year previously and learned that he experienced no disability save that due to the shortness and stiffness of the limb, and walked for miles without fatigue.

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[1] DE ROSSET (M. J.), READ'S *Case of Excision of Knee Joint*, in *Confederate States Medical and Surgical Journal*, 1864, Vol. I, p. 83, and *Savannah Journal of Medicine*, 1866, Vol. V, N. S., p. 33; READ (J. B.), *Report on Wounds of Large Joints, made to the "Confederate States Association of Navy and Army Surgeons," Richmond, Va.*, 1864, in *Southern Medical and Surgical Journal*, 1866, Vol. I, 3d series, p. 213, and *New York Medical Journal*, 1866, Vol. III, p. 73.

Fatal Instances of Intermediary Excision at the Knee Joint.—This group comprises twelve cases, ten in the Union and two in the Confederate armies:

FIG. 241.—The inner half of the right patella, in two fragments. *Spec.* 1065.

CASE 617.—Private O. Derocher, Co. I, 1st Maine Heavy Artillery, aged 31 years, was wounded in the right knee, at Spottsylvania, May 19, 1864, by a conoidal musket ball, which fractured and comminuted the patella. Three days after the reception of the injury he was admitted to Emory Hospital, Washington, the soft parts about the knee being badly swollen. On May 23d, the inner half of the patella was excised by Surgeon N. R. Moseley, U. S. V. The operation was followed by cold-water dressings. By May 30th erysipelas had invaded the limb, for which carron oil and copper wash was applied, and tincture of iron was administered. Stimulants and generous diet were allowed liberally. The patient died from the effects of constitutional irritation and exhaustion, June 10, 1864. The history and the excised bone (FIG. 241), consisting of two fragments (*Cat. Surg. Sect.*, 1866, p. 363, *Spec.* 1065), were contributed by the operator.[1]

FIG. 242.—Left knee after excision. *Spec.* 629, A. M. M.

CASE 618.—Private Charles F. Gould, Co. I, 1st Pennsylvania Reserves, was wounded at the second battle of Bull Run, August 30, 1862. A musket ball appeared to have entered the outer side of the joint near the head of the tibia. The patient was sent to Fairfax Seminary Hospital, near Alexandria, September 9, 1862. On September 15th, an excision of the knee joint was performed. The condyles of the femur, the patella, and the heads of the tibia and fibula were removed through an H-shaped incision. The wound united, and there seemed every prospect of a satisfactory result, when, on October 8th, symptoms of pyæmia were developed, and death ensued October 12, 1862. The pathological preparation was forwarded to the Army Medical Museum by Acting Assistant Surgeon T. O. Bannister. The specimen represented in the left-hand wood-cut (FIG. 242) shows the osseous portion, while the appearance of the soft parts are shown in the right-hand wood-cut (FIG. 243). (See *Cat. Surg. Sect.*, 1866, pp. 336, 500.)[2]

FIG. 243.—Soft parts from same excision. *Spec.* 600.

CASE 619.—Corporal G. W. Hays, Co. K, 2d Michigan, aged 19 years, was wounded in both knees, at Petersburg, June 17, 1864. Surgeon R. B. Bontecou, U. S. V., reported: "He was admitted to Harewood Hospital, Washington, June 20th, suffering from amputation at the lower third of the thigh, performed on the field for a shot wound of the knee joint by a ball, which fractured the condyles of the femur and the patella. The right knee was also wounded, a ball entering the joint, fracturing the patella, and denuding the condyles of the femur and the head of the tibia. Extensive suppuration followed in the right knee, and an abscess burrowed half way up the thigh; the joint itself became entirely disorganized and much swollen." On June 24th, resection of about two-thirds of the condyles of the femur, with the entire patella and the articular face of the tibia, was performed by Surgeon R. B. Bontecou, U. S. V. Sulphuric ether was used as the anæsthetic. The stump of the left thigh progressed very satisfactorily towards healing, while the resected joint commenced to fill up with healthy granulations also and looked well in other respects. Profuse suppuration of healthy looking pus, however, continued. The constitutional treatment was mainly directed towards supporting the strength of the patient, and consisted of stimulants, tonics, and nourishing diet. The right thigh and leg were supported and kept in place by means of a wide board, to which a bag of bran was attached and so arranged as to embrace the parts on either side, it being readily adjusted and kneaded to suit the manipulations during dressing. The entire extremity, from the foot to the great trochanter, was confined in a Scultetus' bandage. The patient did tolerably well up to June 30th, from which date he became drowsy and was only waked with difficulty. He continued so, with intervals of wakefulness, until his death, which occurred on July 2, 1864, from exhaustion. There were no pyæmic symptoms. The exsected patella and condyles of the femur were contributed to the Museum by the operator and are represented in the cut (FIG. 244).[3]

FIG. 244.—The patella and condyles of the right femur. *Spec.* 3046.

CASE 620.—"Private *J. W. Holtzman*, Co. B, 2d Virginia, about 35 years of age, was wounded at Chancellorsville, May 3, 1863, a ball entering the knee joint through the patella and lodging in the head of the tibia. The patient persistently declined amputation and other active interference until much suffering and pain induced him to accept the chances of a resection, which was reluctantly performed on May 10th. The joint was laid open by a semilunar incision, the synovial membranes and cartilages were removed, and thin slices of the contiguous surfaces of the condyles and head of tibia were taken off. The limb was placed in a posterior angular splint and carefully watched. The patient, however, finally succumbed to diarrhœa and exhaustion about May 20, 1863." The history of the case was communicated by Dr. I. W. Walls, late Surgeon P. A. C. S., in November, 1877.

CASE 621.—Private M. B. Horan, Co. F, 63d New York, was wounded at Antietam, September 17, 1862, and entered Frederick Hospital one week afterwards. Surgeon H. S. Hewit, U. S. V., contributed the pathological specimen (*Cat. Surg. Sect.*, 1866, p. 290, *Spec.* 445), and reported the case as a "partial resection of the knee joint, performed, October 4th, for a shot injury of the condyles of the femur, and followed by death October 14, 1862." The specimen consists of thirteen minute fragments of dead bone.

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[1] See also CULBERTSON (H.), *Excision of the Larger Joints of the Extremities*, in *Trans. Am. Med. Assoc.*, Philadelphia, 1876. Supplement to Vol. XXVII, p. 188, Case 11.

[2] *Circular* No. 6, War Department, S. G. O., Washington, 1865, p. 60; CULBERTSON (H.), *Excision of the Larger Joints of the Extremities.* Prize Essay, in *Trans. Am. Med. Assoc.*, 1876, p. 182, Case 8.

[3] *Circular* No. 6, War Department, S. G. O., Washington, 1865, p. 59; CULBERTSON (H.), *Excision of the Larger Joints of the Extremities.* Prize Essay, in *Transact. Am. Med. Assoc.*, Philadelphia, 1876. Supplement to Vol. XXVII, p. 184, Case 17.

CASE 622.—Private H. Lawson, Co. D, 36th Colored Troops,[1] aged 17 years, was accidentally wounded March 5, 1864, and entered Point Lookout Hospital six days afterwards. Surgeon A. Heger, U. S. A., reported: "He was admitted with shot fracture of the right knee joint, caused by a conical musket ball, which entered one-half inch inside of the tuberosity of the tibia and emerged at the middle of the popliteal space. The knee joint was inflamed and suppurating; the patient, suffering from acute bronchitis, was otherwise in good constitutional condition. On March 12th, resection of the knee joint was performed by a longitudinal incision seven inches long over the anterior border of the internal lateral ligament, dividing the capsule and crucial ligament, and removing the fractured portions of the tibia and the articular cartilages. All the cartilaginous covering of the femur and the tibia was removed with a scraper; the synovial membrane was destroyed by iodine; no arteries ligated; wound closed by sutures of iron wire. The anæsthetic, consisting of chloroform, acted well for forty-five minutes. After the operation, which was performed by Acting Assistant Surgeon T. Liebold, the limb was placed at once in a plaster of Paris splint, enclosing the whole extremity. The next day an opening was cut over the wound so as to permit its being syringed with tepid water four times a day. Solution of permanganate of salts was also applied, and oakum was used to absorb the discharge. For the bronchial affection wine of antimony and infusion of ipecacuanha was prescribed. The patient died during a paroxysm of coughing, March 24, 1864. The *post-mortem* examination exhibited extensive inflammation of the bronchii, the smallest ramification being filled with pus; other organs healthy. The parts operated on looked well. Good pus was found in the bursa mucosa quadriceps."

CASE 623.—Private J. Miller, Co. A, 3d Pennsylvania Cavalry,[2] aged 38 years, was wounded at Mine Run, November 27, 1863, by a conical ball, which entered the right knee above and internal to the patella and emerged below and external to that bone. The missile fractured the patella, denuded the external condyle of the femur of a portion of its articulating surface, and fractured the outer articulating surface of the tibia. The wounded man was admitted to the Third Division Hospital, Alexandria, December 5th, considerably prostrated and the parts being tumefied. Two days after admission chloroform was administered and resection was performed by Surgeon E. Bentley, U. S. V., who removed the patella and half an inch of the articulating surfaces of the femur and tibia. The subsequent treatment consisted of simple dressings, tonics, stimulants, and nourishing diet. There was profuse suppuration. The patient progressed favorably for one week, when he was seized with chills accompanied by loss of appetite, quick and feeble pulse, and sallow hue of skin. He died of pyæmia December 18, 1863. The history was reported by the operator.

CASE 624.—Sergeant G. Northard, Co. G, 2d Ohio Cavalry,[3] aged 23 years, was wounded at Five Forks, April 1, 1865. Surgeon W. W. Bowlby, 3d New Jersey Cavalry, reported his admission to the field hospital of the 3d division, Cavalry Corps, with "severe shot wound of right knee." Surgeon R. B. Bontecou, U. S. V., in charge of Harewood Hospital, Washington, subsequently operated on the injured limb, of which he contributed a photograph (*Contr. Photo's*, S. G. O., Vol. I, No. 41), with the following history: "The patient was admitted April 5th. He had been wounded by a ball entering just above the patella, through which it passed and which it fractured into six fragments. Ranging downward and outward the missile fractured the external condyles of the femur and escaped. On April 8th, the patient was etherized, when the fractured patella and a fragment of the external condyle of the femur were removed. The constitutional state of the patient at the time of the operation was very good. After the operation the limb was placed in a box containing bran and the patient was put on low diet. Subsequently the limb was placed upon a light open splint, extending from the tuberosity of the ischium to a point near the heel, and suspended by a cord. The patient was put on nutritious diet, with wine and porter. On April 13th, he was transferred to a tent ward. Up to this time he had suffered considerable pain in the joint and was very restless and irritable. His appetite now became poor, and hiccough and vomiting set in. Suppuration was profuse. The patient died April 22, 1865, from exhaustion."

CASE 625.—Private J. Noble, Co. D, 30th Ohio, was wounded at South Mountain, September 14, 1862, and admitted to hospital No. 5, Frederick, four days afterwards. Surgeon H. S. Hewit, U. S. V., recorded: "Comminuted fracture of right knee by minié ball. Excision of a large portion of knee joint on September 30th. Death on October 5, 1862."

CASE 626.—Private *D. F. Rogers*, Co. I, 49th Georgia,[4] aged 34 years, was wounded at Petersburg, April 2, 1865, by a musket ball, which struck the right knee joint anteriorly, passed through the patella, comminuting it completely, and the outer condyle, and made its exit at the outer posterior aspect. He was admitted to the general hospital at Fort Monroe, April 13th. Surgeon D. G. Rush, 101st Pennsylvania, who operated in the case after applying an anæsthetic composed of chloroform and ether, reported as follows: "My attention was called to the case on April 18th, when the patient was suffering from great pain, and the knee, leg, and thigh were extremely swollen. A dense fibrous involucrum of the joint closed the track of the ball, thus preventing the escape of pus. I at first decided to lay the joint freely open and to remove the patella only, but discovering the disorganized and injured state of the condyles, they were also removed, with little hope of saving the patient, however, the operation being performed at too late a period. A piece of catheter was fixed in the joint to drain it. Cold-water dressings were applied. The patient rallied perfectly and lived comfortably for six days. He died of exhaustion the eighth day. He could not have survived amputation twenty-four hours. I think this operation could be performed with success primarily in cases in which the patella and condyles alone are involved." The excised bones were contributed to the Museum by the operator, and are represented in the cut (FIG. 245).

FIG. 245.—Bones of right knee excised. *Spec.* 4212.

[1] CULBERTSON (H.), *Excision of the Larger Joints of the Extremities.* Prize Essay, in *Trans. Am. Med. Assoc.*, Philadelphia, 1876. Supplement to Vol. XXVII, p. 190, Case 17.

[2] See CULBERTSON (H.), *Excision of the Larger Joints of the Extremities.* Prize Essay, in *Trans. Am. Med. Assoc.*, Philadelphia, 1876. Supplement to Vol. XXVII, p. 184; *Circular* No. 6, War Department, S. G. O., Washington, 1865, p. 59.

[3] CULBERTSON (H.), *Excision of the Larger Joints of the Extremities.* Prize Essay, in *Trans. Am. Med. Assoc.*, Philadelphia, 1876. Supplement to Vol. XXVII, p. 186, Case 29.

[4] See *Circular* No. 6, War Department, S. G. O., Washington, 1865, p. 60; CULBERTSON (H.), *Excision of the Larger Joints of the Extremities.* Prize Essay, in *Trans. Am. Med. Assoc.*, Philadelphia, 1876. Supplement to Vol. XXVII, p. 186, Case 30.

CASE 627.—Corporal J. Sims, Co. B, 4th Ohio,[1] aged 23 years, was wounded at Mine Run, November 27, 1863, by a conoidal ball, which entered the right knee joint just below the patella, on the inner and anterior aspect, fracturing the inner condyle and opening the joint, passed downward and forward, and was extracted about four inches from point of entrance. He was admitted to the Third Division Hospital, Alexandria, December 5th. "At the time of admission the joint and thigh were very much inflamed and discharging pus copiously, and the man was much prostrated and terribly anxious as to the result of the wound. But after being washed and fed and otherwise cared for, he appeared much recruited. On the 8th of December the operation of excision of the knee joint was performed by Surgeon E. Bentley, U. S. V., who removed one inch of the femur and about one and a half inches of the tibia and fibula. The hæmorrhage was slight, but the condition of the tissues was not very satisfactory. The patient endured the operation well under the influence of chloroform, and reacted well. On the following day he complained of severe pain over the lung on the right side of the chest, which continued for several days. On the 10th, he had a severe chill at night, which was followed by two, more severe, on the 11th. Stimulants were freely given with raw eggs well beaten up, and beef essence for diet. He continued to have chills till the night of the 13th, when he was seized with a very severe one, from which he never rallied. He died on the morning of December 14, 1863. The *post-mortem* examination showed no attempt at repair, there being considerable sloughing, while on the inside of the thigh there were numerous small abscesses. The heart and left lung were healthy, but the right lung was infiltrated with pus, and a single large abscess appeared upon the surface of the inferior lobe. There was no pus nor abscess found in the liver, but it was very much softened." The history, with the *post-mortem* specimen, represented in the cut (FIG. 246), was contributed to the Museum by the operator. Surgeon J. B. Brinton, U. S. V., who examined the limb two days after the patient's decease, found "the whole joint one suppurating mass; pus extending up and down, far down under the gastrocnemius and up between the muscles on the inside of the thigh; a long abscess in the sheath of the vessels, extending up to the middle of the thigh; small clot in femoral artery, thin and three inches long; none in femoral vein; surrounding tissues of vessels hardened in some places where pus had not reached; long membrane of femoral vein of dirty gray color and softened; clot in saphena vein."

FIG. 246.—Right femur, tibia, and fibula, after excis'n of joint surfaces. *Spec.* 1909.

CASE 628.—Corporal I. Wells, Co. A, 33d Wisconsin,[2] aged 42 years, was wounded at Tupelo, July 15, 1864, and admitted to Adams's Hospital, Memphis, five days afterwards. Assistant Surgeon J. M. Study, U. S. V., reported: "Shot wound of left knee by a conical ball, fracturing the patella and opening the joint; missile emerged over internal condyle. On July 21st, the inner third of the patella was removed through a vertical incision by Acting Assistant Surgeon R. W. Coale. The constitutional condition of the patient at the time of the operation was good. Cold-water dressings were applied to the parts, and stimulants, with beef juice, was given freely. The patient appeared to improve up to July 26th, after which date he commenced to decline. Pyæmia developed on July 29th, and from that time he continued in a comatose condition. Death resulted on August 2, 1864."

Secondary Excisions at the Knee Joint.—Seven examples of secondary excision at the knee joint are recorded; four were successful and three fatal, a rate of mortality of 42.8 per cent. The patients were all Union soldiers.

Examples of Recovery after Secondary Excision at the Knee Joint.—Of the four patients of this group, two were pensioners in 1880; one has never applied for a pension, and one died two years and a half after the operation:

CASE 629.—Private E. Jewell, Co. I, 8th New Jersey, aged 19 years, was wounded at Williamsburg, May 5, 1862, a musket ball fracturing both bones of the right leg near their articulation at the knee. He was sent to Hygeia Hospital, Fort Monroe, and thence in the following month to Philadelphia, where he entered Fifth Street Hospital on June 8th. Acting Assistant Surgeon A. C. Bournonville, in charge of the latter, reported that "the leg was bent at a right angle with the thigh and had been in that position since the injury. Caries had taken place, and an excision of the head of the fibula and partial resection of the head of the tibia was performed. The patient is now (November 6th) doing well, and has been able to rise and walk about the ward with the aid of crutches." The patient was subsequently transferred to Haddington Hospital, and was discharged February 23, 1863, and pensioned. Pension Examiner A. W. Woodhull, of Newark, October 24, 1868, described the injury: "A conoidal ball fractured both bones of the right leg just below the knee joint. Large portions of bone have been lost either by operation or nature. The bones are now extensively necrosed and enlarged, and there are two large sinuses, which always suppurate. The leg is shortened four or five inches," etc. The Newark Board reported, in September, 1875, that the limb is greatly atrophied and deformed. Two years later the same board reported "contraction of muscles of calf, producing talipes equinus; anchylosis of ankle and partial of knee. Wound open." The pensioner was paid March 4, 1880.

CASE 630.—Private J. E. Berry, Co. B, 5th Missouri State Militia, aged 22 years, was wounded by guerrillas in Carroll County, Missouri, December 1, 1862, a musket ball fracturing the external condyle of the femur and lodging in the knee joint. Acting Assistant Surgeon J. Thorne, who described the injury, reported that the wounded man was successfully treated in hospital at Kansas City for pyæmia, the systemic infection of which had appeared prior to the patient's admission, and was attended with formation of pus in the knee joint. In addition, Dr. Thorne also reported that the operation of removing the external condyle of the femur, together with the bullet, was performed on May 10, 1863, the missile being found embedded in the articulation.

[1] See *Circular* No. 6, War Department, S. G. O., Washington, 1865, p. 59; CULBERTSON (H.), *Excision of the Larger Joints of the Extremities.* Prize Essay, in *Trans. Am. Med. Assoc.*, Philadelphia, 1876. Supplement to Vol. XXVII, p. 184, Case 13.

[2] See CULBERTSON (H.), *Excision of the Larger Joints of the Extremities.* Prize Essay, in *Trans. Am. Med. Assoc.*, Philadelphia, 1876. Supplement to Vol. XXVII, p. 190, Case 15; *Circular* No. 6, War Department, S. G. O., Washington, 1865, p. 60.

The records of the hospital do not show the exact dates of admission or disposition of the patient. Adjutant General S. P. Simpson, of Missouri, communicated that Berry was mustered out of service June 22, 1863. There is no record of his ever having applied for pension.

CASE 631.—Private J. Friel, Co. F, 2d Kentucky, aged 29 years, was wounded in the right knee joint, at Chickamauga, September 19, 1863. Dr. G. E. Fuller, of Brooklyn, late Surgeon U. S. V., reported the following history: "The wound was caused by a musket ball, which entered just over the external condyle of the femur, passed obliquely downward and inward, and emerged at the junction of the middle and lower thirds of the tibia. He was in the hands of the rebels for eleven days, and was then taken to hospital No. 3, at Chattanooga. On January 18, 1864, he was transferred to hospital No. 8, at Nashville, where he first came under my observation. At this time the leg was flexed upon the thigh at something less than a right angle. Anchylosis of the knee joint had taken place and the patella was firmly attached to the condyles of the femur. Both the original wounds were healed, but there was still some purulent discharge from an abscess about four inches below the knee joint. Under a general tonic treatment he rapidly improved in strength and flesh, the abscess healed, and he was about the ward on crutches, being anxious to be discharged. On March 19th, he was transferred with other convalescents, and I lost sight of him. I had no reason to doubt the entire recovery of this patient, after a fracture of the femur and also a wound of the knee joint. The external treatment consisted of cold-water dressings." Surgeon G. F. French, U. S. V., under whose notice the patient came before his transfer, in a communication citing instances of successful conservatively treated cases of shot fractures of the knee joint, corroborated Dr. Fuller's description of the wound and its results, and added that the missile in its course "fractured the head of the tibia into the joint." The patient subsequently entered Jeffersonville Hospital, and lastly Main Street Hospital, Covington, where he was mustered out, by expiration of service, January 26, 1865, and pensioned. About twenty months afterwards the pensioner, with his injured knee joint in a diseased condition, entered the Good Samaritan Hospital, at Cincinnati. Dr. G. W. Haile,[1] the resident physician, reported: "The patient, being in an anæmic condition on admission, was ordered iron and generous diet, under which his health soon began to improve. On October 15, 1866, Professor G. C. Blackman operated for the removal of the dead bones, which could be readily felt with the probe. A crucial incision was made along the outer aspect of the joint, when some detached fragments of bone were found and removed, as was also the outer portion of the head of the tibia, which was in a carious condition. The wound healed very kindly, and the parts seemed for a while to be in a healthy condition; but in the course of a month from this operation the patient suffered at times violent pains in the part, and, on the 20th of November, a large collection of pus had formed in the joint, nearly a pint, mingled with fragments of necrosed bone, having been discharged during the twenty-four hours. His health began again to fail, but under the influence of tonics and a generous diet it was so far improved on the 14th of December, that Professor Blackman, in the presence of the class of the Medical College of Ohio, exsected the joint. An incision, resembling the letter **H**, was made on the anterior aspect of the joint, exposing the articular surfaces of the tibia and femur. With the ordinary amputating saw an inch and a half of the condyles of the femur, in a softened and carious condition, was removed, together with about one inch of the head of the tibia. The bone-gouge forceps were then employed to take away every suspicious looking portion and to round off the posterior margins of the divided surfaces, so as to render the popliteal vessels less liable to injury. The patella was removed. As the leg had been for a long time somewhat flexed upon the thigh, it was necessary to resort to considerable and prolonged force to overcome this contraction. At length the ends were found to be in apposition, and more of the soft parts included, when the flaps were brought together, and the limb was placed in a neat and carefully padded fracture box. During the operation the loss of blood was trifling; but shortly after the patient had been removed to his bed considerable hæmorrhage occurred. It appeared to come from no particular vessel, but there was a general oozing from the cut surfaces, which lasted several hours. The dressings were not disturbed for four days, the blood being wiped away as far as practicable, with a sponge, while the odor of that which could not be removed without disturbing the parts was corrected by disinfectants. Cold applications were applied over the joint; but little irritation followed, and the transverse incision healed by primary adhesion. A little pus was discharged for several days through the lateral incisions, after which it became very slight, and on the twenty-first day the entire wound seemed to have almost perfectly united. On the eighteenth day after the operation there was secondary hæmorrhage from a small superficial vessel and about ten or twelve ounces of blood were lost before it was discovered. It was readily controlled by pressure. Although perfect union between the tibia and femur seemed about this time to have taken place, the patient was ordered to remain perfectly quiet until the end of the eighth week, when he was allowed to walk on crutches. Just ten weeks from the operation he left for his home in Ironton, Ohio, and from a letter since received from him he seems highly pleased with the result of the operation." Examining Surgeon G. K. Taylor, of Cincinnati, June 25, 1867, certified to the injury and that "the joint is completely anchylosed, with the leg shortened several inches. He has also 'talipes equinus' of the right foot." Examining Surgeon D. C. Wilson, of Ironton, Ohio, at several subsequent examinations, also described the leg as "anchylosed in a straight

FIG. 247.—Appearance of right knee after excision of the patella and the articular ends of the femur and tibia. [From a photograph.]

[1] HAILE (G. W.), *Good Samaritan Hospital, Surgical Clinic, by* Prof. BLACKMAN. *Exsection of the Knee Joint for Gunshot Injury*, in *Cincinnati Journal of Medicine*, 1867, Vol. II, p. 157.

position, with four inches shortening." Examiner C. K. Crennit, of Jackson, Ohio, on April 29, 1879, reported the "muscles below the wound considerably atrophied, but sufficient to bear the weight of the body." The pensioner was paid December 4, 1879. The wood-cut (FIG. 247) is a representation of a photograph contributed by the operator.

CASE 632.—Private S. Miller, Co. L, 1st Missouri State Militia Cavalry,[1] aged 27 years, was accidentally shot in the right knee, by the discharge of his pistol, near Independence, December 28, 1862. The ball passed through the outer condyle of the femur, going obliquely through the patella and lodging in the head of the tibia. Three months after the injury the wounded man entered the Kansas City Hospital, where, on April 7, 1863, Acting Assistant Surgeon J. Thorne performed excision of the outer condyle of the femur, with part of the shaft, removing, by an oblique section, two and a half inches of the femur, together with the patella and the articulating surface of the tibia. No anæsthetic was used. At the time of the operation the leg had become extensively inflamed, the wound was found full of shattered bone, and an extraordinary amount of pus was coming out of the joint. Metastatic abscesses had appeared in the popliteal space. The patient had been suffering from severe pain and was almost insensible; pulse 120 and feeble. He had also severe diarrhœa and was much emaciated, his skin being dark and dry almost like parchment. The patient sank after the operation, but on the next day he revived and continued to do well. London porter was given as tonic. Complete union took place and complete anchylosis resulted, with the limb bent about ten degrees, so as to be almost as good as ever in walking. The details of the case were reported by the operator. The patient was discharged from service December 7, 1863, and pensioned. He died August 15, 1865. Dr. F. A. Simmons, of Rochester, Missouri, certified that he attended the pensioner from the time he returned to his home, and found that the injury had produced extensive suppuration, involving the leg and the thigh; also that he was very much emaciated, and that metastatic or pyæmic abscesses appeared in various parts of his body, which caused his death.

Fatal Cases of Secondary Excision at the Knee Joint.—Three instances are recorded. In one the entire knee joint was excised; in the second case the patella was removed; and in the third case the heads of the tibia and fibula were resected:

CASE 633.—Private G. Lewis, Co. B, 19th Indiana,[2] aged 22 years, was wounded at Gettysburg, July 1, 1863. He remained for two months at the First Corps field hospital, was then admitted to Camp Letterman, and subsequently transferred to Baltimore, where he entered McKim's Mansion and afterwards Jarvis Hospital. Assistant Surgeon D. C. Peters, U. S. A., in charge of the latter, reported: "The patient was admitted November 17th, with a wound of the right knee joint by a round musket ball, which lodged in the inner condyle. The position of the missile was detected by the Nélaton probe. Two weeks after the date of admission the wounded joint was in a state of disorganization and pouring off a large quantity of highly offensive pus, and the entire knee joint was excised by Acting Assistant Surgeon F. Hinkle, the patient having protested against amputation. Ether was used and an **H**-incision employed; wire sutures were applied to draw the sawn bones together. At the time of the operation the patient was feverish and unable to sleep from pain in the wound; pulse 100; skin dry; secretions scanty; appetite wanting. On the twelfth day he was seized with a violent chill, which lasted two hours and recurred every other day. Death resulted from pyæmia on December 23, 1863. At the autopsy both lungs were found filled with pus, the right being covered with abscesses. Six ounces of pus was also discovered in the left pleural cavity and four ounces of fluid in the pericardium. The wounded parts were healed externally and the bones in apposition; but no signs of union were manifest." The excised bone, embracing five-eighths of an inch of the upper extremity of the tibia and nearly two inches of the lower portion of the femur, with the bullet remaining lodged in the inner condyle, was contributed to the Museum by the operator, and is represented in the annexed cut (FIG. 248).

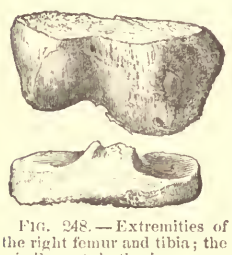

FIG. 248.—Extremities of the right femur and tibia; the missile rests in the inner condyle. *Spec.* 1956.

FIG. 249.—Bones of left knee after excision of the patella. *Spec.* 556.

CASE 634.—Private D. Sexton, Co. H, 11th Massachusetts, aged 18 years, was wounded at Bull Run, August 29, 1862. Surgeon D. P. Smith, U. S. V., recorded his admission to Fairfax Seminary Hospital, September 9th, with "shot wound of left knee joint," and reported that secondary resection of the patella was performed, also that the patient died November 6, 1862, from the effects of his wound and "exsection of the patella." The wood-cuts are representations of two *post-mortem* specimens, contributed by Surgeon Smith, one of which (FIG. 249) consists of a dried ligamentous preparation of the bones of the knee, presenting the appearance of inflammation having been followed by anchylosis; the other (FIG. 250) comprises the soft structures of the knee, and shows an **H**-shaped cicatrix, the horizontal portion being four inches and the upright three inches in length. The integument appears to have sloughed over a large portion of the front of the knee and to have cicatrized imperfectly, while on the lateral and posterior portions there are marks of several abscesses.

CASE 635.—Dr. H. Culbertson tabulates[3] a secondary operation, performed by Surgeon J. T. Hodgen, U. S. V., at the City Hospital, St. Louis, Missouri, in the fall of 1862, on a United States soldier, for a transverse shot wound of the head of the tibia, in which a **U**-incision was employed, and one inch of the head of the tibia and the tip of the fibula was removed, resulting fatally in three days.

FIG. 250.–Soft structures of the knee after excision of the patella. *Spec.* 607.

[1] *Circular* No. 6, S. G. O., 1865, p. 60.

[2] See *Circular* No. 6, War Department, S. G. O., Washington, 1865, p. 59; CULBERTSON (H.), *Excision of the Larger Joints of the Extremities*, in *Trans. Am. Med. Assoc.*, Philadelphia, 1876. Prize Essay. Supplement to Vol. XXVII, p. 182.

[3] CULBERTSON (H.), *Excision of the Larger Joints of the Extremities.* Prize Essay, in *Trans. Am. Med. Assoc.*, Philadelphia, 1876. Supplement to Vol. XXVII, p. 188, Case 9.

Excisions at the Knee Joint of Uncertain Date.—Five cases belong to this group; one proved successful, three were fatal, and the result in one is undetermined. The meagre details of these cases are of little value for statistical purposes:

CASE 636.—Sergeant *L. R. McWhorten*, Co. C, 60th Georgia, appears recorded on the Confederate register of Jackson Hospital, Richmond, as having undergone "excision of knee joint" for gunshot wound received August 28, 1862, and as having been "furloughed September 24, 1864."

CASE 637.—Private *E. Bigman*, Co. D, 26th South Carolina, appears recorded on the Petersburg Confederate general hospital as having been admitted August 6, 1864, with "resection of the patella and partial resection of the knee joint," performed by reason of "gunshot wound," and as having "died August 23, 1864."

CASE 638.—Lieutenant *I. M. Dickens*, Co. C, 44th Tennessee, aged 30 years, appears recorded on the register of Confederate hospital No. 4, Richmond, as having received a "shell wound of both patellas and of the left little finger," for which "ablation of the left patella and amputation of the injured finger was performed May 20, 1864." His entrance into the hospital was dated two days after the operation, and his death, preceded by febrile excitement, was noted June 5, 1864.

CASE 639.—Private S. Lininger, Co. H, 74th Indiana, aged 32 years, was wounded at Chickamauga, September 19, 1863. He was admitted to the general field hospital near Chattanooga (date not recorded), where Surgeon J. A. Stillwell, 22d Indiana, noted the following: "Shot wound of right knee joint; excision of internal condyle of femur. Thigh amputated at junction of middle and lower thirds on November 19th. Stump opened and dressed November 23d. Milk punch given freely. November 26th, stump granulating some; resin cerate applied and stump bandaged as tight as it would bear. On November 30th, the sutures all sloughed out; granulations poor. December 6th, patient transferred." Surgeon L. D. Waterman, 39th Indiana, reported that the patient was admitted to the general hospital at Bridgeport, and that he died on the following day, December 7, 1863.

CASE 640.—Private *L. T. Huffman*, Co. E, 57th North Carolina, appears noted on the records of Confederate hospital No. 4, Richmond, as having been admitted December 15, 1862, with "excision of knee joint," performed for shot wound. The result of the operation was not recorded.

AMPUTATIONS AT THE KNEE JOINT.—One hundred and eighty-nine examples of exarticulation at the knee joint[1] for shot fractures are found on the returns. The results of two cases could not be ascertained; eighty-one were followed by recovery, and one hundred and six by death, giving a mortality of 56.6 per cent., thus exceeding the

[1] The operation of amputation at knee joint, mentioned by HIPPOCRATES (*Œuvres complètes*, par É. LITTRÉ, Paris, 1844, T. IV, p. 285) and GUY DE CHAULIAC (*La Grande Chirurgie de* GUY DE CHAULIAC, Rouen, 1615, p. 464), was advocated by J. GUILLEMEAU (*Les Œuvres de Chirurgie*, Rouen, 1649, p. 710) as preferable, under certain circumstances, to amputation in the thigh: "Vray est que si la gangrene, ou fracas d'os, finissoit à la jointure du genoüil ou fort proche d'icelle, sans monter au dessus, comme au commencement de la cuisse, l'amputation se doit plustost faire en la jointure que de coupper plus haut, et principalement en la cuisse: car les accidens en seroient tousiours pires, à raison des vaisseaux, veines, arteres et nerfs, lesquels tant plus on tire et montevers le haut, tant plus sont trouuez gros: joint aussi qu'il conuiendroit appuyer la partie cicatrisee sur la jambe artificielle, comme si on la couppoit à la jointure." The statement of R. B. SABATIER (*Méd. Opératoire*, Paris, 1824, T. IV, p. 548) and others that the operation had been performed by FABRICIUS HILDANUS in 1581, is evidently erroneous. The latter (*Opera quæ extant omnia*, Francofurti, 1646, p. 805) amputated the hand at the wrist joint for shot injury, in a young man of Dusseldorf, in 1581, and adds: "Sin Sphacelus poplitem superarit, in ipsa genu articulatione incisio facienda veniet." Cases of amputation at the knee joint for disease are cited by J. L. PETIT (*Œuvres Complètes*, Paris, 1844, p. 814), BRASDOR (*Essai sur les amputations dans les articles*, in *Mém. de l'Acad. Roy. de Chir.*, Paris, 1774, T. V, p. 771), and others; but the first examples of this operation in military surgery are mentioned by: MICHAELIS (*Briefe aus New York*, in RICHTER'S *Chirurgische Bibliothek*, Göttengen, 1782, B. VI, p. 125), who visited the wounded French in Charleston, left there by Count D'Estaing after his unsuccessful expedition to Savannah, in September, 1779. He found 4 cases of amputations at the knee joint; all proved fatal. The surgeon in charge ascribed these unfortunate results partly to venereal poisoning, partly to scorbutus, and partly to the insalubrious air of Charleston. JOBERT DE LAMBALLE (*Plaies d'armes à feu*, Paris, 1833, p. 293): A. M., aged 15, shot in left leg July 28, 1830; amputation at the knee joint two months after injury. VELPEAU (*Nouveaux Éléments de Médecine Operatoire*, Paris, 1839, T. II, p. 521) states that disarticulation of the leg had been successfully practised once since 1830, by M. NIVERT, of Azai-le-Rideau, on a man whose leg had been fractured by shot. BAUDENS (L.) (*Clinique des plaies d'armes à feu*, Paris, 1836, pp. 532, 536): A soldier, wounded at Tafna, January 26, 1836, in right knee; patella shattered; ball lodged in condyle of femur; amputation through joint; portion of condyles removed; recovery, with serviceable stump. A soldier of the 13th regiment, wounded April 1, 1836, at Atlas; fracture of the head of the tibia; amputation through joint; recovery. SÉDILLOT (G.) (*Campagne de Constantine de* 1837, Paris, 1838, p. 266) tabulates 3 fatal cases of exarticulation at the knee for shot injuries. SMITH (STEPHEN) (*Cases in Surgery—Amputation at the Knee Joint*, by W. PARKER, in *New York Jour. of Med.*, 1852, Vol. IX, p. 318): A saddler, shot in the leg; amputation at the knee joint with a razor, the surgeon having no other instrument; recovery with a good stump, which was tender on pressure. Dr. I. MOSES (T. M. MARKOE, *Amputation at the Knee Joint—Illustrated by the Cases which have occurred in American practice, and mainly by those which have been treated in the New York Hospital*, in *The New York Jour. of Med.*, 1856, Vol. XVI, p. 30) operated in the case of J. Senno, a Mexican, aged 26, who had received a shot fracture of the left tibia in June, 1854; amputation at the knee November 22, 1854; recovery, with firm stump, in six weeks. MAZANOWSKY (JOSEPH) (*Zur Exarticulation im Kniegelenke*, in LANGENBECK'S *Archiv für Klin. Chir.*, 1866, B. VII, S. 489): Osman Babassy, aged 25, wounded in the Crimea, July 17, 1854; fracture of bones of both legs; January 30, 1855, exarticulation at knee joint after BAUDENS; recovery. CHENU (J. C.) (*Rapport, etc., pendant la Campagne d'Orient en* 1854-55-56, Paris, 1865, p. 416) tabulates 67 cases of amputation at the knee joint; 5 were successful and 62 proved fatal. The successful cases are: J. P. Bernad, 80th line, shot fracture of left leg, September 8, 1855; primary disarticulation. A. A. Boullier, 97th line, shot fracture of right leg, June 7, 1855; primary amputation at the knee. J. N. Dewatine, 82d line; shot comminution of right leg, September 20, 1854, at the Alma; amputation on the same day. L. A. Roudil, 3d Zouaves; shot fracture of right leg at Inkerman, November 5, 1854; exarticulation at knee. J. B. Sainpy, 26th line, shell fracture of left leg, September 8, 1855; primary exarticulation. MATTHEW (T. P.) (*Med. and Surg. Hist. of the British Army in the years* 1854-55-56, London, 1858, Vol. II, p. 368) tabulates 7 amputations at the knee joint; 3 were successful and 4 fatal; the 3 successful cases were all primary; of the 4 fatal cases, 3 were primary and 1 secondary. CHENU (J. C.) (*Stat. Méd.-Chir. de la Camp. d'Italie en* 1859 *et* 1860, Paris, 1869, T. II, p. 775) tabulates 4 cases of amputations at the knee occurring in the French army during the campaign in Italy in 1859-60; 1 recovered, 3 died. The instance of recovery is detailed: L. Dumas, 37th line, comminuted fracture of upper third of left leg, Solferino, June 24, 1859; amputation at the knee December 19, 1859; recovery, with good stump, February 25, 1860. The same author states that

fatality of amputations in the continuity of the femur by 2.8 per cent. One hundred and eight were primary operations, fifty-one intermediary, and twenty-six secondary, while in four instances the period of operation was not indicated:

TABLE LIV.

Summary of One Hundred and Eighty-Nine Amputations at the Knee Joint for Shot Fracture.

OPERATIONS.	CASES.	RECOVERY.	DEATH.	UNDETERMINED.	MORTALITY RATE OF DETERMINED CASES.
Primary	108	50	57	1	53.2
Intermediary	51	16	34	1	68.0
Secondary	26	12	14	.....	53.8
Time not specified	4	3	1	.....	25.0
Aggregates	189	81	106	2	56.6

Fifty-four of the one hundred and eighty-nine exarticulations[1] at the knee were performed for lesions of the bones of the knee joint. In the remaining one hundred and thirty-five cases the original injuries were: Fractures of one or both bones of the leg in one hundred and sixteen, fractures of the ankle joint in thirteen, and fractures of the bones of the foot in six instances.

Primary Amputations at the Knee Joint.—Of one hundred and eight operations of this group, fifty were followed by recovery, fifty-seven by death, and, in one instance, the final result could not be determined. The mortality rate, 53.2 per cent., exceeds that of the primary amputations in the lower third of the thigh (TABLE XXIX, p. 213) 4.5 per cent., and that of the primary operations in the thigh, whether in the upper, middle, or lower thirds, 3.2 per cent.

Recoveries after Primary Amputations at the Knee Joint.—Thirty-eight of the fifty successful primary operations were performed on Union, and twelve on Confederate soldiers. Thirty-seven of the thirty-eight Union soldiers became pensioners, and six have since died, one, one year; one, two years; one, five years; two, sixteen years; and one, eighteen years

3 amputations at the knee were performed on Austrian soldiers; all proved fatal. According to B. BECK (*Kriegs-Chirurgische Erfahrungen während des Feldzuges*, 1866, Freiburg, i. B., 1867, p. 340), the operation was successfully performed in 1866, in Würzburg, by LINHART. OTIS (G. A.) (*A Report of Surgical Cases treated in the Army of the United States from* 1865 *to* 1871, *Circular* No. 3, War Department, S. G. O., Washington, 1871) records 2 successful operations: Pt. T. Nipple, 3d Cavalry; March 31, 1870, pistol ball wound of right knee, perforating head of tibia; May 3, amputation through knee joint, sawing off about an inch of the condyles after the manner of Mr. CARDEN, of Worcester, by Ass't Surgeon J. D. HALL, U. S. A.; recovered, with a well rounded stump. Pt. L. Shire, 3d Cavalry; wounded by Apache Indians October 6, 1870; ball embedded itself in internal condyle of left femur; October 11th, amputation, sawing off about an inch of the condyles, by Ass't Surgeon J. D. HALL, U. S. A.; recovery, with a good stump. CHENU (J. C.) (*Aperçu Hist. Stat. et Clin, etc., pendant la guerre de* 1870–71, Paris, 1874, T. I, p. 493) tabulates 23 amputations at the knee; 5 were successful and 18 fatal. BECK (B.) (*Chirurgie der Schussverletzungen*, 1872, p. 852): U. O. L., 43d East Prussian Infantry; shot fracture of both bones of right leg January 15, 1871; exarticulation at knee joint January 23, 1871; periostitis of femur; recovery in 6 weeks; stump not well covered. FISCHER (G.) (*Dorf Floing und Schloss Versailles*, in *Deutsche Zeitschrift für Chirurgie*, 1872, B. I, p. 187) tabulates 1 secondary amputation at the knee joint; the result is not stated. GRAF (E.) (*Die Königlichen Reserve-Lazarethe zu Düsseldorf während des Krieges*, 1870–71, Elberfeld, 1872, p. 53): Martinet, shot fracture of fibula; exarticulation at knee by BÜCHNER; death. LOSSEN (H.) (*Kriegschirurgische Erfahrungen*, in *Deutsche Zeitschrift für Chirurgie*, 1873, B. II, p. 137) mentions a case of successful primary exarticulation at the knee. SOCIN (A.) (*Kriegschirurgische Erfahrungen*, Leipzig, 1872, p. 153) tabulates 3 fatal cases of amputation at the knee joint, but gives no details. Of the 128 cases referred to in this note 25 recovered, 102 died, and the result in 1 case is undetermined; 11 were primary, 2 intermediary, 7 secondary, and 108 were operations of undetermined date.

[1] To these 189 cases of amputation at the knee joint for shot fractures should be added 6 exarticulations for shot flesh wounds, cited in the first section of this Chapter, on page 56, making a total of 195 cases, with 82 recoveries, 111 deaths, and 2 undetermined results. In an article by Dr. J. H. BRINTON, *On Amputation at the Knee Joint and at the Knee*, in *The Am. Jour. of the Med. Sci.*, April, 1868, Vol. LV, p. 311, occurs the following: "In a communication from Surgeon OTIS, received since the preceding pages were penned, the following additional information has, with the permission of the Surgeon General, been furnished to the writer. The whole number of cases of knee joint amputations recorded in the Surgeon General's Office is two hundred and eleven. Of these, ninety-six recovered, one hundred and six died, one is still under treatment, and in eight the result is undetermined." This information was furnished to Dr. BRINTON in the early part of 1868, when every moment of the editor's time was occupied with the analysis of the injuries of the head, and when, with the limited clerical assistance at his command, it had only been possible to examine into the details of such cases as were under immediate discussion. Although there were entered on the records at that time 211 cases of alleged exarticulations at the knee, it has been ascertained from subsequent careful analysis and comparisons, and from additional information gathered from artificial limb statements and pension records, that 16 of these 211 cases were, in reality, amputations of the femur immediately above the condyles. The editor exceedingly regrets to have been the cause of this, although unavoidable, erroneous statement in Dr. BRINTON'S excellent paper on knee joint amputations.

after the exarticulation at the knee. In one instance, the case of Corporal Lapham, 1st Vermont Cavalry, detailed on page 224, *ante*, the opposite thigh was simultaneously removed at the middle third; in six instances the exarticulation was followed by amputation in the thigh, viz: four in the lower and two in the middle thirds.

CASE 641.—Private L. J. Matson, Co. K, 2d New York Cavalry, aged 21 years, was wounded at Petersburg, April 1, 1865. Two days after the reception of the injury he was admitted to the Depot Hospital at City Point, whence he was forwarded to Washington. Surgeon R. B. Bontecou, U. S. V., contributed a photograph of the wounded man (*Contrib. Photo's*, S. G. O., Vol. VIII, p. 21), with the following history: "The patient was admitted to Harewood Hospital, April 5th, suffering from amputation at the left knee joint, which was performed on the field by the antero-posterior flap method, for shot wound of the leg involving injury to the knee joint. The operator and the extent of the injury were unknown. At the time of admission the condition of the stump and the constitutional state of the patient were tolerably good. The parts subsequently became gangrenous; but by timely application of escharotics, and by supporting treatment throughout, the patient did well and made fair progress in his recovery. A part of the femur was removed with the dressing forceps." The patient subsequently passed through Lincoln and Armory Square Hospitals, and on September 2, 1865, he was discharged from service, and furnished with an artificial limb by the Jewett Patent Leg Company. The pensioner was paid December 4, 1879. In his application for commutation he represented the stump as being in a sound condition.

CASE 642.—Private R. Kelly,[1] Co. A, U. S. Engineer Battalion, aged 23 years, was wounded in the left knee by one of the sharpshooters in front of Petersburg, August 18, 1864. Assistant Surgeon G. M. McGill, U. S. A., reported: "The ball entered somewhat to the left of the median line, near the tuberosity of the tibia, passed upward and backward, and lodged in the face of the external condyle, partially embedding itself crosswise. On consultation with Surgeon J. R. Ghiselin and Assistant Surgeon J. R. Gibson, U. S. A., and Acting Assistant Surgeon B. F. Goodrich, who had charge of the case, it was decided to amputate through the knee joint. I introduced a scalpel opposite the termination of the external condyle and outlined an anterior flap—the lowermost part of which was two inches below the terminal insertion of the quadriceps extensor—with a firm cut that divided the skin and the superficial fascia: terminating the primary incision of the anterior flap opposite a point of the internal condyle corresponding to the point of introduction opposite the external condyle. From this termination the scalpel was reversed and the inner half of the posterior flap formed, the depth of my incision being sufficient to insure section of the superficial fascia as well as the skin proper. The knife was then removed and reinserted near the original point of entrance from which the outer half of the posterior flap was formed. This posterior flap was very long, extending fully half way down the leg, and the angles of the union of the anterior and posterior lines of incision were made very acute, so that retraction would not tend to separate the angles of the stump by drawing the sac of the stump tightly over the large extent of bone substance left. The anterior flap was now raised, and in raising it I took care to dissect so as to inflict as little injury as possible to the superficial fascia. The ligament of the patella was incised closely above the tuberosity of the tibia, and the patella, with its connections, was left untouched so far as practicable. The ligaments remaining were then divided at their insertion and so cut through that the semilunar cartilages remained in the stump. All the ligaments having been thus severed, I cleared the posterior flap with a large operating knife, cutting in the plane of the retracted posterior skin flap, outlined as described above. This procedure afforded a base of flesh to what was essentially a skin flap, in addition to which I found that by the method adopted the fleshy part of the posterior flap had been so formed as to expose so much of the anterior surface of the deep posterior layer of crural fascia that a fibrous sheet fitted upon the synovial surfaces exposed by the removal of the tibia. I now cut away all points and strips of cartilage or fibrous tissue accidentally made in operating. The ball was elevated from its bed in the face of the external condyle and this bed cleared. Nothing unusual took place in the subsequent steps of the operation; unfortunately, however, the silk ligature threads used were rotten. There was also a ball hole in the anterior flap besides the wound in the face of the condyle to complicate the case. The latter was oozing blood from its sides when last observed. Throughout the operation any injury to what was left of the synovial sac was avoided. September 9th, patient is doing very well; none of the ligatures have yet come away, and gentle traction met with firm resistance this morning. The patient is afflicted with pains of a darting lancinating character, shifting in location. The wound of entrance in the outer border of the anterior flap has healed rapidly by granulation, and to a great extent the flaps have united. A sinus, the mouth of which is to the right of the middle of the cicatricial line, communicates with the bed of the ball; but so little discharge takes place through this that the bed is thought to be already filled with callus. A peculiar 'leaden' feeling about the patella has been observed by the patient. He is not able to move this bone, but moves the thigh without pain. September 14th, patient is doing finely. One of the ligatures on the inside, that of an articular artery, has broken off short. The popliteal ligature has not yet separated. September 22d, the patient has steadily improved. The tumor of the stump has subsided and the line of the cicatrix is somewhat depressed. There is still discharge from where the ligature is broken off, and it is probable that the knot of this ligature will remain in the stump for some time. The main ligature has not yet come away; the thread being fine and rotten, I dreaded to pull it even gently. The patella is now freely movable up and down, to the right and left. The capsule of the joint, as a whole, has adhered strongly to the condyloid surfaces of the femur, and affords a sufficient stay to the connected muscles. On September 27th, the patient was sent away to West Point, New York. He was then able to walk on crutches, and I had only to regret that knots of all the ligatures remained in the stump, having considered it inexpedient to search for them. On his way to West Point the patient—as he informed me by letter—was attacked with what he termed gangrene, rendering some operation necessary, which, I believe, was performed at West Point. From his description of it I understood that this operation did not extend to interference with the bone or the remains of the synovial sac." Surgeon J. F. Head, U. S. A., certified to the patient being treated in hospital at West Point. The man was discharged by expiration of service, January 23, 1865, and pensioned, and after reaching his home he was supplied with an artificial limb by the Palmer Arm and Leg Company. The Brooklyn Examining Board, December 16,

[1] Abstracts of this case have been cited by MARKOE (T. M.), *Amputation at the Knee Joint*, in *New York Medical Journal*, 1868, Vol. VI, p. 503, CASE XXXII, and in *Circular* No. 3, War Department, S. G. O., Washington, 1871, p. 278.

1874, certified to the amputation, and to the patella being unremoved and remaining embedded in the extensor muscles of the anterior surface of the stump; also to the integuments being adherent to the stump and parts so thin that an artificial limb can be worn but little of the time without creating inflammation. The pensioner was paid December 4, 1879.

CASE 643.—Private E. Baker, Co. A, 38th Wisconsin, aged 17 years, was wounded in the right leg, before Petersburg, July 17, 1864, and admitted to the field hospital of the 3d division, Ninth Corps. Surgeon M. K. Hogan, U. S. V., recorded: "The ball entered at the outer tuberosity of the tibia, ranged inward and slightly upward, and embedded itself between the tuberosities. The synovial membrane was lacerated and synovia escaped. The leg was amputated by Surgeon A. F. Whelan, 1st Michigan Sharpshooters, the operation being performed on Butcher's plan." From the field hospital the wounded man was moved to City Point, and thence to Philadelphia. Surgeon S. J. W. Mintzer, U. S. V., reported that "the patient was admitted to South Street Hospital, July 26th, his right leg having been amputated on the field, on the day following the injury, at the knee joint, and the patella removed. When admitted, parts of the integuments had sloughed away, leaving the extremity of the bone exposed. On July 30th, hæmorrhage occurred without much loss of blood, from which the patient rallied, though much weakened by diarrhœa. A narrow semicircle of bone was removed, after which granulations began to cover it. There was considerable suppuration from the depth of the posterior flap." About eight months afterwards the patient was supplied with an artificial limb, and on May 30, 1865, he was discharged from service. The pensioner was paid December 4, 1879. In his application for commutation he stated that the stump of his amputated limb remained in good condition.

Fatal Cases of Primary Amputation at the Knee Joint.—Fifty-seven cases were reported; in fifty-one instances the patients were Union, and in six Confederate soldiers. Seven deaths were referred to pyæmia, two to tetanus, three to hæmorrhage, one to gangrene, one to typhoid fever, and seventeen to exhaustion. The average period between the day of the operation and the date of death was forty-one days.

CASE 644.—Private W. Stanley, Co. H, 53d Pennsylvania, aged 26 years, was wounded at Fredericksburg, December 13, 1862. He was admitted to a Second Corps field hospital, and thence transferred to Washington. Assistant Surgeon C. C. Lee, U. S. A., reported: "The patient entered Douglas Hospital December 26th, having received a comminuted fracture of the upper third of the right leg, for which amputation through the knee joint was performed the following day. He stated that hæmorrhage was profuse both before and since the amputation. The stump sloughed somewhat and did badly. On March 1, 1863, when I took charge of the case, the stump was tightly bandaged from above downward, the extremities being swollen and bulbous, and the thigh completely honeycombed in appearance by small abscesses and sinuses for six inches above the condyles. The bandage was removed and the sinuses and abscesses laid open. The patient was also greatly enfeebled by chronic diarrhœa, from which he had suffered for six months, and which, though checked from time to time, always returned with full force. In this state he vacillated from better to worse until April 20th, when, without any ostensible cause, he was seized with obstinate nausea and vomiting. This resisted every means employed to remedy it and exhausted what little strength remained in the patient. He sank steadily until the night of April 26, 1863, when he expired of sheer debility. At the autopsy, the thoracic viscera were found healthy with the exception of old pleuritic adhesions on the right side; lungs crepitant throughout and without tubercular deposit. The liver and kidneys were shrunken and showed evidence of chronic congestion, but were otherwise normal; stomach and spleen healthy. In the large intestines well-marked congestion was observed and partial maceration of the mucous membrane, which was here and there dotted with dark maculæ. These spots were surrounded by depressions and apparent cicatrices in the mucous membranes, and were thought to be the result of ulcers that had already cicatrized. The condition described was chiefly noticed in the upper portion of the rectum. The small intestines were here and there greatly congested, but no ulceration was detected. The stump had healed completely; but from the removal of the patella in the operation and the subsequent emaciation of the patient the edges of the condyles were too superficial to have borne pressure with success. A large abscess, which had been very troublesome during life, existed between the rectus and cruræus muscles. The latter was wasted to the last degree, but seemed to have protected the bone, which was not diseased. A very complete calcareous degeneration of the mesenteric glands should also have been noted above." The lowest portion of the femur was saved and contributed to the Museum by Assistant Surgeon W. Thomson, U. S. A. (*Cat. Surg. Sect.*, 1866, p. 363, *Spec.* 1240.)

CASE 645.—Major A. McQ. Corrigan, 9th New York Cavalry, aged 27 years, was wounded in the right leg, at Meadows Bridge, May 12, 1864. Surgeon A. P. Clark, 6th New York Cavalry, described the injury as follows: "At the time of receiving the wound he was in command of a detachment of his regiment and at a considerable distance in advance, endeavoring to force the enemy from his entrenchments on the other side of the bridge, when he was struck by a conical musket ball, which passed from the anterior to the posterior aspect of the limb, fracturing the upper extremity of the tibia and wounding the anterior tibial artery. The hæmorrhage was, in a measure, controlled by the men who brought the patient a short distance to the rear, where a tourniquet was applied. A few minutes afterwards the enemy was dislodged, when orders were received for the troops to cross as speedily as possible, and the train was not allowed to halt until it reached Mechanicsville, five miles distant, where Acting Assistant Surgeon C. Rodgers, assisted by another medical officer and myself, amputated the leg at the knee joint, adopting the method of double flaps and removing the patella and a section of the condyles of the femur. The patient was then placed in an ambulance and taken to Haxall's Landing, which place was reached on May 15th, and whence he was sent by water to general hospital." Acting Assistant Surgeon T. Liebold communicated the following termination of the case: "The patient was admitted to Point Lookout Hospital May 16th. The stump was much inflamed and the pus retained by sutures, which were removed. Two days after his admission, secondary hæmorrhage came on at noontime. Happening to be near at the time I was enabled to stop it immediately, so that not more than from four to six ounces of blood was lost. The stump was then opened again entirely and the anterior tibial artery, from which the ligature had come off, was religated in a few minutes by Surgeon A. Heger, U. S. A., in charge of the hospital. The patient died May 28, 1864, from exhaustion, having had severe diarrhœa and profuse discharge of pus from an abscess in the stump. He was also attacked with vomiting of bile."

TABLE LV.

Summary of One Hundred and Eight Cases of Primary Amputation at the Knee Joint for Shot Fracture.

[Recoveries, 1–50; Deaths, 51–107; Result unknown, 108.]

No.	Name, Military Description, and Age.	Date of Injury.	Nature of Injury.	Date of Operation.	Operation and Operator.	Result and Remarks.
1	Baker, E. V., Pt., A, 38th Wisconsin, age 17.	July 17, 1864.	Rifle ball fracture of bones of right leg, involving knee.	July 18, 1864.	Flap; remov'g patella; Butcher's operation, by Surg. A. F. Whelan, 1st Mich. S. S.	July 30th, hæm. Semicircle of bone removed. Disch'd May 30, 1865.
2	Becker, H., Serg't, F, 5th Mich. Cavalry, age 27.	July 3, 1863.	Conoidal ball comminuted head of left tibia.	July 4, 1863.	Antero-posterior flap.....	Stump heal'd by first inten. Disch. Dec. 14, '63. (Also fract. jaw.)
3	Begle, G., Pt., E, 91st Indiana, age 22.	Aug. 3, 1864.	Conoidal ball fracture of left leg, involving knee joint.	Aug. 3, 1864.	Flap; thro' condyles of femur, by Surg. J. T. Woods, 99th O.	Stump perfectly healed. Disch. June 21, 1865.
4	*Bowen, H.*, Pt., K, 52d North Carolina.	July 3, 1863.	Shot fracture of left leg. (Also wound of right ankle.)	July 3, 1863.	Amputation at knee joint.....	Recovery, January 12, 1864.
5	Bragg, W., Serg't, F, 8th Penn. Cavalry, age 23.	May 27, 1864.	Conoidal ball fracture of left tibia.	May 27, 1864.	Flap amputation, by Assistant Surg. H. G. Chritzman, 8th Penn. Cavalry.	Discharged April 6, 1865.
6	Brooks, J. M., Pt., A, 17th Penn. Cavalry, age 28.	June 21, 1863.	Cannon shot fracture two ins. below left knee joint, severing leg.	June 21, 1863.	Amputation at knee joint.....	Sept. 10, amp. lower third thigh. Disch'd July 28, 1865. (TABLE XL, No. 14, p. 320.)
7	Credon, J., Pt., A, 91st New York, age 45.	May 27, 1863.	Musket ball comminuting left patella and opening knee joint.	May 27, 1863.	Ant. and post. flaps; one half of patella retained, by A. Surg. J. T. Myers, 91st New York.	September 1st, entirely healed. Discharged Mar. 29, 1866. The stump is tender.
8	Darkes, J., Pt., B, 10th Infantry, age 33.	Aug. 19, 1864.	Disrupture of left leg at upper third by a solid shot.	Aug. 20, 1864.	Anterior rectangular flap amputation, involving patella, lateral and inferior surfaces of condyles, by Surg. A. A. White, 8th Maryland.	August 30, gangrene. To regimental headquarters Dec. 17, 1864. Stump healed.
9	David, T., Pt., A, 90th Pennsylvania, age 27.	Dec. 13, 1862.	Shot fracture of right tibia and fibula, upper third.	Dec. 13, 1862.	Flap amputation at knee, retaining patella and condyles, by Ass't Surg. C. C. Lee, U. S. Army.	Disch'd Feb. 21, 1863. Died Feb. 25, 1870. BRINTON (J. H.), *On Amp. at the Knee Joint, etc.*, in *Am. Jour. Med. Sci.*, 1868, Vol. LV, p. 324.
10	Dow, G. E., Pt., G, 12th N. Hampshire, age 22.	June 3, 1864.	Grape shot fracture of left leg.	June 3, 1864.	Flap amputation at knee joint.	June 23d, hæm.; 24th, lig. fem. artery. Disch'd Nov. 18, 1864.
11	Everett, J., Serg't, G, 142d Pennsylvania, age 27.	May 23, 1864.	Conoidal ball fracture of right tibia and fibula.	May 24, 1864.	Lateral flap; patella retained; a small section of condyles size of a half dollar remo'd, by Surg. J. Ebersole, 19th Ind.	Discharged January 22, 1865. *Spec.* 4857.
12	Freeman, C., Pt., B, 210th Pennsylvania, age 32.	Mar. 31, 1865.	Conoidal ball fracture and great splintering of patella and tibia of left leg.	April 1, 1865.	Antero-posterior flap; removing patella, by Surg. J. J. Comfort, 190th Penn.	Discharged Aug. 3, 1865; good stump.
13	Gallot, E. F., Pt., E, 146th New York, age 26.	June 2, 1864.	Conoidal ball comminuted fracture of upper third of left leg.	June 3, 1864.	Antero-posterior flap, by Surg. La Grange, C. S. A.	Discharged January 20, 1865. Healthy stump.
14	Hare, F., Corp'l, B, 6th Wisconsin, age 23.	May 5, 1864.	Shot fracture of bones of left leg.	May 6, 1864.	Amputation at knee joint, by a Confederate surgeon.	Gang. Aug. 6, re-amp. mid. th'd thigh. Disch'd May 22, 1865. (TABLE XXXIX, No. 39, p. 314.)
15	Harkins, J. B., Pt., K, 119th Pennsylvania, age 22.	Dec. 13, 1862.	Shot wound of the left leg.....	Dec. 13, 1862.	Amputation at knee joint, by Surgeon J. P. Leidy, 119th Pennsylvania.	Disch'd Mar. 19, 1863. Diseased stump; violent neuralgia; hectic fever; exhausting diarrhœa. Died May 19, 1867.
16	Heinle, J., Pt., G, 51st Pennsylvania, age 23.	June 3, 1864.	Shell wound of right leg, upper third.	June 3, 1864.	Flap; by Surg. A. F. Whelan, 1st Michigan S. S.	Discharged June 1, 1865. Died May 1, 1870.
17	Herbert, C., Pt., C, 69th N. York, age 19. (Alias Chas. St. J. Nichols.)	Aug. 25. 1864.	Two shot wounds of right leg by conoidal balls, fracturing heads of both bones and their lower thirds.	Aug. 27, 1864.	Long posterior flap, by a Confederate surgeon.	Discharged June 9, 1865. Cannot wear an artificial limb.
18	Hopkins, W., Pt., E, 6th Michigan Cavalry, age 32.	Sept 16, 1863.	Conoidal ball penetrating cavity of left knee joint.	Sept. 17, 1863.	Amputation at knee joint, by a Confederate surgeon.	Sound stump. Disch'd March 23, 1864.
19	*Howard, J. W.*, Corp'l, D, 61st Virginia.	May 12, 1864.	Shot wound of knee joint.....	May 12, 1864.	Amputation at knee joint.....	Recovery.
20	Ivey, A., Serg't, D, 7th Wisconsin, age 26.	July 1, 1863.	Shot fracture of upper third of left tibia.	July 1, 1863.	Bi-lateral skin flap, by Surg. J. Ebersole, 19th Indiana.	Discharged May 14, 1864.
21	*Jones, H. C.*, Lieut., E, 15th Virginia.	May 16, 1864.	Shot wound of knee joint.....	May 16, 1864.	Amputation at right knee joint.	Recovery.
22	*Karnes, W. H.*, Pt., G, 11th Virginia Cav., age 40.	June 9, 1863.	Conoidal ball fracture of head of left tibia.	June 10, 1863.	Amputation left knee joint, by a Union surgeon.	Exchanged and furloughed Mar. 12, 1864.
23	Knul, J., Pt., G, 29th New York, age 21.	Aug. 29, 1862.	Musket ball perforated head of right tibia; joint not involved.	Aug. 29, 1862.	Double flap amputation.....	Mar. 12, 1863, patella raised and movable. Disch'd April 30, '63. Died Dec. 13, 1878; dropsy.
24	Kelly, R., Artificer, U. S. Engineers, age 23.	Aug. 18, 1864.	Conoidal ball entered near tuberosity of left tibia, lodging on external condyle of femur, slightly injuring it.	Aug. 18, 1864.	Antero-posterior flaps; patella not removed, by Ass't Surg. G. M. McGill, U. S. A.	Disch'd Jan. 23, 1865. MARKOE (T. M.), *Amp. Knee Joint*, in *N. Y. Med. Jour.*, 1867–68, Vol. VI, p. 503. Stump tender.
25	Kerr, G., Serg't, H, 2d Cavalry, age 41.	June 11, 1864.	Conoidal ball wound of upper third of right leg.	June 11, 1864.	Amputation at knee joint, by Union surgeon.	Disch'd October 17, 1864. Died 1865.
26	Kuhn, A., Pt., F, 99th Ohio, age 28.	July 19, 1864.	Conoidal ball comminuted fracture of right tibia, extending nearly to knee joint.	July 19, 1864.	Short flap, leaving condyles of femur intact, by Surg. J. T. Woods, 99th Ohio.	Discharged June 21, 1865.
27	Lapham, C. N., Corp'l, K, 1st Vermont Cavalry, age 23.	July 8, 1863.	Both legs carried away by a solid shot.	July 10, 1863.	Amputation left knee joint by ant.-post. flap (also amp. right thigh, middle third), by Surg. L. P. Woods, 5th N. Y. Cav.	Disch'd August 25, 1864. (CASE 436, p. 224, and No. 336, TABLE XXXI, p. 231.)
28	*Leonard, W. J.*, Pt., K, 43d Alabama, age 20.	May 16, 1864.	Shot comminution of tibia and fibula just below knee joint.	May 16, 1864.	Antero-posterior flap; removing patella.	Recovered July 31, 1864.
29	Matson, L. J., Pt., K, 2d N. York Cavalry, age 21.	April 21, 1865.	Conoidal ball wound of left leg, injuring knee joint.	April 1, 1865.	Antero-posterior flap amputation.	Gangrene; sloughing. Portion of femur removed with forceps. Discharged Sept. 2, 1865.
30	McGee, J., Pt., G, 2d Rhode Island, age 22.	May 5, 1864.	Conoidal ball fracture of right tibia and fibula.	May 5, 1864.	Short post. flap; patella remo'd. by Surg. G. W. Carr, 2d R. I.	Discharged Oct. 15, 1864. Stump never healed entirely.
31	*McMullen, R. J.*, Pt., I, 4th Georgia, age 20.	May 3, 1863.	Shot fracture of the leg.....	May 4, 1863.	Amputation at knee joint.....	Protrusion of condyle. May 23d, amp. thigh, lower third. June 5th, hæm.; lig. femoral artery. Recovery. (TABLE XXXVI, No. 130, p. 295.)

No.	Name, Military Description, and Age.	Date of Injury.	Nature of Injury.	Date of Operation.	Operation and Operator.	Result and Remarks.
32	*Mitchell, A.*, Pt., F, Palmetto S. S., age 17.	May 24, 1864.	Shot wound of the upper extremity of tibia.	May 25, 1864.	Amputation at knee joint.....	Slough'g; both condyles exposed. Furloughed Sept. 10, 1864.
33	Muir, L., Pt., I, 5th Vermont, age 25.	May 5, 1864.	Shot fracture of left leg four inches above ankle.	May 6, 1864.	Circular amputation at knee joint.	Discharged May 22, '65. Stump enlarged; cannot use artif. leg.
34	O'Brien, P., Pt., F, 39th N. York, age 27.	Aug. 14, 1864.	Conoidal ball fracture of left tibia two ins. below knee j't.	Aug. 15. 1864.	Flaps, by Surg. N. Hayward, 20th Mass.	Discharged June 19, 1865. Died August 11, 1866.
35	Pace, H., Pt., G, 143d Pennsylvania, age 33.	May 5, 1864.	Conoidal ball fract. of articulating surface head of right tib.	May 5, 1864.	Skin flaps, by Surg. J. Ebersole, 19th Indiana.	Discharged August 31, 1864.
36	Padgett, C. S., Serg't, K, 12th New Jersey, age 23.	June 3, 1864.	Conoidal ball comminuted fracture of right tibia and fibula. (Also fracture of left radius.)	June 4, 1864.	Antero-post. flaps; retaining patella but removing articular surface of condyles, by Surg. A. Satterthwaite, 12th N. J.	Discharged July 13, 1865. BRINTON (J. H.), *Am. Jour. Med. Sci.*, 1868, Vol. 55, p. 322.
37	*Raftay, P.*, Pt., C, 21st Mississippi, age 40.	May 6, 1864.	Shot wound of left knee.....	May 6, 1864.	Amputation at knee joint.....	Retired January 31, 1865.
38	Rist, C. H., Pt., A, 36th Wisconsin, age 19.	June 1, 1864.	Conoidal ball fracture of upper third of left tibia, extending into knee joint.	June 1, 1864.	Osteoplastic, leaving patella and condyles, by Surg. J. M. Burr, 42d New York.	Ulceration of cartilages. Dec. 15, amp. thigh, lower third. Discharged May 20, '65. *Spec.* 3514. (CASE 492, p. 318, and TABLE XL, No. 82, p. 321.)
39	Rogers, J. W., Pt., D, 6th Wisconsin, age 47.	Aug. 18, 1864.	Conoidal ball fracture of left tibia and fibula immediately below knee.	Aug. 19, 1864.	Flap amputation at knee joint.	Bone protruded. Disch'd March 23, 1865.
40	Sholes, H., Pt., D, 26th New York, age 20.	Dec. 13, 1862.	Shot wound of right knee	Dec. 15, 1862.	Amputation, by Surg. T. Sim, U. S. V.	Gang. March, 1863, amp. thigh, low. third. Disch'd Dec. 11, '63. (TABLE XL, No. 84, p. 321.)
41	Stewart, W., Pt., K, 2d Michigan, age 22.	June 17. 1864.	Shell wound just below right knee, nearly severing leg.	June 17. 1864.	Antero-posterior flaps; removing patella and condyles, by Surg. S. S. French, 20th Mich.	Sloughing. Discharged May 4, 1865. Tender cicatrix.
42	Stratton, E. L., Capt, F, 12th New Jersey, age 24.	May 3, 1863.	Conoidal ball fracture of head of right tibia.	May 4, 1863.	Amputation knee joint, leaving patella intact, by Ass't Surg. J. T. Calhoun, U. S. A.	Discharged January 3, 1864.
43	Struble, E. H., Pt., F, 19th Ohio, age 25.	May 22, 1862.	Shell, taking off left leg below knee.	May 22. 1862.	Flap amputation, by Surg. F. T. Hurxthal, 19th Ohio.	Discharged March 16, 1863.
44	*Swittenburg, J. C.*, Capt., H, 16th Miss., age 27.	Aug. 21, 1864.	Conoidal ball shattering upper third left leg.	Aug. 21, 1864.	Amputation at knee joint, by Surg. J. Ebersole, 19th Ind.	Exchanged February 23, 1865.
45	*Trent, S. A.*, Pt., 2d Richmond Howitzers.	May 12, 1864.	Gunshot wound of knee	May 12. 1864.	Amputation at knee joint, by Surg. — Capers, C. S. A.	Retired November 5, 1864.
46	*Turner, J. L.*, P., G, 1st S. Carolina, age 20.	July 1, 1863.	Shell wound of right leg, involving knee joint.	July 2, 1863.	Amputation at knee joint.....	Exchanged March, 3, 1864.
47	Unknown, age about 30.	Dec. 13, 1862.	Shot fracture of the leg.....	Primary	Long ant. and short post. flaps: patella and condyles retained, by Surg. J. H. Brinton, U. S. V.	Recov'd, with good stump. BRINTON (J. H.), *On Amp. at the Knee Joint, etc.*, in *Am. Jour. Med. Sci.*, 1868, Vol. LV, p. 316.
48	Wheeler, T. H., Serg't, E, 1st Mich. Cav., age 32.	May 31, 1864.	Shot wound of right tibia and fibula, implicating knee joint.	May 31, 1864.	Flap amputation, by Surg. G. K. Johnson, 1st Mich. Cav.	June 10th, gangrene. Disch'd Nov. 12, 1864.
49	Woodruff, A. O., Corp'l, D, 5th Artillery, age 23.	July 3, 1863.	Conoidal ball fracture of upper third of left tibia. (Also wound of right leg.)	July 3, 1863.	Amputation, by Ass't Surg. B. Howard, U. S. A.	Discharged May 28, 1864. Poor stump, with very thin covering.
50	*Young, L. C.*, Pt., A, 3d Virginia Cavalry, age 31.	May 12, 1864.	Pistol ball injuring both right tibia and femur, involving the knee joint.	May 14, 1864.	Long anterior flap, by Surg. C. B. Gibson, C. S. A.	July 27th, amp. thigh, mid. third; gangrene; recovery. *Spec.* 5514. (TAB. XXXIX, No. 100, p. 315.)
51	*Barger, J. C.*, Pt., G, 52d Virginia, age 40.	May 30, 1864.	Shot wound right leg and left shoulder.	Primary	Amputation at knee joint.....	Died June 14, 1864.
52	Barker, J., Pt., I, 58th Mass., age 42.	June 17, 1864.	Shot wound left leg and right thigh.	June 17. 1864.	Oval flap amput'n at left knee and amp. low. third r't thigh.	Died June 28, 1864. (TABLE XXXII, No. 1014, p. 257.)
53	Bates, O. S., Pt, A, 20th Mass., age 24.	June 24, 1864.	Shell fracture of middle third of left leg.	June 24. 1864.	Antero-posterior flap, at left knee joint, by Surg. N. Hayward, 20th Mass.	Gangrene. Died August 19, '64; exhaustion.
54	Bingham, D., Corp'l, H, 118th Pennsylvania, age 36.	June 26, 1864.	Shot shattering right leg extensively.	June 26. 1864.	Double flap; condyles of femur sawn off and patella removed.	Gang.: hæm. Died July 25, '64; pyæmia.
55	Briggs, J., Pt., A, 26th New York.	Dec. 13, 1862.	Shot fracture of left tibia.....	Dec. 13, 1862.	Amputation at knee joint, retaining patella.	Died December 13, 1862.
56	*Brooks, E.*, Pt., K, 19th Virginia, age 26.	April 20, 1865.	Shell fracture of right leg.....	April 20, 1865.	Amputation at knee joint.....	Erys.; bed sores; large abscesses. Died May 11, '65; exhaustion.
57	Butler, G., Pt., C, 8th New Jersey, age 19.	Aug. 16, 1864.	Fracture of left leg by a fragment of shell.	Aug. 16, 1864.	Amputation at knee joint.....	Died November 22, 1864; chronic diarrhœa.
58	Campbell, B. J., Pt., H, 5th New York, age 22.	Aug. 19, 1864.	Shot wound of right leg, involving knee joint.	Aug. 20. 1864.	Flap amputation at knee joint.	Died September 19, 1864.
59	Chase, J. B., Pt., K, 24th N. York Cavalry, age 49.	June 16, 1864.	Shot fracture of left tibia and fibula.	June 16. 1864.	Amputation at knee joint.....	July 7th, lig. fem. artery. Died July 9, 1864; constitutional irritation.
60	Clark, W., Pt., A, 111th Pennsylvania.	Sept. 17. 1862.	Shot fracture of right leg.	Sept. 17. 1862.	Amputation at knee joint.....	Died October 10, 1862.
61	Cole, F., Pt., G, 61st New York.	July 3, 1863.	Shot fracture of both bones of left leg.	July 3, 1863.	Amputation at knee joint, by Surg. C. S. Wood, 66th N.Y.	Died July 9, 1863.
62	Conland, O., Pt., I, 61st N. York.	Mar. 25, 1865.	Shot wound of the left knee joint.	Mar. 25. 1865.	Amputation at knee joint, by A. Surg. C. S. Hoyt, 126th N.Y.	Died April 19, 1865.
63	Cornell, J., Pt., B, 7th West Virginia.	May 31, 1864.	Shot fracture of left knee joint.	Primary	Amputation at knee joint, by Surg. M. Rizer, 72d Penn.	Died June 3, 1864.
64	Corrigan, A. McQ., Major, 9th New York Cavalry, age 27.	May 12, 1864.	Conoidal ball fracture of upper extremity of right tibia and wound of ant. tibial artery.	May 12. 1864.	Antero-posterior flap; remov'g patella and a section of condyles of femur, by A. A. Surg. C. Rodgers and Surg. A. P. Clark, 6th N. Y. Cavalry.	May 18th, hæm., 6 oz.; popliteal artery ligated; diarrhœa. Died May 28, 1864; exhaustion.
65	*Councell, E. C.*, Col., 16th Miss., age 32.	Aug. 21, 1864.	Musket ball fracture of right leg near knee.	Aug. 21, 1864.	Antero-posterior flap, by Surg. A. A. White, 8th Maryland.	Sept. 2d, hæm., 14 oz.; Sept. 3d, lig. femoral; Sept. 10th, hæm. recurred and proved fatal.
66	Douglass, J., Serg't, G, 63d Indiana.	Nov. 24. 1864	Fracture of right leg, extending to knee j't, by a cannon ball.	Nov. 24. 1864.	Amputation at knee joint.....	Died November 25, 1864.
67	Draher, W., Pt., B, 51st Pennsylvania, age 32.	June 3, 1864.	Shot fracture of upper third of left leg. (Wound of shoulder.)	June 3. 1864.	Lateral flap amp. at knee joint, by Surg. A. F. Whelan, 1st Michigan S. S.	June 11th, hæm. Died June 24, 1864; exhaustion.
68	Fitzsimmons, J. M., Pt., E, 19th Indiana, age 22.	June 18, 1864.	Conoidal ball fracture of right leg.	June 18, 1864.	Amputation at knee joint.....	Parts gangrenous. Died August 17, 1864, of injury.
69	Gervig, H., Pt., K, 15th N. York Artillery, age 28.	Mar. 31, 1865.	Conoidal ball fracture, involving right knee joint.	Mar. 31, 1865.	Amputation at knee joint, by Surg. A. A. White, 8th Md.	Died April 7, 1865; exhaustion.

No.	Name, Military Description, and Age.	Date of Injury.	Nature of Injury.	Date of Operation.	Operation and Operator.	Result and Remarks.
70	Gooley, N., Pt., C, 73d Ohio.	May 25, 1864.	Shot wound of the knee. (Also wound of neck.)	May 25, 1864.	Amputation at knee joint, by Surg. I. N. Himes, 73d Ohio.	Died August 14, 1864.....
71	Gould, M. W., Corp'l, H, 36th Illinois, age 20.	May 14, 1864.	Conoidal ball fracture of left tibia and fibula in mid. third.	May 15, 1864.	Circular amput'n at knee joint.	Died September 19, 1864; chronic diarrhœa.
72	Grice, T., Pt., E, 38th Col'd Troops, age 22.	Sept. 29, 1864.	Conoidal ball fracture of right leg.	Sept. 29, 1864.	Amputation at knee joint.....	Died March 21, 1865.
73	Gulick, W. O., Corp'l, M, 1st Iowa Cavalry.	Aug. 27, 1863.	Shot fracture of the right leg.	Aug. 27, 1863.	Disarticulation at knee joint, by Surg. J. C. Lynch, 1st Mo. Cav.	Died September 3, 1863.
74	*Harbor, E.*, Pt., G, 21st Virginia Cavalry, age 33.	Aug. 4, 1864.	Shell fracture of right tibia and fibula, extending into knee j't.	Aug. 4, 1864.	Anterior skin flap; patella removed; condyles of femur undisturbed.	Died Aug. 20, 1864; exhaustion consequent upon excessive ichorous discharge; autopsy.
75	Hedder, W., Pt., C, 56th N. York.	June 1, 1862.	Shot fracture of leg, involving the knee joint.	June 1, 1862.	Amputation at knee joint.....	June 13th, amp. thigh, mid. third; 29th, hæm. Died July 3, 1862; exh., diar., bed sore. *Spec.* 4933.
76	Hughes, A. J., Pt., B, 14th Infantry, age 26.	May 5, 1864.	Conoidal ball wound of left knee.	May 5, 1864.	Antero-posterior flap at knee joint.	Died June 6, 1864. *Card Photo's A. M. M.*, Vol. 2, p. 45.
77	Johnson, T. R., Pt., F, 95th Ohio.	Aug. 30, 1862.	Gunshot wound.....	Aug. 31, 1862.	Amputation at left knee joint.	Died September 21, '62; tetanus.
78	Judd, W. B., Adjutant, 97th New York.	Feb. 7, 1865.	Shot fracture of knee, severe..	Feb. 7, 1865.	Amputation at knee joint.....	Died February 19, 1865.
79	Kennedy, J. A., Corp'l, H, 38th Ohio, age 24.	Sept. 1, 1864.	Conoidal ball fracture of the right tibia.	Sept. 2, 1864.	Flap amputation at knee joint.	Died December 24, 1864; chronic pneumonia.
80	Koch, J. R., Serg't, F, 69th Penn., age 22.	June 16, 1864.	Grapeshot fracture of left knee joint.	June 16, 1864.	Circular amput'n at knee joint, by Surg. G. L. Potter, 145th Pennsylvania.	July 3, 4, hæm., 15 oz.; lig. fem. artery. Died July 12, 1864; exhaustion.
81	Krowlow, H., Pt., A, 66th New York, age 18.	Mar. 31, 1865.	Shot wound of the right leg...	April 1, 1865.	Antero-posterior flaps at knee joint.	Gang.; slough.; femur protrud.; hæm.; femoral artery lig.; June 23d, recur'd; re-lig. Died June 24, 1865; exhaustion.
82	Lepper, W. F., Pt., H, 143d Pennsylvania.	May 5, 1864.	Conoidal ball fracture, involving right knee joint.	May 5, 1864.	Antero-posterior flaps at knee joint, leaving condyles and patella, probably by Surg. J. H. Brinton, U. S. V.	Died May 15, '64, hæm. (?) BRINTON (J. H.), *Am. Jour. Med. Sci.*, 1868, Vol. 55, p. 316.
83	Long, J. W., Serg't, I, 8th Kansas, age 23.	Dec. 16, 1864.	Conoidal ball fracture of right leg.	Dec. 17, 1864.	Flap, by Surg. J. R. Ludlow, U. S. V.	Dec. 18th, hæm.; lig. int. artic. art.; Dec. 25th, hæm. from ext. artic. art., 1 qt. Died Dec. 26, 1864.
84	Long, W., Pt., A, 1st Missouri Artillery, age 40.	Sept. 21, 1862.	Shot wound, involving head of right tibia and patella.	Sept. 21, 1862.	Amputation at knee joint.....	Died October 27, 1862; pyæmia. *Spec.* 467.
85	Matthews, S., Pt., A, 93d Pennsylvania, age 28.	May 15, 1864.	Shot comminuted fracture of left tibia and fibula.	May 17, 1864.	Lateral flap at knee joint.....	May 30th, hæm.; rec. June 3, 5, 8, 12; lig. pop. artery; hæm. June 16. Died June 17, '64; pyæmia.
86	McCullough, W. T., Serg't, I, 2d New York.	Aug. —, 1862.	Gunshot wound of leg	On field.	Amputation at knee joint.....	Lig. sloug.; hæm.; attempt to lig.; tetanic symp. Died Sept. 7, '62.
87	Merrill, S., Pt., I, 39th Mass., age 39.	Feb. 7, 1865.	Shot fracture of upper third of right tibia.	Feb. 7, 1865.	Flap amputation at knee joint.	Typhoid symptoms. Died March 3, 1865; pyæmia.
88	Opperman, J., Pt., E, 8th New Jersey.	May 5, 1864.	Conoidal ball fracture of left knee joint.	On field.	Amputation, by Surg. N. Hayward, 20th Mass.	Bone removed. Died May 15, 1864.
89	Parmenter, E. M., Pt., I, 15th Massachusetts.	Sept. 17, 1862.	Gunshot fracture of leg.....	On field.	Amputation at left knee joint..	Died October 13, 1862.
90	Rathburne, E., Pt., C, 36th Wisconsin, age 27.	May 31, 1864.	Conoidal ball fracture of right tibia.	May 31, 1864.	Flap, through the knee joint, by Surg. N. Hayward, 20th Massachusetts.	Sloughing. Died June 9, 1864; pyæmia; autopsy. *U. S. San. Com. Mems.*, Surg. Vol. I, p. 372.
91	*Rea, J.*, Pt., H, 24th Virginia.	May 16, 1864.	Conoid. ball fract. of patella and articular surf. of head of tibia.	May 18, 1864.	Long posterior flaps, by Surg. C. B. Gibson, C. S. A.	Bone protruded. Died July 19, 1864.
92	Ribinger, R., Pt., B, 27th Pennsylvania.	June 11, 1862.	Gunshot wound of the knee joint.	June 11, 1862.	Amputation at the knee joint..	Died June 15, 1862.
93	Roberts, E. P., Corp'l, G, 107th Illinois, age 20.	Feb. 18, 1865.	Shell shattering both bones of left leg in upper third.	Feb. 18, 1865.	Antero-posterior flap, Bauden's operation, by Surg. E. Shippen, U. S. V.	Slough.; cond. pro. Died Apr. 22, '65; pyæ. BRINTON (J. H.), *Am. Jour. Med. Sci.*, '68, Vol. 55, p. 321.
94	Russell, J., Pt., D, 27th Michigan, age 51.	July 30, 1864.	Fracture of upper third of right leg by a conoidal ball.	July 30, 1864.	Double skin flap, by Surg. A. F. Whelan, 1st Mich. S. S.	Thigh inflam.; disch. from end of stump. Died Aug. 18, '64; asthe.
95	Scott, J., Pt., F, 1st N. Y. Dragoons, age 33.	May 31, 1864.	Conoidal ball shattering bones of left leg.	June 1, 1864.	Amputation at knee joint.....	Slough. June 16, hæm.; 18th, lig. fem. art. Died June 18, '64; col.
96	Slater, P., Pt., I, 170th New York, age 45.	May 24, 1864.	Fracture of upper third of left leg by a conoidal ball.	May 26, 1864.	Amputation at left knee j't, by Surg. N. Hayward, 20th Mass.	Died June 4, 1864; effects of wounds.
97	Smith, H., Pt., I, 14th New Jersey, age 24.	June 7, 1864.	Conoidal ball wound of left leg and right thigh.	June 7, 1864.	Flap amp. at left knee j't and amp. right thigh, lower third.	Died June 17, 1864. (TABLE XXXII, No. 1745, p. 265.)
98	Stanley, W., Pt., H, 53d Pennsylvania, age 26.	Dec. 13, 1862.	Conoidal ball fracture of upper third of right leg.	Dec. 14, 1862.	Amputation at knee joint, removing the patella.	Stump swollen and bulbous, thigh honey-comb. by small abscesses; chronic diarrh. Died April 26, 1863; exhaustion. *Spec.* 1240.
99	Storey, J. M., Pt., H, 37th Wisconsin, age 30.	July 30, 1864.	Grapeshot fracture of left tibia and fibula.	July 31, 1864.	Amputation at knee j't, Butcher's operation, by Surg. A. F. Whelan, 1st Mich. S. S.	Slough. Aug. 15th, hæm.; Apr. 14, 1865, amp. thigh, mid. third. Died July 3, '65; gang. (TABLE XXXIX, No. 157, p. 316.)
100	Sutton, G. H., Pt., B, Purnell's Md. Legion, age 34.	Aug. 18, 1864.	Fract. of mid. third of left tibia and fibula by conoidal ball.	Aug. 19, 1864.	Amp. at knee joint, by Surg. A. A. White, 8th Maryland.	Died September 7, 1864; exhaustion.
101	Swan, D. K., Pt., F, 38th Ohio, age 18.	Sept. 1, 1864.	Shot fracture of the right tibia.	Sept. 1, 1864.	Antero-posterior flaps; removing condyles.	Died December 26, 1864.
102	Thompson, I. R., Pt., I, 6th Wisconsin, age 20.	May 11, 1864.	Shell comminuted fract. of left tibia and fibula near knee.	May 12, 1864.	Antero-posterior flaps, by Surg. A. J. Ward, 2d Wisconsin.	Died June 27, 1864; exhaustion.
103	Tilbury, G., Pt., E, 74th Illinois.	May 27, 1864.	Shot fracture of the right leg..	May 27, 1864.	Amp., by Surgs. W. P. Pierce, 88th Ill., and H. E. Hasse, 24th Wis.	Died June 12, 1864.
104	Turner, W. H., Serg't, 6th New York Battery, age 26.	May 6, 1864.	Cannon ball struck left leg, fracturing the tibia and the fibula.	May 6, 1864.	The patella, condyles, and synovial surfaces were not removed: and the capsules of the joint, divided at their distal extremities, were preserved, by Ass't Surg. G. M. McGill, U. S. A.	May 20th, hæm., 4 oz.; hæmorrh. recurred; flaps opened, sloughy tissue removed; end of bone necrosed. Died May 27, 1864; pyæmia.
105	Waldenburg, G., Pt., A, 46th New York, age 29.	July 30, 1864.	Conoidal ball fracture of right tibia. (Also wound of left heel.)	July 30, 1864.	Butcher's operation; long ant. flap; small portion of condyles sawn off articulating surface, by Surg. A. F. Whelan, 1st Michigan S. S.	Abscess; diarrhœa. Died Aug. 15, 1864; exhaustion.

No.	Name, Military Description, and Age.	Date of Injury.	Nature of Injury.	Date of Operation.	Operation and Operator.	Result and Remarks.
106	Westacott, R., Pt., F, 19th Massachusetts.	Dec. 13, 1862.	Shot fracture of leg	Dec. 13, 1862.	Amputation at knee joint	Died December 30, 1862.
107	*Wood, W. B.*, Serg't, I, 16th Tennessee.	Oct. 8, 1862.	Shot wound of leg	Oct. 8, 1862.	Amputation at knee joint	Died November 14, '62; typhoid fever.
108	*Baker, J. S.*, Pt., D, 25th Virginia.	May 12, 1864.	Conoidal ball fracture of patella and head of tibia.	May 13, 1864.	Large posterior flap, by Surg. C. B. Gibson, C. S. A.	May 15th, transferred to private quarters.

Intermediary Amputations at the Knee Joint.—Fifty-one intermediary operations gave a fatality of 68.0 per cent., only sixteen of the fifty determined cases having a successful issue. Three patients submitted to re-amputation in the thigh; one survived and two succumbed.

Recoveries after Intermediary Amputation at the Knee Joint.—Of the sixteen cases of this group three were Confederate and thirteen Union soldiers. The latter are all pensioners, and were living in August, 1880. In one instance primary amputation in the upper third of the leg had preceded the exarticulation at the knee, and in a second case hæmorrhage to the amount of sixteen ounces occurred from the popliteal artery seven days after the amputation. The bleeding vessel was ligated, but hæmorrhage recurring three days later, the femoral was successfully ligated:

Case 646.—Private D. Meikle, Co. B, 11th Massachusetts, aged 20 years, was wounded at Bull Run, August 30, 1862, and admitted to Fairfax Seminary Hospital nine days afterwards. Surgeon D. P. Smith, U. S. V., reported: "The case was one of gunshot wound of left knee joint, and the sequence of the injury was an amputation at the knee joint, performed by lateral flaps, on September 28th. Secondary hæmorrhage to the amount of sixteen ounces occurred on October 4th from the popliteal artery, when the stump was opened, the vessel dissected up for about two inches, and again tied. Three days afterwards hæmorrhage recurred; the stump was again reopened and the artery dissected up into Hunter's canal, where, becoming the femoral, it was then ligated. No further bleeding took place, and the patient recovered with a beautifully firm and broad stump." The patient was discharged from service December 16, 1862, and pensioned. He was paid March 4, 1880. The stump was described to be in good condition in the pensioner's application for commutation.

Case 647.—Private J. M. McGee, Co. E, 119th Pennsylvania, age 19 years, was wounded at the Wilderness, May 5, 1864. Surgeon E. B. P. Kelly, 95th Pennsylvania, recorded his admission to the field hospital of the 1st division, Sixth Corps, with "shot wound of right knee by a conical ball." Surgeon E. Bentley, U. S. V., who operated in the case, made the following report: "The patient entered Third Division Hospital, Alexandria, three weeks after receiving a wound of the right knee joint, the ball passing beneath the patella. The bones were not much fractured, but the joint was swollen and painful and the leg œdematous. Circular amputation at the knee joint, by skin flaps, was performed on June 2d, sulphuric ether being employed as the anæsthetic. At the time of the operation the patient had become very weak, his pulse quick and feeble, and he perspired considerably, had cough and spat up blood. He reacted very well. Tonics, stimulants, and nourishing diet were given, and simple dressings used. The wound healed up kindly, and the patient's general condition became much improved." The patient was subsequently treated at various hospitals, and finally, after being provided with an artificial leg, he was discharged September 9, 1865, and pensioned. Examining Surgeon E. A. Smith, of Philadelphia, certified to "amputation at the knee joint, with preservation of the patella." The pensioner was paid March 4, 1880. In his application for commutation he represented the stump of the amputated limb as being in a "sound" condition.

Case 648.—Private W. H. Thomas, Co. A, 17th Infantry, aged 19 years, was wounded at Bull Run, August 29, 1862, receiving a shot fracture of the upper third of the right leg. Assistant Surgeon B. Howard, U. S. A., reported that he amputated the leg on the field, on September 1st, at the knee joint, including the removal of the patella in the operation, which was performed by the double flap method. Several days after the date of the injury the wounded man was removed to Washington and admitted to Ascension Hospital, whence Surgeon J. C. Dorr, U. S. V., described his case as follows: "After his admission, the sutures were found upon examination to have given away and the flaps were gaping. The patient had been much exhausted by long marching prior to the battle, and it was feared that he would not survive the effects of the operation. Stimulants, beef tea, and quinine were freely given, and finally, after repeated relapses, he has now (December 3d) nearly recovered, the stump being covered with fine granulations, and his strength having recuperated to its normal standard." The patient subsequently passed through Carver and St. Elizabeth Hospitals, and on June 16, 1863, he was discharged, having been previously furnished with an artificial leg. He afterwards entered the Veteran Reserve Corps, and was ultimately discharged from service April 5, 1864, and pensioned. He was paid March 4, 1880. In his application for commutation he reported the stump as being in a good condition.

Fatal Cases of Intermediary Amputation at the Knee Joint.—The thirty-four operations were performed on three Confederate and thirty-one Union soldiers. Primary excision of three inches of the fibula, and primary amputation of the leg at the upper third, had

preceded the exarticulation at the knee in one instance each. Death was ascribed to pyæmia in eleven, to hæmorrhage in two, to gangrene in six, and to exhaustion in eight instances. Autopsies were recorded in four cases, and of nine cases specimens are preserved in the Army Medical Museum.

CASE 649.—Private M. B. Aseltyne, Co. F, 10th Vermont, aged 22 years, was wounded in the left foot, at Mine Run, November 27, 1863, and entered the Third Division Hospital, Alexandria, one week afterwards. Acting Assistant Surgeon A. P. Crafts reported: "A conical ball entered the anterior surface of the foot, fractured the cuneiform bones, and was extracted through the orifice of entrance, on the field. At the time of the patient's admission there was much tumefaction and inflammation of the foot and leg, which at first seemed to yield to treatment. But, on December 10th, evidences of gangrene began to show themselves, and four days afterwards the leg was amputated at the knee joint by Surgeon E. Bentley, U. S. V. The operation was performed by the circular method, and by retaining the patella after disarticulating the joint. Chloroform constituted the anæsthetic. Simple dressings were used to the stump, and tonics and stimulants, including iron and quinine, and acetate of ammonia were given in the treatment. On December 20th, there were symptoms of pyæmia. The patient's countenance became sallow and anxious, a severe chill occurred, and hiccough set in, followed by loss of appetite and by profuse sweating. Death supervened on December 27, 1863. At the *post-mortem* examination the liver, kidneys, spleen, and intestines were found healthy, the lungs much discolored, and some effusion in the cavity of the chest. There was also great hypertrophy of the heart and some effusion within the pericardium." A section of the stump, made by Surgeon J. H. Brinton, U. S. V., showed the femur to be healthy, although denuded of periosteum for six inches above the joint. The synovial membrane on the crucial ligament was congested, and the cartilage of the femur was thinned and softened, the whole color being changed and absorption commencing. The ligature of the popliteal artery had partially sloughed, and the base of the long internal clot had come down and projected through the opening made by sloughing in the walls of the vessel. The artery, showing its condition as described, was contributed to the Museum by the operator. A wet preparation of it constitutes specimen 1989 of the Surgical Section, and a chromo-lithographic representation is shown on PLATE XXII, opposite page 736 of the *Second Surgical Volume*.

CASE 650.—Corporal A. A. Lepper, Co. L, 8th Iowa Cavalry, aged 27 years, was wounded in the left leg, at the battle of Cassville, May 20, 1864. He was admitted to hospital at Chattanooga on the following day, and ten days afterwards he was transferred to hospital No. 8, Nashville, whence Acting Assistant Surgeon R. T. Higgins made the following report: "The injury consisted of a compound fracture of the tibia at the upper third. The day after admission the leg was placed in a box splint and kept there until, finding that the limb could not be saved, amputation or excision was determined upon; the foot having become considerably swollen and slightly œdematous, and the wound discharging ichorous pus. On June 8th and 10th, the patient also had severe chills, each attack lasting from twenty minutes to half an hour; pulse feeble and frequent; appetite wanting. Upon a thorough examination of the parts, amputation was decided to be the more advisable operation, and was performed at the knee joint, on June 13th, by Surgeon R. R. Taylor, U. S. V., in charge of the hospital. Rectangular flaps were made, with circular section of muscles, and the condyles of the femur were taken off in the operation, chloroform being employed as the anæsthetic. Two ounces of whiskey and forty drops of laudanum were administered at once after the operation, and mustard plasters were applied to the ankle and wrists. The patient reacted slowly. Milk punch and beef tea were given alternately every twenty minutes in half-ounce doses. On the following day he was troubled with colliquative diarrhœa and involuntary discharges and began to sink rapidly. There was also another chill, but not so severe as the previous ones, and on the second day the upper flap was found to be sloughing, dark in color, and gangrenous. Stimulants and nourishments were continued freely. Death occurred on June 16, 1864. At the *post-mortem* examination the lungs were found to be engorged and slightly hepatized and the intestinal canal slightly inflamed, the other organs being normal. The clot found in the femoral vein was slightly adherent and the internal coat of the vein very much inflamed. The cause of death was thought to be pyæmia." The upper half of the tibia of the amputated leg, a large fragment of it being partly necrosed and remaining in position, was contributed to the Museum by Assistant Surgeon C. C. Byrne, U. S. A., and is specimen numbered 3758 of the Surgical Section.

TABLE LVI.

Summary of Fifty-one Cases of Intermediary Amputations at the Knee Joint for Shot Fractures.

[Recoveries, 1—16; Deaths, 17—50; Unknown result, 51.]

NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATE OF INJURY.	NATURE OF INJURY.	DATE OF OPERATION.	OPERATION AND OPERATOR.	RESULT AND REMARKS.
1	*Butler, T. J.*, Lieut., A, 38th Virginia, age 28.	July 3, 1863.	Fracture of upper third of left leg by conoidal ball.	July 19, 1863.	Amputation at knee joint, by A. A. Surg. L. Fisher.	To prison April 23, 1864; afterwards exchanged.
2	Clark, O. H., Serg't, H, 1st Mass. Cav., age 30.	Nov. 27, 1863.	Pistol ball wound of left knee joint.	Dec. 2, 1863.	Flap amputation at the knee joint.	Discharged Oct. 4, 1864. Stump tender.
3	Desmond, H., Pt., I, 28th Mass., age 29.	Dec. 13, 1862.	Fracture of head of right tibia and patella; conoidal ball.	Dec. 21, 1862.	Amputation at the knee joint.	Secondary amp. lower third of thigh. Disch'd Dec. 22, 1863. (TABLE XL, No. 25, p. 320.)
4	*Frame, J. M. F.*, Pt., B, 4th Virginia, age 33.	Sept. 19, 1864.	Fracture and extensive comminution of right tibia 3 ins. below knee joint.	Sept. 22, 1864.	Circular amputation, patella retained, by Assistant Surg. G. M. Burdette, P. A. C. S.	Stump sloughed; typhoid fever. Released June 28, 1865.
5	Hawley, L. M., Serg't, I, 71st New York, age 21.	July 2, 1863.	Shot fracture of both bones of left leg in lower third.	July 5, 1863.	Flap amputation, by Surg. F. Prentice, 73d New York.	Sept. 24th, entirely healed. Discharged April 19, 1865.
6	*Lassiter, V. M.*, Pt., F, 32d Texas, age 17.	May 20, 1864.	Conoidal ball fracture of both bones of right leg in middle third.	June 5, 1864.	Amputation through condyles, removing patella; long ant. short post. flaps.	Post. flap slough.; June 10, hæm.; stump cicat'd; recovery. *C. S. Med. and Surg. Jour.*, Vol. 2, p. 28.

No.	Name, Military Description, and Age.	Date of Injury.	Nature of Injury.	Date of Operation.	Operation and Operator.	Result and Remarks.
7	McCaigue, S. B., Corp'l, H. 183d Penn., age 21.	May 12, 1864.	Shell fracture of bones of left leg; primary amputation upper third; sloughing.	May 27, 1864.	Amputation, by Ass't Surg. A. Delaney, U. S. V.	Mustered out July 13, 1865. He has caries of right tibia. Stump tender.
8	McGee, J., Pt., E, 119th Pennsylvania, age 19.	May 5, 1864.	Conoid. ball passed ben'th patel. r't knee, bones not much fract.	June 2, 1864.	Circular skin flaps, by Surg. E. Bentley, U. S. V.	Discharged September 9, 1865.
9	Meikle, D., Pt., B, 11th Massachusetts, age 20.	Aug. 30, 1862.	Shot wound of left knee joint.	Sept. 28, 1862.	Lateral flaps, by Surg. D. P. Smith, U. S. V.	Oct. 4, hæm.; lig. of popliteal; 7th, hæm.; lig. fem. Dis. Dec. 16, '62.
10	Nolan, P., Pt., G, 13th Mass., age 21.	Aug. 29, 1862.	Musket ball fracture of right tibia and fibula.	Sept. 3, 1862.	Markoe's operation; patella retained; condyles sawn off, by Surg. E. Donnelly, 2d Pa. R.	Patella raised 4 inches. Disch'd August 29, 1863.
11	Palmer, E., Pt., 6th Maine Battery, age 19.	Aug. 9, 1862.	Shell fracture of right tarsus, metatarsus, and tibia.	Aug. 14, 1862.	Anterior operation; articular surfaces of condyles sawn off, leaving patella, by Surg. E. Bentley, U. S. V.	Discharged Oct. 23, 1862. *Spec.* 53. Brinton (J. H.). *Am. Jour. Med. Sci.*, 1868, Vol. 55, p. 322.
12	Pittman, W., Pt., G, 148th Penn., age 23.	May 9, 1864.	Shell, carrying away external of malleolus of right ankle.	May 16, 1864.	Poste. museular flap, by Surg. E. Bentley, U. S. V.	Disch'd June 22, '65. 1870, stump sound.
13	Shambaugh, C., Corp'l, B, 11th Penn. Res., age 24.	Aug. 29, 1862.	Musket ball fracture of both bones of left leg in upper third.	Sept. 4, 1862.	Single upper flap, patella not removed, by Ass't Surg. B. Howard, U. S. A.	Stump healed; patella movable 4 ins. up the limb. Discharged May 22, 1863.
14	Sheppard, P., Pt., C, 34th New York, age 25.	May 31, 1862.	Shot fracture of right leg	June 5, 1862.	Circular amputation at knee joint.	Discharged April 2, 1863. Cannot wear artificial limb.
15	Thomas, W. H., Pt., A, 17th Infantry, age 19.	Aug. 29, 1862.	Conoidal ball fracture of right tibia and fibula 3 ins. below joint.	Sept. 1, 1862.	Double flap 2½ ins. long, rem'g patella and art. surfaces, by A. Surg. B. Howard, U. S. A.	Sutures gave way; flaps gaped. Disch'd April 5, 1864. Stump good, 1870.
16	Wright, O., Pt., B, 12th Penn. Res., age 20.	Dec. 11, 1862.	Musket ball wound of right leg, involving knee joint.	Dec. 14, 1862.	Flap amputation, by a Confederate surgeon.	Discharged January 19, 1863.
17	Aseltyne, M. B., Pt., F, 10th Vermont, age 24.	Nov. 27, 1863.	Conoidal ball fracture of cuneiform bones left foot; inflammation of foot and leg.	Dec. 14, 1863.	Circular amp., leaving patella, by Surg. E. Bentley, U. S. V.	Died Dec. 27, 1863; pyæmia. Autopsy. *Spec.* 1989.
18	Bailey, W. H., Pt., A, 2d New York Cav., age 23.	June 9, 1863.	Shot fracture of right leg.....	June 18, 1863.	Amputation at the knee joint.	Sloughing; hæmorrhage, 20 oz. Died June 29, 1863.
19	Blancheau, P., Pt., I, 28th Massachusetts, age 22.	June 4, 1864.	Fracture of exter. condyle and slight fract. of inter. condyle of right femur.	June 8, 1864.	Skin flap, 1 inch of condyle, including fract. portion, rem'd, by A. Surg. S. B. Ward, U. S. V.	June 12th, gang.; 14th. hæm. Died June 16th, '64; gangrene and hæmorrhage. *Spec.* 2656.
20	Britton, M., Corp'l, F, 7th Penn. Res., age 21.	Dec. 13, 1862.	Musket ball fracture of cuboid and astragalus of right foot.	Dec. 26, 1862.	Circular, by Surg. E. Bentley, U. S. V.	Jan. 7, '63, hæm.; lig. fem.; gang. Died Jan. 12, 1863. *Spec.* 4541.
21	Carroll, F., Pt., K, 45th Pennsylvania, age 23.	June 3, 1864.	Shot injury of right fibula; primary excision.	June 18, 1864.	Ant.-post. flap, rem'g patella, by Surg. R. B. Bontecou, U. S. V.	Hæm. from ant. tibial art. Died June 22, 1864: exhaustion.
22	Danzenbaker, L. H., Pt., D, 10th New Jersey, age 21.	June 2, 1864.	Grapeshot struck inner condyle of femur; joint opened.	June 7, 1864.	Circular amp., skin flaps, by Surg. E. Bentley, U. S. V.	Died June 12, 1864: gangrene.
23	Eno, C., Pt., B, 91st Ohio, age 23.	July 20, 1864.	Musket ball fract. right tibia; leg swollen and ecchymosed.	July 31, 1864.	Antero-posterior flap, by Surg. J. B. Lewis, U. S. V.	Diarrhœa. Died August 9, 1864.
24	Farley, A., Pt., I, 83d New York, age 31.	May 9, 1864.	Shot fract. inter. malleolus of r't ankle j't; tissues œdematous, pus extend. nearly to knee j't.	May 15, 1864.	Circular by skin flaps, by Surg. E. Bentley, U. S. V.	Died June 1, '64; pyæmia. *Spec.* 2655.
25	Fuller, C. E., Pt., D, 36th Wisconsin, age 25.	June 3, 1864.	Conoidal ball fract. of os-calcis; left foot and leg in very bad condition.	June 9, 1864.	Skin flap, ½ inch of condyle removed, by Ass't Surg. S. B. Ward, U. S. V.	Gangrene. Died June 13, 1864; pyæmia. *Spec.* 2660. (Amputation was a last resort.)
26	Glazier, J. M., Pt., H, 55th New York, age 27.	May 31, 1862.	Wounds through both ankles; comminution left; fract. right; swollen and sloughing.	June 4, 1862.	Antero-post. flap at left knee joint, by Surg. R. B. Bontecou, U. S. V.	Died June 10, 1862; pyæmia.
27	Headley, S. G., Pt., F, 12th New Jersey, age 34.	May 10, 1864.	Conoidal ball commin. fract. of up. third of right tib. and fib.; j't swollen and erysipelatous.	May 18, 1864.	Flap amputation, by A. A. Surg. W. H. Ensign.	Tendency to slough. Died May 30, 1864.
28	*Hennessy, D.*, Pt., I, 8th Alabama.	May 5, 1862.	Shot fract. up. third left tibia; knee joint opened by fissures.	May 17, 1862.	Amputation at knee joint, by A. Surg. J. S. Billings, U. S. A.	Died August 27, 1862. *Spec.* 929.
29	*Hicks, W.*, Serg't, B, 14th Tennessee, age 28.	July 1, 1863.	Left tibia seriously injured and partly fractured; sloughing; hæm. from post. tibial artery.	July 25, 1863.	Long ant. flap, leaving patella and condyles, by A. A. Surg. J. A. Draper.	Slough. Died Aug. 10, '63; exh. *Spec.* 2051. Brinton (J. H.). *Am. Jour. Med. Sci.*, 1868, Vol. 55, p. 324.
30	Hoscid, A., Pt., I, 4th Maryland, age 27.	May 7, 1864.	Conoidal ball fract. of malleolus and astragalus; left foot and ankle much swollen.	May 15, 1864.	Ant. post. flap, retaining patella and condyles, by Ass't Surg. H. Allen, U. S. A.	Slough. Died May 28, '64; gang.; absorption. *Am. Jour. Med. Sci.*, 1865, XLIX, p. 33.
31	*Jewell, W.*, Pt., D, 59th Georgia.	May 10, 1864.	Conoidal ball fracture of metatarsal bones.	May 22, 1864.	Long post. flap, by Surg. C. B. Gibson, C. S. A.	May 24th, delirium. Died May 29, 1864.
32	Lepper, A. A., Corp'l, L, 8th Iowa Cavalry, age 27.	May 20, 1864.	Comminuted fract. up. third of left tibia by con. ball; foot swollen and œdematous.	June 13, 1864.	Rectangular flaps; circ. sect. muscles; condyles sawn off, by Surg. R. R. Taylor, U. S. V.	Slough.; gang.; colliquative diar. Died June 16, 1864; pyæmia. *Spec.* 3758.
33	McConnell, D. W., Pt., H, 46th Ohio.	April 6, 1862.	Shot fracture of the leg	April 10, 1862.	Amputation, by Ass't Surg. W. D. Turner, 1st Illinois Light Artillery.	Slough.; intermed. amp. thigh. Died April 25, 1862. (Table XXXVI, No. 481, p. 300.)
34	McFarland, A., Pt., I, 150th Penn., age 23.	May 10, 1864.	Ball lodging in articulation beside right external malleolus; tissues œdematous.	May 27, 1864.	Anterior oval skin flap, by Surg. E. Bentley, U. S. V.	May 29th, gang., which caused death June 7, 1864.
35	McKenna, J., Pt., D, 39th New Jersey, age 29.	April 2, 1865.	Conoidal ball wound of left ankle; infiltration of pus in tissues of leg.	April 24, 1865.	Circular amputation at knee joint, by Surg. E. Bentley, U. S. V.	Died May 2, 1865; exhaustion.
36	Mansfield, M., Corp'l, F, 2d Connecticut H'vy Artillery, age 21.	May 31, 1864.	Shot fracture of right tibia, extending into knee joint.	June 4, 1864.	Post. flap; ant. incision from condyle over mid. of patella, and condyles sawn off, by A. A. Surg. J. F. Thompson.	Died June 16, 1864; pyæmia.
37	Marys, D., Pt., C, 90th Pennsylvania.	May 5, 1864.	Shot wound of right leg; parts gangrenous.	May 10, 1864.	Amputation at knee joint, by Surg. J. Ebersole, 19th Ind.	Popliteal sloughed; hæm., 50 oz. May 20th, amp. thigh. Died May 20, '64. *Spec.* 2340. (Table XXXVI, No. 475, p. 300.)
38	Mearns, J., Pt., D, 154th N. York, age 22.	May 4, 1863.	Shot wound of leg.....	May 14, 1863.	Amputation at the knee joint.	Died June 7, 1863; hæmorrhage and anæmia.
39	Murray, J., Pt., B, 51st N. York.	May 6, 1864.	Shot wound of right ankle....	May 18, 1864.	Amputation at the knee joint.	Died May 20, 1864.
40	Ostre, P., Pt., H, 72d New York, age 21.	May 10, 1864.	Conoidal ball fracture of tibia, ankle joint opened; leg swollen to knee.	May 21, 1864.	Long anterior, short post. flap, leaving patella, by Ass't Surg. G. A. Mursick, U. S. V.	Died June 1, '64; pyæmia. *U. S. San. Com. Mems.*, Surg. Vol. 1, p. 522.
41	Parks, L. C., Pt., E, 11th Vermont, age 28.	June 1, 1864.	Ball lodged in condyle of left femur, splitting it into knee joint.	June 7, 1864.	Ant. skin and post. muse. flaps; ½ inch of condyles of femur removed, by Surg. E. Bentley, U. S. V.	June 10th, gangrene. Died June 17, 1864; prostration.

No.	Name, Military Description, and Age.	Date of Injury.	Nature of Injury.	Date of Operation.	Operation and Operator.	Result and Remarks.
42	Rhinehart, C., Pt., K, 74th Pennsylvania, age 21.	Aug. 27, 1862.	Shot wound of leg; primary amputation up. third; sloughing.	Sept. 21, 1862.	Circular amputation at knee joint, by Surg. E. Bentley, U. S. V.	Died September 23, 1862; gangrene.
43	Sandford, W. W., Pt., F, 103d Pennsylvania, age 21.	Dec. 18, 1862.	Ball passed between bones of right leg 3 ins. below knee joint; tibia indented; pus in synovial cavity.	Jan. 10, 1863.	Antero-posterior flaps; condyles were sawn off and patella removed, by Surg. E. P. Moroney 2d Maryland.	Jan. 11th. chill and dyspnœa. Died Jan. 12, 1863; pyæmia.
44	Schreiber, A., Pt., A, 50th Pennsylvania, age 17.	May 10, 1864.	Wound of both legs; fracture of right tibia; round ball; 19th. hæm.; lig. post. tib. art.	May 19, 1864.	Antero-posterior flap, remov'g patella, by Surg. R. B. Bontecou, U. S. V.	June 1st, pyæmic symp. Died June 9, 1864; pyæmia.
45	Sheldon, C. S., Serg't, G, 12th New Hampshire, age 21.	June 3, 1864.	Grapeshot fract. left ext. malleolus, communicating with ankle joint; gangrenous.	June 22, 1864.	Anterior post. flap, by Surg. R. B. Bontecou, U. S. V.	Progress unfavorable. Died June 27, 1864; exhaustion.
46	Sweeney, J., Pt., H, 9th Maine.	July 18, 1863.	Right leg shattered by a grapeshot.	July 27, 1863.	Posterior flap amputation at the knee joint.	Died July 28, 1863.
47	Unknown, age about 35.....	———	Shot fracture of head of tibia, extending into knee joint.	Some days after injury.	Disarticulation at knee joint, leaving patella; sawing off tips of condyles, by Ass't Surg. C. C. Lee. U. S. A.	Died about three days after operation; exhaus.: pyæmic symp. BRINTON (J. H.). *Am. Jour. Med. Sci.*, 1868, Vol. 55, p. 324.
48	Veazie, C. H., Pt., C, 1st Mass. Cavalry, age 21.	Nov. 27, 1863.	Fract. and extensive comminution of r't tibia and fibula near ankle j't; much ecchymosed.	Dec. 6, 1863.	Antero-posterior flap through knee joint, by Surg. E. Bentley, U. S. V.	Dec. 10th, gangrene. Died Dec. 21, 1863; pyæmia; autopsy.
49	Velsor, A., Pt., D, 127th N. York, age 36.	Nov. 30, 1864.	Ball thro. head of tibia, fract. tibia and fibula; knee joint involved.	Dec. 9, 1864.	Antero-posterior skin flaps, by Ass't Surgeon C. F. Reber, U. S. V.	Died Dec. 22, 1864; pyæmia.
50	Wilhelm, J., Pt., A, 37th Ohio.	May 17, 1862.	Musket ball fracturing both bones of left leg in middle; sloughing.	May 31, 1864.	Amputation at the knee joint, by Surg. J. F. Gabriel, 11th Ohio.	Diffused abscess extending to hip. Died June 14, 1862.
51	*Chandler, A. J.*, Lieut., G, 40th Georgia, age 25.	May 26, 1864.	Fracture of right tibia, middle third; conoidal ball; large ulcer in leg.	June 21, 1864.	Amputation at knee joint thro' condyles, leaving patella.	June 30, '64, sloughing of stump. *C. S. Med. and Surg. Jour.*, Vol. 2, p. 33.

Secondary Amputations at the Knee Joint.—The secondary exarticulations at the knee joint numbered twenty-six; twelve were successful and fourteen were fatal, a mortality of 53.8 per cent. In four cases excision in bones of the leg, in four amputation of the leg, and in one amputation of a toe, had preceded the amputation at the knee.

Successful Cases of Secondary Amputation at the Knee Joint.—The patients were ten Union and two Confederate soldiers. Two of the ten Union soldiers have since died; the remaining eight were pensioners in 1880. In the following instance primary amputation in the middle third of the leg had been performed for shot fracture of the ankle joint. Sloughing and ulceration followed, and the limb was exarticulated at the knee fourteen months after the ablation of the leg:

Case 651.—Private W. Neveling, Co. N, 71st Pennsylvania, aged 26 years, was wounded at White Oak Swamp, June 30, 1682, and was admitted to Broad and Cherry Streets Hospital, Philadelphia, one month afterwards. Surgeon J. Neill, U. S. V., reported: "The injury was produced by a minié ball, which entered the outer side of the right ankle joint and passed directly through, severely comminuting the bones. Amputation of the leg at the middle third was performed the same day on the field, the operation being performed by the double flap method. The wounded man was taken prisoner and remained on the field for ten days, when he was sent to Richmond. After being paroled he was brought to this hospital, entering on July 30th, at which time the flaps had sloughed and both bones were protruding from the stump. There was also profuse discharge of unhealthy pus, and the patient's health was very much broken down. Stimulating poultices were applied, and the patient was ordered extra diet, with tonics, milk punch, and beef tea. Under the treatment adopted new tissue developed in the stump and the patient improved; but his recovery was necessarily slow. On November 13th, a piece of necrosed bone, four inches in length, was removed from the fibula, and three days later a large piece was removed from the tibia. After this the stump improved rapidly and the patient's general condition continued very good until March 15, 1863, when he injured the stump by a fall. Immediately after, sloughing recommenced, which was not checked until a month had elapsed and produced a condition of the parts from which recovery was slow. Under the application of fermenting poultices, with solution of chloride of zinc and sulphate of copper used alternately, the ulcer slowly diminished. On June 22d, when the patient was transferred to Satterlee Hospital, the lower end of the stump appeared to be made up of a carneo-osseous matter, on the extremity of which there remained an ulcer about two inches in diameter." Acting Assistant Surgeon T. G. Morton reported the subsequent progress of the case at Satterlee Hospital as follows: "At the time of admission the stump was still unhealed, and from the end of the bone a bulky exostosis sprang out as large as an orange. The tissue over this growth was constantly ulcerating and painful, and the disease continued to involve the tibia further up, reaching as high as the ligamentous patella. On August 27th, I proposed amputation at the knee joint for the reason that less shock follows that operation and a better stump is obtained, with more power, from non-division of the muscles of the thigh and non-interference with the medullary canal, lessening the danger of pyæmia. I made a long anterior and short posterior flap, leaving the patella in.

Fig. 251.—Hyperostosis of bones of right leg, after amputation. *Spec.* 2778.

No necrosis followed the operation, and the patient recovered with a most useful and firm stump." The patient was discharged from service March 3, 1864, and pensioned. He was paid December 4, 1879. The specimen, numbered 2778 of the Surgical Section, is represented in the annexed cut (FIG. 251), and forwarded to the Museum by the operator, shows an extraordiuary osseous formation at the divided extremities of the tibia and fibula, due to an exaggeration of the natural process by which the extremities of the bones are rounded off, and presents the histological characters of ordinary callus. The sequestrum, removed from the fibula prior to the second amputation, was also contributed by Surgeon Neill, and a cast of the stump of the disarticulated knee was furnished by Surgeon I. I. Hayes, U. S. V. The former is numbered specimen 668, and the latter 2458 of the Surgical Section.[1]

CASE 652.—Corporal E. C. Wright, Co. H, 21st New Jersey, aged 19 years, was wounded at Fredericksburg, May 3, 1863, by a solid shot, which carried off his right foot. Amputation of the leg by posterior flap, at the junction of the middle and lower third, was performed on the field by Surgeon D. McNeill, 21st New Jersey, and several days afterwards the patient was sent to Washington, where he entered Judiciary Square Hospital. He was discharged from service June 13, 1863, and pensioned. Subsequently the stump became diseased, inducing the pensioner, in January following, to seek relief by treatment at St. Luke's Hospital, New York City. The tibia became necrosed and cloaca formed, leading to sinuses in the substance of the bone, so that an injection would find its way through the canals. On June 23, 1864, amputation through the knee joint by antero-posterior flaps was performed by Dr. Gurdon Buck, the cartilages and patella being allowed to remain. Sulphuric ether was used as the anæsthetic. At the time of the operation the patient was in feeble condition, owing not only to the amount of pus discharged from the stump, but also to the presence of an abscess in the region of the liver, which had formed some months after the first amputation. This abscess discharged itself by a track passing between the ribs over the right lobe of the liver. There had been no admixture of bile, however, in the discharge, nor did jaundice exist at any time. A succession of abscesses formed during the healing of the stump. The first appeared at the upper boundary of the synovial sac and was freely laid open by Dr. Buck. Six days after the operation a tendency to slough appeared, and permanganate of potash was applied to the affected parts. Dr. Buck's method of extension by weight and pulley, with bands of adhesive plaster, was also used to prevent the retraction of the edges of the flaps and maintain them in apposition. This afforded great relief to the patient, steadying the limb and taking all the strain off the flaps. On September 1, 1864, the patient was discharged from hospital, the stump being solid and well rounded. The abscess in the side had ceased to discharge. In the following month the pensioner was fitted with an artificial leg by Dr. E. D. Hudson, of New York City. Pension Examining Surgeons who have inspected the stump have described it as a "very good" one, and the pensioner has reported its condition as "sound and healthy." He was paid March 4, 1880.

CASE 653.—Private H. A. Steward, Co. B, 8th Pennsylvania Reserves, aged 23 years, received a fracture of the right leg by a fragment of a shell, at Gaines's Mill, June 27, 1862. He was conveyed to Washington, where he remained under treatment at the Cliffburn Hospital until November 20, 1862, when he was discharged and pensioned, Surgeon H. Bryant, U. S. V., certifying to "exsection of a large portion of the tibia in consequence of the wound." Examiner George McCook, of Pittsburg, December 17, 1863, testified to the injury, and that "exfoliation is going on in a slight degree. He can walk inconveniently," etc. The pensioner subsequently entered the Good Samaritan Hospital, Cincinnati, where the injured limb was amputated on April 1, 1867, by Dr. Thomas H. Kearney, who certified as follows: "I amputated the leg through the knee joint, the section of the bone being performed through the condyles of the femur. The amputation was rendered necessary in consequence of inflammation of the tibia, leading to abscesses and general infiltration of the tissues. Removal of the condyles was necessitated in consequence of the want of sufficient healthy integument to cover them. The wound he had received involving the tibia, doubtless left it impaired in vitality and prone to attacks of inflammation, such as rendered its removal ultimately necessary." The Quincy Examining Board, in 1872, reported that "the flaps have sloughed from gangrene, leaving the bone only covered with tender cicatricial tissue, which often gives away and becomes an open ulcer," etc. The pensioner was paid March 4, 1880.

Fatal Cases of Secondary Amputation at the Knee Joint.—Fourteen operations were performed, three on Confederate and eleven on Union soldiers. The fatal results were attributed to pyæmia in three, to erysipelas in one, to exhaustion in eight instances:

CASE 654.—Private P. Fallon, Co. D, 11th Infantry, aged 20 years, was wounded in the left leg, at Gaines's Mill. June 27, 1862. He was captured by the enemy and remained a prisoner for one month, when he was exchanged and conveyed by the Hospital Steamer Daniel Webster to Philadelphia. Acting Assistant Surgeon R. R. Thomas recorded the following description of the case: "The patient entered the Episcopal Church Hospital July 30th, there being an irregular cavity in the front of his injured leg, running into the tibia but not reaching the fibula. He had been wounded by a bullet, which entered about nine inches above the inter-malleolar space, and was extracted, in part, two days after his admission. The opening in the leg was about one and a half inches square and about one inch deep, its sides being formed by necrosed bone and injured flesh. Pieces of bone had been taken out on previous days, and the patient was doing well. On August 6th, Acting Assistant Surgeon R. S. Kenderdine amputated the leg at the knee joint. On August 22d, secondary hæmorrhage occurred from ulceration and resulted in considerable loss of blood, the patient being found quite blanched. A tourniquet was then applied and the instruments were gotten ready to tie the bleeding vessel; on loosening the tourniquet, however, the bleeding was found to be arrested and no ligation necessary. The patient died October 6, 1862, worn out by puriform discharges and of pyæmia. The end of the stump was in pretty good condition, but large abscesses had formed in the thigh, and his back was covered with bed sores." The upper half of the amputated tibia, with the integument over the wound of entrance, enlarged by sloughing, attached, was contributed to the Museum by the operator (*Cat. Surg. Sect.*, 1866, p. 396, *Spec.* 500). The specimen shows an oblique fracture of the bone, with comminution, and a portion of the bullet remaining in the medullary canal. The cavity in the shaft is also exhibited, and the posterior surface of the shaft is covered with a moderate layer of new osseous tissue.

[1] A brief abstract of this case was published by Dr. JOHN H. BRINTON, *On Amputation at the Knee Joint and at the Knee*, in *Am. Jour. Med. Sci.*, 1868, Vol. LV, p. 319.

TABLE LVII.

Summary of Twenty-six Cases of Secondary Amputation at the Knee Joint for Shot Fracture.

[Recoveries, 1—12; Deaths, 13—26.]

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATE OF INJURY.	NATURE OF INJURY.	DATE OF OPERATION.	OPERATION AND OPERATOR.	RESULT AND REMARKS.
1	*Brady, J. W.*, Pt., E, 6th Louisiana.	Aug. 29, 1862.	Shot wound of the leg	Nov. 20, 1863.	Amp. at left knee j't, by Surg. J. C. Nott, C. S. A.	Recovery.
2	Bronchard, A., Pt., A, 5th New Hampshire, age 31.	April 7, 1865.	Fract. meta. bones of left foot; conoidal ball; April 17, exc. meta's; May 15, amp. leg. Disch'd Aug. 12, 1865.	Feb. 18, 1866.	Amputation at knee joint, in New York City Hospital.	Amputation of thigh near middle; recovery; 1870, stump healthy. (TABLE XXXIX, No. 11, p. 313.)
3	Frost, N. G., Pt., G, 32d Maine, age 34.	July 30, 1864.	Shot fract. left leg; prim. amp. at mid. third. Disch'd Feb. 8, 1865.	May 29, 1865.	Amp. knee joint, patella retained, by Dr. J. Lord, Norway, Maine.	April, 1866, leg in bad condition; 1870, stump tender and irregular.
4	Marsein, J., Pt., A, 115th New York, age 28.	Feb. 20, 1864.	Musk't ball lodged in r't patella; remo'd on 21st. Disch'd May 24,'65; anchy. knee j'nt. May, 1866, leg atrophied: condy. of femur eroded.	May 28, 1866.	Antero-posterior flap; 1 inch of extremity of condyles of femur sawn off; patella retained, by Dr. E. Mason, New York City.	Hæmorrhage; ice; flap healed almost by first intention; left hospital cured, July 28,'66. BRINTON (J. H.). *Am. Jour. Med. Sci.*, 1868, Vol. 55, p. 321.
5	Neveling, W., Pt., N, 71st Pennsylvania, age 26.	June 30, 1862.	Con. ball shattering bones of right ankle. Prim. amp. mid. third; sloughing. Nov. 13, sequestra removed.	Aug 27, 1863.	Long ant. and short post. flap, retaining patella and condyles of femur, by A. A. Surg. T. G. Morton.	Disch'd March 3, '64. *Specs.* 668, 2458, 2778. BRINTON (J. H.), *loc. cit.*, p. 319.
6	Pattee, J. H., Pt., D, 26th Ohio, age 23.	Sept. 19, 1863.	Shot fract. mid. third of left. tib. Sept. 21, exc. 2 ins.; bone exf.; separation of bone 2 ins.	Jan. 24, 1864.	Circular amputation, by Surg. J. Y. Finley, 2d Kentucky Cavalry.	Disch'd July 14, 1864; stump sound, 1870.
7	Perigo, H. C., Pt., B, 12th New York, age 30.	June 27, 1862.	Round ball fract. of mid. third right tibia; nec.; large seq. firmly set.	Mar. 14, 1863.	Long anterior flap, leaving condyles and patella, by A. A. Surg. J. A. Draper.	Recovery rapid; discharged Nov. 14, 1863. *Spec.* 2065. BRINTON (J. H.), *loc. cit.*, p. 323.
8	Reeder, J. H., Pt., E, 1st Colored Troops, age 22.	Aug. 12, 1864.	Fract. upper third of left tibia; conoidal ball; necrosis.	Mar. 19, 1865.	Double flap, by A. A. Surg. O. Shittler.	Discharged Nov. 8, 1865. Died August 5, 1870.
9	Steward, H. A., Pt., B, 8th Pennsylvania, age 23.	June 27, 1862.	Fract. right tibia; shell; excis. tibia. Discharged Nov. 20, 1862; exfoliation; general infiltration of tissues.	April 1, 1867.	Amputation; removal of condyles necessitated by want of healthy integument, by Dr. T. H. Kearney, Cincinnati.	Gangrene; sloughing of flaps; 1872, tender covering of stump often gives way and becomes an open ulcer.
10	*Walk, W.*, Pt., D, 52d North Carolina, age 22.	July 3, 1863.	Con. ball fract. left tib. and metatarsal; tissues slough. nearly two-thirds circumference of leg.	Aug. 4, 1863.	Flap amputation, leaving patella and condyles, by A. A. Surg. J. A. Draper.	Exchanged March 17, '64. *Spec.* 2061. BRINTON (J. H.), *loc. cit.*, p. 324.
11	Walter, G., Pt., H, 98th Pennsylvania, age 37.	July 2, 1863.	Shell fract. of mid. third of left leg; gangrene; tibia much diseased.	Nov. 8, 1863.	Ant. post. flap, retaining patella and condyles of femur, by A. A. Surg. M. S. Perry.	Disch'd Aug. 2, 1865. *Spec.* 2791. Died Dec. 5, 1873. BRINTON (J. H.), *loc. cit.*, p. 319.
12	Wright, E. C., Corp'l, H, 21st New Jersey, age 19.	May 3, 1863.	Solid shot taking off right foot; amp. juncture of low. thirds; necrosis of tibia. Discharged June 13, 1863.	June 23, 1864.	Ant. post. flap, cartilages and patella allowed to remain, by Dr. Gurdon Buck, New York City.	Succession of abscesses. Buck's method of extension to prevent retraction of flaps. Recovered Sept. 1, 1864.
13	*Adams, D. F.*, Pt., A, 55th North Carolina.	July 1, 1863.	Shot fract. junc. low. thirds left tibia (also fract. orbital arch and flesh wounds right leg); necrosed tibia.	Aug. 29, 1863.	Flap amputation left knee joint, leaving patella, by A. A. Surg. C. G. M. Griffith.	Ascites; general anasarca. Died Sept. 20, 1863. *Spec.* 2049.
14	Billington, H., Pt., I, 115th New York, age 45.	Aug. 16, 1864.	Conoidal ball inj'y of left tibia; gangrene; tibia necrosed.	Sept. 26, 1864.	Antero-posterior flap, by Ass't Surg. C. Wagner, U. S. A.	Died September 28, 1864; exhaustion.
15	Fallon, P., Pt., D, 11th Infantry, age 20.	June 27, 1862.	Shot lodged in left leg. Aug. 1, ball ext.; cavity in front of leg excavated into tibia 1 inch square and deep.	Aug. 6, 1862.	Amputation at the knee joint, by A. A. Surg. R. S. Kenderdine.	Aug. 22d, hæm. from ulceration; large abscess in thigh; bed sores. Died Oct. 6, 1862; exhaus. and pyæmia. *Spec.* 500.
16	*Forbes, W. A.*, Pt., A, 55th North Carolina, age 24.	July 1, 1863.	Con. ball fract. lower third left tibia; caries and nec.; slough.; bone exposed one fourth its length.	Aug. 6, 1863.	Flap amputation, leaving patella, by Ass't Surg. B. Stone, U. S. V.	Died August 11, 1863; exhaustion. *Spec.* 2058.
17	Foster, W., Pt., A, 22d Ind., age 22.	Aug. 7, 1864.	Shot fract., fourth toe, left foot; con. ball; amp. toe; gang.; dis. of tibia; caries.	Nov. 24, 1864.	Circular amputation, by Ass't Surg. R. McGowan, U. S. V.	Died November 27, 1864.
18	Garrity, M., Pt., I, 9th Mass., age 25.	May 5, 1864.	Right tibia extensively comminuted near crest; con. ball lodged; suppurat'n from knee to ankle.	June 10, 1864.	Ant. skin and post. muscular flaps; condyles of femur removed, by Ass't Surg. S. B. Ward, U. S. V.	Never rallied thoroughly; wound did well, nearly uniting. Died June 17, '64; prostration. *Spec.* 2551.
19	Grainger, S. M., Pt., A, 38th Indiana, age 23.	Dec. 30, 1862.	Shot fracture of left tibia and fibula. Jan. 14, 1863, excision fractured portions. Feb. 20, gangrene.	Mar. 15, 1863.	Malgaigne's oval flap amputation at the knee joint.	April 1, 1863, hæm. from branch of popliteal; sloughing. Died April 23, 1863; pyæmia.
20	Kane, W. H., Serg't, I, 115th New York, age 23.	Aug. 16, 1864.	Con. ball injury of left tibia; gangrene; tibia exposed five inches.	Sept. 17, 1864.	Antero-posterior flap, by Ass't Surg. C. Wagner, U. S. A.	Sept. 25th, hæm., 15 oz.; lig. fem. Died Sept. 26, 1864; exhaustion and hæmorrhage.
21	Peddie, J., Pt., B, 139th N. York, age 24.	June 3, 1864.	Shell fracture lower third left tibia; gangrenous.	Aug. 1, 1864.	Antero-posterior flap, by Surg. R. B. Bontecou, U. S. V.	Died August 18, 1864; exhaustion. *Spec.* 3065.
22	Sager, S., Pt., K, 5th Vermont, age 18.	June 29, 1862.	Fracture middle third of left tibia and fibula by a round ball.	Oct. 6, 1862.	Antero-posterior integument'ry flap; patella and condyles were left.	Died Oct. 9, 1862; pyæmia. *Spec.* 270. BRINTON (J. H.), *loc. cit.*, p. 323.
23	Sharp, T., Corp'l, I, 38th Illinois, age 30.	Feb. 6, 1864.	Conoid. ball fract. of right tibia; injury of artery. Feb. 7, exc. tibia; slough.; bones carious; tibia separated 3 inches.	April 5, 1864.	Circular amp. at knee joint, by Surg. I. Moses, U. S. V.	Gangrene. Died June 23, 1864; erysipelas.
24	Skilton, G. T., Pt., I, 36th Wisconsin, age 31.	June 3, 1864.	Conoidal ball fract. of low. third right tibia and fibula; gang.; sloughing of post. tibial art.; August 4, hæmorrhage.	Aug. 8, 1864.	Antero-posterior flap, by Surg. R. B. Bontecou, U. S. V.	Aug. 10th, gangrene: condyles of femur protr.; hæm. Aug. 30th, amp of thigh. Died Sept. 19, 1864. (TABLE XXXIX, No. 156, p. 316.)
25	Toppings, E., Corp'l, D, 147th New York, age 29.	June 18, 1864.	Conoidal ball fract. of mid. third of right tibia; necrosis.	Oct. 10, 1864.	Posterior flap, removing patella, by A. A. Surg. H. Boardman.	October 20th, partial union. Died May 11, 1865; variola.
26	*Waddell, W. E.*, Pt., H, 1st Virginia, age 33.	July 3, 1863.	Conoidal ball fracture of external malleolus of right tibia, opening ankle joint; slough'g.	Aug. 8, 1863.	Flap, leaving patella, by A. A. Surg. C. G. M. Griffith.	Died August 12, 1863; exhaustion. *Spec.* 2064.

Amputations at the Knee Joint of Uncertain Date.—The date of the exarticulation at the knee was not reported in four cases. Two of the patients were Confederate and two Union soldiers. Of the latter one died, the other is a pensioner. The meagre details are recorded in the following summary:

TABLE LVIII.

Summary of Four Cases of Amputation at the Knee Joint of Uncertain Date.

[Recoveries, 1—3; Death, 4.]

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATE OF INJURY.	NATURE OF INJURY.	DATE OF OPERATION.	OPERATION AND OPERATOR.	RESULT AND REMARKS.
1	*Faubion, H.*, Pt., K, 9th Texas.	Before June 19, 1863.	Gunshot wound; fract. of knee joint.	———	Amputation at the left knee joint.	Transferred August 19, 1863.
2	Keefe, P., Seaman, U. S. Brig Perry, age 24.	April 28, 1863.	Shot wound of left ankle.....	———	Amputation at the knee joint..	Discharged November 12, 1864; pensioned.
3	*Moore, J. R.*, Lieut., K, 33d North Carolina.	Before Aug. 26, 1864.	Shot fracture of left leg.....	———	Amputation at the knee joint..	Transferred September 30, 1864.
4	Call, G., Pt., H, 18th Ohio.	Dec. 31, 1862.	Shot wound of leg	———	Amputation at the knee joint..	Died January 16, 1863.

Adding to the one hundred and eighty-nine cases of amputations at the knee joint performed for shot fracture during the American civil war, six cases of exarticulation for shot flesh wounds, cited in TABLE VII, on p. 56, one hundred and twenty-eight cases collected in *Note* 1, on p. 397, and four operations performed by medical officers of the United States Army[1] since 1871, not heretofore published, we have in the annals of surgery a total

[1] The exarticulations at the knee joint performed in the United States Army since the date of the publication of *Circular* 3, 1 *Report of Surgical Cases Treated in the Army of the United States from* 1865 *to* 1871, Washington, War Department, S. G. O., 1871, are: 1. Private G. Grove, Co. F, 2d Infantry, aged 34 years, while firing a small swivel gun near Mount Vernon Barracks, Alabama, July 5, 1875, was wounded by the bursting of the piece, a fragment of which, weighing six and a half pounds, passed through his left leg, carrying away a portion of both bones to within a short distance of the knee joint, destroying the main arteries and lacerating the soft parts. The fracture extended into the articulation. The man had been drinking excessively, and the injury occurring some distance from the post, considerable hæmorrhage took place before assistance could be procured and a tourniquet applied. While being conveyed to hospital he fainted several times and had involuntary evacuations of fæces and urine. No reaction taking place and the venous hæmorrhage being uncontrollable, the patient was with difficulty etherized, and disarticulation was rapidly performed by Assistant Surgeon J. K. Corson, U. S. A. The operation was performed without removing the patella, the condyles of the femur being sawn through, and a long anterior and short posterior flap being made. There was scarcely any arterial hæmorrhage, and only two vessels besides the popliteal were ligated. Reaction was slow, and irritability of the stomach great on account of the large amount of liquor imbibed. The wound was closed with silk sutures; adhesive strips and water dressings and carbolic acid solution were applied. The case progressed favorably and the stump had almost closed, the man being able to sit up, when, on July 27th, erysipelas ensued with symptoms of an alarming nature. Sloughing of the flaps followed, and an abscess formed on the outer side of the thigh. Under the local application of hot fomentations and the internal administration of tincture of chloride of iron the inflammation subsided. About one month afterwards the stump had almost entirely healed, having the appearance of being a good one as regards bearing pressure. On December 6, 1875, the patient being entirely cured, he was discharged from service and sent to the Soldiers' Home. The bones of the amputated leg and the removed ends of the condyles of the femur, together with the fragment of the gun which inflicted the injury, were contributed to the Museum by the operator, and constitute specimen 6581 of the Surgical Section.—2. Sergeant H. F. Gude, Co. G, 12th Infantry, was wounded in the battle at the Modoc Caves, Lava Beds, California, April 15, 1873, by a conical bullet, which caused a compound comminuted fracture of the right tibia at the upper third and wounded the posterior tibial artery. Both ends of the vessel were ligated and temporary splints were applied on the field. The wounded man was conveyed to hospital at Peninsula Tula Lake, California, where Smith's anterior splints were employed. The leg was swollen, and mortification had appeared about the wound on April 19th, when amputation at the knee joint was performed by Assistant Surgeon H. McElderry, U. S. A., the patella being dissected out and the articulating surface of the femur removed. The patient suffered high surgical fever and constitutional excitement. During the period of suppuration the flaps retracted and the suture was torn out. The treatment consisted of antiseptic applications, tonics, and stimulants. In October following the stump had healed, and on January 7, 1874, the patient was transferred to his command.—3. Private F. Heber, Co. M, 1st Cavalry, aged 32 years, was wounded in the right arm and right leg during the fight at Clearwater River, I. T., July 11, 1877. He arrived at the field hospital at Grangeville three days after the injury, and six days later he reached the post hospital at Fort Lapwai. During the night previous to his arrival at the latter place a profuse hæmorrhage, probably from the anterior tibial artery, occurred, which was quickly arrested by compression of the femoral artery by Surgeon G. M. Sternberg, U. S. A., who, as soon as candle lights could be procured and a tourniquet applied, placed the man under the influence of ether and enlarged the wound in the upper part of the calf of the leg for the purpose of securing the bleeding vessel. It was then discovered that the head of the tibia was badly shattered by the ball, which entered two inches below the knee joint, perforating the bone and comminuting it to a considerable extent posteriorly; and amputation through the knee joint was at once decided upon as preferable to ligation of the femoral with a certainty almost that amputation would have to be performed subsequently. The operation was performed by Surgeon Sternberg, with the assistance of the Hospital Steward only, the patient being feverish from his wound, which had been painful, and fatigued from his transportation in a farm wagon. The stump was dressed with carbolic acid mixture. A large portion of the wound healed promptly, but some sloughing occurred near the centre of the extremity of the stump. On August 7th, when the patient was transferred to Fort Vancouver, only a space the size of a half-dollar piece remained to be filled by granulations. On March 13, 1878, the patient was discharged from service entirely cured.—4. Beatrice Hanciva, a woman twenty-two years of age and in the third month of pregnancy, was accidentally shot, at or near Fort Clark, Texas, November 28, 1871. A full charge of buckshot, discharged at a distance of a few feet, passed through her right leg at the junction of the middle and upper third, shattering the bones and extensively destroying the soft parts. Acting Assistant Surgeon A. L. Buffington failed to obtain the consent of the patient and her relatives to an amputation until December 2d, when, in consultation with Assistant Surgeon J. H. Patzki, U. S. A., amputation through the knee joint was decided upon. The amputation was performed with long anterior and short posterior flaps, retaining the patella

of three hundred and twenty-seven amputations at the knee joint for shot injury, with one hundred recoveries, two hundred and twenty-four deaths, and three undetermined results, giving a mortality rate of 69.1 per cent.

CONCLUDING OBSERVATIONS ON SHOT INJURIES OF THE KNEE JOINT.—With a very few exceptions,[1] writers on military surgery prior to the American civil war[2] agreed that shot wounds of the knee joint with fracture of the articulating surfaces of the bones required immediate amputation, and the correctness of this rule seems to have been generally accepted by the medical officers serving in the Union and Confederate armies. Surgeon T. H. Squire, 89th New York Volunteers, in his note-book of surgical cases at the Big Spring Hospital, near Sharpsburg, Maryland, on October 16, 1862, writes: "Every knee joint fractured by a ball should be amputated, and the quicker the better." Surgeon David Judkins, U. S. V., at the West End Military General Hospital, Cincinnati, in September, 1862, reports: "I have had three cases here of shot wounds in the knee joint, admitted, one in twelve, another in fifteen, and a third in seventeen days after the reception of the injury, in all of which the hope of successful issue in the removal of the leg by amputation had passed away. They all died. The operation should have been performed on the field." Surgeon H. S. Hewit, U. S. V., in charge of the Frederick Hospital, Maryland, January, 1863, argues: "The absolute law of strictly primary amputations in perforations of the knee joint has been distinctly asserted. In compound frac-

but dividing the rectus tendon and extirpating the lower bursa. The condyles were not removed, and only four ligatures were required. The wound was closed by stitches and adhesive straps. The stump was dressed with carbolated ointment, and when suppuration had commenced it was syringed twice a day with solution of permanganate of potash. The popliteal ligature came away on the twelfth day. The patient (who remained ignorant of the loss of the limb) continued to do well, the wound healing kindly, until December 20th, when rigors were soon followed by marked symptoms of pyæmia, which terminated her life on December 29th. She aborted a few days before death.

[1] JOBERT DE LAMBALLE, who, according to PAUL (*Die Conservative Chirurgie der Glieder oder Darstellung der Mittel and Methoden, welche zur Vermeidung, respective Beschränkung, der Amputation und Knochen-Resectionen sich darbieten*, Breslau, 1859, p. 192), was the only advocate of conservative measures in shot fractures of the knee joint, contended (*Des plaies d'armes à feu. Communications* par MM. les Docteurs BAUDENS, *etc.*, Paris, 1849, p. 166): "Les plaies pénétrantes de l'articulation du genou, regardées principalement comme nécessitant l'amputation, ont été traitées par la position horizontale et par une médication antiphlogistique très énergique et les cataplasmes froids Ce traitement a été également employé, soit que les os fussent intéressés, ou que la membrane synoviale ait été seule ouverte. Trois malades ont guéri sur six, et on sait que JOHN BELL avait défié qu'on lui montrât une guérison sur mille." But nearly fifty years before JOBERT, JEAN MÉHÉE (*Traité des plaies d'armes à feu*, Paris, An. VIII, p. 172) had urged conservation in such cases: "Une balle peut causer un grand délabrement dans ces articulations, briser les os, déchirer les tendons, les ligamens, les capsules; accidens tous fort graves, mais qui n'indiquent point l'amputation. Une balle, quelque violente contusion qu'elle cause, ne sauroit détruire les ressources des parties qu'elle frappe, et la contusion qu'elle peut causer ne s'étendant que dans son trajet et dans les parties qu'elle divise, ne présente qu'une indication principale, celle des incisions. Lorsque ces incisions sont bien dirigées, et que l'escarre est divisée, tous les accidens que pourroit entraîner l'espèce de contusion que la balle a faite, cessent, et l'amputation ne sauroit être indiquée."

[2] WISEMAN (R.) (*Severall Chirurgicall Treatises*, London, 1676, p. 430) cites a case of shot fracture of the knee joint: "Death followed, as commonly it doth in all such Wounds of the great joints. Therefore at sea, while they are warm with heat of Fight, we dismember them." DESPORT (*Traité des Plaies d'Armes à feu*, Paris, 1749, p. 225): "Si toute l'extrêmité inférieure du fémur est fracassée et toute la partie supérieure du tibia, et plus encore si ces deux os sont fracassés à la fois, il est absolument indispensable de couper la cuisse." SCHMUCKER (J. L.) (*Vermischte Chirurgische Schriften*, Berlin und Stettin, 1785, B. I, pp. 37, 38) declares that when the bones of the knee joint are comminuted, its ligaments are torn, or when the popliteal artery is shot through, amputation must be performed at once: "The sooner the operation is done the better will be the result." THOMSON (JOHN) (*Report of Observations made in the British Hospitals in Belgium after the Battle of Waterloo*, Edinburgh, 1816, p. 243): "Immediate amputation has generally been acknowledged to be particularly necessary in wounds in which bullets have passed through the knee joints and have fractured the articulating surfaces of the bones. Almost every case of this kind which we saw in Belgium seemed to afford a proof of the propriety of this rule in military surgery." HENNEN (JOHN) (*Observations on some important points in the practice of Military Surgery*, Edinburgh, 1818, p. 159): "In my own practice, I have met with only two cases where the limb was saved after a serious injury of the knee joint, and in one of them only was the perfect use of it restored." GUTHRIE (G. J.) (*Treatise on Gunshot Wounds*, London, 1827, p. 379): "Wounds of the knee joint, with fracture of the great bones composing it, from musket balls, require amputation . . from an extensive practice in wounds of the knee joint, with fracture of the articulating surface of the femur or tibia, I have no hesitation in declaring amputation to be imperiously demanded, and that it ought to be performed with the least possible delay consistent with propriety; and on no account should the surgeon wait to give the wound a trial; for I most solemnly protest, I do not remember a case recover in which I knew the articulating end of the femur or tibia to be fractured by a ball that passed through the joint, although I have tried great numbers, even to the last battle of Toulouse." In 1855, in his *Commentaries on the Surgery of the War in Portugal, Spain, France, etc.*, London, 6th ed., 1855, p. 82, the same author remarks: "Wounds of the knee joint from musket balls, with fracture of the bones composing it, require immediate amputation, for although a limb may be sometimes saved, it cannot be called a recovery, or a successful result, where the limb is useless." ESMARCH (F.) (*Ueber Resectionen nach Schusswunden*, Kiel, 1851, p. 129): "All shot wounds of the knee joint in which the epiphysis of the femur or tibia has been injured demand immediate amputation of the thigh; this is a deplorable sentence, already given by the best authorities, and which our experience has fully confirmed." MACLEOD (G. H. B.) (*Notes on the Surgery of the War in the Crimea*, London, 1858, p. 310) remarks: "The knee when penetrated by gunshot, presents an injury of the gravest description. Taking much interest in cases of this description, I visited every one I could hear of in camp, and can aver that I have never met with one instance of recovery in which the joint was distinctly opened, and the bones forming it much injured by a ball, unless the limb was removed." LOHMEYER (C. F.) (*Die Schusswunden und ihre Behandlung*, Göttingen, 1859, p. 202): "But when the capsule is opened and the condyles of the femur or tibia are injured, the prospect for the preservation of the limb, and, should the latter be attempted, for the preservation of life, is very poor. Therefore amputation of the thigh is always indicated in such wounds, and is to be performed as early as possible."

tures of the thigh the fatal result is usually the indirect, in gunshot wounds of the knee the direct, result of the accident. Much greater latitude both as respects operation and the period of operation in the former than in the latter class of cases, for obvious reasons, must be allowed. The shock of a wound of the knee joint when recognized by the system is profoundly constitutional and speedily fatal, in obedience to an obscurely understood physiological law. When the joint has been pierced and rent in the wedge-like manner described, molecular death commences. The system does not immediately recognize the fact, and this explains the delay of shock and the delusive appearance which these cases present. At a varying period of from three to ten or twelve days, according to constitutional and local circumstances and the rapidity of interstitial degeneration, postponed shock occurs, commencing with undefined but threatening expressions of uneasiness, and attaining its full development in surgical rigor and fatally declining reaction in typhoid surgical fever, with pyæmia, traumatic pneumonia, purulent cachexia, or uræmia, as the case may be, and all equally indicating hopeless injury overwhelming vital force." Surgeon A. B. Crosby,[1] U. S. V., advised amputation in shot fractures of the articulating surfaces of the knee joint, and added: "Slight injuries of this joint, it is true, may recover under favorable circumstances, although injuries seemingly insignificant often prove fatal." Surgeon J. T. Woods, 99th Ohio Volunteers, gave it as his experience[2] that "if bony structure is involved, fracture and comminution produced, the only warrantable procedure is amputation, the attempt to save the limb no less than a wanton robbing of the unfortunate sufferer of the only chance for life, by operative procedure." Based upon his experience as medical inspector during the War, Professor F. H. Hamilton declared, immediately after its close, that the surgeon should not attempt to save the limb[3] "when the fracture implicates the knee joint, or even when it is near the knee joint, experience having shown that amputations near the knee joint give a better percentage of recoveries than any other thigh amputations, while, on the other hand, attempts to save the limb in these cases give a worse percentage of success than in any other fractures of the thigh." Equally emphatic are the opinions of the surgeons of the Confederate army. Dr. Hunter McGuire[4] says: "As Medical Director of a large army, and one more actively engaged, probably, than any similar force in the late Confederacy, I saw a larger number of these cases of wounds of the knees involving the extremity of the bones, but not one which recovered without amputation. Whenever the surgeon persisted in his effort to save the limb, the patient died." Confederate Surgeon J. W. Thompson,[5] of Kentucky, maintained: "Gunshot wounds of the knee joint have claimed much attention during the past half century in both military and civil practice. I feel confident that the surgical experience in our late war in reference to this class of wounds is largely in favor of primary amputation," and Confederate Surgeon T. G. Richardson[6] declared that during his whole experience in the army he did not witness "a single recovery without amputation from unmistakable gunshot wound of the knee joint, with injury, however slight, to the femur or tibia." The attempts at conservation after shot fractures of the knee joint were therefore fewer than those after shot fractures of the

[1] CROSBY (A. B.). *Gunshot Injuries of the Knee Joint requiring Amputation*, in *Transactions of the New Hampshire Medical Society*, 1864, p. 31.

[2] WOODS (J. T.). *Gunshot Knee Joint Injuries*, in *Ohio Medical and Surgical Journal*, 1864, Vol. XVI, p. 297.

[3] HAMILTON (F. H.). *A Treatise on Military Surgery and Hygiene*, New York, 1865, p. 400.

[4] MCGUIRE (HUNTER). *Clinical Remarks on Gunshot Wounds of Joints*, delivered January 10, 1866, at Howard's Grove Hospital, in *Richmond Medical Journal*, 1866, Vol. I, p. 260.

[5] THOMPSON (J. W.), *Cases of Resection—Fractures of Upper Third of Femur—Gunshot Wounds of Knee Joint*, in *Nashville Medical Journal*, 1866, Vol. I, p. 342.

[6] RICHARDSON (T. G.), *Gunshot Wounds of the Knee Joint*, in *New Orleans Medical and Surgical Journal*, 1866–67, Vol. XIX, p. 57.

femur. We have seen on page 175, *ante*, that of six thousand five hundred and seventy-six shot fractures of the shaft of the femur, three thousand four hundred and sixty-seven, or over one-half, were throughout treated without operative interference; but in only eight hundred and sixty-eight, or about one-fourth of the three thousand three hundred and fifty-five reported cases of shot fractures of the articular extremities of the bones of the knee joint, conservation of the limb was attempted, and this preference for amputation in shot fractures of the knee joint was, in many instances, not so much due to the teachings of the masters of surgery of the first half of the present century as to the sad experience gained from the attempted practice of conservative measures which a number of the American surgeons were desirous to give a fair trial. Surgeon J. Moore, U. S. A., Medical Director of the Department of Tennessee, after the battle of Chattanooga, in November, 1863, declared that: "The attempts at conservative surgery in wounds of the knee joint were not encouraging. Of sixteen cases reported as occurring in the 2d, 3d, and 4th divisions, seven underwent primary amputation and seven were treated without amputation. On the twenty-fifth day one case not amputated had died and only two reported favorable for recovery." Surgeon M. G. Sherman, in charge of the 2d division, Twenty-first Corps, in a letter to Medical Director A. J. Phelps, reports cases of shot wounds of the knee joint observed by him, and remarks: "Believing the surgeon who saves a limb is more justly entitled to credit than he who operates scientifically, I was inclined to be conservative in my practice and treatment of those who came under my care, and operated only when it was fully apparent the patient could not be saved without an operation, and was compelled, as a result, to perform more secondary operations than I otherwise should have been." Surgeon I. Moses, U. S. V., believing that in cases of shot wounds of the knee "the patients had not so much died from the injury itself as from timid surgery," the surgeon failing to freely lay open the joint, determined to save the limb in a number of cases under his charge at the hospital at Chattanooga, in the summer of 1863; but the ultimate results were very discouraging,[1] and Surgeon Moses had to admit[2] that he had "lost confidence in the possibility of saving gunshot wounds of the knee joint, involving fractures of the con-

[1] Dr. I. MOSES (*Surgical Notes of Cases of Gunshot Injuries occurring during the advance of the Army of the Cumberland, in the summer of* 1863, in *Am. Jour. Med. Science*, April, 1864, Vol. XLVII, pp. 339 *et seq.*): "Ten cases of wounds of the knee joint were admitted." "Of these," Dr. MOSES reports "three died without operation; one died after amputation; one died of secondary hæmorrhage from a branch of the popliteal artery; three were nearly recovered when I left the post, September 15 [1863], and two remained with fair chances of ultimate recovery. Thus we have one-half the cases, which will, in all probability, be saved with useful limbs and various amounts of motion in the joints." Surgeon MOSES admits that "these cases were treated under the most favorable circumstances; the physical condition of the men was most excellent, and soon after the reception of the injury they were taken to well-appointed hospitals, surrounded with comfort and with every luxury of diet at command, and skilful surgical attendance." But let us examine the five cases of alleged recovery after shot fractures of the knee joint, cited by Dr. MOSES, and see how his expectations were realized: Private A. Loutenschlager (MOSES, *loc. cit.*, CASE V, p. 341), Co. A, 77th Pennsylvania, admitted to general field hospital at Murfreesboro', June 27, 1863, who, it was thought on September 15, 1863, would "recover with an anchylosed joint," died on September 26, 1863, in consequence of active inflammation and burrowing of pus in the joint and up the thigh. Captain *Pettigrew*, 20th Tennessee (MOSES, *loc. cit.*, CASE III, p. 340), admitted to general field hospital at Murfreesboro', June 27, 1863, and declared "beyond all danger" on September 16th, submitted to secondary amputation in the lower third of the thigh on January 4, 1864, and died on January 7, 1864. (See TABLE XL, No. 178, p. 322, *ante*.) In the case of Adjutant *Y*—— [*J. R. Youre*], Caswell's Georgia Sharpshooters (MOSES, *loc. cit.*, CASE II, p. 340), admitted to hospital No. 1, Murfreesboro', June 26, 1863, no information later than July 27, 1863, can be obtained, when the prisoner was sent to Nashville with wound healed and partial anchylosis of joint. Sergeant Haynie (MOSES, *loc. cit.*, CASE I, p. 340), 10th Ohio Cavalry, wounded at Hoover's Gap, June 24, 1863 [not June 6, 1863, as stated by Dr. MOSES], and admitted to hospital at Murfreesboro', June 27th, recovered, was promoted to 1st Lieutenant and mustered out with his regiment July 24, 1865. This case is reported on the Murfreesboro' hospital register as "a fracture of the patella, carrying away the upper half of it and opening the knee joint." Haynie is not a pensioner. Private Edward Phipps, Co. F, 6th Indiana (MOSES, *loc. cit.*, p. 341, CASE IV), also wounded at Hoover's Gap, Tennessee, June 24, 1863, and admitted to hospital at Murfreesboro', June 27th; recovered, and was discharged September 20, 1864, with almost complete anchylosis. He is a pensioner, and Pension Examiner G. W. MEARS reported, on September 24, 1864: "Ball entered inside right knee, and ranging outward and downward, escaped about two inches lower down, upon outside, passing into joint on inside and through upper part of head of tibia on outside; . . leg weak, and a partial anchylosis exists with slight angle at the knee." In September, 1877, the Dayton Board of Examiners stated: "There is a creaking in the joint on motion being made, and partial anchylosis; leg is weak, and he carries a cane constantly." Granting that in the two cases cited last the articular extremities of the femur or tibia were implicated, which is by no means certain, we find that of the 8 cases treated conservatively, possibly 3, or, considering the case of *Youre* as undetermined, only 2 recovered, a mortality rate of, respectively, 62.5 or 71.4 per cent. As the cases cited by Surgeon MOSES have been made a basis for the advocacy of conservative measures in shot fractures of the knee joint by DEININGER (C.) (*Ueber die conservative Behandlung der Schusswunden des Kniegelenkes*, München, 1867, p. 28) and by other European surgeons, it has been deemed best to refer to the cases here somewhat in detail.

[2] MOSES (I.), *Surgical Notes of Cases of Gunshot Injuries occurring near Chattanooga in the Battles of September, October, and November*, 1863, in *American Journal Medical Science*, October, 1864, Vol. XLVIII, p. 363.

dyles of the femur or head of the tibia, under the usual circumstances of bustle and confusion of the field, and repeated removals of wounded in ambulances to the rear."

When it is considered that of three thousand three hundred and fifty-five shot injuries of the knee joint with lesion of the articulating surfaces of the bones, grouped in TABLE LII, on page 367, only eight hundred and sixty-eight, with three hundred and thirty-eight recoveries, were conservatively treated, and that in these eight hundred and sixty-eight cases are included one hundred and seventeen, with eighty-four recoveries, in which the synovial cavity was not primarily opened and only the patella fractured; furthermore, that with the exception of a few instances, in which amputation was refused or in which the cases came to the notice of the surgeons at a period when the proper time for amputation had passed, the cases reserved for conservative treatment were those deemed to have the best chances of a favorable result, the percentage of mortality (60.6 per cent.) must be regarded as very large, and the question naturally arises whether fewer attempts at conservation would not have saved more lives. It has already been pointed out on page 332 that the mortality of the two thousand three hundred and ninety-nine amputations of the thigh after shot fracture of the knee joint was only 51.1 per cent. Of these two thousand three hundred and ninety-nine amputations in the thigh for shot wounds of the knee joint, one thousand five hundred and twenty-five, with six hundred and sixty-nine deaths, were primary operations, giving a mortality of 43.8 per cent., while eight hundred and thirty-nine, with five hundred and thirty-two deaths, or 63.4 per cent. fatality, were intermediary or secondary operations, performed, generally as a last resort, when it became evident that a continuance of the conservative treatment would inevitably lead to a fatal issue. Thus it will be seen that the mortality after shot fractures of the bones of the knee joint treated conservatively, even under the most favorable circumstances, exceeded the mortality after primary amputation in the thigh by 16.8 per cent.

Shot fractures of the knee joint by small projectiles, in their early stages, are among the most deceptive of serious injuries. Surgeon H. S. Hewit, U. S. V., observed, in a report from Frederick Hospital, in January, 1863: "The conical wedge-like missile, propelled by an irresistible force and revolving with the rapidity of a steam augur, pierces, bores, and comminutes without occasioning great displacement. The bones are broken into a great number of minute fragments which are still held together by their capsular and ligamentous investments. The destruction is as great *ab interno*, as it would be *ab externo* by crushing between a railroad carriage wheel and the iron rail." Deluded by the seeming insignificancy of the external injury, the patient not rarely refuses to submit to amputation until the moment of hopeful operation has passed. Several cases of recovery after severe comminuted fractures of the bones of the knee joint are, it is true, recorded in the annals of surgical literature. Such examples have been cited among the cases of shot injuries adduced in *Note* 3, on page 368, and similar instances will be found among the cases collected in the appended table (TABLE LIX, page 417), in which it has been attempted to give a numerical summary of the cases of this nature recorded by writers on surgery; but these fortunate results only seem to indicate, as Professor von Langenbeck[1] remarks: "that if amputation is refused, the surgeon must never despair of saving life."

It has been shown on page 28 that of three hundred and fifty-one cases of shot wounds of the knee joint with either primary or secondary involvement of the joint capsule, but without lesion of the bony structure, ninety-eight, or 27.9 per cent., proved fatal. The

[1] LANGENBECK (B. v.), *Ueber die Schussfracturen der Gelenke und ihre Behandlung*, Berlin, 1868, p. 28.

attempt to save the limb should always be made in injuries of this nature, and amputation has not been advocated by military surgeons, although Schwartz[1] remarks that: "According to our experience we cannot find fault with the surgeon who, in a case of clearly defined extensive wound of the joint capsule, prefers immediate operation to generally useless attempts at conservation with subsequent secondary amputation." Stromeyer, Langenbeck, Legouest,[2] and others believe simple wounds of the joint capsule, without lesion of the bony structure, to be very rare; but the records of the American civil war, of the Franco-Prussian War of 1870–71, and of the Russo-Turkish War of 1877 (TABLE LIX, page 417), furnish examples of such injuries, and the experiments of Woods,[3] Simon,[4] and

[1] SCHWARTZ (HARALD), *Beiträge zur Lehre von den Schusswunden*, Schleswig, 1854, p. 173.

[2] STROMEYER (L.) (*Erfahrungen über Schusswunden im Jahre* 1866, Hannover, 1867, p. 57): "I will not deny that there are cases in which an opening in the knee joint made by a bullet will heal, but they must be very rare. I have not and do not expect to see one, because a ball which opens the joint must, as a rule, interest one of the articulating ends." LANGENBECK (B. V.) (*Ueber die Schussfracturen der Gelenke und ihre Behandlung*, Berlin, 1868, p. 38): "That the knee joint can be shot through from before backwards without lesion of bone I cannot think possible. There will always be more or less deep grooving of the condyles, and I have been able to feel the grooving in two cases of recovery." LEGOUEST (L.) (*Traité de Chirurgie d'Armée*, Paris, 1872, p. 444): "On voit cependant quelquefois des balles atteindre et même traverser de part en part de grandes articulations sans toucher les os. Nous avons traité, pendant la campagne d'Orient (1855), un militaire qui eut manifestement l'articulation du genou ouverte par une balle: le projectile passa immédiatement au-dessus de la rotule entre le tendon de cet os et les condyles du fémur sans fracturer ni les uns ni les autres et sans même déterminer d'accidents sérieux; mais ce sont là de rares exceptions."

[3] WOODS (J. T.) (*Gunshot Knee Joint Injuries*, in *Ohio Med. and Surg. Jour.*, 1864, Vol. XVI, p. 295): "The joint is only traversed by the ball, no fracture being inflicted, or at most simply a grooving or abrasion of the articular cartilages occurring. This idea seemed to find confirmation in the fact that in these cases the ball uniformly passed antero-posteriorly, or laterally in certain directions at the level of the joint, thus affording the first qualification of this occurrence. Passing antero-posteriorly the nearly level articular surface of the tibia, the large size of the inter-condyloid notch would, especially if the knee were partially bent, render the passing of a ball, without violently impinging on bony structure, quite easy of occurrence; and similar considerations of anatomy and varied position seemed to afford a similar explanation to the harmlessness of the balls—cases where their course was laterally through the anterior third of the joint. These theoretic views it was found quite easy to demonstrate upon the dead subjects: making a slit in the ligamentum patellæ below the patella itself, passing in a narrow bladed knife to clear away the soft parts, and slightly flexing the leg upon the thigh, I was enabled to introduce through the joint into the popliteal space a round piece of wood one-third greater in diameter than a minié ball, and by flexing the leg to a right angle with the thigh, the space between the bones of the joint on the anterior aspect was found to be quite sufficient for the passage of a minié ball laterally, and through the tense skin the opening would be so small that when the leg was straightened it would appear to have entered immediately below the inner condyle."

[4] SIMON (*Kriegschirurgische Mittheilungen. Zur Prognose und Behandlung der Schusswunden des Kriegelenkes*, in *Deutsche Klinik*, 1871, B. XXIII, p. 258 *et seq.*) tried to "determine these questions by experimental means, and obtained surprisingly clear results. I had three round iron rods made provided with very sharp points; one of the rods had the thickness of a Chassepot missile, the other that of the Prussian *Langblei*, and the third a yet greater thickness; and with these I attempted to penetrate the knee joints of dead bodies in various directions. With the limb extended it was impossible to push any one of the rods through, bone being struck everywhere. But on very little flexion, with the knee bent at 170°, the joint became so far opened that one could put the thinner rod through the intercondyloid notch with the greatest ease, and without touching the bones immediately below the lower margin of the patella through the ligamentum patellæ as well as by the sides of the same (FIG. 252). The rod penetrated antero-posteriorly through the middle of the joint, and appeared in the popliteal space or several centimetres above the same. When the rod was pushed in at the median line of the extremity immediately below the patella, or through the ligamentum patellæ, it would also appear in the median line on the posterior aspect; but when it penetrated beside the ligamentum patellæ, the rod had to be forced through the joint in a somewhat oblique direction, and its point would appear on the posterior aspect one to two centimeters distant from the median line. The rod of the calibre of the Prussian *Langblei* could be pushed through the joint in the same direction without injury to the bone, if the flexion of the joint was increased to an angle of 150°; and, with a still greater flexion, at an angle of 130°, the perforation could be accomplished with ease by the third or the thickest of the rods. But in these greater flexions the point of the rod appeared in the posterior side of the thigh much higher, about 6 to 12 centimeters, above the popliteal space (FIG. 253), and these various experiments proved that the greater the flexion in which the knee was perforated the higher the exit wound came to be located. Nor could the joint be penetrated from side to side when the limb was in a straight position. But when the knee was bent to an angle of 165°, the front portions of the articular surfaces of the femur and tibia would separate sufficiently to allow the thinner rod to be pushed through the anterior third of the joint, and, on greater flexion, the space between the bones would open to such a degree that the iron rod of the calibre of the Prussian *Langblei* penetrated (FIG. 254). After withdrawing the rod and stretching the knee, essential local changes were observed in the aperture of the canal, which were brought about by displacement of the bones and of the skin. The knee pan elevated itself out of the *sulcus intercondylicus* upon which it had been held down, and the anterior parts of the articulating surfaces of the femur and the tibia fixed themselves so upon each other that one could neither penetrate from the front nor from the side towards the middle of the joint. But the wound in the skin suffered the greatest displacement. In the penetrations from before backward, the entrance aperture, which, when the knee was bent, was located immediately below the lower margin of the patella, either in the middle or at the side of the *ligamentum patellæ*, pushed itself upwards upon the lower part of the patella, so that this bone, being covered by periosteum and a mass of fibrous bands, formed the underlying base of the wound in the skin. The opening in the synovial membrane was thereby so completely closed that the synovia could not at all or only very sparingly ooze out

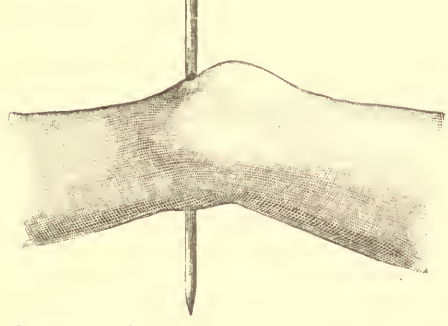

FIG. 252.—Perforation of the joint, at trifling genu-flexion from before backwards. [After SIMON.]

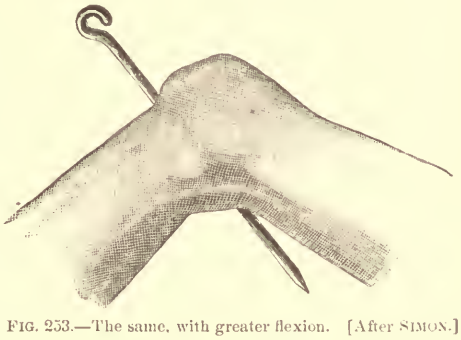

FIG. 253.—The same, with greater flexion. [After SIMON.]

Socin[1] clearly prove their feasibility. Hoffmann[2] states that among shot wounds of the knee, examples of missiles striking the knee, running around under the skin, and escaping on the opposite side, are very frequent; but no examples of such injuries were recorded from our civil war, and it can hardly be believed, as von Langenbeck[3] justly remarks: "That when the wound of entrance is in the middle of one side and the wound of exit in the middle of the other side of the joint, or when the former is in front, the latter in the bend of the knee, the ball should pass around the joint,—the angular projections of the condyles and of the edges of the patella would not permit it."

Analyzing the eight hundred and sixty-eight cases of shot fractures of the bones of the knee joint treated by conservation (TABLE LII, p. 367, *ante*), we find that in one hundred and seventeen cases the patella alone was injured, without lesion to the synovial cavity; eighty-four were successful, thirty proved fatal, and in three instances the result was undetermined, a fatality of 26.3 per cent., or 1.6 per cent. less than that of the cases of penetration of the joint capsule without bony lesion. Ten cases of fractures of the patella and head of tibia gave a mortality of 40.0 per cent., and of seventeen cases of fractures of the patella and condyles of femur 47.0 per cent. proved fatal. In the majority of the cases of these two groups the missile grazed the joint on the side, grooving or fracturing the bone and only slightly injuring the joint capsule. Forty-seven instances of fractures of the patella with primary lesion of the joint cavity gave a mortality of 53.1 per cent. Of the remaining six hundred and seventy-seven cases with fractures either of the condyles of the femur or the head of the tibia or both, or of the femur, tibia, and patella, two hundred and seventeen recovered, four hundred and fifty-four proved fatal, and six were undetermined, a mortality of 67.6 per cent., exceeding the mortality rate of primary amputations in the lower third of the thigh 18.9 per cent. On examining the reports of the eight hundred and sixty-eight cases of shot fractures of the bones forming the articulation of the knee, it was found that pyæmia supervened in seventy-seven instances, all proving fatal,—hæmorrhage in twenty-five, with nineteen deaths,—hospital gangrene in twenty, with seventeen deaths,—phlegmonous erysipelas in twenty, with eighteen deaths,—and tetanus in two, both resulting fatally. Fragments of bone or sequestra were removed in forty-four instances, twenty belonging to the group of fatal cases.

The consideration of the shot wounds of the knee joint treated by conservation will be concluded by an enumeration of such cases from other wars and from accidents in civil life.

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from under the edge of the membrane. At the wound of exit upon the posterior aspect of the knee the displacement of the skin made itself also apparent, but in a reversed direction, namely, from above downward, entirely in accord with the fact that the anterior opening was made during tension, the posterior during great relaxation of the skin. Hence, too, the parallelism of the subcutaneous and of the skin wound on the posterior aspect was so completely broken up that with the finest probe we could only penetrate to the depth of the skin wound. By stretching, after transverse perforations, the anterior part of the articular end of the tibia laid itself against that of the femur, so that the synovial membrane, and with it the wound, was so compressed that the joint became closed beneath the gaping skin wound. The openings in the skin moved either upon the condyles of the tibia or of the femur. The displacement here was generally much less, and, in several instances, one could see beneath the entrance aperture of the skin the compressed opening in the synovial capsule. As a rule also synovia escaped from these transverse perforations. . . After these experiments and observations at the patient's bedside, no doubt really remains to be overcome that so inexplicable swiftly healing shot injuries of the knee are to be taken up as wounds in which the knee joint was perforated during flexion (to bring about a perforation of the joint the flexion need not be greater than that produced in ordinary walking by the advancing leg) by the missile without injury to the bone, and which through the displacing of the skin, on straightening the joint immediately after the injury, were changed from open into subcutaneous joint wounds."

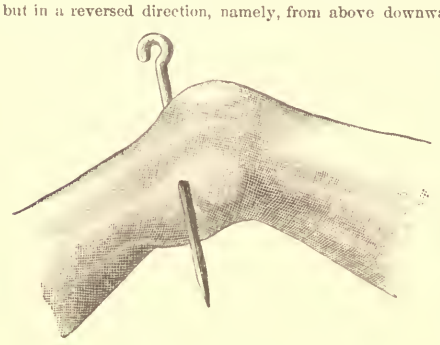

FIG. 254.—Transverse perforation. [After SIMON.]

[1] SOCIN (AUGUST), *Kriegschirurgische Erfahrungen, Gesammelt in Carlsruhe* 1870 *und* 1871, Leipzig, 1872, p. 168, and PLATE IX.

[2] HOFFMANN, *Ueber Verletzungen des Kniegelenks durch Kleingewehrprojectile und deren Behandlung*, in *Deutsche Militairärztliche Zeitschrift*, Berlin, 1875, Jahrgang 4, p. 243.

[3] LANGENBECK (B. v.), *Ueber die Schussfracturen der Gelenke und ihre Behandlung*, Berlin, 1868, p. 37.

TABLE LIX.

Shot Wounds of the Knee Joint treated by Conservation on the Occasions named and from the Authorities quoted.

OCCASIONS.	CASES.					NO BONY LESION.			FRACTURE OF BONE INDICATED.		
	Cases.	Recovery.	Fatal.	Unknown.	Ratio of Percentage.	Recovery.	Fatal.	Unknown.	Recovery.	Fatal.	Unknown.
Cases prior to 1846 (*Note* 3 on page 368, *ante*)	99	61	37	1	37.7	8	3	.....	53	34	1
War in Mexico, 1846–48 (JARVIS,[1] PORTER[2])	2	1	1	.....	50.0	.....	.....	.....	1	1	.....
Revolution in Baden, 1848 (SIMON[3])	3	2	1	.....	33.3	.....	.....	.....	2	1	.....
Revolution in Paris, 1848 (BAUDENS, HUGUIER, JOBERT DE LAMBALLE[4])	10	7	3	.....	30.0	.....	.....	.....	7	3	.....
Schleswig-Holstein War, 1848–50 (STROMEYER[5])	24	5	19	.....	79.1	.....	.....	.....	5	19	.....
Campaign in Algiers, 1854–57 (BERTHERAND[6])	2	.....	1	1	100.0	.....	.....	.....	.....	1	1
Crimean War, 1854–57 (CHENU,[7] MATTHEW,[8])	138	45	93	.....	67.3	2	1	.....	43	92	.....
Campaign in Nicaragua, 1856 (MOSES[9])	1	1	.....	.....	.....	1	.....	.....	.....	.....	.....
British in India, 1857–58 (WILLIAMSON,[10] GORDON,[11] WOODS[12])	6	4	2	.....	33.3	1	.....	.....	3	2	.....
Italian War, 1859–60 (CHENU,[13] DEMME[14])	85	49	36	.....	42.3	.....	.....	.....	49	36	.....
New Zealand War, 1863–65 (MOUAT[15])	2	1	1	.....	50.0	.....	.....	.....	1	1	.....
Danish War, 1864 (HEINE[16])	4	1	3	.....	75.0	.....	.....	.....	1	3	.....
Austro-Prussian War, 1866 (BIEFEL,[17] K. FISCHER,[18] GRITTI,[19] LANGENBECK,[20] MAAS,[21] STROMEYER[22])	78	44	34	.....	43.5	4	5	.....	40	29	.....
Revolution in Japan, 1868 (SIDDALL[23])	6	4	2	.....	33.3	.....	.....	.....	4	2	.....
United States Army, 1865–70 (OTIS[24])	4	4	.....	.....	.....	1	.....	.....	3	.....	.....
Franco-German War, 1870–71 (GERMANS[25])	166	85	79	2	48.1	44	14	.....	41	65	2
Franco-German War, 1870–71 (FRENCH[26])	88	33	49	6	59.7	10	3	.....	23	46	6
Russo-Turkish War, 1877 (BERGMANN,[27] ASSENDELFT[28])	58	38	15	5	28.3	18	.....	3	20	15	2
Isolated Cases since 1846 (HARRIS,[29] COBB,[30] ROSS,[31] SCHUH,[32] VAN BUREN,[33] ISNARD,[34] JOHNSON,[35] ROOKER,[36] ATLEE,[37] MAIR,[38] HUBBARD,[39] HOLDEN,[40] POWELL,[41] KOBER,[42] VOLKMANN,[43] CHANDLER,[44] GROSS[45])	17	17	.....	.....	.....	4	.....	.....	13	.....	.....
Aggregates	793	402	376	15	48.3	93	26	3	309	350	12

It is noticeable that all the isolated cases of shot injuries of the knee joint collected from civil life since 1846, seventeen in number, recovered, and it is only reasonable to sup-

[1] JARVIS (N. S.) (*Surgical Cases at Monterey*, in *New York Journal of Medicine*, 1847, Vol. VIII, p. 158): Soldier of 4th U. S. Infantry; fracture of patella by grapeshot. Died, seven days after injury, of tetanus.—[2] PORTER (J. B.) (*Medical and Surgical Notes of Campaigns in the War with Mexico, during the years* 1845, '46, '47, *and* '48, in *Am. Jour. Med. Sci.*, 1852, Vol. XXIII, p. 33): Case of G. R. Brush, Hays's Rangers, wounded at Monterey, September 22, 1846; musket ball perforated left patella; considerable inflammation; fragments of broken patella kept in place. Recovered. Seen at Vera Cruz in the autumn of 1847, serving with a mounted company of Texans, at which time there was no stiffness of the joint and but little deformity.—[3] SIMON (G.), *Ueber Schusswunden*, Giessen, 1851, p. 96.—[4] *Des plaies d'armes à feu; Communications*, etc., Paris, 1849, par BAUDENS, p. 231 (1 fatal); HUGUIER, p. 131 (4 recoveries); JOBERT DE LAMBALLE, p. 153 (3 recoveries, 2 fatal).—[5] STROMEYER (L.), *Maximen der Kriegsheilkunst*, Hannover, 1855, pp. 756, 757.—[6] BERTHERAND (A.), *Campagnes de Kabylie*, Paris, 1862, pp. 110, 267.—[7] CHENU (J. C.), *Rapport, etc., pendant la Campagne d'Orient en* 1854, '55, '56, Paris, 1865, p. 410 (37 recoveries, 87 fatal).—[8] MATTHEW (T. P.), *Med. and Surg. History of the British Army, etc., in the years* 1854, '55, '56, London, 1858, p. 350 (8 recoveries, 6 fatal).—[9] MOSES (I.) (*Military Surgery and Operations following the Battle of Rivas, Nicaragua, April,* 1856, in *Am. Jour. Med. Sci.*, 1857, Vol. XXXIII, p. 28): Case of Major Markham; ball struck on inside and a little above patella, involving cavity of joint; synovial fluid oozing from wound; absolute rest and abstemiousness enjoined, and cold dressings applied. Recovery, with free motion of joint.—[10] WILLIAMSON (G.), *Military Surgery*. London, 1863, pp. 170, 172 (4 recoveries).—[11] GORDON (C. A.), *Experiences of an Army Surgeon in India*, London, 1872, p. 25 (1 fatal).—[12] WOODS, *Description of a Mortal Gunshot Wound perforating the Knee Joint*, in *Dublin Medical Press*, 1862, Vol. XLVII, p. 158 (1 fatal).—[13] CHENU (J. C.), *Stat. Med. Chir. de la Camp. d'Italie, en* 1859 *et* 1860, T. II, p. 766 (45 recoveries, 22 fatal).—[14] DEMME (H.), *Militär-Chirurgische Studien*, Würzburg, 1861, Zweite Abth., p. 274 (4 recoveries, 14 fatal).—[15] MOUAT, *The New Zealand War of* 1863, '64, '65, in *Stat. San. and Med. Reports for the year* 1865, London, 1867, Vol. VII, p. 509.—[16] HEINE (C.), *Die Schussverletzungen der unteren Extremitäten*, Berlin, 1866, p. 371.—[17] BIEFEL (R.), *Im Reserve-Lazareth. Kriegschirurgische Aphorismen von* 1866, in LANGENBECK'S *Archiv für Klin. Chir.*, Berlin, 1869, B. XII, p. 449 (5 recoveries, 8 fatal).—[18] FISCHER (K.), *Militärärztliche Skizzen*, Aarau, 1867, p. 93 (25 recoveries, 21 fatal).—[19] ROCCO GRITTI, *Nuovi documenti in favore della cura conservativa nelle fractura del femore par arma da fuoco*, in *Annali Universali di Medicina*, 1868, Vol. CCV, p. 527 (2 recoveries, 1 fatal).—[20] LANGENBECK (B. v.), *Ueber die Schussfracturen der Gelenke und ihre Behandlung*, Berlin, 1868, p. 30, etc. (9 recoveries, 2 fatal).—[21] MAAS (H.), *Kriegschirurgische Beiträge aus dem Jahre* 1866, Breslau, 1870, pp. 52, 54 (2 recoveries, 2 fatal).—[22] STROMEYER (L.), *Erfahrungen über Schusswunden im Jahre* 1866, Hannover, 1867, p. 58 (1 recovery).—[23] SIDDALL (J. B.), *Surgical Experiences in Military Hospitals in Japan*, in *St. Thomas's Hospital Reports*, London, 1874, Vol. V, p. 95.—[24] OTIS (G. A.), *Circular* No. 3, War Department, S. G. O., Washington, 1871, pp. 79, 80.—[25] BECK (B.), *Chirurgie der Schussverletzungen*, Freiburg, i. B. 1872, pp. 609 *et seq.* (16 recoveries, 11 fatal). BILLROTH (T.), *Chirurgische Briefe aus den Kriegs-Lazarethen*, Berlin, 1872, p. 230, etc. (2 recoveries, 6 fatal). BOCK, *Verhandlungen der Militairärztlichen Gesellschaft zu Orléans im Winter* 1870–71, in *Deutsche Militairärztliche Zeitschrift*, Berlin, 1872, Jahrg. I, p. 265 (1 recovery). BURKHARDT, *Aus der Schweizer—Ambulance in Lure*, in *Correspondenz-Blatt für Schweizer Aerzte*, Bern, 1871, Jahrg. I, p. 217 (3 fatal). CZERNY (V.), *Bericht über die im Collège Stanislaus in Weissenburg behandelten Verwundeten*, in *Wiener Med. Wochenschrift*, 1870, No. 60, p. 1447 (5 fatal). FISCHER (G.), *Dorf Floing und Schloss Versailles*, in *Deutsche Zeitschrift für Chirurgie*, Leipzig, 1872, B. I, p. 240 *et seq.* (3 recoveries, 2 fatal, 2 unknown). FISCHER (H.), *Kriegschirurgische Erfahrungen*, Erlangen, 1872, p. 202 (8 recoveries, 9 fatal). GEISSEL (R.), *Kriegschirurgische Reminiscenzen von* 1870 *bis* 1871, in *Deutsche Zeitschrift für Chirurgie*, Leipzig,

pose that similar instances with fatal issue occurred during the same period, but were not reported by the attending surgeons. The percentage of fatality (48.3) must therefore be considered as too favorable. Attention should here be called to the favorable results claimed to have been achieved in the late Russo-Turkish War, 1877, by Professor Bergmann. Of twenty-one cases without bony lesion, eighteen recovered and the results in three were undetermined. None had died at the date of Professor Bergmann's report. Of thirty-one instances of shot fracture of the bones of the knee joint, two had undetermined results, twenty recovered, and nine died, giving the favorable mortality of 31.0 per cent. Professor Bergmann had hoped to have occasion to try Lister's antiseptic mode of treatment on the field of battle, and had provided himself with a complete outfit for that purpose; but he soon realized that in the excitement and confusion following an engagement it was impossible[1] to proceed with the care and precision requisite to a successful practice of Lister's somewhat

1875, B. V, p. 45 (1 recovery, 3 fatal). GRAF (E.), *Die Königlichen Reserve-Lazarethe zu Düsseldorf wahrend des Krieges* 1870–71, p. 67 (6 recoveries, 5 fatal). HEINZEL, *Ueber die conservirende Behandlung der Kniegelenkschüsse. etc.*, in *Deutsche Militairärztliche Zeitschrift*, Berlin, 1875, 4 Jahrg., p. 318 (1 recovery). KIRCHNER (C.), *Aerztlicher Bericht über das K. P. Feld-Lazareth im Palast zu Versailles*, Erlangen, 1872, p. 60 (8 recoveries, 11 fatal). KOCH (W.), *Notizen über Schussverletzungen*, in LANGENBECK'S *Archiv für Klin. Chir.*, Berlin, 1872, B. XIII, p. 512 (3 fatal). LOSSEN (H.), *Kriegschirurgische Erfahrungen aus den Barackenlazarethen zu Mannheim, Heidelburg und Karlsruhe* 1870 *und* 1871, in *Deutsche Zeitschrift für Chirurgie*, Leipzig, 1873, B. II, p. 128 (8 recoveries). LÜCKE (A.), *Kriegschirurgische Fragen und Bemerkungen*, Bern, 1871, p. 62 (1 fatal). MAYER (L.), *Kriegschirurgische Mittheilungen aus den Jahren* 1870–71, in *Deutsche Zeitschrift für Chirurgie*, 1873, B. III, p. 83 (1 recovery, 1 fatal). MOSETIG, *Erinnerungen aus dem deutsch-französischen Kriege*, in *Der Militärarzt*, with *Wiener Medizinische Wochenschrift*, 1872, p. 92 (1 recovery). OTT, *Mittheilungen aus dem Ludwigsburger Reservespital*, in *Med. Correspondenz-Blatt des Württemberg. ärztl. Vereins*, Stuttgart, 1871, B. XLI, p. 156 (2 recoveries, 1 fatal). SALZMANN, *Mittheilungen aus dem Vereinsspital in Esslingen*, in *Med. Correspondenz-Blatt des Württemberg. ärztl. Vereins*, 1871, B. XLI, pp. 138, 154, 155 (3 recoveries, 1 fatal). SCHÄFFER (T.), *Chirurgische Studien und Untersuchungen aus dem Feldzuge von* 1870, in LANGENBECK'S *Archiv für Klin. Chir.*, 1872, B. XIII, p. 102 (1 recovery, 1 fatal). SCHINZINGER (A.), *Das Reserve-Lazareth Schwetzingen im Kriege* 1870–71, Freiburg, i. B., 1873, p. 76 (4 recoveries, 2 fatal). SCHULLER (M.), *Kriegschirurgische Skizzen aus dem deutsch-französischen Kriege* 1870–71, pp. 67, 68 (2 recoveries). SCHWABE, *Verhandlungen der Militairärztlichen Gesellschaft zu Orléans im Winter* 1870–71, in *Deutsche Militairärztliche Zeitschrift*, 1872, B. I, p. 480 (1 fatal). SOCIN (A.), *Kriegschirurgische Erfahrungen*, Leipzig, 1872, p. 174 (15 recoveries, 10 fatal). STOLL, *Bericht aus dem Königlich Württembergischen 4. Feldspital von* 1870–71, in *Deutsche Militairärztliche Zeitschrift*, 1874, B. III, p. 205 (2 recoveries, 2 fatal). STUMPF (L.), *Bericht ueber das Kriegs-Spital des St. Georg-Ritter-Ordens zu Neuberghausen im Jahre* 1870–71, in *Aerztliches Intelligenz-Blatt*, Munchen, 1872, p. 657 (1 fatal).—[26] CHIPAULT (A.), *Fractures par armes à feu*, Paris, 1872, p. 37 (3 recoveries, 3 fatal). CHRISTIAN (J.), *Relation sur les plaies de guerre observées a l'ambulance de Bischwiller*, 1870–71, in *Gaz. Méd. de Strasbourg*, 1871–73, p. 283 (3 recoveries, 6 fatal). COUSIN (A.), *Histoire Chirurgicale de l'ambulance de l'École des Ponts et Chaussées*, in *L'Union Médicale*, 1872, T. XIII, p. 157 (3 recoveries, 1 fatal). DESPRÈS (A.), *Rapport sur les travaux de la 7e ambulance à l'armée du Rhin et à l'armée de la Loire*, Paris, 1871, pp. 46, 48 (6 recoveries, 36 fatal, 5 unknown). FELTZ ET GROLLEMUND, *Relation clinique sur les ambulance de Haguenau*, in *Gaz. Méd. de Strasbourg*, 1871, p. 145 (4 recoveries). GOLTDAMMER, *Bericht über die Thätigkeit des Reserve-Lazaretts des Berliner Hilfsvereins in der Garde-Ulanen-Kaserne zu Moabit*, in *Berliner Klin. Wochenschrift*, 1871, Jahrg. VIII, p. 150 (3 recoveries). GORDON (C. A.), *Lessons on Hygiene and Surgery from the Franco-Prussian War*, London, 1873, p. 157 (6 recoveries). GROSS (F.), *Notice sur l'hôpital civil pendant le siége et le bombardement de Strasbourg*, in *Gazette Méd. de Strasbourg*, 1871, p. 189 (2 fatal). JOESSEL, *Ambulances de Haguenau*, in *Gazette Méd. de Strasbourg*, 1871, p. 21 (1 recovery). MACCORMAC (W.), *Notes and Recollections of an Army Surgeon*, London, 1871, p. 128 (3 recoveries, 9 fatal). MUNDY, *Revue Médico-Chirurgicale des Ambulances*, in *Gazette des Hôpitaux*, 1870, p. 593 (1 fatal, 1 unknown). PONCET (F.), *Contribution à la Relation médicale de la guerre de* 1870–71, in *Montpellier Medical*, 1872, T. XXVIII, pp. 41, 44 (1 fatal). VASLIN (L.), *Étude sur les plaies par armes à feu*, Paris, 1872, p. 189 (1 recovery). [27] BERGMANN (E.), *Die Behandlung der Schusswunden des Kniegelenks im Kriege*, Stuttgart, 1878 (26 recoveries, 14 fatal, 5 unknown).—[28] ASSENDELFT, *loc. cit.*, p. 44 (12 recoveries, 1 fatal).—[29] HARRIS (S. N.), *Gunshot Wound of the Knee Joint, with Transverse Fracture of the Patella*, in *Charleston Medical Journal and Review*, 1848, Vol. III, p. 42 (1 recovery).—[30] COBB (W. H.), *Cases and Observations*, in *Western Journal of Medicine and Surgery*, 1854, Vol. II, 4th ser., p. 435 (1 recovery).—[31] ROSS (F. A.), *Gunshot Wound of the Knee Joint*, in *New Orleans Medical and Surgical Journal*, September, 1850, p. 178 (1 recovery).—[32] SCHUH, *Ausschneiden einer Kartätschenkugel aus dem Kniegelenke*, in *Wiener Med. Wochenschrift*, 1851, p. 129 (1 recovery).—[33] VAN BUREN (W. H.), *Gunshot Wound of Knee Joint*, in *New York Medical Times*, August, 1855, Vol. IV, p. 387 (1 recovery).—[34] ISNARD (C.), *Plaies pénétrantes du genou*, in *L'Union Médicale*, Paris, 1865, T. XXVIII, 2e sér., p. 595 (1 recovery).—[25] JOHNSON (R. H.), *Gunshot Wound of the Knee Joint*, in *Cincinnati Lancet and Observer*, Cincinnati, 1869, Vol. XII, p. 659 (1 recovery).—[36] ROOKER (J. I.), *Gunshot Wound of the Knee Joint, with fracture of the Patella*, in *Western Jour. of Med.*, 1868, Vol. III, p. 281 (1 recovery.)—[37] ATLEE (W. F.), *Case of Gunshot Wound of the Knee Joint; Removal of the Ball from the Articulation and Recovery*, in *Am. Jour. Med. Sci.*, 1867, Vol. LIV, p. 127 (1 recovery).—[38] MAIR, *Schwere Körperverletzung durch einen Schrotschuss in das Knie*, in *Friedreich's Blatter für gerichtliche Medicin und Sanitätspolizei*, Nürnberg, 1873, B. XXIV, p. 11 (1 recovery).—[39] HUBBARD (L.), *Gun-shot Wound in the Knee-joint*, in *Pacific Med. and Surg. Jour.*, 1870, Vol. IV, p. 302 (1 recovery).—[40] HOLDEN, *Gunshot Wound into the Knee-Joint*, in *British Medical Journal*, London, 1871, Vol. I, p. 169 (1 recovery).—[41] POWELL (J. L.) (*Cases of Gunshot Wounds of Knee Joint and Pelvis*, in *Virginia Med. Monthly*, Richmond, 1875, Vol. II, p. 35): Case of Lieut. G. L——, Co. I, 5th Infantry, aged 32, wounded in fight with Indians, September 9, 1874, near Washita River, Texas; fracture of patella and inner condyle of femur of left knee; recovery.—[42] KOBER (G. M.) (*Report of a Case of Gunshot Wound of the Right Knee-Joint and Right Hand*, in *Am. Jour. Med. Sci.*, 1876, Vol. LXXII, p. 427): Case of Serg't E. McM——, aged 24, accidentally wounded December 5, 1874; a load of duckshot entered the right knee, involving the tuberosity of the external condyle; lacerated wound of right hand; ring finger amputated through middle of second phalanx. Carbolated lotions applied to the knee without avail; injections of solution of iodine substituted; recovery, with anchylosed joint.—[43] VOLKMANN, *Verhandlungen der Deutschen Gesellschaft für Chirurgie*, VI Congress. Berlin, 1877, p. 39 (1 recovery). [44] CHANDLER (W. T.) (*Conservatism in the Treatment of Gunshot Wounds of the Knee*, in *Louisville Medical News*, 1877, Vol. III, p. 159): R. J——, aged 18; ball entered about 1 inch above patella, passed downward through the knee, fractured the femur, and emerged in the popliteal space; amputation advised but not allowed by patient; recovery, with probably a useful limb.—[45] GROSS (S. D.) (*A System of Surgery*, Philadelphia, 1872, 5th ed., Vol. I, p. 1039): Shot wound of the knee joint; recovery.

[1] BERGMANN (E.) (*Die Behandlung der Schusswunden des Kniegelenks im Kriege*, Stuttgart, 1878, p. 15): "In the night of the extensively planned and so gloriously successful crossing of the Danube, I was at the place of first dressing with a complete LISTER apparatus, with spray and excellently prepared gauze, aided by my Dorpat assistant, well schooled in the application of antiseptic dressings. The number of wounded was small, not exceeding 480, and plenty of helping hands were present. The wounded were brought to us in very little time after receiving their injuries—in short, I could not help taking hold, as I have just explained, of the gunshot fractures, and amongst them, also, of the knee wounds. But I soon desisted from my

complicated mode of treatment. Discarding the use of the spray apparatus, he dressed the wounds, immediately after the bleeding had ceased, thickly with salicylic cotton or jute, covering the same with a McIntosh rubber cloth, and applied the gypsum bandage without fenestration over the entire extremity and part of the pelvis.

Adding to the seven hundred and ninety-three cases collected in TABLE LIX, p. 417, the three hundred and thirteen cases of capsule wounds (page 28, *ante*) and the eight hundred and sixty-eight cases of shot fracture of the knee joint treated by conservation during the American war (TABLE LII, p. 367, *ante*), we have a total of one thousand nine hundred and seventy-four cases. The bony structure was not involved in four hundred and thirty-five, with three undetermined cases, three hundred and thirty-seven recoveries, and ninety-five deaths, or a mortality rate of 21.9 per cent. In one thousand five hundred and thirty-nine cases, lesion of the articulating ends of the knee joint was indicated; of these, six hundred and forty-seven were recoveries, eight hundred and seventy-one proved fatal, and in twenty-one the results remained undetermined, a fatality of 57.3 per cent.

Excision at the Knee Joint.—The results of the excisions at the knee joint performed during the late civil war, whether the operations were primary, intermediary, or secondary, were not very encouraging, forty-four of the fifty-four cases in which the issues were ascertained having terminated fatally, a mortality of 81.4 per cent., exceeding the mortality rate of the amputations in the thigh (53.8) by 27.6 per cent. Of the ten patients who survived excisions at the knee joint, one, Private W. M. Constable, 1st U. S. Cavalry (CASE 587, p. 387, *ante*), submitted to successful amputation at the junction of the middle and lower thirds of the thigh five days after the excision. Another, Private S. Miller, 1st Missouri Cavalry (CASE 632, p. 396, *ante*), was discharged the service and pensioned; but died two years and four months after the operation, from extensive suppuration of the leg and thigh and metastatic and pyæmic abscesses in various parts of the body. As regards the results of the instances of excisions at the knee joint, these cases, therefore, must also be considered as failures. Of the remaining eight cases three recovered with fair use of limb. In the case of Lieutenant *J. W. Harlee*, 1st South Carolina (CASE 584, p. 386, *ante*), the upper portion of the head of the tibia was excised. The patella was not removed. The leg is shortened three inches; but with the aid of a high heel and thick sole to the boot the patient can walk without crutches. Private *W. F. Jackson*, 6th South Carolina (CASE 585, p. 386, *ante*), in whose case the condyles of the femur and the patella were removed, has a "good sound leg which answers every purpose." In the case of Captain *Charles Knowlton*, 10th Louisiana (CASE 616, p. 391, *ante*), one and a half inches of the condyles of the femur, one inch of the tibia, and the patella were excised. Firm ligamentous union followed, and, when last heard from in 1877, the patient could "not only walk almost as well as ever, but could dance even round dances." Less favorable than in the three foregoing cases was the result in the case of Private J. Friel, 2d Kentucky (CASE 631, p. 395, *ante*). As in the case of *Knowlton*, the entire articulation, viz: one and a half inches of the condyles of the femur, one inch of the tibia, and the patella, was removed. The patient recovered with an anchylosed joint and four inches shortening; but the muscles of the limb below the knee became considerably atrophied and contracted, producing "*talipes*

efforts, for I was unable to disinfect, cleanse, and wash out scrupulously, to bandage and to place in position with the care that this dressing, according to my conviction and experiences, absolutely requires. The water which we drew at the banks of the Danube to solve our carbolic acid in was anything but clear and transparent, being, on the contrary, turbid with slime, mud, and sand. For the purpose of filtering, or even cooking itself, time and means were wanting. The spray apparatuses immediately became choked and spoiled, and in spite of a superabundant addition of carbol crystals, the water intended for disinfection retained its putrid odor."

equinus," while the muscular development of Captain *Knowlton's* leg remained excellent. In the case of Private Anson Rider (CASE 586, p. 386, *ante*), in which the condyles of the femur and the semilunar cartilages from the tibia had been excised, the patient was able to walk with the assistance of a cane at the time of his discharge ten months after the operation. Both lower extremities afterwards became paralyzed; but, according to the Pension Examining Surgeon's report, this may have been caused by malarial poisoning. Private E. Jewell's (CASE 629, page 394, *ante*) limb became atrophied and deformed, with contraction of the muscles and distortion of the foot. A portion of the head of the tibia and the head of the fibula had been excised. The evidence in the cases of Private J. E. Berry (CASE 630, page 394, *ante*) and Sergeant L. R. McWhorten (CASE 636, page 397, *ante*) is rather unsatisfactory, and beyond the fact that the former was mustered out forty-three days, and the latter furloughed twenty-seven days after the operation, nothing is known of their subsequent histories. As in the excisions at the elbow, the operations performed by the Confederate surgeons would seem to have given the best results; but it must be considered that, with the exception of the remarkable case of Captain *Knowlton*, the histories of the Confederate patients end with their discharge from hospital. In the cases of the Union soldiers the records are completed up to the present writing, and the remote results are found far less gratifying than the conditions of the patients at the time of their discharge from the service would seem to have warranted. For instance, in the case of Private Miller the success reported was so remarkable as to lead the editor, in the preliminary report,[1] published immediately at the close of the war in 1865, to doubt its authenticity. But, as stated above, and in CASE 632, p. 396, *ante*, subsequent reports, while verifying the account of the operative interference, revealed also the final fatal issue. These unfavorable results would seem to justify the declarations of Surgeon D. P. Smith,[2] U. S. V., that "this operation should be utterly discarded from the list of operations to be performed for gunshot injury;" of Surgeon H. S. Hewit,[3] U. S. V., that it is "highly questionable whether excision, gouging, or resection of any kind is to be permitted in traumatic surgery of the knee;" and of Dr. John Ashhurst, jr.,[4] that "excision of this joint should be banished from the practice of military surgery." The results of this operation in the late European wars (TABLE LX, p. 422) were equally discouraging. In the Schleswig-Holstein War of 1864, the mortality after knee joint excision was 85.7 per cent.; in the Austro-Prussian War of 1866, 86.6 per cent.; in the Franco-Prussian War of 1870–71, 80.0 per cent.; and in the Russo-Turkish War of 1876–77, 100. per cent.; and, while some of the European surgeons[5] yet hope for

[1] *Circular* No. 6, War Department, S. G. O., Washington, November 1, 1865. *Reports on the Extent and Nature of the Materials available for the preparation of a Medical and Surgical History of the Rebellion*, Philadelphia, 1865, p. 60.

[2] Surgeon D. P. SMITH, in charge of Fairfax Seminary Hospital, declares (*Experiences in Military Surgery*, in *American Medical Times*, 1863, Vol. VI, p. 100): "I am prepared to utterly discard this operation from the list of operations proper to be performed for gunshot or other *injury*, for this reason, even in civil practice, where every advantage of rest and careful nursing can be had, it is a doubtful remedy. But it is admissible because it is, or should be, always done for *caries*, which should most certainly be considered by every surgeon as imperatively demanding as thorough excision as *cancer*."

[3] Surgeon H. S. HEWIT, in his *Report of the Surgery of the U. S. A. General Hospital No. 5, at Frederick, Md.*, in 1862 (B. MSS. 33, p. 37), states: "Three partial resections of the knee were performed. The operation consisted in laying open the joint, removing the fragments, and smoothing the abraded and roughened surfaces. In one case the whole of the internal condyle and two-thirds of the head of the tibia were taken away, leaving the patella untouched. In the other cases the operation was confined to the head of the tibia. They all three failed, as might have been expected;" and on p. 43 adds: "The experiment of incising the knee joint and partially resecting signally failed. It was undertaken after consultation with several eminent civil and military surgeons, and I do not regret it, although the result of my experience has determined me never to repeat it. It is highly questionable whether excision, gouging, or resection of any kind is to be permitted in traumatic surgery of the knee."

[4] ASHHURST (JOHN, JR.), *The Principles and Practice of Surgery*, 2d edition, Philadelphia, 1878, p. 166.

[5] HEINE (C.) (*Die Schussverletzungen der Unteren Extremitäten*, Berlin, 1866, p. 395) regrets that excision at the knee joint was not more frequently performed, and hopes that in a future campaign the question as to its value may be more definitely settled. SENFTLEBEN (HUGO) (*Beobachtungen und Bemerkungen ueber die Indikationen, den Heilungsprocess, und die Nachbehandlung der Resectionen grösserer Gelenke*, in LANGENBECK'S *Archiv*, B. III, Berlin, 1862, p. 121) declares the introduction of the excision at the knee joint in military surgery a problem of the future, which he hopes will take the place of amputation in the thigh. BILLROTH (TH.) (*Chirurgische Briefe*, Berlin, 1872, p. 267): "The unfavorable results of this operation in war seem to prove that the therapeutic of knee joint injuries by resection, until now, has not accomplished any more than before;" but adds, on p. 271: "To discard primary resection altogether, the observations are yet too few." STARK (W.) (*Beiträge zu der Statistik und den Endresultaten der Gelenkresectionen*, in

better results in future wars, considering the number of observations on record too few to arrive at general conclusions, and while others,[1] basing their opinions generally on the more propitious results obtained in civil practice, approve of the operation under favorable circumstances, the most experienced[2] have declared themselves against the expediency of excision at the knee joint in times of war, and only perform it when amputation has been refused by the patient.

Of the fifty-seven patients on whom excision at the knee was performed, thirty-five were Union and twenty-two were Confederate soldiers. Of the former six survived, twenty-eight died, and one result remained undetermined, a mortality rate of 82.3 per cent. Of the latter four recovered, sixteen died, and the terminations in two cases could not be ascertained, a fatality of 80.0 per cent. In twenty-six instances—7 recoveries, 18 deaths, and 1 undetermined case—the right limb was injured; in seventeen—1 recovery and 16 deaths—the left; in fourteen instances the side injured was not recorded. In seven cases,[3] with 1 recovery, the excision at the knee was succeeded by amputation in the thigh.

V. CZERNY, *Beiträge zur Operativen Chirurgie*, Stuttgart, 1878, p. 325) trusts that "primary excision may retain its place in war surgery." SOCIN (A.) (*Kriegschirurgische Erfahrungen*, Leipzig, 1872, p. 169), although he performed 4 excisions at the knee joint, all of which proved fatal, concludes: "For all cases in which not only the nature of the injury, but also the surrounding circumstances permit it, I would recommend the primary excision. I live yet in hope that this operation will retain its place in military surgery." Professor v. NUSSBAUM, on the other hand, considers excision at the knee joint in peace as well as in war as a less dangerous operation than amputation in the thigh (*Ueber die Resectionen des Kniegelenks*, in *Aerztliches Intelligenz-blatt*, 1873, No. 9, p. 136): Dr. NUSSBAUM performed, during the Franco-Prussian War, 1870–71, 26 excisions at the knee joint (25 on the battlefield and 1 in hospital), and claims that 7 of these operations terminated successfully. But Professor E. GURLT, in his exhaustive work: *Die Gelenk-Resectionen nach Schussverletzungen*, etc., Berlin, 1879, p. 603, etc., thoroughly analyses the results in the alleged cases of recovery after excision in the knee joint by v. NUSSBAUM, and proves that in one case the excision was followed by amputation in the thigh terminating in death; that in another the patient died after 4 years of suffering from fistulous openings in the joint; that in the remaining four cases no subsequent history can be obtained, as the names given by Dr. NUSSBAUM, after a most careful scrutiny, cannot be found on the official muster rolls, nor among the claimants for pension; and Professor GURLT concludes, therefore, that of the excisions performed by v. NUSSBAUM only one can be claimed with certainty as a successful operation.

[1] RUPPRECHT (L.) (*Militärärztliche Erfahrungen*, Würzburg, 1871, p. 82): "Resection at the knee should not be performed unless immediately after the operation the measures are at hand for the most careful after treatment and perfect rest." KÜSTER (E.) (*Zur Resection des Kniegelenks im Kriege*, in *Deutsche Militairärztliche Zeitschrift*, 1873, p. 447): "Primary total excision of the knee joint for shot injuries, unless contravened by especially unfavorable circumstances, is preferable to amputation." FEHR (M.) (*Ueber die Resection im Kniegelenk*, in *Berliner Klinische Wochenschrift*, 1872, No. 46) concludes that: "In superficial shot injuries of the epiphysis of the femur or tibia, excision at the knee joint is indicated whenever the external circumstances are favorable and whenever by resection of the bony structure everything obnoxious can be removed. KOENIG (*Beiträge zur Würdigung der Resection des Kniegelenkes nach Schussverletzungen*, in *Berliner Klinische Wochenschrift*, 1871, No. 30, p. 355), from his experience in civil life and in military hospitals far remote from the seat of war, is inclined to favor excision at the knee in military surgery, while Oberstabsarzt J. ECKER (*Zur Total Resection des Kniegelenkes*, in *Wiener Medicinische Wochenschrift*, No. 34, 1877, p. 817) defends the operation on the ground of art and humanity.

[2] MACCORMAC (WM.) (*Notes and Recollections of an Ambulance Surgeon*, London, 1871, p. 119): "Excision for wounds of the knee may be successfully performed in civil practice, but is not justifiable in military." LÜCKE (A.) (*Kriegschirurgische Fragen und Bemerkungen*, Bern, 1871, p. 60): "Resection of the knee in war surgery has not recommended itself; I only perform it when amputation is refused; and I cannot boast of my success." COUSIN (A.) (*De la valeur de la résection du genou en temps de guerre*, in *Bull. Gén. de la Thérapeutique Méd. et Chir.*, Paris, 1873, T. 84, p. 161): "Mais, en temps de guerre, à la suite des batailles qui amènent fatalement l'encombrement des ambulances, la nécessité des évacuations successives des blessés avec des moyens de transport le plus souvent défectueux et partant l'impossibilité d'assurer aux opérés, d'une part, les soins minutieux dont ils doivent être l'objet, l'isolement, seule garantie certaine contre l'infection purulente et la septicémie, et, d'autre part, l'immobilisation absolue du membre blessé, condition *sine qua non* du succès de l'expectation ou de la résection, selon que l'on a adopté l'un ou l'autre de ces modes de traitement, toutes ces conditions défectueuses que nous venons d'énumérer expliquent et justifient la réprobation dont les chirurgiens militaires ont frappé la resection du genou." SPILLMANN (E.) (*De la résection du genou envisagée au point de vue du traumatisme*, in *Archives Générales de Médecine*, 1868, T. XI, sèr. VI, p. 690) cites 19 cases of excision at the knee joint with only 2 recoveries, and exclaims: "Toutes les illusions doivent tomber devant une pareille expérience; la résection ne peut s'appliquer à la chirurgie d'armée, si ce n'est dans des conditions très exceptionnelles." CZERNY (VINCENZ) (*Bericht ueber die im College Slanislaus in Weissenburg behandelten Verwundeten*, in *Wiener Med. Wochenschrift*, 1870, No. 59, p. 1429), on account of his many sad experiences, "could not persuade himself to perform knee joint resection again." Induced by the excellent results achieved in civil practice, Generalarzt BECK recommended and practised primary excisions in cases of shot fractures of the articular extremities without lesion of the blood vessels and without extensive laceration of the soft parts. "The results," he remarks (*Chirurgie der Schussverletzungen*, Freiburg, i. B. 1872, p. 883), "in no way came up to my expectations, although, with the exception of two cases, the operation was clearly indicated, the condition of the wounds was well suited to the operation, and, with one exception, the operations were skilfully performed, and in one instance only, too early transportation perhaps interfered with the result. Of the nine patients operated upon, seven died; of the remaining two, one had to have the thigh amputated afterwards, and one only, therefore, survived with preservation of the limb." LEGOUEST (L.) (*Traité de Chirurgie d'armée*, Paris, 1872, p. 579): "Nous doutons que la résection du genou puisse jamais être substituée d'une manière générale à l'amputation de la cuisse, dans la chirurgie d'armée." LOTZBECK (*Zur Kniegelenk-Resection nach Schussverletzungen*, in *Aerztliches Intelligenz-Blatt*, 1872, No. 32, p. 419) advises amputation in the lower third of the femur as preferable to excision. PIROGOFF (N.) (*Bericht ueber die Besichtigung der Mil.-Sanitätsanstalten in Deutschland*, etc., *im Jahre* 1870, Leipzig, 1871, p. 110) has not, in the seventy hospitals he visited, seen a single case of recovery after amputation in this joint. HUETER (C.) (*Klinik der Gelenkkrankheiten mit Einschluss der Orthopædie*, Leipzig, 1870–71, p. 507): "Resection of the knee joint in perforating shot wounds must not be performed when the accompanying fracture of the femur or tibia extends beyond the joint surface. It must also not be performed when the necessary guaranty cannot be had for careful attention and after treatment of the wounded."

[3] The cases in which the excision at the knee joint was followed by amputation in the thigh are: 1. Private W. E. L. Morrison, I, 29th Connecticut (TABLE XXXV, No. 388, p. 285, and CASE 607, p. 390), intermediary, in middle third of femur; fatal.—2. Private W. M. Constable, H, 1st Cavalry (TABLE XXXV, No. 43, p. 280, and CASE 587, p. 387), intermediary, in the middle third; recovery.—3. Corporal A. Glazier, B, 1st Minnesota (TABLE XXXVI, No. 366, p. 298, and CASE 606, p. 390), intermediary, in lower third; fatal.—4. Private J. W. Derr, E, 7th Maryland (TABLE XL, No. 128, p. 321, and CASE 605, p. 390), secondary operation in lower third; fatal.—5. Private S. Lininger, H, 74th Indiana (TABLE XL, No. 157, p. 322, and CASE 639, p. 397), secondary operation in lower third; fatal.—6, 7. Two unknown Confederate soldiers (TABLE XLI, p. 323, Nos. 9, 10, and CASES 611, 612, p. 390).

TABLE LX.

Excisions at the Knee Joint for Shot Injury on the Occasions named and from the Authorities quoted.

OCCASIONS.	CASES.					PRIMARY.		INTERMEDIARY.			SECONDARY.			PERIOD UNKNOWN.	
	Cases.	Recovery.	Fatal.	Result Unknown.	Mortality of Determined Cases.	Recovery.	Fatal.	Recovery.	Fatal.	Result Unknown.	Recovery.	Fatal.	Result Unknown.	Recovery.	Fatal.
Prior to September 15, 1862 (*Note* 1, p. 384)	18	8	9	1	52.9	2	3	.....	1	.....	6	3	1	.....	2
Accidents, 1862–1863 (VERNEUIL[1])	2	2	.....	.....	.0	.....	.....	2	.....	.....	.....	.....	.....	.....	.....
Danish War, 1864 (NEUDÖRFER,[2] LŒWENHARDT,[3] OCHWADT,[4] ESMARCH,[5] LANGENBECK[6])	7	1	6	.....	85.7	.....	2	1	1	.....	.....	3	.....	.....	.....
French in Mexico and Algiers, 1865 (NEUDÖRFER,[7] DAUVÉ[8])	2	1	1	.....	50.0	.....	1	.....	.....	.....	1	.....	.....	.....	.....
Six Weeks' War, 1866 (BAERWINDT,[9] BIEFEL,[10] BURCHARDT,[11] BUSCH,[12] FIEBER,[13] HAHN,[14] JUNG,[15] KÖNIG,[16] LANGENBECK,[17] MIDDELDORPF,[18] RAST,[19] TEXTOR,[20] WAGNER[21])	15	2	13	.....	86.6	.....	.....	1	7	.....	1	5	.....	.....	1
Accidents, 1866–1868 (BUXMANN,[22] THOMPSON,[23] OATMAN[24])	3	3	.....	.....	.0	2	.....	.....	.....	.....	1	.....	.....	.....	.....
Franco-Prussian War, 1870–71 (GURLT[25])	75	15	60	.....	80.0	9	14	2	35	.....	1	10	.....	3	1
Accidents, 1871–1873 (NEWMAN,[26] MINER,[27] MEUSEL[28])	3	2	1	.....	33.3	.....	1	1	.....	.....	1	.....	.....	.....	.....
Russo-Turkish War, 1876–1877 (REYHER,[29] BERGMANN,[30] KADE,[31] RUDDUCK[32])	7	.....	6	1	100.	.....	2	.....	2	1	.....	1	.....	.....	1
Accident, 1876 (TWITCHELL[33])	1	1	.....	.....	.0	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Aggregates	133	35	96	2	73.2	14	23	7	46	1	11	22	1	3	5

[1] VERNEUIL (A.) (*De la résection du genou*, in *Gazette Hebd. de Méd. et de Chir.*, Paris, 1862, T. IX, No. 46, p. 722): A young man, aged 18, in the fall of 1862 received a pistol shot in the knee joint; resection, five days after injury, of the articulating ends of the bone; cicatrized in seven weeks. In a communication to the *Société de Chirurgie* (*Gaz. des Hôp.*, Paris, 1864, No. 54, p. 215), at their meeting of April 27, 1864, VERNEUIL related the case of a poacher shot through the patella in 1863; neither femur nor tibia fractured; secondary excision of condyles of femur and tibia; recovery with anchylosis in 3½ months.—[2] NEUDÖRFER (J.) (*Handbuch der Kriegschirurgie und der Operationslehre*, Leipzig, 1872, Zweite Hälfte, Zweite Abtheilung, p. 1546, and GURLT (E.) (*Die Gelenk-Resectionen nach Schussverletzungen. Ihre Geschichte, Statistik, Endresultate*, Berlin, 1879, p. 278): Ferd. Blumauer, 27th Austrian Infantry Regiment, 1st Co., wounded February 6, 1864, at Oversee, by ricochet shot in the left knee. March 11, 1864, resection in hospital at Schleswig. Death April 2, 1864. Wasil Dumma, 30th Austrian Infantry, wounded at Oversee, March 5, 1864, in the left knee joint. Wound healed rapidly in seven weeks, but broke open again and suppuration ensued. Resection March 13, 1864. Amputation of thigh April 8, 1864. Death from exhaustion April 13, 1864.—[3] Prussian Staff Surgeon LŒWENHARDT operated in the case of Peter Jensen Ugle, 4th Danish Infantry, aged 27, wounded at Alsen, June 29, 1864; epiphysis of the right femur perforated antero-posteriorly, and external condyle shattered. July 13, 1864, resection, by H-incision, in hospital at Ulderup: about 4 inches of the femur, the patella, and a slice of the tibia removed. Recovered, and living in 1874 (C. HEINE, *Die Schussverletzungen der Unteren Extremitäten*, Berlin, 1866, p. 393, and GURLT, *loc. cit.*, p. 318).—[4] OCHWADT (A.) (*Kriegschirurgische Erfahrungen, etc., während des Krieges gegen Dänemark* 1864, Berlin, 1865, Anhang, *Tabelle der Operationen*, p. VI, No. 20, and GURLT, *loc. cit.*, p. 319): Sören Jacobsen, 9th Danish Infantry, wounded at Düppel, April 18, 1864, in the left knee; epiphysis of the femur split into three parts and joint opened; patella and tibia intact. Resection April 19, 1864, in hospital at Flensburg. Only the epiphysis of the femur was removed. Death May 7, 1864.—[5] ESMARCH'S case of Chremers Petersen, 9th Danish Infantry, wounded at Düppel, April 18, 1864, in the right knee; joint opened; resection in hospital at Broacker, April 21, 1864, by oval incision; patella retained. Death May 1, 1864 (GURLT (E.) (*loc. cit.*, p. 319).—[6] B. v. LANGENBECK twice excised the knee joint in the Schleswig-Holstein campaign of 1864: Jensen, 3d Danish Infantry, wounded at Alsen, June 29, 1864, through the right joint, shattering the bone; amputation was refused; subperiosteal resection, with inner longitudinal incision; patella retained, July 19, 1864. Death July 22, 1864. Stjernholm, 18th Danish Infantry, wounded at Alsen, June 29, 1864; penetrating shot wound of right knee joint. August 1st, subperiosteal resection of both carious ends of the joint. Death August 7, 1864 (GURLT, *loc. cit.*, p. 319).—[7] NEUDÖRFER (J.) (*Handbuch der Kriegschirurgie und der Operationslehre*, Leipzig, 1872, Zweite Hälfte, Zweite Abth., p. 1550, and GURLT, *loc. cit.*, p. 328): Kaspar Ruppnik, 1st Austrian-Mexican Chasseur Co., aged 41, wounded at Tlapacoyan, November 22, 1865, in the left knee; patella shattered, joint opened on the outer side. December 28th, resection. Living in 1872, his confessor writing from Schwarzenberg that the injured extremity is entirely stiff; that he is unable to do any hard labor, but can make considerable journeys with the aid of a cane.—[8] DAUVÉ (*Lésions traumatiques des deux genoux par coup de feu.—Articulation du genou gauche ouverte et broyée; résection du genou*, in *Rec. de Mém. de Méd. de Chir. et de Phar. Mil.*, Paris, 1867, T. XIX, 3me sér. p. 29): An Arab, nearly 20 years of age, was shot in both knees, on July 26, 1865, and, on the following day, was admitted into the hospital at Boghar. The upper part of the internal condyle of the right femur was fractured, but the capsule was not thought to be interested; two small pieces of bone were removed. The injury of the left limb was more severe. The internal condyle of the femur was crushed and the articulation largely opened. Amputation proposed but not allowed by the patient. July 27th, patella removed, and portion of condyles of femur and tibia excised. Death August 13, 1865.—[9] BAERWINDT, of Frankfurt, operated in the case of W. Rauch, 2d Silesian Grenadiers, No. 11, 8th Co., aged 26, wounded at Vettingen, July 26, 1866, in the left knee joint. September 2d, admitted into Garrison hospital in Frankfurt, a. M. Resection of both condyles in their middle September 12th; ball not found. Death October 5, 1866 (GURLT, *loc. cit.*, p. 397).—[10] BIEFEL (R.) (*Im Reserve-Lazareth. Kriegschirurgische Aphorismen von* 1866, in LANGENBECK'S *Archiv für Klin. Chir.*, Berlin, 1869, B. XI, p. 450): Joh. Palyo, 34th Austrian Infantry, 13th Co., aged 24, wounded at Königgrätz, July 3, 1866, in the left knee joint, shattering the patella. July 8th, admitted into reserve hospital at Landeshut. Resection August 9th. Death September 14, 1866.—[11] Dr. BURCHARDT excised the knee in the case of Josef Drozdz, 20th Austrian Infantry, aged 27, wounded at Königgrätz, July 3, 1866, close beneath the right knee. Resection July 10th, removing the patella and portions of the tibia and condyles of the femur. July 19th, hæmorrhage from popliteal artery: ligation of femoral artery. Death 20 minutes afterwards, July 19, 1866 (GURLT, *loc. cit.*, p. 487).—[12] Dr. BUSCH (SCHOLZ W.) (*Bericht über das Verwundeten-Spital Schloss Hradek bei Königgrätz vom 28. August bis zu dessen Auflösung am 6. November* 1866, in *Allgemeine Militärärztliche Zeitung*, 1867, S. 324, 357, and GURLT, *loc. cit.*, p. 486): Case of Joh. Necasek, Corporal, 74th Austrian Infantry, aged 24, wounded at Problus, July 3, 1866, in the right knee joint; the ball lodged and was removed

Amputations at the Knee Joint.—As indicated in TABLE LIV, on page 398, the fatality of one hundred and eighty-seven cases of amputation at the knee joint in which the

on the 6th day. July 13th, conveyed to Castle Hradek Hospital. Resection July 15th; fistulas, erysipelas, etc., ensued, and on July 3, 1867, at the solicitation of the patient, amputation was performed in the middle third of the thigh. Dr. BUSCH performed two additional operations in 1866: Alfred Graf, sublieutenant, Austrian Cuirassiers Regiment, No. 2, aged 18, wounded at Königgrätz, July 3, 1866, through the right knee joint, fissuring the femur extensively. Admitted into Castle Hradek Hospital. Resection, July 27th, of about four inches of the lower end of the femur and patella. Death Aug. 2, 1866. Anton Dunda, 8th Austrian Infantry, aged 25, wounded at Königgrätz, July 3, 1866, in the left knee joint. Admitted into Castle Hradek Hospital. August 1st, resection of about 1¾ inch of end of femur. August 6th, ligation of femoral artery below Poupart's ligament on account of arterial hæmorrhage. Death August 7, 1866 (GURLT, *loc. cit.*, pp. 487, 488).—[13] FIEBER (CARL) (*Chirurgische Studien und Erfahrungen mit Zugrundelegung der im italienischen Feldzuge des Jahres* 1866 *gemachten Beobachtungen*, in *Allgemeine Wiener Med. Zeitung*, 1875, No. 21, p. 202): Nicolo Pinosco, 1st Italian Grenadier Regiment, wounded at Custoza, June 24, 1866, in the left knee by a grenade splinter; patella shattered, joint opened. Admitted into hospital at Verona. Resection July 7th; pieces of patella entirely extirpated; both condyles removed. Death on the evening of July 9, 1866.—[14] Dr. HAHN operated on Carl Böhm, 42d Austrian Infantry, wounded at Königgrätz, July 3, 1866, through the right knee joint. Admitted, July 6th, into hospital at Horic. August 7th, resection of about 1 inch of tibia and fibula and 1½ inch of femur. August 27th, hæmorrhage, followed by death in a few minutes (GURLT, *loc. cit.*, p. 488).—[15] Dr. JUNG, of Frankfurt, a. M., operated in the case of Gustav Hornbogen, non-commissioned officer of Magdeburg Fusileer Regiment, No. 36, aged 23, wounded at Vettingen, July 26, 1866; penetrating shot wound of the knee joint. Admitted into Relief Hospital No. 4, Frankfurt, August 9th. Resection, August 15, 1866, of knee joint. Death from pyæmia August 19, 1866 (GURLT, *loc. cit.*, p. 398).—[16] KÖNIG (*Beiträge zur Resection des Kniegelenkes*, in *Archiv für Klin. Chir.*, 1868, B. IX, s. 465, and GURLT, *loc. cit.*, p. 485): Leopold Anzenberger, Austrian Infantry Regiment, No. 49, aged 25, wounded near Aschaffenburg, July 14, 1866, in the left knee joint. On September 10th he was admitted into hospital at Hanau. Resection, September 11th, of about 2½ centimetres (broad) of the femur, the fractured patella, and a piece of the tibia about a centimetre broad. Living October 19, 1874, having been engaged in shoemaking for three years. Leg shortened 2 inches.—[17] B. v. LANGENBECK (*Ueber die Schussfracturen der Gelenke, etc.*, Berlin, 1868, p. 33, and GURLT, *loc. cit.*, p. 398): Case of Simon Bach, Pommeranian Field Artillery, aged 24, wounded at Königgrätz, July 3, 1866; right knee joint shattered by splinter of grenade; capsule opened. Admitted into hospital at Milowic, July 30th. Subperiosteal resection of the knee joint. Death August 5, 1866.—[18] Dr. MIDDELDORPF operated on Constantin v. Memerty, 2d Lieutenant, 7th East Prussian Infantry, No. 44, aged 23, wounded at Königgrätz, July 3, 1866. Besides two slight flesh wounds, the left knee joint was shattered by a piece of grenade, the patella carried off, and the joint opened. Resection, July 10th, in hospital at Königinhof. Death from pyæmia, July 27, 1866 (GURLT, *loc. cit.*, p. 398).—[19] Surgeon RAST excised the knee in the case of Michael Maier, 1st Bavarian Infantry, aged 26, wounded at Vettingen, July 26, 1866, at inner condyle of left knee. Admitted into hospital at Würzburg August 18th; resection, August 30th, of condyles, patella, and a slice of tibia. Death, September 17, 1866, from pyæmia (GURLT, *loc. cit.*, p. 418).—[20] Professor KARL TEXTOR, in the case of Andreas Jörg, 9th Bavarian Infantry, 3d Co., resected the knee joint in hospital at Würzburg. Death August 16, 1866 (GURLT, *loc cit.*, p. 419).—[21] Generalarzt WAGNER, in the case of Franz Skazel, Field Chasseur Battalion, No. 27, aged 20, wounded at Königgrätz, July 3, 1866, in the left knee, and admitted into hospital at Görlitz on July 30th, removed, on August 31st, the patella. Death September 29, 1866 (GURLT, *loc. cit.*, p. 488).—[22] Surgeon BUXMANN: Case of Corporal H. Schildgen, Hessian Sharpshooter Corps, aged 30, wounded accidentally, September 16, 1866, in the right knee; joint opened, tibia and fibula uninjured. Resection of knee joint about 16 or 18 hours after injury; removal of patella, head of fibula, articular portion of tibia, and the splintered femur 1½ inch above its articulating extremity. Recovered July 21, 1875; shortening 10 centimetres; walks about all day, but feels very tired in the evening. Cicatrix adherent; total anchylosis of joint; leg entirely straightened; can walk up hill easier than down hill; uses no supporting apparatus (GURLT, *loc. cit.*, p. 1191).—[23] THOMPSON (HENRY) (*Gunshot Wound of the Knee—Excision of the Knee Joint*, in *The Dublin Quarterly Journal of Medical Science*, 1868, Vol. XLVI, p. 27): Case of Peter McSorley, a carpenter, shot February 29, 1868, in his bent right knee. Admitted into Tyrone County Infirmary at Omagh. March 1, 1868, resection of 2½ inches of the femur, a very thin slice of the head of the tibia, and all the fragments of the patella, shot, and pieces of lead. For weeks afterwards pieces of bone, lead, shot, etc., continued to discharge. July 1, 1868, patient able to go about with the aid of a crutch and cane and without splints, limb being shortened about 1½ inch.—[24] OATMAN (IRA T.) (*Excision of the Knee Joint*, in *Pacific Med. and Surg. Jour.*, 1869, Vol. III, N. S., p. 56): C. G——, of Yolo County, California, aged 16, wounded March 10, 1868; penetrating shot wound of knee joint, resulting in caries. Resection May 21, 1868; removal of lower portion of condyles, anterior articular surface of femur beneath the patella, the patella, head of tibia, and fragments of fibula. October 15, 1868, amputation of thigh on account of continuous progress of caries of the femur and leg; recovered.—[25] For details of the cases of excision of the knee joint of the Franco-Prussian War of 1870–71, the reader is referred to the exhaustive work of Professor E. GURLT, *Die Gelenk-Resectionen nach Schussverletzungen, etc.*, Berlin, 1879, pp. 602, etc. From a careful and critical examination of the sources at his command, Dr. GURLT collects 75 authentic cases of excisions at the knee joint performed during that short but decisive struggle: 15 were successful and 60 proved fatal, a mortality rate of 80.0 per cent.—[26] NEWMAN (WM.) (*Gunshot Wound of Right Knee Joint, twenty-five years ago—Removal of Lower Half of Patella (carious), and of shot imbedded in inner Condyle of Femur, from a patient aged* 55, in *St. Bartholomew's Hospital Reports*, London, 1874, Vol. X, p. 392), in the case of J. T——, accidentally shot in the right knee. Excision March 29, 1871. Recovery, with bony anchylosis.—[27] MINER (J. S.) (H. CULBERTSON, *Excision of the Larger Joints of the Extremities.* Prize Essay, in *Trans. Am. Med. Assoc.*, Philadelphia, 1876, Supp. to Vol. XXVII, p. 186, Case No. 37): Thomas S. Cobb, of Buffalo, N. Y., aged 35, received, on November 8, 1871, a pistol shot in the articulating surface of the tibia. Resection, on November 10th, of both surfaces of joint. Died 15 days afterwards of pyæmia.—[28] Dr. MEUSEL (*Eine Kniegelenkresection nach Schussverletzung*, in *Berliner Klin. Wochenschrift*, 1875, XII Jahrg, S. 272): Case of Zeiss, aged 25, wounded November 1, 1873, by a revolver shot in the left knee; ligamentum patellæ perforated, missile lodged in the epiphysis of the tibia about 5 centimetres deep. Resection November 9, 1873, removing a piece from the condyles of femur 4 centimetres thick, without touching the patella, and reseeting the tibia so as to leave the fibula joint unopened. Discharged from treatment April 8, 1874, walking on crutches; he subsequently accustomed himself to walk with a light cane; shortening 5 centimetres.—[29] REYHER (G. TILING, *Bericht über* 124 *im Serbisch-Türkischen Kriege im Baracken-Lazareth des Dorpater Sanitäts-Trains zu Swilainatz behandelte Schussverletzungen*, Dorpat, 1877, pp. 67, 68, and GURLT, *loc. cit.*, p. 1160) performed 3 excisions at the knee joint during the Russo-Turkish War, 1876–78: Rista Bokowitsch, aged 35, wounded September 18, 1876, in the external condyle of the right femur; ball removed. Resection of knee joint September 21, 1876, at Swilainatz. Death September 22, 1876. Radojiza Schiwanowitsch, aged 40; admitted into hospital at Swilainatz, September 2, 1876, with penetrating shot wound of left knee joint, fracturing the femur, received several days previous. Resection of entire lower portion of femur. Died September 13, 1876. Gaja Miliwojewitsch, aged 34, admitted into hospital at Swilanatz, August 22,1876, with a shot wound of left knee joint received two and a half weeks previously. Resection of both condyles of femur, August 23, 1876. Death from pyæmia August 31, 1876.—[30] BERGMANN (E.) (*Die Behandlung der Schusswunden des Kniegelenks im Kriege*, Stuttgart, 1878, pp. 30, 31): Aleksei Neboschenko, Russian Regiment Wolhynien, aged 27, wounded at the crossing of the Danube, June 15, 1877, in the right knee joint. Primary resection of the shattered condyles of femur. Death July 2, 1877, from pyæmia. [31] KADE (E.) (*Das temporäre Kriegslazareth des Ressorts der Anstalten der Kaiserin Maria im Kloster Mariahimmelfahrt bei Sistowa*, in *St. Petersburger Med. Wochenschrift*, 1877, S. 381. 1878, s. 19): Peter Petrunja, 14th Russian Sharpshooter Battalion, wounded on the Nicolai Mountain, August 13, 1877, through the left knee. Resection, October 5, 1877, in hospital at Sistowa, of articulating ends of femur and tibia. Death October 8, 1877.—[32] RUDDUCK operated twice during the Russo-Turkish War, 1876–78 (*Société ottomane de secours aux blessés et malades militaires constituée d'après la Convention de Genève*, Vol. III, *Ambulances fixes et mobiles du Croissant rouge*, Constantinople, 1878, pp. 137, 232): Ahmed Ibrahim, wounded September 8, 1877, in the right knee. Resection, September 22, 1877, of the condyles and articular facet of the tibia, in hospital Le Mevle-Hane, at Philippopolis. Hassan Ali, penetrating wound of right knee joint; ball in one of the condyles of the femur. Resection, October 25, 1877, of knee joint, in field hospital No. 5, at Orkhanie. Death from pyæmia.—[33] RICHARDSON (A. P.) (*Proceedings of the Connecticut River Valley Medical Association*, in *Boston Med. and Surg. Jour.*, 1878, Vol. XCVIII, p. 43): A girl, aged 14, accidental shot wound of knee joint, in 1876; excision of articular end of bones by Dr. TWITCHELL, of Keene, N. H. Recovery, with 2 inches shortening and a useful leg.

final issues were determined was 56.6 per cent., viz: fatality of one hundred and seven primary operations, 53.2 per cent.; of fifty intermediary, 68.0 per cent.; of twenty-six secondary, 53.8 per cent.; and of four operations in which the date of the amputation was not ascertained, 25.0 per cent. These results do not sustain the opinion expressed in the preliminary report, issued in 1865, that the mortality, especially of primary amputations in the lower third of the thigh, is much larger than that of the exarticulations at the knee joint. It will be remembered that the fatality of the amputations in the lower third of the thigh was 53.6 per cent., and of the primary amputation in the lower third only 48.7 per cent. (TABLE XXIX, p. 213), or 3 and 4.5 per cent., respectively, less than that of the corresponding groups of amputations at the knee joint, and the former operation would, therefore, seem to give a better chance for life than the latter. It must also be taken into consideration that in 8, or nearly 10 per cent., of the eighty-one cases of recovery after amputation at the knee, amputation in the thigh subsequently became necessary.

The mode of operation in amputations at the knee joint has been varied in many ways: by a semilunar incision in front and a long posterior flap behind, as practised by Hoin, in 1764;[1] by the long anterior flap of Léveillé;[2] by the anterior and posterior semicircular flaps of N. Smith,[3] the patella being retained; by the circular method of Velpeau,[4] three or four inches below the patella; by the oval method of Baudens,[5] consisting of one flap, long anteriorly and short posteriorly; by the lateral flaps of Rossi;[6] and by three subcutaneous flaps (one anterior and one posterior, the latter split up along the middle of the popliteal space) from the circumference of the upper part of the leg, as proposed by Pancoast.[7] Syme,[8] in 1845, made a semilunar incision on a line with the upper edge of the patella and a long flap from the calf of the leg, after the manner of Hoin, but he removed the condyles and the patella. Carden,[9] since 1846, cut an anterior semioval skin flap, removing the patella and portions of the condyles of the femur. Operations similar to Carden's were performed by Melchiorj[10] in 1850 and 1851, but the patella was retained in these cases. In 1857, R. Gritti proposed to cut an anterior rectangular flap, to saw through the condyles of the femur, to remove a segment of the inner portion of the patella and to place the sawn surfaces in apposition, to secure in this manner a sound surface to

[1] BRASDOR (*Sur les amputations dans les articles*, in *Mém. de l'Acad. Roy. de Chir.*, Paris, 1774, T. V, p. 773), who practised the operation at Dijon, in 1764, on a laborer who had fallen from a building. [2] LÉVEILLÉ (J. B. F.), *Nouvelle doctrine chirurgicale*, Paris, 1812, T. IV, p. 586.

[3] SMITH (NATHAN) (*On Amputation at the Knee Joint*, in the *American Medical Review and Journal*, 1825, Vol. II, p. 370) marked "two points one on the out and the other on the inside of the limb, the latter half an inch below the head of the tibia, and the other opposite to it. Then draw a semicircular line from one point to the other, over the anterior part of the leg, and in such a direction that its lower part shall touch the lower part of the tubercle on the tibia into which the ligament of the patella is inserted, and then mark another circle on the posterior part of the leg, exactly corresponding to the former. The above lines limit the two flaps, the former of which will be formed of the patella and its ligament, together with the investing integuments, and the latter of the head of the gastrocnemius, the tendons of the flexor muscles, and the popliteal blood-vessels and nerves. The operator should first raise the anterior flap with the patella, which will expose the anterior part of the joint and render the division of the lateral ligaments easy. Two or three strokes of the knife will then complete the section of the lower flaps, with the crucial ligaments."

[4] VELPEAU (A.), *Mémoire sur l'amputation de la jambe dans l'articulation du genou, et description d'un nouveau procédé pour pratiquer cette opération*, in *Archives Générales de Médecine*, 8me année, T. XXIV, 1830, p. 58.

[5] BAUDENS (L.) (*Clinique des plaies d'armes à feu*, Paris, 1836, p. 537, and *Désarticulation coxo-fémoral et tibio-fémoral*, in *Bulletin de l'Acad. Roy. de Méd.*, Paris, 1836, T. I, p. 324) recommends a combination of the oval and flap methods. A long oval flap anteriorly, commencing five inches below the patella, is dissected and turned up; the ligaments, muscles, and vessels are next divided by a circular incision, the articulation is opened, and the semilunar cartilages and crucial ligaments detached as in the circular process of VELPEAU.

[6] ROSSI (R.), *Elémens de Médecine Opératoire*, Turin, 1806, T. II, p. 227.

[7] PANCOAST (JOSEPH), *A Treatise on Operative Surgery*, Philadelphia, 1846, p. 171.

[8] SYME (JAMES), *Surgical Cases and Observations*, in *London and Edinburgh Monthly Journal*, 1845, p. 339.

[9] CARDEN (HENRY D.) (*On Amputation by Single Flap*, in *British Medical Journal*, 1864, Vol. I, p. 416): It consisted "in reflecting a rounded or semi-oval flap of skin and fat from the front of the joint; dividing everything else straight down to the bone; and sawing the bone slightly above the plane of the muscles; thus forming a flat-faced stump with a bonnet of integument to fall over it." The patella was not retained in this operation.

[10] MELCHIORJ (G.) (*Caso di amputazione sopracondiloidea del femore col metodo del dott.* ROCCO GRITTI, *cioè con lembo patellare, per ferita da arma da fuoco; preceduto da altri due, in cui fu conservata la rotella disarticolando il ginocchio ed amputando ai condili femorali*; in *Annali Universali di Medicina*, Milano, 1857, Vol. CC, pp. 370, 371); but in these operations the *entire* patella was retained. One of the patients on whom the amputation was performed recovered from the operation, but died of recurring cancerous tumors four and a half months after the operation. The patella, deprived of its cartilage, was found, held by adhesions, in the intercondyloid notch; the skin of the flap adhered to the condyles. In the other case, the operation was performed at the level of the condyles for a railroad accident, in 1851. The anterior flap sloughed, but finally the patella became anchylosed to the outer part of the femur and the patient recovered with an excellent stump.

the stump.[1] From the records it would seem that this mode of amputating at the knee joint was practised once only during the late civil war in the case of Private C. H. Rist, 36th Wisconsin (CASE 492, p. 318, and TABLE LV, p. 402, No. 38), who subsequently underwent secondary amputation in the lower third of the thigh; although, as already stated on page 357, *ante*, similar procedures were employed by Surgeon B. A. Vanderkieft, U. S. V., and Assistant Surgeon J. W. S. Gouley, U. S. A., in two instances of amputations in the lower third of the femur. In the Danish War of 1864, the Austro-German War of

[1] R. GRITTI, *Dell' amputazione del femore al terzo inferiore e della disarticolazione del ginocchio. Valore relativo di cadauna, coll'indicazione di un nuovo metodo denominato amputazione del femore ai condili con lembo patellare*, in *Annali Universali di Medicina*, Milano, 1857, Vol. CLXI, p. 5. The author, who found no occasion to practise the amputation on the living subject, gives, on page 18, a minute description of the operation, of which the following is a brief outline: An incision is made from the upper edge of the head of the fibula transversely across the leg, about one inch below the patella, to the inner tuberosity of the tibia. From the extremities of this incision a vertical cut is made upward to the level of the middle of the patella. The rectangular flap thus outlined is dissected, the joint is opened by cutting through the ligamentum patellæ. The patella is then thrown back, and a segment, about two lines in thickness, removed from the inner surface by a small saw. The condyles of the femur are sawn through. The posterior flap is then made by an incision direct to the bone, connecting the upper extremities of the lateral cuts. This flap is separated from the femur for a short distance, the periosteum cut through, and the limb removed. The vessels are ligated, the sawn bony surfaces are placed together, and the edges of the flaps secured by several interrupted sutures. Professor J. NEUDÖRFER, in the preface to his *Handbuch der Kriegschirurgie. Ein Vademecum für Feldärzte*, Leipzig, 1864, Erste Hälfte, p. IX, claims that he performed an operation similar to GRITTI'S in 1859: "The work of GRITTI was unknown to me; but it struck me, in the fall of 1859, to combine exarticulation at the knee with resection, and to practically test it," and on p. 1559 of the Zweite Hälfte states that he performed the operation in 1859, but he fails to give details of the case. In an article, *Beitrag zur Amputation*, in *Vierteljahrschrift für die Praktische Heilkunde*, Prag, 1860, Vol. I, p. 80, Professor SZYMANOWSKY advocates GRITTI'S mode of operation, and details his experimental efforts on the cadaver; but at that time he found no occasion to employ this method on the living subject. SAWOSTITZKI seems to have been the first to practically test GRITTI'S operation, in 1862. The case is published in the *St. Petersburger Medicinische Zeitschrift*, 1862, B. III, p. 372: The patient, aged 19, fell from a wagon and received a fracture of the right leg. The operation was performed according to GRITTI'S mode as described by SZYMANOWSKY; the sawing of the patella caused the only difficulty; the sawn surfaces of the femur and patella fitted readily; the wounds healed principally by first intention. On the sixth day after the operation the patella was found to have been drawn upwards on the anterior surface of the femur by the quadriceps, and could not be replaced. The patient recovered with a good stump. The first recorded operation after shot injury is a case reported by SZYMANOWSKY (*Die Rechtfertigung der* GRITTI'*schen Operation durch Wort und That*, in *Vierteljahrschrift für die Praktische Heilkunde*, Prag, 1866, B. II, S. 38): "February 5, 1863, shot fracture of leg, gangrene; GRITTI'S operation with dissection of the synovial pouch; gangrene of thigh; death. The patella was found unmoved upon the sawn surface of the femur." In the Schleswig-Holstein War of 1864, 10 cases of GRITTI'S operation were reported.—A. LÜCKE (*Kriegschirurgische Aphorismen aus dem zweiten Schleswig-Holsteinschen Kriege im Jahre* 1864, in LANGENBECK'S *Archiv für Klin. Chir.*, Berlin, 1866, B. VII, pp. 23, 24, 134, 147) reports 4 cases.—2. Christian Balzer, 24th Regiment, shot wound of left knee joint, June 29, 1864; amputation June 30th, by Surgeon SCHILLING; fatal.—3. Thomas Thomsen, 9th Danish Infantry, shot wound of right knee, April 18, 1864; amputation April 27th, by Dr. LÜCKE; death May 1, 1864.—4. Carl Neumann, 4th Guards, shot wound of right knee joint, April 18, 1864; amputation by Dr. LÜCKE, April 26th; recovery.—5. Hoffmann, wounded in right knee, February 2, 1864; amputation February 10th, by Dr. LÜCKE; death about the end of February. Six other cases of the War of 1864 are mentioned by C. HEINE (*Die Schussverletzungen der unteren Extremitäten, etc.*, in LANGENBECK'S *Archiv für Klin. Chir.*, 1866, B. VII, p. 607.—6. Prussian soldier, shot fracture of the leg. Operation by Generalarzt von LANGENBECK; fatal.—7. Primary operation by Professor ESMARCH, at the hospital at Broaker, April 18, 1864, for shot wound of upper extremity of tibia; fatal.—8. L. Chr——, 8th Prussian Grenadiers, comminution of left leg, April 18, 1864. Operation, April 18, 1864, by Staffsurgeon OCHWADT, at Flensburg; fatal. (See also OCHWADT, *Kriegschir. Erfahrungen*, Berlin, 1865, No. 18 of Table of Operations).—9. Private J. K——, 9th Danish Infantry, wounded April 18, 1864; operation, April 21st, by Staffsurgeon FISCHER, at the Latin School Hospital at Flensburg, for shot fracture of the tibia with splintering into knee joint; the patient died eight days after the operation. The autopsy showed that no consolidation of the femur and patella had taken place.—10, 11. After the naval engagement at Helgoland, in 1864, two of these operations were performed; one at the hospital at Altona, by Dr. STEINLECHNER (H. KUCINIC, *Bericht über die Verwundeten, der K. K. Kriegsmarine*, in *Allgemeine Militärärztliche Zeitung*, 1864, B. V, p. 52): Sailor A. Gasparo, of Frigate Radetzky, shot fracture of left leg, May 9th; amputation after GRITTI, May 13th; recovery. The other (HEINE, *loc. cit.*, p. 608, and SALZMANN, *Die* GRITTI'*sche Operationsmethode und ihre Verwerthung in der Kriegschirurgie*, in B. VON LANGENBECK'S *Archiv für Klinische Chirurgie*, Berlin, 1880, B. XXV, p. 662) was the case of an Austrian naval cadet, wounded in the same engagement; amputation after GRITTI on the day of the injury, May 9, 1864. It is stated that union of the patella had taken place, but that on his return to Austria the patient fell upon his stump, necessitating amputation in the middle third of the thigh.—12. MELCHIORJ (G.) (*Annali Universali di Medicina*, 1867, Vol. CC, p. 374): P. Pietro, 5th Italian Artillery, aged 27, shot in the right leg, July 21, 1866. GRITTI'S amputation August 16th; recovery. Of the Austro-Prussian War of 1866, seven operations after GRITTI'S method are reported by SALZMANN (*loc. cit.*, p. 669, etc.).—13. Austrian soldier, aged 17, comminution of left leg by shell, at Königsgrätz, July 3, 1866; operation July 3d; healed by first intention; August 12th, recovered.—14. Prussian Infantry soldier, comminution of bones of right leg, Königsgrätz, July 3, 1866; operation at Castle Prim, July 15th, by Dr. BUSCH; death same day.—15. Franz Wulichowski, comminution of lower third of left tibia and fibula, and of right elbow joint; July 15th, resection of elbow joint; July 27th, GRITTI'S amputation at knee joint; death August 15, 1866; operation by Dr. BUSCH.—16. Johann Bielin, 8th Austrian Infantry, fracture of tibia and laceration of the peronæus, July 3, 1866; operation by Dr. BROCK, July 27, 1866; death from pyæmia.—17. Austrian soldier, shot fracture of head of tibia, July 3d; amputation at Nechanic, August 10, 1866, by Dr. BUSCH; death from pyæmia, August 10, 1866.—18. Austrian soldier, shot fracture of leg; operation at the hospital at Nedelist, by Dr. SPANNER; death 50 days after the operation.—19. O. Weiser, 3d Baden Infantry, shot fracture of right leg, Werbach, July 24, 1866; operation by Dr. MÜLLER, August 2d; death August 9, 1866. Of the Franco-Prussian War of 1870–71, Staffsurgeon SALZMANN (*loc. cit.*, p. 674, etc.) collects 15 cases, viz: 20. G——, 94th French Infantry, shell laceration of both calves, August 22, 1870; GRITTI'S operation at the knee on one limb; amputation in the thigh on the other, August 23d; operation by Dr. MÜLLER; death August 24, 1870.—21. T. H——, 1st French Infantry, shell fracture of left leg, August 18, 1870; operation, August 24th, by Dr. MARQUARDT; death.—22. Private A. Ihl, 88th Infantry, comminution of left leg, September 1, 1870; amputation, September 4th, by Dr. LANG (?); recovery, with good stump.—23. A. Brauer, 3d Grenadiers, splintering of left tibia, August 18, 1870; GRITTI'S operation by Dr. MATZ, September 7th; recovery, with tender stump.—24. Reimann, 14th Bavarian Infantry, shot fracture of right leg; gangrene; operation, September 13th, in hospital at Aix-la-Chapelle, by Dr. BRANDIS; death in a week.—25. C. G. Renner, 46th Prussian Infantry, shot fracture of right leg; GRITTI'S amputation performed by Dr. STAHL, October 17th, at the 7th field hospital of the IXth Corps; recovery, with good stump.—26. W. Pluta, 1st Posen Infantry, No. 19; groove shot of right tibia, with opening of the joint, October 7, 1870; amputation by Dr. MÜLLER, October 25th, at the 7th field hospital of the Xth Corps at Hagondange; death October 31, 1870.—27. Private P. H. KÜPPER, 65th Infantry, comminution of left leg, October 28, 1870; operation by Dr. MÜLLER, November 19th, at Hagondange; death from pyæmia, November 24, 1870.—28. J. Ollagnon, 13th French Infantry, shot fracture of left tibia, August 18, 1870; operation by Dr. MÜLLER, in hospital at Nancy, March 2, 1871; recovery in 29 days.—29. Lieut. W. von du Prel, Infantry body guard, shot fracture of left knee joint, September 1, 1870; GRITTI'S operation, by Professor v. NUSSBAUM, at Bazeilles, September 1st; September 14th, resection of exposed portion of femur; death September 25, 1870.—30. P. Zoll, 10th Bavarian Infantry, shot fracture of left leg at Remilly, August 31, 1870; operation by Dr. LOTZBECK, September 8th; death September 17, 1870.—31. O. Willner, 9th Bavarian Infantry, aged 24, shell fracture of leg near the knee joint, October 7, 1870; GRITTI'S amputa-

1866, and the Franco-Prussian War of 1870–71, Gritti's operation was performed in a number of instances, and, in 1870, a modification of Gritti's plan was presented by Stokes,[1] but the results of these operations in war surgery have not been very favorable, and the opinions of military surgeons generally are recorded against its performance.[2]

In nine of the one hundred and eighty-nine cases of exarticulation at the knee the condyles of the femur and the patella were removed; in sixteen the condyles were removed and the patella retained; in seven the condyles were retained and the patella removed; in twenty-eight the condyles and the patella were retained; and in one hundred and twenty-nine instances this point was not indicated.

Regarding the value of the stump after knee joint amputations, the records would seem to confirm the opinions of Velpeau, Stephen Smith, Markoe, and Syme,[3] that the stump formed by the articular surface of the lower extremity of the femur is as well, and perhaps better adapted to the successful wearing of an artificial limb than the thigh stump. Of the eighty-one cases of recovery after amputation at the knee, the condition of the stump is known in sixty instances; in forty it is recorded as sound and healthy, and, in twenty, as tender or painful, or as not allowing the use of an artificial apparatus.

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tion, by NEUHÖFER, October 8th; discharged the service July 17, 1871, and died in February, 1872; stump had healed after tedious exfoliations of small particles of bone, but union of bone of the cut surfaces of the femur and patella had not taken place.—32. F. Borron, 9th French Chasseurs, aged 29, shot fracture of right leg, October 11, 1870, at Artenay; operation by v. NUSSBAUM, October 11th; result undetermined.—33. J. Krum, 1st Bavarian Jægers, shot fracture of left leg, October 11, 1870; operation, October 15th, by LOTZBECK; result unknown.—34. G. Kofler, 3d Bavarian Infantry, shot fracture of left knee joint, October 11, 1870; operation by LOTZBECK, October 21st; death October 25, 1870. The results of two of the 34 amputations at the knee after GRITTI'S method, here cited, are not recorded; 10 had successful and 22 fatal issues, a mortality rate of 68.7 per cent.

[1] STOKES (WILLIAM) (*On Supra-Condyloid Amputation of the Thigh*, in *Medico-Chirurgical Transactions*, London, 1870, Vol. LIII, p. 180). The author claims that his mode differs from GRITTI'S in the following particulars: "1. That the femoral section is made in all cases at least half an inch above the antero-superior edge of the condyloid cartilage. 2. That in all cases the cartilaginous surface of the patella is removed. 3. That the flap is oval, not rectangular. 4. That there is a posterior flap fully one-third of the length of the anterior flap." In regard to the second point of modification, Dr. STOKES remarks that "much importance was not attached by GRITTI to the removal of this portion of the bone," and, in proof thereof, cites three cases reported by MELCHIORJ, in two of which the articular surface of the patella was not removed. Dr. STOKES evidently overlooked the fact that these two operations were performed 6 and 7 years before Dr. R. GRITTI proposed his osteoplastic operation, while the third operation, in which the inner surface of the patella was removed, was performed in 1866, or 9 years after Dr. GRITTI'S plan had been published. Dr. GRITTI (*loc. cit.*, p. 18) clearly insists upon the division of the patella, and, in FIG. III, at the conclusion of his article, delineates the manner of the division.

[2] BECK (B.) (*Kriegs-Chirurgische Erfahrungen während des Feldzuges* 1866, Freiburg, i. B., 1867, p. 62): "GRITTI'S operation, which must be designated as one entirely without purpose, is to be rejected as one too complicated, having no advantages and only disadvantages." ZEIS (E.) (*Einige Bemerkungen zur Würdigung der Exarticulation des Unterschenkels im Kniegelenke*, in *Arch. für Klin. Chir.*, Berlin, 1866, B. VII, p. 770): "I confess that my great predilection for this operation, by which, when successful, unquestionably great advantages are gained for the patient, has greatly diminished, and I, therefore, do not feel encouraged to perform the operation after GRITTI, as the dangerous consequences alluded to by me must be the same." Dr. R. F. WEIR (*On* GRITTI'S *Supra-condyloid Amputation of the Thigh*, in the *Medical Record*, New York, 1879, Vol. XV, p. 342) tabulates 76 operations after GRITTI, of which 54 recovered and 22 died, and remarks, on p. 341: "For gunshot wounds or compound fractures involving the condyles of the femur, its practicability is yet undetermined, and time will probably record an adverse judgment against it in such cases. For diseases of the knee joint it affords a better operation, in my judgment, than disarticulation, which has lately been revived." The unfavorable results of the few cases of GRITTI'S amputation after shot injuries that the editor has been able to collect would seem to confirm the conclusions of Dr. WEIR. Dr. SALZMANN (*loc. cit.*, in *Archiv für Klin. Chir.*, Berlin, 1880, B. XXV, p. 658): "Taking into consideration, besides the high mortality, the disadvantages of a complicated operative technic, requiring a certain aptitude and at least 36 minutes time, the readily injured and for transport little adapted stump, liable to displacement of the patella, and bleeding from the popliteal artery; furthermore, the slow healing process with its uncertain results; we must come to the conclusion that neither on the field of battle nor in the field hospitals GRITTI'S operation seems to have any value as an operation in war surgery."

[3] VELPEAU (A.) (*Mémoire sur l'amputation de la jambe dans l'articulation du genou, et description d'un nouveau procédé pour pratiquer cette opération*, in *Archives Générales de Médecine*, 8me année, T. XXIV, 1830, p. 60) considers amputation at the knee preferable to amputation in the thigh as being less dangerous, easier performed, and furnishing a good stump for the use of a wooden leg. SMITH (STEPHEN) (*Cases in Surgery.—Amputation at the Knee Joint.* By W. PARKER, M. D., Professor of Surgery in the College of Physicians and Surgeons, New York. Reported by STEPHEN SMITH, in the *New York Journal of Medicine* for November, 1852, Vol. IX, p. 326) arrives at the following conclusions: "1. That amputation at the knee joint is a justifiable operation, as respects the nature of the structures engaged. 2. That it is a justifiable operation as respects the point of election. 3. That the stump formed by the articular surface of the lower extremity of the femur is as well adapted to the adjustment of an artificial limb, and to sustain and transmit the weight of the body, as when the operation is performed in the continuity of the thigh-bone." MARKOE (T. M.) (*Amputation at the Knee Joint, Illustrated by the Cases which have occurred in American practice, and mainly by those which have been treated in the New York Hospital*, in *New York Jour. of Med.*, New York, 1856, Vol. XVI, N. S., p. 35, etc.) presents eight points of comparison between this operation and the amputation in the thigh, all favoring knee joint amputation. SYME (JAMES) (*On Amputation at the Knee*, in *Edinburgh Medical Journal*, Edinburgh, 1866, Vol. XI, p. 874) concludes that the resulting stump is comfortable and serviceable. MARKOE (T. M.) (*Amputation at the Knee Joint*, in *New York Medical Journal*, 1868, Vol. VI, p. 509) sums up the cases of amputation in the thigh and at the knee joint performed from 1830–1864, in the New York Hospital, both showing a mortality of 54 per cent., and admits that as far as the percentage of fatality is concerned "this exhibit shows no advantage on the side of the knee joint operation," but claims a decided advantage for the usefulness of the knee joint stump. In this opinion he is corroborated by Dr. E. D. HUDSON, the ingenious deviser of various mechanical appliances for the relief of maimed soldiers; but the latter (*Mechanical Surgery.—Prothetic Appliances and Apparatus for Amputations. Resections, etc.*, New York, 1878, p. 24) deprecates the removal of the condyles as an operation neither "sustained by any rational hypothesis nor practised on any scientific principles. Except disease or injury of the condyles compel their excision, their thin anatomical and functional vestments should be kept inviolate from knife and saw. The condyles, their cartilage and vestment, as constituted, are nature's strongest, most tolerant and important supports in the entire body, and when these parts are amputated or disturbed, a valid, a positive reason should exist for so doing."

Section V.

WOUNDS AND OPERATIONS IN THE LEG.

The consideration of examples of simple and compound fractures, of burns, frost-bites, and other miscellaneous injuries of the leg will be reserved for Chapter XII, and as no cases of sabre or bayonet injuries of the tibia and fibula are recorded, it remains therefore only to examine the instances of shot injuries of this portion of the human structure. There are found on the registers one hundred and eighty-three shot contusions, and eight thousand nine hundred and eighty-eight shot fractures, making a total of nine thousand one hundred and seventy-one shot injuries of the bones of the leg. Four thousand one hundred and three were treated by conservation, and in five thousand and sixty-eight instances operative interference was resorted to, viz: excision in the bones of the leg or at the knee in three hundred and eighty-eight; amputation in the leg in three thousand seven hundred and thirty-six; amputation in the leg and subsequent exarticulation at the knee in three; amputation in the leg and subsequent amputation in the thigh in thirty-nine; exarticulation at the knee joint in one hundred and one; exarticulation at the knee and ablation in the thigh in seven; and amputation in the thigh in seven hundred and ninety-four instances. The exarticulations at the knee joint and the amputations in the thigh following shot fractures of bones of the leg have already been considered in the preceding sections of this Chapter, leaving the amputations in the leg to be examined in this Section.

SHOT CONTUSIONS OF THE BONES OF THE LEG.—One hundred and eighty-three examples of shot contusions of the bones of the leg are entered on the records. The injuries involved the tibia in one hundred and thirty-six, the fibula in twenty, the tibia and fibula in twelve instances, and in fifteen cases the precise seat of the injury was not specified. One hundred and sixty-five cases, of which fifteen resulted fatally, were treated throughout by expectation; in eight amputation in the leg was resorted to, unsuccessfully in four; one was followed by an unsuccessful amputation at the knee; and nine—three successful and six fatal—by amputation in the thigh.

Shot Contusions of the Bones of the Leg Treated by Conservation.—Of the one hundred and sixty-five cases of this group, fifteen, or 9.09 per cent., had fatal terminations. The right limb was injured in sixty-six, the left in seventy-eight, and in twenty-one cases the side was not indicated. Sequestra or exfoliations were removed in twenty-two instances. In one hundred and thirty-two of the one hundred and sixty-five cases the tibia was the seat of the injury, the lesion generally being on the inner anterior flat surface.

Recoveries after Shot Contusions of the Bones of the Leg treated by Conservation.—Generally the healing process was very slow, and not rarely attended by necrosis of the bone and tedious exfoliation, as in the following instances:

CASE 655.—Sergeant J. Meier, Co. H, 52d New York, aged 43 years, was wounded at Spottsylvania, May 12, 1864, by a musket ball, which entered the middle third of the right leg and injured the tibia. Surgeon D. H. Houston, 2d Delaware, reported that the wounded man was admitted to the field hospital of the 1st division, Second Corps, where the missile was extracted. Two weeks after the reception of the injury he was sent to Washington, and several days later to Philadelphia. Assistant Surgeon T. C. Brainerd, U. S. A., reported that "the patient entered Broad and Cherry Streets Hospital May 31st, the wound being healthy at date of admission and continuing so until July 3d, when sloughing set in. This was successfully treated by applications of nitric acid, followed by dressings of coal oil, together with internal administration of tincture of chloride of iron, porter, and generous diet. By July 12th, the wound was again granulating and his general health improving. Complete cicatrization being prevented by the presence of dead bone, that portion of the tibia was removed by Acting Assistant Surgeon D. W. Cadwallader, on October 1st, through an incision over the spine. The small fragments of bone were then thoroughly washed out with a syringe and the parts coaptated by adhesive plaster, over which simple water dressing was applied. Cicatrization progressed rapidly and was complete by October 28, 1864, when the patient was discharged from hospital," his term of service having expired three weeks previously. The removed sequestrum, six inches long, and contributed by the operator, is represented in the wood-cut (FIG. 255). Examining Surgeon G. J. Fisher, of Sing Sing, N. Y., August 22, 1865, certified to the injury, and stated: "The front of the injured leg is covered with delicate blue integument, not perfectly healed. He is unable to labor, and an artificial leg would be far preferable." The New York Examining Board reported, September 3, 1873: "There has been considerable loss of osseous substance. The entire anterior and inner aspect of the middle and upper portion of the leg is covered with encrustations, and there is periostitis and necrosis of bone at present." At subsequent examinations the same indurated, ulcerated, and partly indolent condition of the parts, interfering with locomotion, was reported. The pensioner was paid December 4, 1879.

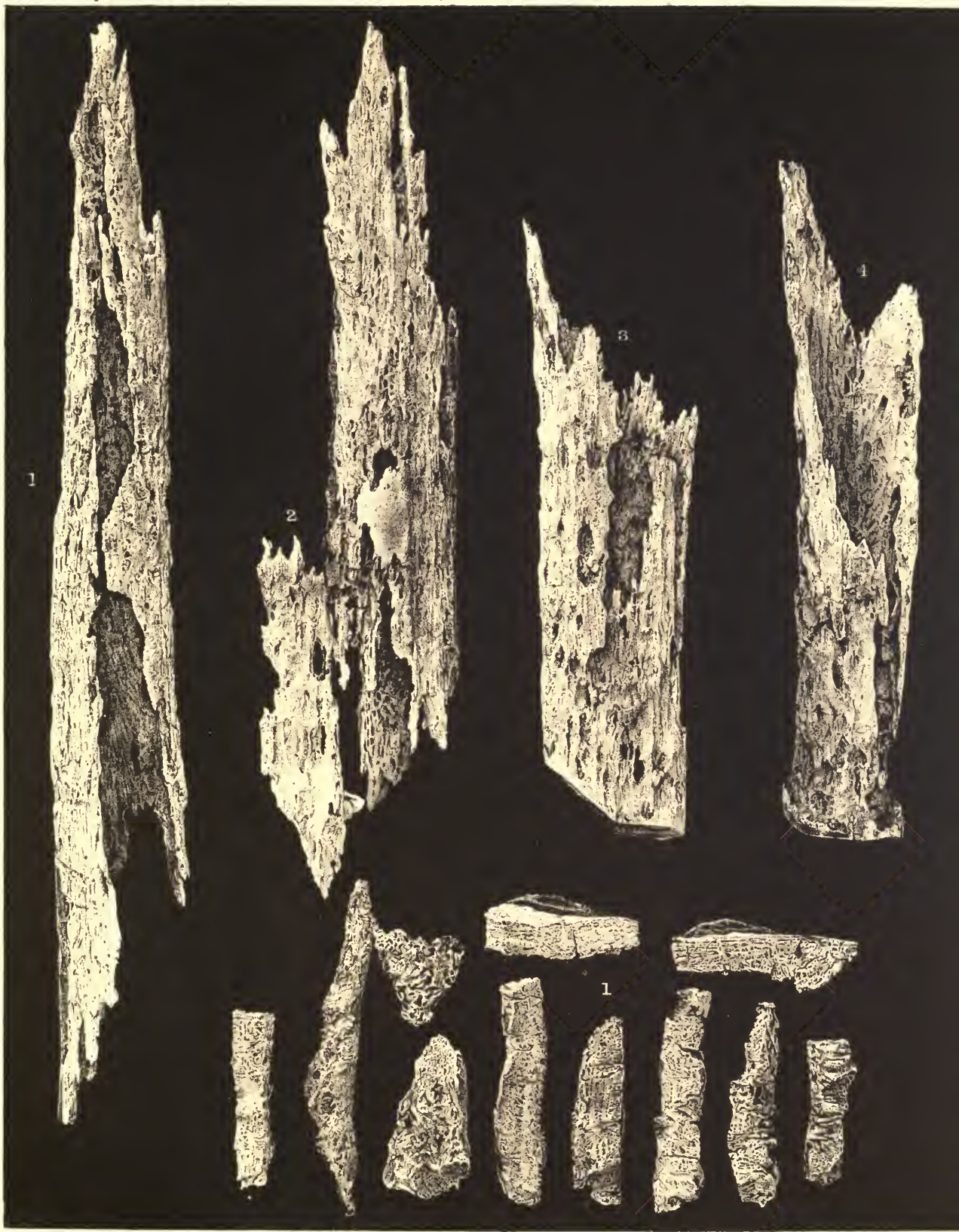
FIG. 255.—Sequestrum from right tibia. *Spec.* 4193.

FIG. 256.—Exfoliation from right tibia. *Spec.* 2620.

CASE 656.—Corporal G. Ditch, Co. D, 82d Ohio, aged 21 years, received a shot wound of the right leg, with injury to the tibia, at Gettysburg, July 1, 1863. He was admitted to Satterlee Hospital, Philadelphia, eight days after the injury. Acting Assistant Surgeon M. Lampen contributed the pathological specimen, represented in the annexed cut (FIG. 256), with the following report: "The injury was caused by a round ball, which entered the leg anteriorly at the junction of the upper with the middle third of the tibia. On admission the wound was in a healthy condition. Hospital gangrene first appeared on July 23d, and spread rapidly for several days. Creasote mixture and yeast poultices were used to the wound and tonics internally, which treatment was continued for two weeks, when all signs of the disease had disappeared, a small portion of the tibia being left exposed. The patient's general health was good with the exception of an obstinate intermittent fever, which yielded but temporarily to quinine. On September 26th, a segment of bone about five inches long, one and a half inch in width at its widest part, and from one-eighth to one-fourth of an inch thick, was removed from the wound, the entire exfoliation of it having taken place in a few days from the time it was first observed. During the succeeding days several small spiculæ of bone were removed, after which exfoliation still progressed downwards, indicating that more bone would have to be removed." In October the patient was transferred to Seminary Hospital, Columbus, and lastly he was sent to Camp Dennison, where he was discharged March 30, 1864, and pensioned. Examining Surgeon R. L. Sweeney, of Marion, Ohio, describes the injury as follows: "A gunshot wound by a musket ball impinging on the leg just above the junction of the middle and upper thirds of the tibia. Contraction and adhesion of the muscles afterwards resulted from gangrene." The same Examiner reported, in 1870, that the wound had reopened and afterwards again closed imperfectly. On June 21, 1874, he stated that "the wound is still open and the bone diseased;" and in September, 1877, he reported a "large, adherent, and irritable cicatrix over the spine of the tibia, with malformation of the bone." The pensioner was paid December 4, 1879.

FIG. 257.—Appearance of limb fourteen months after injury. [From a photograph.]

CASE 657.—Corporal H. Rall, Co. D, 15th New York Heavy Artillery, aged 22 years, was wounded at the battle of Old Church, May 30, 1864. Surgeon L. W. Read, U. S. V., reported his entrance into the field hospital of the 3d division, Fifth Corps, with "shot wound of left leg." Surgeon B. B. Wilson, U. S. V., in charge of Stanton Hospital, Washington, contributed the pathological specimen (No. 4337 of the *Surgical Section*, A. M. M.), with the following history: "This young man was admitted to this hospital on June 4th. He had been wounded by a minié ball, which passed across the spine of the tibia about four inches from the head of the bone, bruising it and denuding it of periosteum along the track of the ball. He was somewhat debilitated when admitted, but being young and of good constitution, his general condition was not unfavorable. He was treated with applications of cold water and ice dressings to the wounded limb, and stimulating and supporting constitutional remedies. During the month of June and the beginning of July the limb was highly inflamed, and there was profuse suppuration and some sloughing in the vicinity of the wound; with considerable sympathy of the general system as manifested by chills, great debility, loss of appetite, and general febrile action. In the month of July, deep-seated fluctuation having been observed in the course of the shaft of the tibia, the pus was evacuated by free incisions in the direction of the length of the limb, with great relief to the patient. The periosteum was found to be extensively separated and the shaft of the bone necrosed. During the months of September, October, November, and December his condition gradually improved as the process of formation of the involucrum and the separation of the necrosed portion went on. A number of cloacæ formed in the line of the incisions for liberating pus, through which the necrosed bone could be felt gradually becoming detached from the living portion. The limb was, during this time, for the most part treated with emollient poultices. About the first of January the upper part of the shaft of the tibia could be distinguished at the position of the original wound, and about March 1st, upon seizing it with a forceps the whole dead mass could be moved within the sheath of the investing new bone. The operation for



Ward phot.

T. Sinclair & Son lith.

PLATE LXXI.—TUBULAR SEQUESTRA AND PIECES OF NECROSED BONE FROM TIBIA.

Fig 1.—Corporal Henry Rall,
D. 15 New York H.A., Spec. 4337, A.M.M.

Fig 2.—Private Joseph Walker,
A. 7 Wisconsin Vols. Spec. 3283, A.M.M.

Fig 3.—Private O.M. Armstrong,
B. 120 New York Vols. Spec. 3284, A.M.M.

Fig 4.—Private George Cullom,
D. 83 Ohio Vols. Spec. 2099, A.M.M.

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the removal of necrosed bone was performed by Surgeon A. N. Dougherty, U. S. V., on March 14, 1865, by turning back the soft parts on each side from an incision through the centre of the cloacæ, and cutting away with the mallet and chisel sufficient of the new growth to permit the sequestrum to be lifted directly from its bed. It was found to consist of the entire shaft of the tibia from one epiphysis to the other, except small portions eroded by the absorbents. The after-treatment consisted of simple water dressings with slightly stimulating applications, and was unmarked with any noteworthy complication. On June 6, 1865, the patient was discharged on certificate of disability, being able to walk with ease and comfort, though the wound was not entirely healed. In July a photograph was taken, of which the adjoining wood-cut (FIG. 257) is a copy. He left the hospital in July and returned in the following month, asking to be employed under contract. Since that date he has been doing duty as chief nurse of one of the wards of this hospital, being in robust health, though his limb was not yet entirely healed." The specimen, consisting of a sequestrum nine inches long and eleven smaller pieces of necrosed bone, is shown somewhat reduced in FIG. 1 of PLATE LXXI, opposite page 428. Examiner T. F. Smith, of New York City, September 22, 1873, certified: "Shot fracture of left tibia, with union and great loss of bone substance, leaving a cicatrix over the anterior surface of the bone nine inches in length, red, unhealthy, and ulcerating," etc. The Brooklyn Examining Board reported, September 8, 1877: "We find an adherent, chronically inflamed cicatrix extending along the anterior face of the left tibia from below its head to within three inches of the ankle. There is tenderness on pressure. He requires the application of a bandage, and complains of pain in damp or cold weather. The usefulness of the limb is well nigh destroyed." The pensioner was paid March 4, 1880.

FIG. 258.—Slender sequestrum from left tibia. *Spec.* 420.

CASE 658.—Private W. Hargrave, Co. C, 142d New York, aged 25 years, was wounded at Chapin's Farm, September 29, 1864. Assistant Surgeon E. McClellan, U. S. A., reported his admission to hospital at Fort Monroe, October 4th, with "shot wound of right leg at middle third by a minié ball." On December 20th, the patient was permitted to leave for his home on furlough, and in June following he entered the Ira Harris Hospital, Albany, whence Assistant Surgeon J. H. Armsby, U. S. V., contributed the specimen, represented in the annexed cut (FIG. 258), with the following description: "The ball struck the tibia without fracturing it. The leg became inflamed and tender and a number of fistulous openings appeared. By exploring with the probe a large sequestrum was discovered on July 15th, when chloroform was administered and the necrosed bone was withdrawn with a forceps through a straight incision four inches long. After this operation the wound healed rapidly." The patient was mustered out of service July 17, 1865, but, owing to his becoming insane for a time, he did not apply for a pension until seven years afterwards. Examining Surgeon B. F. Sherman, of Ogdensburg, N. Y., October 9, 1872, certified to the injury, and added that "the skin is now closely attached to the bone, and the slightest abrasion produces a sore difficult to heal. There are now two small unhealed surfaces. The man states he suffers great pain in the leg at night after walking." In 1877, the wound was reported as healed. The pensioner was paid March 4, 1880.

CASE 659.—Private J. C. Coats, Co. I, 5th Vermont, aged 22 years, was wounded at Fredericksburg, December 13, 1862. He was conveyed to Harewood Hospital, Washington, and transferred to Satterlee, Philadelphia, December 23d. Acting Assistant Surgeon W. W. Keen, jr., from the latter hospital, described the wound as "an injury of the right tibia," and reported: "The man had been hit by a fragment of a shell, which struck his left shoe without seriously injuring the foot; it then glanced and struck the right tibia antero-internally in the lower third. On admission to the hospital there was a swelling, fluctuating but quite tense, at the point of the injury in the leg, which I opened by an incision about three-fourths of an inch long. About an ounce and a half of coagulated blood and some pus was evacuated, and poultices were ordered to be applied. The wound did well till January 1, 1863, when it began to enlarge and look very much like hospital gangrene. I suspected this the more from the prevalence of this disease at that time in the ward. The edges of the wound had become everted, its base rather ashy grey, and the discharge unhealthy, and a considerable circle of inflammation was around the opening. But the characteristic stinging pain being absent, I determined not to treat it as hospital gangrene but by the ordinary measures for inflammation. I ordered three compound cathartic pills to be taken and tincture of iodine to be applied locally, also a large poultice. On January 6th, the wound had increased to two and one-fourth inches in diameter, but was still entirely without the peculiar pain of hospital gangrene, when I ordered a mixture, consisting of half an ounce of hydrochloric acid, two ounces of laudanum, and one pint of water, to be used locally with lint. The acid wash was gradually diluted, and finally abandoned on January 25th. The patient being rather anæmic, I ordered two grains of quinine and four ounces of milk punch to be given daily. On January 30th another abscess was opened, and on February 9th yet another, each being preceded by severe pain, tenderness, and swelling. No doubt they as well as the original one were the result of severe local periostitis. They were readily subdued by cathartics and poultices, with morphia at night. No bone was at any time discharged, although considerable depression existed on the tibia from absorption of the tissue. On February 20th, the patient was transferred to Brattleboro', the wound having almost entirely healed and there being but little depression." The man entered the Marine Hospital at Burlington, and on March 8, 1864, was assigned to the Veteran Reserve Corps, and discharged July 13, 1865, and pensioned. Examining Surgeon A. P. Belden, of Whitehall, N. Y., reported the wound as being in an inflamed condition, and added that "it opens at any time the limb is much used in standing or walking. There is adhesion of the *peroneus longus* muscle and ligament, and inflammation produced partial anchylosis of the ankle joint." Examiner J. Lambert, of Salem, N. Y., August 10, 1878, reported that "the injured bone is necrosed for about three inches and demands an operation." The pensioner was paid September 4, 1880.

In the next instance copious hæmorrhage followed the injury, and the femoral artery was successfully ligated in Scarpa's triangle:

CASE 660.—Private T. Dassel, Co. G, 60th Indiana, aged 25 years, was severely wounded in the right leg, at Arkansas Post, January 11, 1863. He was placed on board of a hospital steamer several days after the reception of the injury and conveyed to St. Louis, where he entered Lawson Hospital, January 22d. Surgeon C. T. Alexander, U. S. A., in charge, reported: "The wound was located on the inner side of the upper third of the leg and the tibia was slightly injured. Hæmorrhage to the amount of eight ounces occurred from the anterior tibial artery on February 20th, on account of which the femoral artery

was ligated in Scarpa's triangle. Pyæmic infection also existed, which was successfully combated with the administration of quinine and brandy." The patient was discharged from service December 22, 1863, and pensioned. Examining Surgeon B. J. Day, of Evansville, Indiana, on April 25, 1864, certified to the anterior wound as "still discharging," and reported the same as "recently healed, in September, 1865, leaving a deep and adherent cicatrix." Examiner I. Casselberry subsequently certified: "The ball injured the tibia without fracturing it." At later examinations chronic inflammation of the bone and the impaired usefulness of the leg was described. The pensioner was paid March 4, 1880.

Fatal Cases of Shot Contusions of the Bones of the Leg treated by Conservation.—Fifteen of the one hundred and sixty-five cases of this group proved fatal:

CASE 661.—Private J. Buchfinck, Co. A, 16th Michigan, aged 26 years, was wounded at Poplar Grove Church, September 30, 1864, and admitted to the field hospital of the 1st division, Fifth Corps, with "severe wound of left leg, caused by a musket ball." A week later the man was transferred to Harewood Hospital, Washington, whence Surgeon R. B. Bontecou, U. S. V., contributed the specimen and reported the result of the case: "The leg was wounded in the lower third, the ball passing anterior to the tibia and injuring the periosteum. The patient, although weak, did tolerably well up to October 13th, at which time the parts became gangrenous, destroying the tissues from the ankle joint to the upper part of the middle third of the leg and leaving the tibia exposed for about six inches. Under the application of escharotics the wound became healthy and the limb improved until January 2, 1865, when gangrene reappeared and the tissues of the heel commenced sloughing, the exposed tibia being necrosed and exfoliating. In addition to escharotics the treatment was supporting throughout. The patient died of exhaustion January 26, 1865." The specimen (No. 3609, *Surgical Section*, A. M. M.) consists of the tibia, and shows one longitudinal half of the bone to be necrosed and nearly separated, the other portion being sheathed with callus.

CASE 662.—Corporal T. N. Chapin, Co. H, 21st Michigan, aged 35 years, was wounded at the battle of Stone River, January 1, 1863, and admitted to the field hospital of the 1st division, Fourteenth Corps, with "shot wound near the left ankle." Assistant Surgeon C. C. Gray, U. S. A., contributed the specimen (*Cat. Surg. Sect.*, 1866, p. 375, *Spec.* 1916), with the following history: "The ball entered at the inner side of the middle of the calf of the leg, passed obliquely downward under the bone, and came out a little above and posterior to the malleolus. The patient was admitted to hospital No. 8, Nashville, January 19th, his wound being erysipelatous, with great swelling of the entire leg. Gangrene invaded the limb so as to destroy the soft structures covering the tibia for nearly half way around the leg, and from within two inches of the insertion of the tendon of the patella to a point about three inches from the ankle joint. The bone was exposed and became badly necrosed. Chlorinated solution of soda in its full strength, and applied with picked lint, was used three times a day in the treatment, with general stimulants, bromine being used in the room as a general fumigant. The gangrene was arrested in about four weeks. The patient died June 1, 1863. Two weeks previous to his death granulations were feebly struggling to extend over the diseased bone, much of which was covered. The patient's general condition had become very low; his stomach refused almost everything, and the first symptoms of hydrothorax presented themselves. The autopsy disclosed the chest full of serum, also slight recent pleuritic adhesions." The specimen shows the diseased portion of the contused tibia encircled with a fringe of callus.

CASE 663.—Private N. Hollenbeck, Co. F, 7th New York Heavy Artillery, aged 37 years, was wounded at Tolopotomy Creek, May 30, 1864. He was admitted to Emory Hospital, Washington, June 8th, with "shot wound of left leg, over tibia." Acting Assistant Surgeon A. McLetchie contributed a specimen (*Cat. Surg. Sect.*, 1866, p. 519, *Spec.* 3133), with the following report: "The wound was caused by a minié ball, which entered the leg directly over the spine of the tibia, middle third, injuring the periosteum but not splintering the bone itself. The missile was extracted through the wound of entrance. The wounded man was admitted to Patterson Park Hospital, Baltimore, June 11th. He was in a very asthenic condition, and I ordered stimulants and good nourishing diet. About the 18th of June gangrene set in, manifesting itself by constitutional symptoms, fever, loss of appetite, etc., some days before the distinctive symptoms appeared in the wound. The disease was treated with nitric acid, cautery, dressings of chlorinate of soda, linseed poultices, charcoal, turpentine, and linseed oil, with frequent use of the syringe. On August 11th, he was returned from the gangrene ward with the wound much enlarged, but entirely free from gangrene, and nearly four inches of the bone exposed. Tincture of chloride of iron was administered daily, and milk punch, from the first appearance of the disease. Diarrhœa, which had been checked on his entrance into the hospital, now set in again, complicated with acute dysentery, and was treated with chalk mixture, vegetable astringents, and pulverized iron and opium. But the patient gradually wasted away from the steady strain on his system, and died August 26, 1864." The specimen is a wet preparation of the leg, showing a contusion in the middle third of the tibia, and necrosis extending up the shaft of the bone on its posterior surface to near its head, also two openings from ulceration in the lower third.

Shot Contusions of the Bones of the Leg followed by Amputations.—In eighteen instances the shot contusions of the bones of the leg were followed by amputation: eight in the leg, one at the knee joint, and nine in the thigh. The cases of amputation in the thigh and at the knee joint have already been cited in SECTIONS 2 and 3 of this CHAPTER.[1] The cases of amputation in the leg will be briefly reported:

[1] Amputations in the thigh for shot contusions of the bones of the leg: Corp'l S. B. Besley, H, 147th New York (TABLE XXXIX, No. 6, p. 313), secondary, middle third; recovery. Pt. C. C. Cannivan, G, 88th Pennsylvania (TABLE XL, No. 123, p. 321), secondary, lower third; fatal. Pt. C. P. Cobb, F, 1st Michigan (TABLE XXXIX, No. 113, p. 315), secondary, middle third; fatal. Serg't H. A. Colby, G, 2d U. S. S. S. (TABLE XL, No. 125, p. 321), secondary, lower third; fatal. Pt. J. C. Lemar, B, 97th Illinois (TABLE XXXIX, No. 136, p. 315), secondary, middle third; fatal. Serg't Z. H. Mather, M, 5th Michigan Cavalry (TABLE XXXVI, No. 476, p. 300), intermediary, lower third; fatal. Pt. J. Moran, I, 6th New York (TABLE XXXI, No. 979, p. 238), primary, middle third; fatal. Corp'l E. McGinley, I, 23d Wisconsin (TABLE XXXVI, No. 126, p. 295), intermediary, lower third; recovery. Corp'l S. H. Powell, C, 14th New Jersey (TABLE XL, No. 77, p. 321), secondary, lower third; recovery. Amputation at the knee joint for shot contusion of the tibia was performed in the case of Pt. W. W. Sandford, F, 103d Pennsylvania (TABLE LVI, No. 43, p. 407), intermediary; fatal.

CASE 664.—Sergeant R. T. Beatty, Co. H, 22d Pennsylvania Cavalry, aged 27 years, was wounded in the right leg, at Mount Vernon Forge, September 27, 1864, by a musket ball, which injured the tibia. He was discharged from service for disability, December 20, 1864, and pensioned. Extensive necrosis followed the injury, finally involving nearly the entire shaft of the tibia and rendering amputation necessary. The operation was performed, December 27, 1865, below the knee, by Pension Examining Surgeon C. A. Rahter, of Harrisburg, Penn., and resulted successfully. In his application for commutation, the pensioner described the stump as being in a fair condition.

CASE 665.—Private W. Bell, Co. I, 7th Michigan, aged 34 years, was wounded in both lower extremities and the head, at Antietam, September 17, 1862, one ball grazing the right tibia and fibula on their posterior surfaces just above the ankle joint. The patient became a great sufferer from extreme irritation of his nervous system and great irritability of the stomach. Repeated appearances of gangrene necessitated amputation, which was performed on November 3d, about one inch below the tubercle of the tibia, by Surgeon J. O. Bronson, U. S. V. Under the administration of vigorous tonics and strong stimulants, including narcotics, the patient gradually improved, and was able to start for his home December 5, 1862, when he received his discharge from service. He died March 30, 1874, of typhoid fever. A ligamentous preparation of the bones of the foot and the lower portion of the leg constitutes specimen 254 of the *Surgical Section* of the Museum, contributed by the operator.

CASE 666.—Private J. L. Hosford, Co. H, 4th Vermont, aged 21 years, was wounded at the Wilderness, May 5, 1864, by a musket ball, which entered the right leg, striking the tibia above the malleolus and lodging. He was admitted to Camden Street Hospital, Baltimore, where, on May 21st, an abscess was opened, through which the missile, together with several pieces of bone, were discharged. Considerable erysipelatous inflammation followed, attended with profuse and very fetid discharge, and the limb became exceedingly painful, necessitating its removal. The operation was performed by the skin-flap method, at the middle third, by Surgeon Z. E. Bliss, U. S. V., on May 31st. The patient recovered and was furnished with an artificial leg. He was discharged March 20, 1865, and pensioned.

CASE 667.—Private J. Esses, Co. K, 108th Ohio, aged 16 years, received a gunshot contusion of the right tibia, near Kenesaw Mountain, June 23, 1864. He entered hospital No. 2, Nashville, where flap amputation of the leg at the upper third was performed, by reason of gangrene, on July 26th, by Acting Assistant Surgeon J. A. Hall. The patient recovered, and was discharged May 22, 1865, and pensioned.

Four of the eight cases of amputation in the leg for shot contusions of the tibia or fibula had fatal terminations:

CASE 668.—Private J. Dicey, Co. F, 17th Michigan, received a flesh wound of the left thigh and a contused wound by a shell on the fore part of the middle of the right leg, at Antietam, September 17, 1862. He entered Casparis Hotel Hospital, Washington, October 13th, with the latter wound in a gangrenous condition and the tibia denuded of periosteum for four or five inches. The best antiseptic remedies failing to check the spreading of the disease, the limb was amputated on October 21st, by Acting Assistant Surgeon L. Heard, some five or six inches below the knee. The patient was very feeble and failed to rally. He died October 24, 1862. The amputated bones of the leg were contributed to the Museum by the operator, and constitute specimen 212 of the *Surgical Section*, A. M. M.

CASE 669.—Private G. Wilson, Co. B, 1st Ohio Artillery, aged 21 years, was wounded in the left leg, at Chickamauga, September 20, 1863. Acting Assistant Surgeon M. L. Herr, who amputated the injured limb at hospital No. 1, Nashville, contributed the specimen (FIG. 259), with the following history: "The injury was caused by a minié ball, which passed across the crest of the tibia at its middle third, merely cutting the tissues covering it and slightly injuring the bone. The man bandaged his wounded leg and remained with his regiment about a week, when the limb became very sore. He was then sent to hospital at Stevenson, Alabama, where he remained until he came here on October 14th. On examination I found the tibia denuded of periosteum for about four inches below the wound and for some distance above. The integuments were in a highly inflammatory condition, excessively painful, and suppurating freely, the pus being of a very offensive character. The patient was pale, though not much emaciated: his appetite good; bowels costive. Tincture of chloride of iron and whiskey were prescribed. The leg was bandaged from foot to knee so as to maintain equable pressure, and constant application of cold water was made. He continued to grow worse, the leg being very painful and the discharge very profuse, and on October 25th I found upon examination that the patient also had hypertrophy of the heart, from which he suffered considerably. On November 2d, I observed hectic or indication of irritative fever for the first time. His appetite was still good, and he complained of no pain except in the leg; but he was very weak and pale. Quinine, with morphia, was administered every three hours. On November 6th, the patient having expressed his wish of taking advantage of surgical interference, the limb was amputated at the upper third. Chloroform and sulphuric ether constituted the anæsthetic. No reaction took place, and the patient died the next morning. At the *post-mortem* examination four ounces of watery fluid were found in each pleural cavity, with slight pleuritic adhesions on the right side and small multiple abscesses through both lungs, the posterior portion of each being engorged. Some of the abscesses contained an inspissated matter or pus, not well broken up. The heart was very much enlarged and weighed seventeen and a half ounces; the pericardium contained two or three ounces of fluid, but the valves were not diseased. Four or five large abscesses were found on the anterior surface of the right lobe of the liver, which organ contained eight and a half ounces of pus." The specimen consists of the injured tibia, being thoroughly denuded of periosteum and necrosed in its greatest extent.

FIG. 259.—Portion of left tibia amputated for shot contusion. *Spec.* 1920.

CASE 670.—Corporal G. L. Stephens, Co. I, 30th Maine, was wounded at Cane River, April 23, 1864, by a musket ball, which entered the left leg, injuring the tibia but not fracturing it. One week after receiving the injury he was admitted to hospital at Baton Rouge, where the missile was extracted from the calf the leg on May 15th. By reason of erysipelatous inflammation of the foot and leg, attended with sloughing ulceration, circular amputation of the leg at the middle third was performed, on August 2d, by Surgeon D. W. Taylor, 34th Indiana. The patient died August 15, 1864, from exhaustion.

CASE 671.—Captain *F. L. Thompson*, Co. D, 36th Mississippi, aged 29 years, was wounded at Nashville, December 16, 1864, by a musket ball, which entered the right leg over the anterior aspect of the tibia, five inches above the ankle joint, passed downward, and lodged directly over the dorsum of the foot. Erysipelatous inflammation ensued; the ankle joint opened; tibia denuded of periosteum. On December 31st, the patient suffering from much pain and being apparently threatened with tetanus, the leg was amputated, by the circular method, at the junction of the upper and middle third, by Acting Assistant Surgeon C. H. Fisher. The patient was much emaciated, and died of exhaustion January 9, 1865.

SHOT FRACTURES OF THE BONES OF THE LEG.—Eight thousand nine hundred and eighty-eight cases of shot fractures of the bones of the leg are reported, and the results have been ascertained in all but two hundred and seventy-eight cases. The tibia was injured in two thousand five hundred and eighty-eight, the fibula in one thousand and thirty-three, the tibia and fibula in one thousand four hundred and fifty-one instances, and in three thousand nine hundred and sixteen cases the diagnosis failed to indicate the precise seat of the bony lesion.

TABLE LXI.

Numerical Statement of the Nature and Treatment of Eight Thousand Nine Hundred and Eighty-eight Shot Fractures of the Bones of the Leg.

TREATMENT.	CASES.					FRACTURES OF THE TIBIA.			FRACT. OF THE FIBULA.			FRACTURES OF THE TIBIA AND FIBULA.			BONE NOT SPECIFIED.		
	Cases.	Recovery.	Fatal.	Result Undetermined.	Ratio of Mortality.	Recovery.	Fatal.	Result Undetermined.	Recovery.	Fatal.	Result Undetermined.	Recovery.	Fatal.	Result Undetermined.	Recovery.	Fatal.	Result Undetermined.
Treated by Conservation	3,938	3,296	528	114	13.8	1,737	201	34	721	78	7	295	75	4	543	174	69
Followed by																	
Excision in the Bones of the Leg	339	248	87	4	25.9	109	39	2	119	41	2	19	7	....	1	.....	....
Excision in Bones of Leg and Amp. of Leg	19	15	4	....	21.0	11	1	....	2	1	....	2	2	....	.....	.....	....
Excision in Leg—Amp. in Leg—Amp. in Thigh	2	.....	2	....	100.	.....	....	....	....	1	....	.....	1	....	.....	.....	....
Excision in Leg—Amp. at Knee Joint	5	2	3	....	60.0	2	1	....	....	1	....	.....	1	....	.....	.....	....
Excision in Leg—Amp. in Thigh	22	10	12	....	54.5	5	4	....	5	5	....	.....	2	....	.....	1	....
Excision at the Knee Joint	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
Amputation in the Leg	3,728	2,354	1,215	159	34.0	151	88	1	8	13	....	539	206	10	1,656	908	148
Amputation in Leg—Amp. at Knee Joint	3	2	1	...	33.3	.....	.....	.....	....	.....	.....	1	.....	.....	1	1	....
Amputation in Leg—Amp. in Thigh	39	19	20	....	51.2	3	3	....	1	....	....	9	6	....	6	11	....
Amputation at Knee Joint	100	40	59	1	59.6	11	20	1	....	....	....	15	13	....	14	26	...
Amputation at Knee Joint—Amp. in Thigh	7	3	4	...	57.1	.....	.....	.....	....	.....	.....	2	2	....	1	2	...
Amputation in Thigh	785	344	441	....	56.1	69	95	....	8	20	....	130	109	....	137	217	...
Aggregates	8,988	6,334	2,376	278	27.2	2,098	452	38	864	160	9	1,013	424	14	2,359	1,340	217
						2,588			1,033			1,451			3,916		

Three thousand nine hundred and thirty-eight, or less than one half of the cases, were treated by conservation, and five thousand and fifty, or 56.2 per cent., were followed by operation, viz: three hundred and forty by excision, forty-eight by excision and subsequent amputation, and four thousand six hundred and sixty-two by amputation either in the leg, at the knee, or in the thigh. It has already been stated on page 175, *ante*, that of the six thousand five hundred and seventy-six instances of shot fracture of the thigh bone, operative interference was resorted to in three thousand one hundred and nine, or 47.3 per cent., thus showing that the percentage of operations after shot fractures of the bones of the leg exceeded that after shot fractures of the femur by 8.9 per cent.

SHOT FRACTURES OF THE BONES OF THE LEG TREATED BY CONSERVATION.—The results as to fatality were ascertained in three thousand eight hundred and twenty-four of the three thousand nine hundred and thirty-eight shot fractures of one or both of the bones of the leg treated without operative interference, giving a mortal-

ity rate of 13.8 per cent. In seven hundred and eighty-six cases the seat of injury was not specified; in the remaining three thousand one hundred and fifty-two cases the tibia was implicated in nineteen hundred and seventy-two, the fibula in eight hundred and six, and both bones in three hundred and seventy-four instances, with death rates of 10.3, 7.8, and 20.3 per cent., respectively.

SHOT FRACTURES INVOLVING THE TIBIA TREATED BY CONSERVATION.—The tibia alone was involved in nineteen hundred and seventy-two instances, or in over one-half of the total number of cases of shot fractures of the leg treated conservatively. Of the nineteen hundred and thirty-eight instances in which the results were determined, two hundred and one proved fatal, a mortality of 10.3 per cent.

Recoveries after Shot Fractures of the Tibia treated by Conservation.—A few of the one thousand seven hundred and thirty-seven instances of this group will be detailed:

CASE 672.—Private J. Wells, Co. G, 71st Pennsylvania, aged 26 years, was wounded in the right leg, at Spottsylvania, May 12, 1864. He entered Columbian Hospital, Washington, and was subsequently transferred to Harewood Hospital. Surgeon R. B. Bontecou, U. S. V., in charge of the latter, contributed the photograph (*Card Photographs*, Vol. 3, p. 30, A. M. M.), and reported that the patient was discharged from service June 29, 1865, by reason of "shot comminuted fracture of the tibia at the middle third." Examiner C. C. Halsey, of Montrose, Penn., December 4, 1865, certified to the injury, and stated: "The wound at point of entrance is not sound and the skin for from two to three inches around it is a mass of scabs and sores. He complains of pain about the ankle and foot." The man drew pay as a full pensioner until September 4, 1866, after which time he ceased to communicate with the Pension Office for nearly thirteen years, when he reapplied and was restored, having in the meantime changed his residence to the State of Mississippi. Examiner T. G. Birchets, of Vicksburg, reported, February 16, 1880: "The wound is about the middle of the shaft of the tibia, resulting in a very large scar, and, from feeling, there has been loss of bone. His personal appearance is healthy. There is no disability." The pensioner was paid March 4, 1880, having his rate, in consequence of the last Examiner's report, reduced from total to one-fourth.

CASE 673.—Private W. Kelly, Co. C, 149th New York, aged 30 years, received a shot fracture of the left tibia by a minié ball, at Williamsport, July 11, 1863. He was admitted to Frederick, and subsequently passed through various hospitals, being ultimately discharged from service at Harewood, Washington, June 19, 1865. Surgeon R. B. Bontecou, U. S. V., in charge of the latter hospital, contributed the photograph represented in the annexed cut (FIG. 260), and reported that the patient's disability was total. Examiner G. W. Cook, of Syracuse, N. Y., February 25, 1867, certified to "shot wound of left leg at middle third, fracturing the tibia. A part of the bony substance was removed, leaving a large and extensive excavation, cicatrix, and deformity, with several minute fistulæ. Abscesses frequently form; the knee is stiff and the leg bad." Subsequent examiners report the same description of the injury and its results. The pensioner was paid March 4, 1880.

FIG. 260.—Shot fracture of left tibia. [From a photograph.]

CASE 674.—Private *S. Prillaman*, Co. G, 24th Virginia, aged 28 years, was wounded and captured at Williamsburg, May 5, 1862. He was admitted to Camden Street Hospital, Baltimore, nine days after the injury, whence Acting Assistant Surgeon E. G. Waters reported the following history: "A bullet entered the anterior and inner aspect of the left leg five inches above the ankle joint, fracturing the bone at that point through its continuity and comminuting the entire shaft for four inches upward, where a second solution of the continuity was produced. The missile on coming in contact with the bone separated into three portions, one passing inward, backward, and slightly upward, and emerging posteriorly through the calf of the leg; the second passed upward, backward, and outward, lodging under the integuments on the outer aspect of the leg; the third passed into the canal of the shaft, then upward, destroying the continuity of the bone and lodging some four inches above the point of entrance. The two last mentioned fragments were subsequently discovered and removed. When admitted the patient was much broken down in health, having little or no appetite and his complexion being sallow. The leg was much swollen and discharging profusely. It was placed at once in the anterior splint and emollient poultices were applied. Some days later the limb below the knee assumed a livid hue, giving rise to apprehensions of gangrene. This appearance, however, readily yielded to the free exhibition of quinine and stimulants, with cataplasms of bran and yeast applied locally, and the attempt to save the limb was persevered in. On June 24th, the patient was put under the influence of chloroform and the denuded fragments of bone were removed. The centre of the entire length of the fractured shaft was taken out, leaving only a thin scale on each side attached to healthy periosteum. It was hoped that nature would fill the cavity thus left and consolidate the limb. This expectation was fully answered in the sequel. During his stay in the hospital the patient suffered nine distinct attacks of erysipelas, several of them being of extraordinary severity, even for cases of gunshot fracture, the writer having had under his care nearly two hundred cases of the disease resulting from such causes and met with not more than two or three of equal violence. The first attack came on about July 1st, extending no higher than the knee, and yielding after five days treatment. On September 28th, the patient was suffering from the fifth attack, and several fistulous orifices were noticeable over the anterior aspect of the

leg, between the points of the fracture, through which the probe detected necrosed bone. It was then deemed expedient to remove several more detached fragments of bone, and with this view the fistulous orifices were dilated and a number of pieces were seized and withdrawn. Afterwards the leg became enormously swollen and the discharge grumous and offensive. The tissues around the knee joint also began to sympathize with the general disturbance and swelled to twice their natural size. About October 6th, fluctuation manifested itself over an extensive surface about the joint, when a bistoury was carefully introduced to the depth of an inch, giving exit to a quantity of sero-purulent fluid. The patient was actively plied with stimulants and tonics, the leg was maintained in the suspensory splint, and bran and yeast cataplasms were kept constantly applied, under which treatment the inflammation and swelling rapidly subsided, the discharge soon became healthy, and the patient's strength and spirit revived. He finally recovered with a strong and fine limb, an anchylosed knee joint, and a semi-flexed leg. On June 27, 1863, he left the hospital cured, to be sent south, having been for thirteen consecutive months under my care. All of the sinuses (of which there were many) had healed prior to his discharge except two, and these were satisfactorily ascertained not to communicate with dead bone but with aponeurotic expansions. Bony union had taken place to an ample extent, the entire canal of the shaft—which as above stated had been opened for the distance of four inches—being filled in its entire depth with new osseous tissue." This patient was heard from at his home in Franklin County, Virginia, in 1877, fifteen years after the injury, when his condition was described in a letter as that of a "bad cripple."

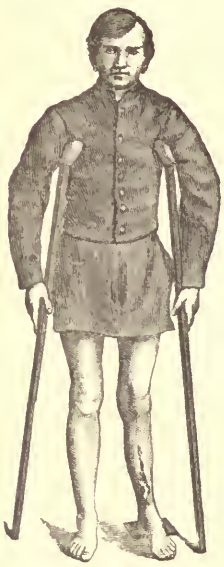

FIG. 261.—Shell fracture of lower third of left tibia. [From a photograph.]

CASE 675.—Private T. Schrup, Co. B, 10th New York Cavalry, aged 22 years, was wounded in the left leg, near the South Side Railroad, April 2, 1865. He was conveyed to the Depot Hospital at City Point two days after the injury, and transferred to Washington April 30th. Surgeon R. B. Bontecou, U. S. V., in charge of Harewood Hospital, contributed the photograph shown in the adjoining cut (FIG. 261), and described the injury as "a shell wound, severely fracturing the tibia, lower third. On admission the patient was in good health; condition of injured parts good, although severely lacerated. Treatment: Simple dressings, splints, and supporting diet. The parts healed kindly, and the patient was doing well when transferred to Lincoln Hospital, July 20, 1865." He was discharged from service, at the latter hospital, August 12, 1865, Surgeon J. C. McKee, U. S. A., certifying to "partial paralysis of the left foot and leg, resulting from the wound." Immediately after being discharged the patient made an application for pension, and was examined by M. D. Benedict, Pension Examining Surgeon, who described the fractured bone as "united with slight shortening and some deformity," and the limb as useless for the time being. The man has not been heard from since filing his application.

CASE 676.—Sergeant J. R. Rice, Co. K, 1st Vermont Cavalry, aged 30 years, was wounded in a cavalry charge between Hagerstown and Williamsport, July 6, 1863, by a minié ball, which entered the outer aspect of the lower portion of the right leg, fracturing the tibia and lodging in the bone. Two days after the injury he was admitted to hospital at Frederick, whence Acting Assistant Surgeon W. S. Adams reported as follows: "The patient was admitted under care of Acting Assistant Surgeon W. P. Morgan, who removed a few fragments and placed the limb in Smith's anterior splint. His general condition was good. On July 22d the patient came under my care, when I found that he had considerable irritative fever; tongue disposed to be dry; slight diarrhœa and but little appetite; limb painful and œdematous. I took off the splint to examine the limb and removed several fragments of bone and the missile, which was found embedded in the medullary cavity about two inches below the point of the injury. Stimulants, with tonics and good diet, were ordered. By August 1st, the appearance of the limb had much improved, the patient having experienced but little pain since the removal of the ball; appetite and general condition improving. On August 14th, his countenance had assumed a sallow appearance, and he had a slight headache, accompanied by constipation of bowels, for which three compound rhubarb pills were administered. Three days later there was well-marked jaundice, when pills of blue mass and compound extract of colocynth were prescribed. By August 21st, the jaundice was disappearing; condition of leg good. On September 1st, union of bone seemed quite firm; wound yet discharging quite freely. The limb now was allowed to rest on pillows during the day time and suspended in splints at nights. On September 20th, the splint was removed from the leg, union being firm, with no evidence of necrosis, and the wound healing kindly. About October 1st, the patient was going around on crutches, and two weeks later he laid these aside and walked with a cane, the wound having all closed with the exception of an opening barely large enough to admit a probe, On February 1, 1864, the patient was furloughed, having been able for a considerable time to walk without the aid of a cane and the wound being healed." He was subsequently promoted to Lieutenant, and ultimately mustered out of service June 21, 1865. In 1876, when applying for pension, he was examined by Surgeon C. B. Currier, of Middlebury, Vermont, who reported that "from loss of bone there is a depression as large as a twenty-dollar piece and about one-eighth of an inch deep; cicatrix tender to the touch; œdema of leg and foot; leg one and a half inch shorter than the other; muscles of leg flabby and evidently weak. He cannot stand or walk much; health good." The pensioner was paid September 4, 1880.

CASE 677.—Captain W. W. Ellis, Co. D, 61st Pennsylvania, aged 23 years, was wounded in the left leg, at Chancellorsville, May 3, 1863, and entered Douglas Hospital, Washington, five days afterwards. Assistant Surgeon W. Thomson, U. S. A., reported: "This officer suffered a fracture of the tibia near its middle by a ball, which entered posteriorly at the gastrocnemius muscle, and was retained. The fracture united without exfoliation, necrosis, or even free suppuration. The leg was placed in a bran box and dressed with cold-water applications. The patient suffered from severe catarrh, which yielded to treatment. There was also hyperæsthesia of the foot, for which, before the patient left on furlough in June, I made an incision in search of the ball and disturbed the cicatrix with good effect, relieving the nervous irritation of the foot. When the patient returned from furlough, September 1st, he was ordered to report to Surgeon M. Clymer, U. S. V., for treatment, and I lost sight of him. His recovery was good, but the leg was yet feeble and contracted, owing to want of passive motion while at his home." Captain Ellis resigned January 1, 1864, and was commissioned in the Veteran Reserve Corps, in which organization he served until

Op. page 434

Ward phot

T. Sinclair & Son lith

PLATE LXXIV. UPPER PORTION OF RIGHT TIBIA SAWN LONGITUDINALLY.

1, 2. Outer Views. 3, 4. Inner Views.

Case of Colonel W. F. Lynch, 58 Illinois Volunteers.

Specimen 6734, Surg. Sect. A.M.M.

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March 13, 1866, when he was mustered out and pensioned. Examining Surgeon G. Urquhart, of Wilkesbarre, Pennsylvania, August 22, 1866, certified to half an inch shortening of the limb; also to painfulness, weakness, and occasional lameness. Examiner J. W. Martin, of Red Oak, Iowa, reported, September 4, 1873: "There are large cicatrices on the left side of the tibia; leg bent and shortened; foot swollen and tender, and muscles shrunken above the ankle. He suffers extreme pain in the leg and is unable to bear much weight upon it; general health not good." The pensioner was paid September 4, 1880.

CASE 678.—Private J. Walker, Co. A, 7th Wisconsin, aged 27 years, was wounded at the Wilderness, May 6, 1864. Surgeon C. N. Chamberlain, U. S. V., reported his admission to the field hospital of the 4th division, Fifth Corps, with "shot fracture of left leg, caused by a minié ball." On May 12th, the wounded man entered Armory Square Hospital, Washington, where his injured leg was operated on by Surgeon D. W. Bliss, U. S. V., who made the following report of the case: "The ball was found embedded in the shaft of the tibia at about its middle, whence it was extracted on August 13th. The leg went through all the symptoms of necrosis of one or both the bones, the first signs of which appeared on August 19th. On October 10th, the patient was placed upon the operating table and four inches of the shaft of the tibia was removed, together with all the necrosed spicula of bone. Chloroform was used as the anæsthetic. Simple dressings, stimulants, and nourishing diet constituted the treatment. The patient did well after the operation." He was discharged from service January 24, 1865, and pensioned. Examiner A. McBean, of Chippewa Falls, Wisconsin, certified, July 9, 1867: "The remaining portion of the bone from the ankle joint to within four inches of its head has become carious. A large open ulcer is the consequence." Examiner F. A. Reckard reported, March 4, 1874: "The wound is yet open and discharging from an orifice some four inches in length. The remainder of the tibia is badly diseased and portions have come away at different times. The limb is very much swollen at times and retains him in bed for months." The pensioner was paid March 4, 1880. The bone removed consists of a sequestrum six inches in length, and for four inches is tubular. It was contributed to the Museum by the operator, and is numbered specimen 3283 of the *Surgical Section*. The specimen is shown in FIGURE 2 of PLATE LXXI, opposite page 428.

CASE 679.—Private A. Elmer, Co. I, 69th Pennsylvania, aged 21 years, was wounded at Petersburg, June 18, 1864, and admitted to the field hospital of the 2d division, Second Corps. Surgeon J. F. Dyer, 19th Massachusetts, reported: "Shot fracture of left leg by minié ball; anterior tibial artery divided. Ligation performed by Surgeon N. Hayward, 20th Massachusetts." Surgeon B. B. Wilson, U. S. V., reported that the wounded man was admitted to Stanton Hospital, Washington, July 1st, with "shot fracture of left tibia, lower third," for which splints and simple dressings were used, and that he was furloughed January 4, 1865. The patient was subsequently transferred to Satterlee Hospital, Philadelphia, whence he was discharged July 7, 1865, by reason of "lameness resulting from the injury," and pensioned. Examiner A. D. Newell, of New Brunswick, N. J., March 5, 1878, certified to the wound and fracture, and stated: "The bone is not sound now. The wounded leg is smaller. The tendo-achillis has contracted so that in walking his toes strike the ground—is quite lame." The pensioner was paid December 4, 1879.

In the following instance a portion of the missile remained lodged in the tibia, keeping the wound open until the time of the officer's death, twelve years after the injury:

CASE 680.—Colonel W. F. Lynch, 58th Illinois, aged 25 years, was wounded at Yellow Bayou, May 18, 1864. Surgeon G. L. Lucas, 47th Illinois, reported his admission to the field hospital of the 1st division, Sixteenth Corps, with "a bullet fracture in right leg; missile extracted by Surgeon J. E. Murta, 8th Wisconsin." From the field hospital the patient proceeded to his home, and, on February 7, 1865, he was mustered out by expiration of service. His condition at this time was described by Surgeon B. Norris, U. S. A., as follows: "The wound is a very remarkable one of the tibia, about two inches from the knee joint, being a perforation of the bone to the depth of more than an inch, and open as an augur hole. A fetid discharge escapes through the opening, and the soft tissues around it are inflamed over a circle of more than two inches in diameter. These signs indicate disease which can only be entirely removed by amputation of the leg. I further certify that in consequence of this wound his nervous system has become morbidly excitable and his health so much impaired as to unfit him for any regimental duty." About a year after his muster out of service Colonel Lynch received a commission as an officer of the Regular Army, and, on December 15, 1870, he was finally placed on the retired list with the rank of Brigadier General. Acting Assistant Surgeon F. H. Atkins reported that this officer died, from the ultimate effects of his wound, on December 29, 1876, at Fort Larned, Kansas, and contributed the pathological specimen numbered 6734 of the *Surgical Section*, and represented in PLATE LXXIV, opposite p. 434, with the following information in regard to the case: "A portion of lead was cut out on the inner aspect of the limb a long time after the injury, while another portion remained lodged in the bone. The wound of exit healed early, both the soft and osseous tissues; but the anterior wound remained open up to the time of his death, small pieces of dead bone being occasionally removed, and a profuse and extremely offensive discharge continuing. All efforts on the part of many able surgeons to induce the patient to submit to the removal of the dead or diseased interior of the tibia were futile until within three months of his death, when he desired an operation, which I refused in view of his previous disease and present prostration, a position concurred in by Assistant Surgeon W. S. Tremaine, U. S. A., who saw him during consultation on December 11, 1876. Meanwhile, in the winter of 1875–6, he had a serious illness, apparently of pyæmic character. About July 1, 1876, a severe pneumonia, followed by diarrhœa, nearly proved fatal, and after that there was constant diarrhœa and almost complete interruption of the digestive functions. From October until his death the apparently tuberculous disease in his left lung progressed rapidly, a large cavity forming. His death seemed to result from inanition. No general autopsy was permitted, though the upper half of the tibia was allowed to be removed. The bone was ripped by a saw longitudinally, the incision running obliquely backward and inward to avoid cutting the wound of entrance. A condition of the bone was displayed which, in my opinion, would have given prompt and absolutely favorable results had excision of the diseased portion been performed at any time prior to the winter of 1875–6. A cavity averaging one and one-fourth inch in diameter, and located most favorably for removing the dead bone successfully, was found directly behind the wound of entrance. The cavity was lined throughout by a membrane continuous with the edges of the soft tissues and the skin. The dead bone approached the surface of the tibia rarely as near as one-third of an inch, and the knee joint about one inch, extending only one-half to three-fourths of an inch below the wound of entrance. At the lowest part of the cavity, on the posterior segment, there was a group of black masses, white internally. A

minute portion of this substance, treated with carbonate of soda on charcoal under the blowpipe, gave numerous metallic globules, malleable under pressure, showing that the mass was part of the missile—now carbonate of lead within and sulphuret without. The upper third of the tibia was greatly hypertrophied."

Fatal Cases of Shot Fractures of the Tibia, treated by Conservation.—Two hundred and one cases of this group were reported, the fatal issue being generally ascribed to pyæmia, gangrene, or exhaustion:

CASE 681.—Private I. D. Mason, Co. D, 17th Maine, aged 30 years, was wounded at the Wilderness, May 5, 1864, by a musket ball, which entered the external aspect of the left leg, fracturing the tibia immediately below its head, passed into the right leg about two inches lower down, fracturing the right tibia also, and lodging. The wounded man was treated at Fredericksburg until May 25th, when he was admitted into Douglas Hospital, Washington, in a typhoid state. Death took place from exhaustion May 31, 1864. The upper halves of the bones of both legs are represented in the adjacent cuts (FIGS. 262, 263), exhibiting each tibia to be shattered in the upper third, and showing incipient necrosis as the only observable change. The history and the specimens were contributed by Assistant Surgeon W. Thomson, U. S. A.

FIG. 262.—Shot fracture of upper third of left tibia. *Spec.* 3549.

FIG. 263.—Shot fracture of right tibia. *Spec.* 3549.

CASE 682.—Corporal *W. Smith*, Co. K, 1st Louisiana, aged 18 years, was wounded at Gettysburg, July 2, 1863, by a musket ball, which fractured the left tibia at the lower third. On July 27th, he was admitted to Camp Letterman, the leg being considerably swollen and painful. Acting Assistant Surgeon P. S. Leisenring reported that the limb was placed in a fracture box and solution of lead and opium applied. On August 6th, the use of flaxseed poultices was commenced, and an abscess opened posterior to the wound. After this there was some improvement. On August 18th, the fracture-box was removed, and four days later the patient was able to move his limb. The administration of febrifuge remedies, including quinine, was subsequently prescribed, the patient having a severe chill on August 25th. Another abscess, forming anterior to the tibia, was lanced several days afterwards, after which there was improvement for some days. On September 14th, the patient came under the care of Assistant Surgeon R. G. Southall, C. S. A., who found him very much emaciated and with several ulcers on the leg. The patient was also troubled with diarrhœa and had lost his appetite. Under the administration of tonics, stimulants, and astringents, and the application of stimulating lotions and nitrate of silver, the patient slowly mended until September 22d, when the ulcers assumed a phagedenic form and the improvement ceased. On September 28th, two spiculæ of considerable size were removed from the tibia. Acting Assistant Surgeon W. M. Welch reported the termination of the case as follows: "The case came under my charge on October 13th. The bone had united, but the leg presented two ulcers near the region of the wound, which had sloughed largely. Nitric acid applications were resorted to, under which treatment the leg improved until October 24th, when the ulcers again became phagedenic and nitric acid was again resorted to. Bromine was also used, but neither remedy produced any salutary effect, the patient's system lacking sufficient vitality to separate the sloughs from the living tissues. The patient also continued to be a sufferer from obstinate diarrhœa, which baffled all treatment. He died from exhaustion November 3, 1863. On examination, the fractured portion of the tibia was found to be very feebly united; callus insufficient in quantity and unhealthy in quality. The proximate portion of the fibula was also diseased." The lower third of the bones of the wounded leg, represented in the cut (FIG. 264), were contributed to the Museum by Acting Assistant Surgeon E. P. Townsend. The specimen, to which a sequestrum remains attached, shows the fractured shaft of the tibia to have been invaded by caries to a considerable degree and a large portion of it lost by suppuration.

FIG. 264.—Shot fracture of lower third of left tibia. *Spec.* 1936.

CASE 683.—Private *J. Guy*, Co. D, 39th North Carolina, aged 19 years, was wounded in the left leg, at Stone River, December 31, 1862. Surgeon C. W. Horner, U. S. V., reported: "The injury was caused by a conical ball, which passed from the inner to the outer aspect of the middle third of the leg, producing a comminuted fracture of the tibia and carrying away one and a half inch of its shaft. The man was captured soon after the reception of the wound and carried to hospital at Murfreesboro', where he remained until August 1, 1863, when he was sent to the Prison Hospital. According to his statement no splints had been applied to the limb. On January 4, 1864, the patient was admitted to Hospital No. 1, at Nashville, at which time he was very much reduced, even to emaciation, numerous and large abscesses having formed about the leg and particles of bone being brought away with the discharge from the wound. The upper fragment of the tibia was displaced outward and forward, and an interval of about an inch existed between it and the lower fragment. The head of the fibula, too, was displaced upward and outward, and the slightest motion of the limb produced excessive pain. The patient had no appetite; stomach irritable; pulse quick and weak. Erysipelas also supervened, and severe cough and diarrhœa. The former was checked and the wound healed; but the cough and diarrhœa continued troublesome and persistent. The pulmonic trouble became more aggravated, and the patient died February 15, 1864." The bones of the injured leg, represented in the annexed cut (FIG. 265), were forwarded to the Museum by Acting Assistant Surgeon R. T. Higgins, and a cast of the limb, taken some weeks prior to the patient's decease, and contributed by Ass't Surgeon C. J. Kipp, U. S. V., constitutes specimen 6683 of the *Surgical Section*.

FIG. 265.—Portions of the bones of the left leg, with shot fracture of tibia at junction of middle and upper thirds. *Spec.* 2184.

SHOT FRACTURES OF THE FIBULA TREATED BY CONSERVATION.—The results of the injuries were ascertained in seven hundred and ninety-nine of the eight hundred and six cases of this group. Seven hundred and twenty-one recovered and seventy-eight died, a mortality of 9.7 per cent.

Examples of Recovery after Shot Fractures of the Fibula treated by Conservation.—These injuries healed without serious complications; but it would appear from the records of the Pension Office that the movements of the ankle joint frequently remained impaired:

CASE 684.—Private A. McPhee, Co. B, 16th New York, aged 20 years, was wounded in the left leg, at Gaines's Mill, June 27, 1862. He was conveyed to hospital at Fort Monroe, and several days afterwards to Philadelphia. Assistant Surgeon C. W. Horner, U. S. V., in charge of Wood Street Hospital, reported: "He was wounded by a minié ball, which entered the leg on its outside at the middle, fractured the fibula extensively, and passing downward made its way to the inside of the limb below the ankle, where it was retained, and whence it was removed at the Pennsylvania Hospital about the 10th of July. He was transferred to this hospital October 6th. His treatment consists of bandaging, occasional poultices, and cerate dressing. The patient is progressing favorably." He was discharged January 19, 1863, and pensioned. Examining Surgeon J. Cummiskey, of Philadelphia, February 6, 1863, certified to "elevation of the heel and stiffness of the ankle joint resulting from the wound. He is very lame, and obliged to carry a cane in walking." Examiner E. H. Lewis, of Carver, Minnesota, reported, August 5, 1874: "At present the lower or articulating portion of the fibula is in a process of acute caries; ankle joint anchylosed, pus discharging from six sinuses," etc. The St. Paul Examining Board reported, several years afterwards, that "the wound continually opens and discharges, small pieces of bone escaping. Cicatrix large and weak; motion of ankle much impaired. The greater toe is doubled under and the tendo-achillis hampered by the wound." The pensioner was paid March 4, 1880.

CASE 685.—Corporal C. A. Woodruff, Co. A, 10th Vermont, aged 19 years, was wounded through the right leg, at Cold Harbor, June 3, 1864. He was admitted to Mount Pleasant Hospital, Washington, four days after the injury, and subsequently to Brattleboro'. On December 27th, the patient was transferred to Sloan Hospital, Montpelier, whence Surgeon H. Janes, U. S. V., contributed the photograph (FIG. 266), with the following history: "The wound was caused by a musket ball, which entered about the middle of the leg, on the outer and posterior aspect, passed forward and emerged anteriorly between the tibia and fibula, two inches below the point of entrance, fracturing the fibula. Several pieces of bone were removed at the time of the injury. Gangrene followed, and the wound opened to the size of an open hand. The wound of entrance closed in April, 1865, but that of exit had not healed at the time of his discharge from service. He was then obliged to use a crutch in walking. The patient also had a congenital malposition of the heart, which he never discovered until the time of his enlistment, the location of it being on the right side, with the apex beating under the right nipple. His chest was well formed, and he was a stout and, excepting his wound, a healthy man." The patient was discharged from service August 18, 1865, and pensioned. Examiner G. B. Bullard, of St. Johnsbury, Vermont, certified, on January 25, 1866, that particles of bone were still being discharged from the wound, and the pensioner complained of stiffness of the ankle joint, and that he was unable to bear his weight on his right foot or walk without crutches. He was last paid September 4, 1866, since when he has not been heard from.

FIG. 266.—Shot fracture of right fibula. [From a photograph.]

Fatal Cases of Shot Fractures of the Fibula treated by Conservation.—Seventy-eight cases are recorded in this group. The fatal issue was frequently due to complications, as in the following instance, in which the patient died with the ordinary symptoms of typhoid fever eight days after the reception of the injury:

CASE 686.—Sergeant D. P. Spicer, 1st Iowa Battery, was wounded in the right leg, at Resaca, May 15, 1864, and admitted to the field hospital of the 4th division, Fifteenth Corps. Dr. J. M. Woodworth, Surgeon 1st Illinois Light Artillery, and Medical Inspector, contributed the following report: "A gunshot wound just below the knee joint, fracturing the head of the fibula and passing out at the centre of the lower border of the popliteal space. The artery was not wounded. The subject was a large, healthy, muscular man, about 30 years old. After his admission to hospital the fragments of bone were removed, the wound was cleansed and cold-water dressing applied. The wound looked well until the morning of the 18th, when it presented a red inflamed margin, with tumefaction of the surrounding soft parts and enlargement of the veins of the thigh. A thin sanious discharge exuded from the opening, and the entire limb as far as the swelling extended was remarkably hot; pulse full and strong. The patient was separated from the rest of the wounded, and his treatment was the same as in similar cases. On May 20th, the wounded limb was tensely swollen from the ankle to the body. At first the surface of the inflamed part was florid, but it became yellowish and mottled with greenish-purple gangrenous blotches. It was completely blistered with the stronger preparation of iodine, and kept imbued with a mixture of tincture of chloride of iron, creasote, and tincture of iodine in alcohol. The patient was also kept on a full course of tonics, stimulants, and generous diet. The disease or erysipelatous inflammation did not extend further, but the pulse grew more and more feeble. The patient became incoherent in mind and sank steadily, expiring on May 23, 1864. He died with the ordinary symptoms of the more grave form of typhoid fever."

SHOT FRACTURES INVOLVING BOTH BONES OF THE LEG TREATED BY CONSERVATION.—The shot fractures involving both bones of the leg, while far less numerous than those of the tibia or of the fibula, largely exceeded them in fatality, seventy-five of the three hundred and seventy determined cases having resulted in death, a mortality of 20.2 per cent.

Examples of Recovery after Shot Fractures involving both Bones of the Leg treated by Conservation.—There were two hundred and ninety-five instances belonging to this group. In nearly all the cases there was more or less shortening of the limb, and in some instances considerable deformity, especially convexity, but many of the patients recovered with useful limbs:

CASE 687.—Private B. F. Hayner, Co. H, 125th New York, aged 19 years, was wounded at Gettysburg, July 3, 1863. He remained at the Second Corps Hospital for one month, when he was transferred to Camp Letterman. Acting Assistant Surgeon W. B. Jones reported: "Compound fracture of right and left tibia, lower third, by a piece of shell, which struck the outer side of the left leg, passed transversely, and grazed the anterior aspect of the right leg. Cold-water and simple cerate dressings were used; splints, etc. Union took place in both legs, and by September 10th the patient was cured, but still unable to walk." He was transferred to McKim's Mansion Hospital, Baltimore, October 23d, and subsequently to Camden Street. Surgeon Z. E. Bliss, U. S. V., in charge of the latter, corroborated the description of the injury, and reported that the fracture box was used in the treatment of both legs; also that in April, 1864, the wound of the right leg had closed, while that of the left leg was still unhealed, there being slight lateral curvature in both legs; the patient able to walk well with the aid of a cane. The patient subsequently passed through different hospitals, and on August 27, 1864, he was returned to his command in the field. Being found entirely unfit for duty, he was returned to hospital for treatment until June 5, 1865, when he was mustered out of service and pensioned. Examining Surgeon R. B. Bontecou, of Troy, N. Y., reported April 7, 1875, that "the tibia and fibula were both broken in the right leg, and have united, with some deformity, leaving a useful limb. The left leg has united with an outwardly curved deformity, and there remains some carious bone in the tibia, with a fistulous opening and constant discharge, considerable tumefaction and inflammation in the vicinity of the wound. There is considerable loss of soft parts, leaving a long cicatrix, and the limb is lame in consequence of the injury." Substantially the same was reported at subsequent examinations. The pensioner was paid December 4, 1879.

CASE 688.—Private M. Lynn, Co. I, 26th Pennsylvania, aged 26 years, was wounded at Chancellorsville, May 3, 1863. He was admitted to the field hospital of the 2d division, Third Corps, where Assistant Surgeon E. Marshall, 124th New York, recorded "shot fracture of left leg." Surgeon J. A. Lidell, U. S. V., reported as follows: "The patient entered Stanton Hospital, Washington, June 15th, with compound fracture of tibia and fibula at the middle third, caused by a minié ball entering at the posterior and inner side of the calf of the leg and escaping in front. At the time of his admission the leg was in a fracture box; the wound suppurated freely; patient's general condition good. Previous to his entrance to this hospital several detached fragments of bone had been removed, and a portion of the bullet had also been extracted; subsequently about half a dozen more fragments of bone were removed at different times. Splints and water dressings were used. About July 1st, the fracture had united, and one month later there was firm union of the bones and the wound was healing rapidly. On September 22d, the patient received a furlough and was allowed to go to his home for two months. The orifice of entrance healed about the 1st of October, and before the patient was transferred to Philadelphia, in April, 1864, the orifice of exit had also closed. The atrophy of the wounded limb had disappeared entirely and the muscles of the leg acted freely, the patient being able to walk well without the aid of a cane and without limping. There was no shortening, and no deformity aside from some loss of osseous tissue at the seat of the fracture. The patient stated that the wounded limb had not caused him to feel sick at any time. He made the best recovery of any case of shot fracture of the leg that has come under my observation." After his transfer the patient was admitted to McClellan Hospital, whence he was returned to duty May 31st, to be discharged. He was mustered out of service June 18, 1864, and pensioned. The Philadelphia Examining Board at different dates certified to the injury, and reported that an adherent cicatrix resulted, causing impaired use of the limb; also that the fractured space had filled with cartilaginous tissue. The pensioner has been exempted from further examinations since 1873. He was paid December 4, 1879.

In the following cases a longitudinal incision was made along the crest of the tibia, and a number of pieces of both the tibia and fibula were removed:

CASE 689.—Private S. McNitt, Co. D, 4th Delaware, aged 23 years, was accidentally shot in the left leg, while in camp near Fairfax Court House, October 22, 1863. Surgeon D. S. Hopkins, 4th Delaware, reported: "The ball entered the limb posteriorly, at the junction of the upper with the middle third, passed directly through, causing a compound comminuted fracture of the tibia and fibula, and came out anteriorly, carrying with it fragments of bone. Comparatively slight hæmorrhage ensued, and that principally of a venous character. An examination showed that although extensive laceration of the soft parts had taken place, yet the arteries were found entire and pulsation at the extremities very perceptible. The leg was, therefore, placed in a horizontal position and loose spiculæ of bone were removed. Cold-water dressings were applied, and the patient was made as comfortable as circumstances would permit. Solution of morphia, two grains to an ounce of water, was administered at intervals of an hour until the patient became quiet. Next morning, October 23d, his system seemed to have suffered but little from the shock, he being comparatively comfortable. More minute examination revealed the fact that a number of pieces of bone still remained in the wound, which it was deemed necessary to remove. Accordingly a longitudinal incision was made along the crest of the tibia, the patient being under the influence of chloroform, and several spiculæ of bone were taken out varying in length from one to two and a half inches. The largest, from the crest of the tibia, included in its thickness much

of the cancellated structure of the bone, as was the case with each piece removed; the average breadth was three-fourths of an inch. After the fragments had been removed the parts were coaptated, the limb was adjusted in a fracture-box, and cold-water dressings were reapplied. The patient was comparatively comfortable during the night." Some months after the reception of the injury the patient was admitted from the field into hospital at Alexandria, and lastly he was transferred to Tilton Hospital, Wilmington, where he was discharged June 19, 1865, Surgeon E. I. Baily, U. S. A., certifying to the shot fracture resulting in "necrosis and shortening of the leg." The Wilmington Examining Board, in describing the injury, December 6, 1871, reported: "Large and irregular cicatrices in front and rear of the limb; unnatural condition of skin; shortening of leg by an inch and a half. On account of occasional suppuration and exfoliation the limb has become much weakened and the convexity of it more marked. The disability is permanent in its present degree." After another inspection two years later the pensioner was exempted from further examinations. He was paid September 4, 1880.

In the next case a sequestrum nine inches and a half in length was removed. New bone of sufficient thickness had formed to hold the limb in its normal position. The patient died, nine years after the reception of the injury, of dropsy:

CASE 690.—Lieutenant C. G. Martyn, Co. A, 2d New York Heavy Artillery, aged 29 years, was wounded at Deep Bottom, August 14, 1864, and entered Armory Square Hospital, Washington, three days afterwards. Assistant Surgeon C. A. Leale, U. S. V., contributed the pathological specimen (FIG. 267), and the following history of the case: "He was wounded by a minié ball, which entered the right leg between the tibialis anticus and extensor longus digitorum muscles, opposite the centre of the middle third of the tibia, passed through the leg transversely, fracturing the tibia and fibula, and made its exit at the anterior lateral aspect of the soleus muscle. Immediately after the reception of the injury the patient was removed to a field hospital, and on the following day he was placed under the influence of chloroform, when several spiculæ of bone were removed. Splints were then applied, and he was transferred to Washington, where the wound was dressed and the limb placed in a fracture-box. The general condition of the patient at that time was good. On account of great pain the fracture-box was removed on October 7th, and Smith's anterior splint was adjusted, which allowed the patient to rest more comfortably. On November 1st the splints were removed, and the limb was laid on a pillow and dressed twice a day with simple dressings. The wound had now nearly closed, but several sinuses existed and communicated with the bone, and the fracture had not yet united. By March 16, 1865, the patient was able to leave his bed and walk on crutches. He first came under my charge on April 1st, when, on an examination with the probe, I found the sinuses to communicate with dead bone; the discharge of pus was about three ounces per diem; appetite and general condition good. The discharge continuing to increase and the patient gradually growing weaker, he was placed under the influence of ether on April 25th, and an incision was made nine inches in length over the anterior portion of the tibia, when it was found that necrosis extended to within two inches of the ankle joint and nearly to the head of the tibia. A sequestrum nine and a half inches long was then removed, also several small pieces, and in the operation a longitudinal piece of newly formed bone had to be withdrawn. After the removal of the necrosed portion, new bone was found of sufficient thickness to hold the foot in its proper position. The loss of blood during the operation amounted to about ten ounces. The wound was dressed with charpie and cold water, and the patient took stimulants and an anodyne every four hours. On the next day he was very weak and had continued nausea, no appetite, and vomited all food as soon as swallowed, not being able to retain brandy even, which increased the nausea. Two ounces of beef tea was then given every four hours, but it also was nearly all thrown off. On April 27th, he was still weaker and the nausea continued, when two ounces of champagne with ice was administered every four hours, and four ounces of beef tea, per enema, was given three times a day. This was continued for two days, when the patient had a well-marked chill and was sinking fast, his nausea having increased to such an extent that the sight of other patient's food caused him to vomit. On April 30th, he was worse in every respect, when doses of five grains of oxalate of cerium was ordered to be given whenever the patient felt as though he would immediately vomit. By 9 o'clock P. M. he had used six powders, not having vomited once since taking the first, and having retained food eaten at noon. The champagne and beef tea were continued. By May 6th great improvement was noticed, and, there being no nausea or vomiting, the powders were discontinued. The wound was now granulating finely, and the discharge consisted of perfectly healthy pus. About June 25th, the patient could leave his bed and sit in a chair, the cavity having nearly filled and the wound being healthy and reduced to about half the size of the incision. He had perfect use of the ankle joint and the tibialis anticus muscle, and there was all probability of a very useful limb. By July 15th, he could bear considerable weight on the injured leg." The patient was subsequently transferred to Douglas Hospital, where he was discharged from service by special order of the War Department, October 13, 1865. In his publication[1] of the case Dr. Leale mentioned Surgeon D. W. Bliss, U. S. V., as the operator, and added that he saw the patient again just before he left Douglas Hospital, at which time the limb was in a healthy condition and the wound had nearly closed, leaving three small openings, which were prevented from closing by the great tension on the newly formed integuments. There was also slight contraction of the tendo-achillis, which could be easily overcome, although every possible care had been taken to guard against that result. The patient's name was subsequently admitted on the Pension Rolls, and afterwards he obtained employment in the New York City Custom House. Dr. G. K. Smith, of Brooklyn, May 11, 1874, certified that the patient, after receiving his discharge from service, entered Bellevue Hospital, New York City, where "Professor J. R. Wood performed an operation on his leg, cutting the tendo-achillis, and, I think, he also removed a large portion of the fractured bone. The wound healed in 1866, but soon broke open again, and continued to discharge until the month of June, 1873, when it finally healed. After leaving Bellevue Hospital he came under my care, and though his health was feeble, he performed his duties at the Custom House, with occasional loss of time, until the wound healed, in June, 1873. From that date his health failed rapidly. His liver began to

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FIG. 267.—A sequestrum, 9½ ins. long, from the right tibia. *Spec.* 1489.

[1] LEALE (C. A.), *Extensive Necrosis of the Shaft of the Tibia following Gunshot Fracture of the Bone*, in *United States Sanitary Commission Memoirs*, Surgical Volume I, New York, 1870, p. 492.

increase in size, the heart became irregular in its action, respiration difficult and circulation very feeble. At length dropsy set in, and he died December 1, 1873. An external examination showed the liver to be nearly twice its normal size, and I have no doubt that death was caused by a waxy degeneration of the liver, the result of the shot fracture."

CASE 691.—Captain E. Bernard, Co. 1, 65th New York, aged 29 years, received a gunshot wound through the left leg just below the knee, fracturing the tibia and fibula, at Malvern Hill, July 1, 1862. He was conveyed to Harrison's Landing, and thence by steamer to Fort Monroe. From there he proceeded to his home in New York City, where he obtained the professional attendance of Dr. L. A. Sayre, who subsequently furnished the following report of the case: "I was called to see Captain Bernard on July 12th, when he had just arrived from Fort Monroe, and was supposed to be in a dying condition from septicæmia. Many surgeons who had seen him at Harrison's Landing and Fort Monroe had all advised amputation of the wounded limb. The leg had become about two and a half inches shorter than the other and very much twisted on its axis. Extensive suppuration extended up the thigh and down the leg, both openings having been hermetically sealed with closely packed lint, which, when soaked off, caused the escape of a greater amount of imprisoned pus than I have ever seen from a single wound. Mingled in the pus there was also a large quantity of very finely broken up and macerated bone, and over the tubercle of the tibia a loose fragment was detected which, when cut down upon, escaped, having the appearance of a polished metal, like a silver sixpence, and the shape of a hollow segment of a robin's egg. This fragment, which, before extracting, I had suspected to be a loose piece of bone, the patient declared to be 'the end of an explosive ball.' His thigh at this time was so infiltrated with pus as to make amputation hazardous. I therefore made free incisions for its escape and drainage, and treated the limb by extension and plaster-of-paris, using adhesive plaster, weight and pulley over the foot of the bed, which was elevated to make the body act as a counter-extending force. Several large fragments of bone, having been macerated in the pus so long, were subsequently easily picked out without removing the periosteum. He made a very satisfactory recovery with but very little shortening, although there must have been more than an inch of entire bone removed. There is still (1874) a small piece of dead bone remaining, which, however, gives no trouble as long as he wears the tent to keep up the drainage. Whenever he leaves this out and the wound closes, he becomes sick until the discharge again takes place. I have been anxious to remove the diseased part, but he can never find time for that purpose, having to work constantly for his living and being too poor to lay up for the operation." The New York City Examining Board, on October 1, 1877, reported the sinus leading to dead bone as still open, having never ceased to discharge, and requiring constant dressing. Captain Bernard obtained his discharge from service October 22, 1863, and has since become a pensioner. He was paid September 4, 1880.

In a number of cases of recovery after shot fracture of both bones of the leg, the knee joint or the ankle joint or both became partially or totally anchylosed:

CASE 692.—Major A. J. Bolar, 12th Pennsylvania Reserves, aged 31 years, was wounded in both legs and captured at Fredericksburg, December 13, 1862. After remaining a prisoner some weeks he was exchanged and conveyed to Annapolis, where he was admitted to hospital on February 21, 1863. Acting Assistant Surgeon J. H. Longnecker reported: "This officer was wounded in the left leg by a round ball entering three inches below the knee joint and fracturing the fibula; also by a buck-shot in the same locality and a minié ball entering the external upper third of the leg. There was compound fracture of both the tibia and fibula. The ball has never been found, and is supposed to have lodged in the muscular part of the leg. The right leg was also wounded by a minié ball entering at the outer tuberosity and passing under the patella. At the time of admission the wound of the right leg was open and discharging. On September 9th, when the patient was put under my care, it had closed and there was anchylosis of the knee joint. The left leg was very much swollen and inflamed, there being two angry looking ulcers about three or four inches below the knee joint, with a tendency to sloughing. The patient's general health was good. Charcoal poultices were ordered, to be renewed twice a day. On September 21st, flaxseed was substituted for the charcoal, the wound looking more healthy and granulating, with not so much swelling or redness, and the pain less acute. On October 1st, two small fistulous openings remained, discharging a thin, sanious, and offensive ichor with small parts of decayed bone, which were injected with a mixture of opodeldoc and sweet oil twice a day. By November 1st, the discharge was much less and of a better quality, the leg of natural size, and the patient able to walk much easier with the aid of crutches. About December 1st, there was still slight discharge, the pus being mixed with small black particles, indicating exfoliation. Gradual improvement continued, and one month later the patient was able to walk by the support of a cane." He was honorably discharged from service January 30, 1864, and subsequently entered the Veteran Reserve Corps, being ultimately mustered out June 6, 1865, and pensioned. Examining Surgeon G. R. Lewis, of Indiana, Pennsylvania, certified, February 8, 1867: "The pensioner was wounded in the left leg by several balls, one being still unremoved. The wound is still discharging and requires to be dressed daily. He was also wounded in the right knee, the ball lodging. Complete anchylosis resulted." On September 21, 1875, the same Examiner reported: "The ball in the left leg has not been removed and the wound still discharges, etc. There is partial stiffness of the knee joint, and he is totally disabled for manual labor." Examiner M. L. Miller, of Blairsville, Pennsylvania, September 4, 1877, certified to the injuries and added: "There has been much muscular waste and tenderness of the parts (left leg), and there is discharge of offensive matter from the place of injury, requiring daily dressing." The pensioner was paid September 4, 1880.

CASE 693.—Assistant Surgeon A. H. Landis, 35th Ohio, aged 39 years, was wounded near Kenesaw Mountain, June 22, 1864, by a twelve-pound solid shot, which, after hitting a tree and bounding off, struck his right leg, causing fracture but not breaking the skin. Surgeon F. D. Morris, of the regiment, reported that the missile fractured both bones of the limb midway between the knee and the ankle, and that the soft parts were much contused. The patient was admitted to the field hospital of the 3d division, Fourteenth Corps, where he received a leave of absence on the following day. He was mustered out of service September 27, 1864, and pensioned. Examining Surgeon J. S. McNeeley, of Hamilton, Ohio, certified, October 31, 1865: "The leg was struck at the posterior part of the middle third, fracturing both the tibia and fibula and lacerating the gastrocnemius and soleus muscles. The resulting cicatrices have formed adhesions to the adjacent parts, entirely destroying their action. In adjusting the fracture complete apposition was not attained, and, from extension of inflammation, there is partial anchylosis

of both knee and ankle joints, rendering locomotion both painful and difficult." Subsequent examiners report no additional information. The pensioner was paid September 4, 1879.

Both bones of the left leg as well as of the left forearm were fractured in the next case. The arm was amputated at the middle third, but the patient was so utterly prostrated that amputation in the leg was deemed inadvisable:

CASE 694.—Sergeant J. McLeer, Co. C, 84th New York, aged 23 years, was wounded by a shell in the left arm and left leg, at Bull Run, August 29, 1862. He entered Mount Pleasant Hospital, Washington, several days afterwards. Assistant Surgeon C. A. McCall, U. S. A., in charge, describes the injury of the arm as a compound comminuted fracture of the radius, ulna, and elbow joint, and that of the leg as a fracture of the tibia and fibula, lower third, and reports: "On or about the 2d of September I amputated the arm at the middle third (*Second Surgical Volume*, TABLE LXXVIII, p. 765, No. 167), and would have also amputated the leg, but that the utter prostration of the patient threatened death upon further surgical procedure. Operating on the leg was therefore left to a future time; but as symptoms of promise developed themselves afterwards, an effort was made to save the leg, which, after long and critical treatment, was successful, although the limb was left somewhat shortened and to a considerable extent unfit for useful progression. The case was one of singular interest to myself and staff, proving as it did the wonderful endurance of the human system and the almost strained limit to which conservative surgery may trust nature. It had been looked upon and classed by me as an excision of the lower portion of both bones of the leg: for though no special operation was performed, yet I know I was over half an hour cleaning out the broken fragments and adjusting loosened spiculæ before trusting it to the fracture-box." In a published account of the case[1] it is mentioned that, under a tonic and stimulant treatment and the application of simple absorbent dressings to the parts, the stump of the arm healed rapidly. The patient was discharged from service July 27, 1863, and pensioned. On September 22, 1880, he was examined by the Brooklyn Pension Board, who certified to the loss of his left arm and added: "There is evidence of a compound comminuted fracture of the tibia and fibula of the left leg in the lower third. Portions of both bones were removed. The cicatrices of entrance and exit of the missile are found upon the internal and anterior aspects of the part. In the latter situation, over the tibia, a firmly adherent cicatrix, three inches long by one inch wide, is present. The leg is bowed outward to a very marked degree, the fibula being very prominent and thickened. There is shortening of the limb of about one inch. The extensor tendons are not full in their movements, being partially bound down by cicatricial tissue, and the ankle is somewhat stiffened and restricted in its motion. The great toe is not supple, since the plantar tendons are somewhat contracted. Altogether the objective signs show that the original wound was of the most severe character. In manual labor, walking, standing, etc., the member would speedily become the seat of great swelling and pain, as is the case after any unusual exercise."

Fatal Cases of Shot Fractures of both Bones of the Leg treated by Conservation.—Of the seventy-five instances of shot fractures of the tibia and fibula with fatal issues three will be detailed:

CASE 695.—Private G. F. Skinner, Co. H, 6th Maine, aged 30 years, was wounded at Chancellorsville, May 3, 1863, and admitted to Douglas Hospital, Washington, five days afterwards. Assistant Surgeon C. C. Lee, U. S. A, reported: "This man suffered a comminuted fracture of the left leg from a musket ball, which entered one-half inch internally to the spine of the tibia, passed through antero-posteriorly, and emerged at a corresponding point at the back of the leg. Much contusion and ecchymosis existed at the time of his admission to the hospital, and but for the high state of inflammatory action then existing the leg would have been removed. The limb was then placed in a fracture-box filled with bran, and covered with water dressings; nutrients and stimulants were given freely. No change was perceptible until the morning of May 16th, when the foot and leg were found in a state of advanced gangrene. To show how rapidly this condition supervened it is only necessary to state that a most careful examination during the previous evening failed to reveal anything of the kind, the patient in all respects seeming as well as usual. By the next morning this condition of the leg was rapidly extending up the thigh, the soft tissues of which became boggy and crepitant; the patient being bathed in clammy sweats, and his circulation so depressed that the pulse was imperceptible at the wrist, though at the groin it was 160 per minute. At the same time the patient's spirits were not at all depressed, and he could hardly believe he was in any danger. His prostration was such that amputation was deferred; but the most energetic stimulation failed to bring his condition into one of sufficient reaction to bear the operation. He gradually sank, and died at 2 o'clock on the morning of May 17, 1863. At the autopsy, the internal organs were discovered to be generally healthy. The bone was found to be extensively comminuted, with a portion of the bullet lying upon the lacerated and obliterated posterior tibial vessels, thus probably furnishing the main cause of the gangrene. No secondary abscesses were found, and it was concluded that the patient had died in the primary stage of blood poisoning." The upper halves of the injured bones, showing a transverse fracture of the fibula and comminution of the tibia, with the battered bullet attached, were contributed to the Museum by Assistant Surgeon W. Thomson, U. S. A., and are shown in the annexed cut (FIG. 268).

FIG. 268.—Shot fractures of upper third of left tibia and fibula. *Spec.* 1249.

CASE 696.—Private J. Bailey, Co. B, 211th Pennsylvania, aged 29 years, was wounded at Petersburg, April 2, 1865. Surgeon A. F. Whelan, 1st Michigan Sharpshooters, reported his admission to the field hospital of the 3d division, Ninth Corps. with "Canister shot fracture of right leg." Surgeon E. Bentley, U. S. V., recorded the result of the injury as follows: "The

[1] COUES (ELLIOTT), *Report of some Cases of Amputations and Resections from Gunshot Wounds, performed at the Mount Pleasant U. S. General Hospital by* C. A. MCCALL, M. D., U. S. A., in *Medical and Surgical Reporter*, New York, 1862-3, Vol. IX, p. 229.

man was admitted to Slough Hospital, Alexandria, four days after receiving his wound. The tibia and fibula were badly shattered. Cold-water dressings were employed, and tonics and stimulants were freely administered, together with all the nourishment the patient would take. He died May 2, 1855, from the severity of suppurative inflammation of the wound. The autopsy showed the tibia to be comminuted for several inches at the upper third and the fibula fractured at the lower third, no union having taken place. The wound was gangrenous."

In the following instance of lesion of both bones of the leg in the middle third, osteomyelitis of the medulla of the femur was noted at the autopsy. The upper and lower thirds of the tibia were found upon opening to be quite healthy:

CASE 697.—Musician G. H. Potter, Co. E, 60th Ohio, aged 14 years, was wounded in the right leg, before Petersburg, July 16, 1864. Surgeon P. A. O'Connell, U. S. V., recorded the following description of the injury at the field hospital of the 3d division, Ninth Corps: "A ball entered the outer side of the limb about the upper third of the fibula; exit below on anterior aspect, gouging tibia and fibula." The wounded man was conveyed to the Depot Hospital at City Point the day after the injury, and one week later he was transferred to Fairfax Seminary Hospital. Assistant Surgeon H. Allen, U. S. A., in charge of the latter, made the following report: "On entering the hospital the lad was in fine spirits, though somewhat anæmic; wound looking well. On August 5th, the wound assumed an indolent appearance and the discharge became greater and more fetid. Bromine was thoroughly applied in the ordinary way and at first checked the progress of the disease. But the patient appeared to have no recuperative energy and a tendency to subcutaneous sloughing was evinced, which, by the 12th of August, had increased so far as to necessitate the slitting up of the integuments and a second rigorous application of bromine. It was observed during the operation that the tibia was exposed and a superficial area of bone was being thrown off. The patient was exceedingly irritable, appetite capricious. The wound still presented a gluing and unhealthy appearance, and the tendency to undermining continued in spite of all efforts to check it. The patient gradually sank. By September 15th, violent and persistent vomiting came on, and from this time until the date of his death, September 26, 1854, he was almost entirely sustained by beef tea enemata. He had no chills and no discoloration of skin, and his mind at all times was clear. Autopsy: emaciation extreme; limb not much swollen; foot somewhat œdematous; ulcer extending from four inches below the knee to the ankle joint; femoral vein healthy; internal organs all healthy except the liver, which was exceedingly fatty. The outer surface of the tibia at the middle third was dead and much blackened from the action of the vapor of the bromine, and the living bone around its borders was covered with several roughened spiculæ of bone. Upon opening the tibia the upper and lower thirds were found to be quite healthy, but the middle third was the seat of varied diseased action. The walls at this point were partially necrosed, of a greyish slate color, roughened, and so thin that at one point they appeared to be nearly destroyed. The medullary substance at this place was shrunken, of a blackish grey color, and closely adherent to the posterior and lateral walls of the cavity. No new deposit of bone was seen. The tissues both above and below this point had taken on active efforts of repair. The cavity of the medulla was much contracted by delicate cancelli extending from either side, and the original walls of the cavity for the extent of a full inch either way were vascular and thickened. The medulla lying in the diminished calibre of canal was of a lively red color, filled with blood, and presented all the appearance of a highly nourished medium. As above observed, no inflammation was noticed in either extremity of the affected bone. Upon examination of the femur an interesting appearance was presented. The walls of the bone were much thickened and dotted with reddish spots; the enlarged nutritious arteries and the periosteum were also thickened, vascular, and easily detached. When the bone was opened the upper two-thirds of the medulla were found to be acutely inflamed, which as usual was more intense towards the neck of the bone than elsewhere." The tibia and fibula of the injured leg, contributed, with the history, by Dr. Allen, constitute specimen 2633 of the *Surgical Section* of the Museum.[1]

The precise seat of the bony lesion was not indicated in seven hundred and eighty-six of the three thousand nine hundred and eighty-eight cases of shot fractures of the bones of the leg treated by conservation. The results in sixty-nine of these cases were not ascertained; five hundred and forty-three patients recovered and one hundred and seventy-four died, a mortality of 24.2 per cent.

An analysis of the cases of shot fracture of the bones of the leg treated by conservation indicates that pyæmia was noted in eighty-one instances (six recoveries and seventy-five deaths), gangrene in seventy (forty recoveries, thirty deaths), tetanus in twenty-four (two recoveries, twenty-two deaths), erysipelas in forty-five (thirty-five recoveries, ten deaths), and in three hundred and forty-seven cases (two hundred and ninety-nine recoveries, forty-two deaths, and six undetermined results) fragments of bone or sequestra were removed. Secondary hæmorrhage is reported in sixty-five instances (twenty-four recoveries, forty-one deaths), and in twenty-six instances ligation of the tibial, popliteal, or femoral arteries were performed, viz: ligation of anterior tibial artery in five (three recoveries, two deaths); of anterior tibial and popliteal in one (fatal); of anterior and posterior tibials

[1] ALLEN (H.), *Remarks on the Pathological Anatomy of Osteomyelitis, with Cases. Gunshot Wound of the Right Leg; phagedena; no pyæmia;* in *American Journal Medical Sciences*, 1865, Vol. XLIX, N. S., p. 44.

in one (fatal); of posterior tibial in eight (five recoveries, three fatal); of —— tibial in one (fatal); of popliteal in five (two recoveries, three fatal); and of femoral in five (two recoveries and three fatal). Details of the five cases of ligation of the femoral artery are adduced:

CASE 698—Private *J. W. Moore*, Co. I, 13th Mississippi, aged 23 years, was wounded and captured at Gettysburg, July 2, 1863. Surgeon H. Janes, U. S. V., reported: "Compound fracture of right leg, middle third. Hæmorrhage from the posterior tibial artery occurred to the amount of one pint daily from July 12th to July 17th, when the femoral artery was ligated in the continuity." The patient recovered, and was transferred to Baltimore October 15th, the wound having entirely healed. Surgeon T. H. Bache, U. S. V., reported that he was paroled from West's Building Hospital, and sent south November 12, 1863.

CASE 699.—Corporal P. Lahany, Co. G, 5th Vermont, aged 21 years, was wounded at Petersburg, April 2, 1865, and admitted to the field hospital of the 2d division, Sixth Corps, where Surgeon S. F. Chapin, 139th Pennsylvania, recorded: "Shot fracture of left leg." Surgeon D. P. Smith, U. S. V., reported the wounded man's entrance into Fairfax Seminary Hospital, April 6th, with "Shot fracture of left fibula," but made no record of any surgical treatment in the case. On May 30th, the patient was transferred to Baxter Hospital, Brattleboro', and subsequently to Sloan Hospital, Montpelier. Surgeon H. Janes, U. S. V., in charge of the latter, contributed a photograph of the patient, which is copied in the wood-cut (FIG. 269), together with the following history: "The wound was produced by a minié ball, which entered the leg on the outer side two inches below its middle, passed backward and inward, fracturing the fibula, and emerging posteriorly one inch lower than the point of entrance. Several fragments of bone were removed on the field four hours after the injury. Secondary hæmorrhage occurred on April 9th, for which the femoral artery was ligated in Scarpa's space by Dr. Smith, at Fairfax Seminary Hospital. The patient was much prostrated after the operation, and artificial heat was required for about a week to keep up the temperature of the limb. No recurrence of the hæmorrhage took place, and the wound closed rapidly after the operation. At the time of his admission to Sloan Hospital, June 12th, both wounds were nearly healed and he could walk without crutches, but could not bring the heel to the ground on account of contraction of the muscles of the calf. In the early part of July an abscess formed at the place of ligation, which healed however in a short time. On August 11th, the patient was discharged from service, though unable to leave the hospital on account of an abscess at the original wound, caused by a fragment of necrosed bone. Three weeks afterwards the abscess had nearly healed and he left the hospital in good health, but still unable to get the heel to the ground. This patient had also been wounded through both buttocks, at the Wilderness, May 5, 1864, from which injury he had recovered in three months, when he rejoined his command for duty." Various surgeons, at consecutive intervals, certified to the injuries, and Examiner F. W. Goodall, of Bennington, October 5, 1877, adds: "The left leg below the knee is one-half smaller than its mate, one-half smaller at the calf, and one-quarter at the ankle; muscles attached to the integument on back of leg, impairing the action of the tendo-achillis. I also find a large cicatrix in the left triangle of Scarpa, from ligation of the femoral artery." The pensioner was paid March 4, 1880.

FIG. 269.—Shot fracture of left fibula and ligation of femoral. [From a photograph.]

CASE 700.—Corporal J. Ferguson, Co. G, 142d Pennsylvania, was wounded in the right leg, at Fredericksburg, December 13, 1862. He remained at a First Corps field hospital for one week and was then transferred to the Patent Office Hospital, and subsequently to Stanton Hospital, Washington. Surgeon J. A. Lidell, U. S. V., in charge of the latter, described the case as follows: "The wound was produced by a bullet, which passed through the calf of the leg in the upper third in a downward and outward direction. The wound did well until the middle of January, when the granulations assumed an unhealthy appearance and the discharge became thin and serous. The patient also exhibited typhoid symptoms, having a hot skin, frequent pulse, and dry red tongue, watchfulness, and no appetite. This went on until the morning of January 23d, when hæmorrhage occurred unexpectedly from the external orifice behind the fibula. The bleeding was readily controlled by application of pressure by bandage and ice, the patient having lost about ten ounces. Throughout the day and the night following the loss of blood by oozing was very little, but on the following morning hæmorrhage recurred from the internal orifice, behind the tibia this time. This amounted to from four to six ounces, and was also readily controlled by the application of persulphate of iron, lint, ice, and bandaging. In the meantime the typhoid symptoms became more marked. The patient also complained of great tenderness throughout the leg and thigh; the inguinal glands were somewhat swollen and tender, and there was dusky redness, with soreness in the track of the long saphenous vein. His skin was now pale and yellow. On the morning of January 25th, another slight bleeding occurred from the internal wound and was readily controlled by pressure. A marked increase of the swelling was now noticed, extending from the leg to the thigh, especially over the external and internal condyles and the popliteal space, and infiltration with blood was suspected. The patient was now very pale and expressed a great deal of anxiety, his pulse being 120, quick and weak. The first day the hæmorrhage was thought to come from the peroneal artery, the next day from the posterior tibial, but now we were uncertain in regard to the source of the bleeding, and the case presented an unpromising appearance on account of the debility from the loss of about eighteen ounces of blood superadded to his typhoid condition. We then decided to tie the femoral artery at the apex of Scarpa's space as affording the best chance of benefit, which operation I performed without any difficulty on the afternoon of January 25th, forty-three days after the reception of the wound. On the following morning the patient appeared brighter; pulse 130; tongue more moist; leg getting warmer down to the ankle. The plugs being removed some dark offensive blood flowed away. In the evening his foot was cold, leg cooler, and blackness was extending across the leg in the track of the wound. Patient had a slight chill; somewhat delirious; pulse 130 and weak; tongue dry. On the morning of January 27th the patient looked better; pulse 132 and stronger; leg warm and blacker; foot pale and swelled; serous infiltration and discoloration extending up the thigh. The next day the patient presented a pale yellow hue; blackness of limb deepening and extending, having reached the lower end of the incision made for the liga-

tion; odor gangrenous. Death supervened on the evening of January 29, 1863. The autopsy showed that the bleeding did not come from the posterior tibial or peroneal artery, but from the lower part of the popliteal, which had been opened to a large extent by ulceration. Some loose splinters of bone were also found, the ball having grazed the hind part of both the tibia and fibula. On the proximal side of the ligature the clot was firm, closely attached to the walls of the artery, and about three-fourths of an inch long, with its apex pointing upward towards the heart. There was also a firm clot on the distal side, adherent to the walls of the artery, but much smaller than the proximal one." A piece of the femoral artery, about four inches long and embracing the seat of the ligature, was contributed to the Museum by Surgeon Lidell, and constitutes specimen 1140 of the *Surgical Section*.

CASE 701.—Sergeant J. Daly, Co. K, 82d New York, aged 27 years, was wounded in the left leg, at the Wilderness, May 6, 1864, and admitted to Douglas Hospital, Washington, six days afterwards. Assistant Surgeon W. Thomson, U. S. A., described the injury as "a gunshot fracture of the fibula," and reported: "On May 17th, a bullet was extracted from the inner side of the leg, through a deep and oblique incision two or three inches below the knee. Three days afterwards three hæmorrhages occurred from the posterior tibial artery, amounting to one, three, and ten ounces respectively, and necessitating ligation of the femoral artery, which was performed below the profunda in Scarpa's space by Assistant Surgeon W. F. Norris, U. S. A. Ether was used as the anæsthetic. On the following day there was venous hæmorrhage to the amount of four ounces. A further loss of eight ounces of blood took place on May 25th, and of one and a half ounces the next day. Four more attacks followed on June 1st, each causing the loss of one-half ounce to an ounce of blood, and being checked by compression over the femoral where it emerges from the pelvis. Death resulted from exhaustion, June 3, 1864. At the *post-mortem* examination the ligature was found to have nearly sloughed through; clot below, but none above it."

CASE 702.—Corporal *H. Day*, Co. A, 6th Alabama, was wounded in the right leg, at Chancellorsville, May 3, 1863. The records of Chimborazo Confederate Hospital No. 4, Richmond, show his admission May 14th, with the following description of the injury and its result: "The ball entered at the external malleolus, slightly fracturing the fibula, ranging upward and inward, and making its exit about an inch and a half from the posterior edge of the tibia and about four inches from the knee joint. On May 26th, a hæmorrhage from the upper wound estimated at from ten to twelve ounces, and probably coming from the posterior tibial artery, was arrested by compression of the femoral on the pubis, after which a tourniquet was applied to the thigh. On May 28th, another hæmorrhage occurred from the upper wound and from fifteen to twenty ounces of blood were lost, when it was checked by introducing the fingers into the wound and seizing the vessel and adjacent tissues. Ligation of the femoral artery was then performed. The tissues were found to be disorganized and reduced to a soft pulpy mass, in which it was impracticable to define any healthy structure. While preparing for the operation the patient had a slight convulsion, and for a few moments all proceedings were suspended in anticipation of immediate death. Hæmorrhage did not recur after the operation. On June 2d, there was a slight chill followed by fever. On the next day the discharge from the upper wound was of a greenish-gray color, offensive in odor, and indicative of gangrene. Gangrenous symptoms increased, and by June 4th the foot and leg were livid and swollen, odor very offensive. He died in a comatose condition, June 5, 1863, the whole leg and thigh having become thoroughly gangrenous. It is probable that the posterior tibial artery was not divided by the ball, but opened by the softening of the tissues subsequent to the occurrence of the wound."

EXCISIONS IN THE CONTINUITY OF THE BONES OF THE LEG FOR SHOT INJURY.—Three hundred and eighty-seven examples of excision in the bones of the leg are recorded. Two hundred and fifteen, or over one half of the total number of these operations, were primary, eighty-seven intermediary, and fifty secondary; in thirty-five instances the interval between the dates of injury and operation could not be ascertained. Two hundred and seventy-five of the patients survived the operation, one hundred and eight died, and in four the results were undetermined, a mortality rate of 28.2 per cent. In comparing the results of the excisions and amputations in the long bones of the upper extremity it will have been noticed that in the upper arm the fatality of the excisions (28.5) exceeded that of the amputations (23.6) by 4.9 per cent., while in the forearm the mortality of the amputations (13.9) was 2.7 per cent. in excess of the death rate of the excisions (11.2). Similarly, in the lower extremity, we find that while the fatality of the excisions in the shaft of the femur (69.4) surpasses that of the amputations through the thigh (53.8) by 15.6 per cent., the excisions in the continuity of the bones of the leg show a death rate of 28.2 per cent., or 4.7 per cent. less than the fatality after amputations in the leg (32.9 per cent.). It would appear, therefore, that in the arm and thigh amputations were less fatal than excisions, while in the forearm and leg the mortality of the amputations exceeded that of the excisions. The low rate of fatality after excisions in the forearm or leg may be ascribed to the fact that in the large majority of the cases of recovery portions of one of the bones of the forearm or the leg only were excised; in the cases in which the excision extended to both bones of the limb, the mortality exceeded that of the amputations.

TABLE LXII.

Numerical Statement of Three Hundred and Eighty-seven Excisions in the Bones of the Leg for Shot Fracture.

OPERATIONS.	CASES.	CASES.				EXCISIONS.											
						TIBIA.				FIBULA.				TIBIA AND FIBULA.			BONES NOT SPECIFIED.	
		Recovery.	Death.	Undetermined.	Mortality rate of determined cases.	Recovery.	Death.	Undetermined.	Mortality rate of determined cases.	Recovery.	Death.	Undetermined.	Mortality rate of determined cases.	Recovery.	Death.	Mortality rate.	Recovery.	Death.
Primary Excisions	215	148	67	....	31.1	69	30	....	30.3	78	32	....	29.0	....	5	100.0	1	.....
Intermediary Excisions	87	58	29	....	33.3	24	9	....	27.2	31	15	....	32.6	3	4	57.1	.....	1
Secondary Excisions	50	42	8	....	16.0	26	5	....	16.1	13	1	....	7.1	3	2	40.0	.....	.....
Time between injury and operation not recorded	35	27	4	4	12.9	17	3	2	15.0	9	1	2	10.0	1	....	.....	.....	.....
Aggregates	387	275	108	4	28.2	136	47	2	25.6	131	49	2	27.2	7	11	61.1	1	1

Primary Excisions in the Shaft of the Tibia, of the Fibula, or of both bones.—The series of two hundred and fifteen primary excisions in the bones of the leg contains one hundred and forty-eight recoveries and sixty-seven deaths, a mortality rate of 31.1 per cent. Portions of the tibia were excised in ninety-nine, of the fibula in one hundred and ten, and of the tibia and fibula in five instances; in one case the seat of excision was not specified. The operations were performed on one hundred and ninety-two Union and twenty-three Confederate soldiers.

Recoveries after Primary Excisions in the Continuity of the Bones of the Leg.—There were one hundred and forty-eight recoveries after primary excisions in the continuity of the bones of the leg; in sixty-nine, portions of the tibia, and in seventy-eight, parts of the fibula had been excised; in one instance the bone was not indicated. No instances of recovery after primary excision in both bones of the leg are recorded. The one hundred and forty-eight operations were performed on seventeen Confederate and one hundred and thirty-one Union soldiers. Of the latter one hundred and twenty-four were pensioned; but ten have died since the date of their discharge—two of phthisis, and three of remote effects of the injury; in five instances the cause of death was not reported. In the following five cases from three to six inches of the tibia were excised:

CASE 703.—Private J. Hogan, Co. F, 127th Pennsylvania, aged 41 years, was wounded in the right leg, at Fredericksburg, December 13, 1862. Surgeon J. E. MacDonald, 79th New York, reported his admission to the field hospital of the 1st and 2d divisions, Ninth Corps, and described the injury as "fracture of the tibia," for which "resection of six inches" of the bone was performed. Assistant Surgeon W. Thomson, U. S. A., contributed the following history of the case: "This man was struck by a minié ball four inches below the knee joint. The tibia was extensively comminuted, the fibula being uninjured. A resection of the shaft of the tibia from a point just below the tubercle to (about) seven inches below was performed by Surgeon J. P. Prince, 35th Massachusetts, at a field hospital. The man was admitted to Douglas Hospital December 26th. The dressing consisted in keeping the incision open with charpie to encourage granulations from the bottom of the wound. On February 25, 1863, a crown-shaped exfoliation (*Spec.* 2237, *Sect.* I, A. M. M.) was removed from the end of the lower portion of the tibia. The wound now healed rapidly, no change having been made in the dressing and the leg being retained in quietness by a fracture box filled with bran. His general health became perfect as the discharge ceased. On May 1st, several small exfoliations were removed from the spongy portion of the tibia at the superior part of the wound. There was of course no reproduction of the tibia and no conservative hypertrophy of the fibula, and hence the leg was perfectly helpless. Before the fistulous orifice had entirely closed at the upper portion of the incision, well marked but mild hospital gangrene appeared. The sloughing extended very deeply as far as the lower side of the tibia. Several applications of bromine checked the spread of the gangrene but not until a large excavation had been caused. This filled up gradually, the patient got up on his crutches and with the aid of a starched bandage hobbled painfully about the wards. His term of enlistment expired on May 29, 1863, but he remained until October 12th, when he returned to his home. No more useless or unphilosophical operation could be devised than the one done in this case. The leg was perfectly helpless, a hiatus of nine or ten inches existing in the tibia and there being no hope of any further improvement from the lapse of time; fibula no larger than natural. Unless some novel means of support can be

applied this man will be infinitely worse off than with an artificial leg." Examining Surgeon S. T. Charlton, of Harrisburg, reported in October, 1866: "There is complete atrophy of the whole limb, as well as deformity from curvature at the point of resection and the pushing out of the head of the fibula from its articulation. He cannot walk or stand upon the limb without the use of a cumbrous apparatus furnished by the Government," etc. At subsequent examinations no change or improvement was reported. The pensioner died May 24, 1877.[1]

CASE 704.—Lieutenant O. R. Fyler, Co. I, 2d Connecticut Heavy Artillery, aged 25 years, was wounded in the left leg, at Opequan Creek, September 19, 1864. He was admitted to the field hospital at Winchester, where Surgeon E. B P. Kelly, 95th Pennsylvania, recorded a "shot fracture of the tibia, middle third, by a minié ball, followed by exsection, the same day, of three inches of the bone by Surgeon H. Plumb, 2d Connecticut Artillery." Acting Assistant Surgeon J. H. Bartholf made the following report: "The patient entered Frederick Hospital on November 12th. On December 15th, I discovered and removed the ball, or what appeared to be the greater part of it, from the lower part of the wound, close to the upper extremity of the lower fragment. It was embedded about two inches and found to be exceedingly battered and misshapen. The patient informed me that Smith's anterior splints were used and continued for three weeks after the injury. A plaster-of-Paris splint was then applied, with which he came here, having traveled by the rough railway from Winchester without inconvenience. I found him with his limb looking well, but there was no union of bone and no coaptation even of the ends, the fibula of course holding the extremities apart. Besides removing the ball, as stated, and a few small fragments of bone, the patient's treatment in this hospital consisted of simple dressings and the continued use of the plaster-of-Paris splint. On January 13, 1865, he left on leave of absence, his general condition being excellent and the wound presenting a granulating surface five inches long. No deposit of bony matter in the interspace between the ends of the bone could be discovered. The sawn face of the upper fragment came away in the early part of January." The patient was discharged from service April 6, 1865, and pensioned, and subsequently supplied with a supporting apparatus for his injured limb by Dr. E. D. Hudson, of New York City. Examining Surgeon H. E. Gates, of Litchfield, Connecticut, certified, June 4, 1877: "The wound was from a minié ball received directly in front, striking the tibia, mashing that bone and lodging in it; it remained there two months, causing exfoliation, profuse discharge, and an attack of gangrene. Resection was done the day the injury was received, the periosteum being removed (or badly torn) with three inches of the bone. It is supposed that the periosteum was so badly torn as not to be able to repair the loss of bone substance. Present aspect: whole leg and thigh atrophied. The fibula is bowed outward and there is partial dislocation of its head. The leg bends easily at the seat of the injury and no weight can be borne upon it. I have no doubt the fibula would instantly give way if the applicant stood upon it. There is great tenderness at the head of the fibula from stretching of the ligaments, the line of support from the bending of the leg being thrown outward towards this articulation. The pensioner wears an appliance weighing seven pounds, which incases the limb and gives the only support. The disability is progressive on account of displacement and bending of fibula, etc. I consider his present condition worse than if he had amputation above the knee; locomotion is very painful indeed," etc. The pensioner was paid March 4, 1880. In the accompanying wood-cut (FIG. 270) the appearance of the limb about one year after the excision is shown.

FIG. 270.—Excision of three inches of the left tibia. [From a photograph.]

CASE 705.—Colonel W. T. Fitch, 29th Ohio, aged 40 years, was wounded at Mill Creek, May 8, 1864. He entered the field hospital of the 2d division, Twentieth Corps, where Surgeon A. Ball, 5th Ohio, recorded: "Shot compound fracture of right tibia; resection at middle third by Surgeon A. K. Fifield, 29th Ohio." Surgeon J. E. Herbst, U. S. V., reported that the patient entered the Officers' Hospital, Nashville, four days after he was wounded, having undergone excision of about three inches of the shaft of the tibia by a longitudinal incision of four inches over the crest. Chloroform was used and prompt reaction followed the operation. The limb was placed in a box-frame splint and wet applications were made. On June 20th the patient left for his home on leave of absence, the wound being in excellent condition. On October 13, 1864, Colonel Fitch resigned and obtained his discharge from service, and subsequently he became a pensioner, his physician testifying that "the wound on the surface has healed, but the vacancy caused by the removal of the bone has not yet filled up." Examiner W. M. Eames, of Ashtabula, Ohio, certified, September 15, 1865, that "the leg is now very small and weak and of no manner of use in walking, a source of constant discomfort. The foot is cold and swollen and not under the control of the muscles." On December 8, 1870, when the pensioner visited the Army Medical Museum, he was in good general health and his wound soundly healed; but the bone remained ununited, the calf of the leg entirely atrophied, and the foot swollen and useless. He also stated that "he regretted greatly that amputation had not been performed." The Cleveland Examining Board at subsequent dates reported that the pensioner was obliged to wear steel splints on the outer and inner aspect of the leg. In September, 1877, the cicatrix was described as being quite irritable and as ulcerating and discharging often. The pensioner was paid December 4, 1879.

CASE 706.—Private D. M. Gould, Co. D, 102d New York, aged 21 years, was wounded in the left leg, at Dallas, May 27, 1864. Surgeon A. Ball, 5th Ohio, reported his admission to the field hospital of the 2d division, Twentieth Corps, with "shot fracture of tibia; resection of four inches by Surgeon C. H. Lord, 102d New York." Ten days after receiving the injury the wounded man was conveyed to Chattanooga, and subsequently he passed through different hospitals, entering Ira Harris Hospital, Albany, on February 9, 1865. Assistant Surgeon J. H. Armsby, U. S. V., in charge of the latter, contributed a plaster

[1] A detailed history of the case will be found in *American Journal of Medical Sciences*, New Series, 1864, Vol. XLVII, p. 395, *Report of Cases of Hospital Gangrene treated in Douglas Hospital*, Washington, D. C., by WILLIAM THOMSON, M. D.

cast (*Spec.* 2552, *Sect.* I, A. M. M.) of the injured limb, represented in the annexed cut (FIG. 271), and reported the patient's discharge from service July 20, 1865, by reason of disability resulting from the wound. Examining Surgeon J. B. Chapin, of Canandaigua, N. Y., reported, July 2, 1869: "The disability had its origin in a gunshot wound of the upper third of the tibia. The bone was shattered, leaving the head uninjured. The operation of resection, by which four inches of the tibia was removed, was performed. The fibula is thrown out of line externally by the action of walking and the weight of the body, and a false joint exists below the knee joint. The limb requires a splint and bandage to be applied constantly for support, and in addition the pensioner requires the aid of a cane," etc. The Canandaigua Examining Board certified, September 4, 1877, to the following: "Leg shortened about two inches; false joint, large cicatrix along spine of tibia; upper end of fibula projecting. Leg curved outward." The pensioner was paid March 4, 1880.

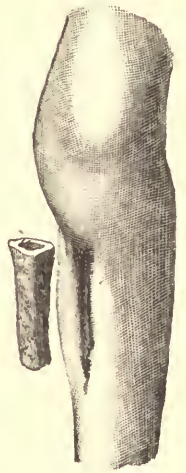

FIG. 271.—Left leg after excision of 4 inches of shaft of tibia. *Spec.* 2552. [From a cast.]

CASE 707.—Sergeant J. Measor, Co. C, 137th New York, aged 37 years, was wounded in the left leg, at Wauhatchie, October 29, 1863, and admitted to the field hospital of the 2d division, Twelfth Corps. Surgeon G. Perin, U. S. A., reported the injury as a "fracture of the tibia," for which excision was performed at the upper third by Surgeon A. K. Fifield, 29th Ohio. Assistant Surgeon H. T. Legler, U. S. V., reported that the wounded man entered the general hospital at Bridgeport three days after receiving the injury, and that he left for his home on furlough April 4, 1864. Acting Assistant Surgeon J. W. Robie reported that the patient was subsequently admitted to Ladies' Home Hospital, New York City, where a second operation for the removal of bone became necessary, by reason of necrosis, on August 22d. He was discharged from service April 5, 1865, and pensioned. From a description of the case by Dr. E. D. Hudson, of New York City, who supplied the pensioner with a surgical apparatus for the wounded limb, it appears that the total amount of bone removed comprised three and a half inches, the first operation consisting of the posterior and main part of the shaft of the tibia, while, at the second, the remaining anterior portion was removed by Acting Assistant Surgeon J. C. Stone. Examining Surgeon D. W. Hunt, of Fairmont, Minnesota, reported: "The wounded limb is much smaller than the other, the muscles being shrunken and somewhat shorter than the other. The deformity modifies his gait very much, causing an appearance of lameness." The pensioner was paid December 4, 1879.

In the next case six inches of the fractured fibula were excised, and the posterior tibial artery was successfully ligated for secondary hæmorrhage:

CASE 708.—Private J. Leichty, Co. F, 8th Pennsylvania Reserves, aged 21 years, received a shot fracture of the fibula of the left leg, at Spottsylvania, May 11, 1864. Surgeon L. W. Read, U. S. V., reported that he was admitted to the field hospital of the 3d division, Fifth Corps, where "resection was performed by Surgeon T. Jones, 8th Pennsylvania Reserves." Assistant Surgeon A. Ingram, U. S. A., contributed the following history: "The wounded man entered Judiciary Square Hospital, Washington, May 18th. About six inches of the injured fibula had been excised on the field. Secondary hæmorrhage occurred from the posterior tibial artery to the amount of thirty-two ounces, when the vessel was ligated in the wound. By June 14th the patient was progressing well. Cold-water dressings were used, and milk punch and a supporting treatment was administered." The patient was subsequently transferred to hospital at Alexandria, whence he was discharged from service January 11, 1865, and pensioned. Examining Surgeon J. McCullock, of Huntingdon, Pennsylvania, April 18, 1867, described the wound, and added that the "leg has sloughed largely and discharged a number of pieces of bone, the last one about three weeks ago. Since that time the wound has healed; tendons back of knee contracted; walks lame; wound painful," etc. Examiner A. B. Brumbaugh reported, in 1877, that, as a result of the resection, "The foot cannot be planted even, as it would turn outward from the want of fibular support, and he has to keep his shoe blocked up accordingly to support the foot. The toes of the left foot tend to turn downward, like hooks, from injury to the nerves and muscles. The leg is not quite but almost useless for all purposes of manual labor." The pensioner was paid March 4, 1880.

Of the one hundred and forty-eight survivors after primary excision in the bones of the leg nineteen submitted to subsequent operations, viz: fourteen[1] to amputation in the leg; one[2] to exarticulation at the knee; and four[3] to amputation in the thigh.

Fatal Cases of Primary Excision in the Continuity of the Leg.—The sixty-seven fatal cases of primary excision in the bones of the leg comprised thirty excisions in the shaft of the tibia, thirty-two in the shaft of the fibula, and five of both bones of the leg. Subse-

[1] In nine of the fourteen cases of amputations in the leg the operation was performed in the upper third, viz: Pt. S. B. Andrews, Co. F, 72d Penn., right leg, secondary operation; Pt. L. Arnold, Co. G, 143d Penn., right leg, intermediary operation; Lieut. Col. W. W. Dudley, 19th Indiana, right leg, intermediary operation; Corp'l W. H. Goldsmith, F, 2d New Hamp., left leg, secondary operation; Pt. D. A. Hatch, C, 2d Mass., right leg, secondary operation, *Spec.* 2155, A. M. M.; Corp'l C. McCarty, E, 1st N. Y., right leg, secondary operation; Pt. T. Powell, F, 6th U. S. C. T., left leg, secondary operation; Musician C. A. Runyan, F, 9th N. Y. H. A., left leg, secondary operation; Pt. P. O'Rourke, F, 7th N. Y. H. A., left leg, intermediary operation, *Specs.* 1502 and 3546, A. M. M. In five cases the operation of amputation was performed in the middle third, viz: Pt. T. Beirn, G, 60th Illinois, left leg, intermediary operation; Pt. J. R. Cowling, A, 62d Penn., right leg, secondary operation; Pt. P. Steif, K, 139th N. Y., right leg, intermediary operation; Pt. J. Koehler, I, 150th Penn., left leg, intermediary operation, *Specs.* 2404 and 3533, A. M. M.; Pt. J. J. Toomey, I, 29th Penn., left leg, intermediary operation, *Spec.* 3361, A. M. M. These cases will appear in the tables of amputations in the leg.

[2] Amputation at the knee joint was resorted to in the case of Pt. J. H. Pattee, Co. D, 26th Ohio (TABLE LVII, p. 409, No. 6).

[3] Two of the four cases of amputation in the thigh were done in the middle third, viz: Pt. S. Montgomery, I, 139th Penn., left thigh, secondary operation (TABLE XXXIX, p. 314, No. 63); Pt. W. Stoedale, D, 48th Indiana, right thigh, secondary operation (TABLE XXXIX, p. 314, No. 87); and two in the lower third, viz: Corp'l M. Dunn, H, 46th Penn., both thighs, primary operations, *Spec.* 3193 (CASE 448, p. 242, and TABLE XXXII, p. 248, Nos. 239, 240); Pt. P. Walsh, A, 69th N. Y., left thigh, intermediary operation (TABLE XXXVI, p. 296, No. 202).

quent amputation was performed in fourteen instances, three times in the leg,[1] twice at the knee joint,[2] eight times in the thigh,[3] and once in the leg with subsequent re-amputation in the thigh.[4] The patients were sixty-one Union and six Confederate soldiers. Pyæmia was noted in eight, gangrene in twelve, erysipelas in four, and hæmorrhage in fifteen instances.

FIG. 272.—Bones of right leg, with 2½ inches of tibia excised. *Spec.* 3337.

CASE 709.—Private N. Biehl, Co. I, 155th Pennsylvania, aged 27 years, received a shot fracture of the right tibia, at Petersburg, June 19, 1864. He was conveyed to the field hospital of the 1st division, Fifth Corps, where excision was performed but not recorded, and whence he was transferred to City Point and subsequently to Alexandria. Surgeon E. Bentley, U. S. V., who amputated the limb, reported the following history: "The patient was admitted to the Third Division Hospital June 28th. Exsection had been performed on June 21st, in the field, by Surgeon J. A. E. Read, 155th Pennsylvania, who removed two inches of the middle third of the tibia by a straight incision four inches in length. When admitted the lips of the wound were widely separated, having apparently never been brought together closely or supported except by straps and bandages. The incision remained open in its whole length, leaving a portion of the crest of each extremity exposed and uncovered of periosteum. The granulations were healthy and covered with laudable pus; but the leg and foot were badly swollen, particularly about the ankle, where the integument was œdematous and pitted deeply on pressure. Water dressings were applied to the wound and stimulants were given internally. On July 14th, gangrene appeared in the wound. Remedies used successfully in other cases signally failed in this. The disease extended along the medullary cavity of the bone and the muscles behind, seemingly bidding defiance to local applications and becoming very offensive. The patient sank very rapidly under the effects of the pain and poison, and the loss of blood from an artery opened by ulceration. On July 19th, amputation at the middle third of the thigh was performed by circular skin flaps. The patient was much prostrated at the time of the operation; had no appetite, great thirst, and dry tongue; face sunken and anxious; pulse quick and tremulous. Alcohol was applied to the stump, which was covered with a compress wet with the same. Whiskey and morphine was given internally. The next day gangrene attacked the stump, spreading rapidly on its face and extending three inches up the inner side of the thigh. The patient died on July 21, 1864, of exhaustion. The *post-mortem* examination, twenty-two hours after death, revealed extensive gangrene of the stump and mortification extending to the body." The bones of the wounded leg, showing the tibia to be dead for one inch on each side of the excision, were contributed by Dr. Bentley and are shown in the annexed cut (FIG. 272).

CASE 710.—Corporal P. Lovell, Co. C, 10th Missouri, aged 41 years, was wounded at Mission Ridge, November 25, 1863. He entered the field hospital of the 3d division, Fifteenth Corps, where Surgeon J. L. Prout, 26th Missouri, noted: "Fracture of leg and wound of right shoulder, resection of portion of tibia." Assistant Surgeon J. J. Whitney, 8th Wisconsin, reported the following history: "The patient was of previous good constitution, but asthmatic. He was severely wounded, the left tibia being fractured at the junction of the middle and lower third. Two and a half inches of bone were resected the evening following the injury. Up to the time of the patient's admission to the general field hospital at Chattanooga, December 20th, no attempts at repair had taken place, the wound granulating feebly and suppuration being profuse. On January 10, 1864, secondary hæmorrhage occurred from the posterior tibial at its superior portion; tissue of the calf infiltrated, and blood flowing from the posterior wound at the seat of the fracture. Up to this date the patient had been generally quiet and had had a good appetite; no diarrhœa, chills or fever. Assistant Surgeon R. Bartholow, U. S. A., in charge of the hospital, being called in consultation, it was determined to amputate below the knee, which operation was then immediately performed by him, at the junction of the upper and middle thirds, by the circular flap incision. During the operation the fibula was found to be fractured just below its articulation with the tibia, when a longitudinal incision was made and the upper fragment was smoothly excised. On January 15th, the stump was sloughing somewhat; discharges comparatively healthy, patient having no constitutional symptoms. On the following day there was a profuse hæmorrhage, the ligatures having sloughed away, and the patient losing about sixteen ounces of blood. The bleeding was controlled by the application of cold and pressure. The skin about the stump now assumed a puffy erysipelatous character; patches looking gangrenous; bone protruding and healthy looking; pulse 100 and feeble. The treatment up to this time had been decidedly supporting, such as quinine, wine, beef tea, and milk. On January 17th, another hæmorrhage occurring, I opened the wound down to the bleeding point and applied actual cautery, which instantly staunched the flow. The dead portions of tissue were all cut away and the stump was dressed with common solution of bromine. This treatment was continued until the 19th, when the artery opened again late in the evening, but the bleeding was controlled so soon that he lost only about four ounces; actual cautery was again employed. On January

[1] The three amputations in the leg were done in the upper third, viz., cases of: Pt. *J. S. Dewes*, H, 18th Virginia, primary operation; Capt. H. R. Schwerin, C, 119th New York, right leg, intermediary operation; Pt. R. Whistler, H, 49th Ohio, right leg, secondary operation.

[2] Amputation at the knee joint was performed in the cases of: Pt. F. Carroll, K, 45th Penn., right leg, intermediary operation (TABLE LVI, p. 406, No. 21); and Corp'l T. Sharp, I, 38th Illinois, right leg, secondary operation (TABLE LVII, p. 409, No. 23).

[3] Subsequent amputations in the thigh were performed in the cases of: Corp'l C. Jackson, G, 2d Michigan, left thigh, intermediary operation in upper third (TABLE XXXIV, p. 276, No. 91); Pt. J. H. Carpenter, E, 110th Ohio, left thigh, intermediary operation in middle third, *Spec.* 2759, A. M. M. (TABLE XXXV, p. 283, No. 241); Pt. N. Biehl, I, 155th Penn., right thigh, intermediary operation in middle third, *Spec.* 3337, A. M. M. (TABLE XXXV, p. 283, No. 223); Pt. N. H. Atwood, C, 6th Vermont, right thigh, intermediary operation in lower third (TABLE XXXVI, p. 296, No. 230); Pt. C. A. Eaton, K, 39th Mass., right thigh, intermediary operation in lower third (TABLE XXXVI, p. 298, No. 324); Pt. D. A. Johnson, E, 43d N. Y., right thigh, secondary operation in lower third (TABLE XL, p. 322, No. 148); Pt. J. Bader, F, 59th Illinois, left thigh, secondary operation in lower third (TABLE XL, p. 322, No. 181); Serg't L. Heath, D, 2d Michigan, right thigh, intermediary operation in lower third, *Spec.* 2867, A. M. M. (TABLE XXXVI, p. 299, No. 390).

[4] Case of Corp'l P. Lovell, Co. C, 10th Missouri, left thigh, secondary operation, *Spec.* 2108 (TABLE XL, p. 322, No. 160).

21st the patient was much the same; stump looking better; pulse 110 and full; appetite good; no pyæmic symptoms. Actual cautery was applied every third day, thus anticipating the occurrence of hæmorrhage. On January 28th, the outer portion of the stump was gangrenous and looked badly; patient now failing; slough cleansed and bromine applied with good effect. On January 31st, the artery gave away farther above, bleeding again profusely, when actual cautery and pressure were successfully employed; patient losing eight ounces of blood; very feeble; gangrene progressing. Hæmorrhage recurring on the morning of February 2d, I consulted with the other members of the faculty, when it was resolved to re-amputate, which was promptly done by Assistant Surgeon R. Bartholow by circular incision above the condyles of the femur. The operation was endured but indifferently well. Ether was solely employed in the production of anæsthesia. The patient did not rally, his stomach rejecting all food and stimulants; pulse 100 and very feeble ten hours after the operation. He died February 3, 1864." The specimen (No. 2108, *Surg. Sect.*), comprising the two lower thirds of the tibia and fibula and represented in the wood-cut (FIG. 273), was contributed by the operator.

FIG. 273.—Lower thirds of left tibia and fibula. *Spec.* 2108.

FIG. 274.—Upper half of right tibia. Two inches of shaft have been excised. *Spec.* 2867.

CASE 711.—Sergeant L. Heath, Co. D, 2d Michigan, aged 22 years, received a shot fracture of the right leg, before Petersburg, June 18, 1864. He was admitted to the field hospital of the 3d division, Ninth Corps, where excision was performed but not recorded. Assistant Surgeon A. Ingram, U. S. A., contributed the pathological specimen, shown in the annexed cut (FIG. 274), with the following report: "The patient entered Judiciary Square Hospital, Washington, July 1st, with a wound about the junction of the upper and middle thirds of the tibia. Resection of about two inches of the continuity of the bone was performed on the day of the injury. The tibia was somewhat shattered for about an inch above and below the points of resection. Amputation at the lower third of the thigh was performed in this hospital on July 7th, by Acting Assistant Surgeon J. H. Thompson, the condition of the injured parts and the constitutional state of the patient rendering the operation necessary. The circular method was chosen and ether was used as the anæsthetic. Tonics and stimulants were administered after the operation. Hæmorrhage to the amount of six ounces occurred from the femoral artery on July 12th, when the vessel was taken up in Scarpa's triangle. Death occurred from pyæmia July 28, 1864." The specimen (No. 2867, *Surg. Sect.*) consists of the upper half of the injured tibia and shows the extremities to be somewhat irregularly necrosed.

TABLE LXIII.

Summary of Two Hundred and Fifteen Primary Excisions in the Bones of the Leg for Shot Injury.

[Recoveries, 1—148; Deaths, 149—215.]

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.	No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	Adams, I. N., Pt., D, 110th Ohio, age 29.	April 2, 2, 1865.	Left; 5 inches lower part tibia excised; amputation leg April 12. Disch'd Sept. 11, '65; leg useful.	14	Carson, J. W., Pt., B, 7th Ohio, age 25.	June 18, 19, 1864.	Left; 4 inches of fibula. Discharged July 5, '65; leg disabled.
2	[1]*Allen*, ——, Major.	April 6, —, 1862.	Right; 6 inches fibula. Surgs. B. W. Avent and J. W. Thompson, C. S. A. 1866, walks well.	15	Chandler, N. W., Lieut., H. 109th New York, age 21.	June 17, 18, 1864.	Left; portion of upper third tibia excised. Surg. W. B. Fox, 8th Mich. Disc'd Nov. 5, '64; unable to walk without assistance.
3	Andrews, S. B., Pt., F, 72d Penn., age 28.	May 10, 10, 1864.	Right; 2½ inches tibia, middle third; amputation leg Sept. 27. Discharged Nov. 27, 1864.	16	Clark, G., Lieut. Col., 119th Penn., age 44.	April 2, 2, 1865.	Right; 3 inches upper third tibia excised. Must'd out June 19, '65.
4	Arnold, L., Pt., G, 143d Penn., age 20.	May 25, 25, 1864.	Right; tibia; amp leg May 29. Discharged June 17, 1865.	17	Clark, J., Pt., D, 26th Illinois, age 49.	Sept. 3, 3, 1864.	Left; 2½ inches of fibula excised. Ass't Surg. D. Hulderman, 46th Ohio. Disch'd June 29, 1865; can only walk with crutch.
5	Bain, T., Pt., G, 60th Illinois, age 34.	July 4, 4, 1864.	Left; 4 inches tibia, lower third. Surg. E. Batwell, 14th Mich. Gangrene; non-union. Aug. 1, amp. leg. Disch'd May 9, '65.	18	Coddington, R., Pt., C, 21st New Jersey, age 23.	May 3, 3, 1863.	Right; 4 inches fibula excised. Mustered out June 19, '63; limb useless. Died May 4, 1867.
6	*Bell, H. V.*, Pt., I, 5th Virginia.	July 2, 2, 1863.	Right; 3½ inches fibula, middle third. Recovery.	19	Collier, C., Pt., G, 4th Ohio.	May 3, 5, 1863.	Right; 5 inches mid. third tibia excised. Disch'd Mar. 31, '64; use of splint necessary.
7	Bennett, N., Corp'l, A, 7th Michigan.	Oct. 8, 8, 1864.	Left; middle third tibia excised. Disch'd July 18, 1865; permanently lame.	20	Collins, F., Pt., A, 184th New York, age 35.	Oct. 19, 19, 1864.	Left; 2 ins. fibula, middle, exc'd. Disch'd May 22, 1865.
8	*Bingham, J. M.*, Pt., K, 56th N. C., age 37.	Mar. 25, 25, 1865.	Right; mid. third tibia excised. Ass't Surg. E. M. Smyser, 48th Penn. Released Aug. 2, 1865.	21	Cooper, J., Pt., C, 10th N. Y. Artillery, age 25.	April 2, 2, 1865.	Left; 2 inches middle third tibia excised. A. Surg. O. S. Copeland, 10th N. Y. Artillery. Discharged July 19, 1865; partial anchylosed ankle joint.
9	Bovie, P. P., Pt., B, 129th Indiana.	July 4, 4, 1864.	Left; 1½ inch lower third fibula. Surg. C. D. Moore, 13th Ky. Disch'd May 29, 1865; partially anchylosed ankle.	22	Copeland, M., Pt., M, 1st Maine Cav., age 18.	Mar. 31, 31, 1865.	Right; upper third fibula excis'd. Disch'd July 19, 1865. 1867, bone discharged.
10	Bowers, G., Pt., B, 77th New York, age 31.	Sept. 19, 19, 1864.	Right; 5 inches lower half fibula excised. Surg. G. T. Stevens, 77th N. Y. Gang.; hæm.; lig. post. tibial. Disch'd June 5, '65.	23	Cowling, J. R., Pt., A, 62d Penn., age 21.	July 2, 3, 1863.	Right; 3 inches mid. third tibia excised. Surg. J. Kerr, 62d Penn. Mustered out July 13, 1864. Amp. leg Sept. 21, 1864.
11	*Brandon, J. C.*, Pt., Clayborne's Escort, age 19.	Nov. 30, Dec. 1, 1864.	Right; 4 inches mid. third tibia excised. Sent to Provost Marshal March 27, 1865.	24	Crawford, L. S., Pt., F, 126th Ohio, age 21.	Sept. 22, 22, 1864.	Left; 3 inches mid. third fibula excised. Disch'd Mar. 6, 1865.
12	Brown, W. C., Corp'l, K, 141st Penn., age 21.	Aug. 16, 17, 1864.	Right; portion of middle third of tibia; removal exfoliated bone. Disch'd June 27, '65; necrosis.	25	Croston, W., Pt., F, 1st Mass. H. Art., age 24.	Aug. 15, 15, 1864.	Right; portion of fibula. Discharged July 27, 1865.
13	Burton, G. W., Pt., E, 5th Wisconsin, age 20.	April 2, 2, 1865.	Left; middle third tibia (fracture and trephining of occipital). Discharged July 24, 1865; leg disabled.	26	Crow, E., Pt., C, 123d New York, age 20.	June 22, 22, 1864.	Left; 2 inches middle third fibula excis'd. Surg. J. Chapman, 123d N. Y. Disch'd March 27, 1865.
				27	Denny, M., Serg't, F, 70th Indiana, age 37.	July 20, 20, 1864.	Left; lower third fibula excised. Disch'd July 7, 1865.

[1] THOMPSON (J. W.), *Cases of Resection. Fractures of Upper Third of Femur. Gunshot Wounds of Knee Joint, etc.*, in *Nashville Medical Journal*, 1866, N. S., Vol. I, p. 341; and *Resection of the Long Bones*, in the *Medical Record*, New York, Vol. III, 1868–69, p. 28.

No	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
28	Dickerson, C., Corp'l, C, 51st Indiana, age 25.	Dec. 4, 5, 1864.	Right; 2 inches fibula excised (also fracture left tibia). Mustered out Mar. 8, '65; paralysis.
29	*Dodds, W. P.*, Pt., D, 17th Miss., age 21.	July 2, 2, 1863.	Left; portion of fibula. Paroled November 12, 1863; union.
30	Driggs, J. A., Pt., E, 67th Ohio, age 22.	Oct. 27, 27, 1864.	Right; 2 inches mid. third tibia excised. Surg. A. C. Barlow, 62d Ohio. Disch'd May 16, '65; ligamentous union only.
31	Dudley, W. W., Lieut. Col., 19th Ind., age 22.	July 1, 3, 1863.	Right; 3 inches mid. third fibula excised. Surg. J. E. Ebersole, 19th Ind. Gang.; hæm. July 9, amp. leg. Disch'd April 9, '64.
32	Dunham, H., Pt., 1, 2d Ohio, age 23.	Dec. 31, 1862, Jan. 1, '63.	Right; most of mid. third of tibia excised. Disch'd August 3, '63; shortening 3 inches.
33	Dunn, M., Corp'l, H, 46th Penn., age 21.	May 25, —, 1864.	Left; head of fibula excised (also amp. right thigh). May 27, amp. left thigh; re-amp. right thigh. Disch'd August 17, 1865. Died October 23, 1877. *Spec.* 3193.
34	Farnsworth, R. R., Pt., C, 7th Mich. Cavalry, age 32.	July 3, 4, 1863.	Right; upper and middle thirds tibia. Aug. 6, excised. Disch'd July 1, 1864; bone diseased.
35	Ferguson, W. J., Pt., H, 81st Ohio, age 34.	July 22, 22, 1864.	Left; 4½ inches tibia, upper third, exc'd. Surg. W. C. Jacobs, 81st Ohio. Oct. 7, spiculæ removed. Disch'd May 12, 1865; caries.
36	Fitch, W. T., Col., 29th Ohio, age 40.	May 8, 8, 1864.	Right; 3 ins. tibia, middle, exc'd. Surg. A. K. Fifield, 29th Ohio. Resigned Oct. 13, 1864. 1870, bone not united.
37	Flynn, J. P., Pt., E, 56th Mass., age 34.	May 6, 6, 1864.	Left; 1 inch fibula, lower third, exc'd. Surg. J. Barber, 1st Penn. Reserves. Disch'd July 12, '65; ankle lame.
38	Frair, J. E., Pt., F, 9th N. Y. H. Art., age 19.	Oct. 19, 21, 1864.	Right; 4 inches mid. third fibula; necrosis. Disch'd May 31, 1865; requiring continuous bandaging.
39	Freeman, D. B., Pt., G, 10th Vermont, age 22.	Sept. 19, 21, 1864.	Left; 3 inches middle third fibula exc'd. A. Surg. W. G. Bryant, 122d Ohio. Disch'd May 31, '65.
40	French, G. W., Pt., A, 27th Mich., age 27.	June 3, 3, 1864.	Left; 3 inches upper third fibula excised. Surg. H. E. Smith, 27th Mich. Disch'd April 18, 1865.
41	Fuller, A., Pt., G, 109th New York, age 22.	July 30, 30, 1864.	Left; 3 ins. fibula, low. th'd, exc'd. Surg. W. C. Shurlock, 51st Penn. Disch'd May 16, '65; walks well.
42	Fyler, O. R., Lieut., I, 2d Conn. Artillery, age 25.	Sept. 19, 19, 1864.	Left; 3 inches middle third tibia excised. Surg. H. Plumb, 2d Conn. Art. Disch'd April 6, '65; deformity of tibia.
43	Gardner, C. J., Pt., B, 6th N. Hamp., age 32.	Oct. 1, 1, 1864.	Left; middle third fibula excised. Surg. S. Cooper, 6th N. Hamp. Disch'd June 19, 1865.
44	Gibbons, J., Corp'l, C, 90th Illinois, age 22.	Dec. 13, 15, 1864.	Right; 3 inches mid. third fibula exc'd. Surg. I. N. Barnes, 116th Ill. Mustered out June 5, 1865.
45	Gibbons, T., Pt., A, 125th New York.	June 16, 16, 1864.	Left; fibula, lower third, excised. Surg. P. E. Hubon, 28th Mass. Mustered out May 31, 1865.
46	Goldsmith, W. H., Corp'l, F, 2d New Hampshire, age 24.	June 9, 9, 1864.	Left; 4 inches middle third tibia excised. Surg. G. P. Greeley, 4th N. Hamp. May 15, '65, amp. leg. Disch'd Oct. 14, 1865.
47	Gould, D. M., Pt., D, 102d New York, age 21.	May 27, 27, 1864.	Left; 4 inches up. third tibia excised. Surg. C. H. Lord, 102d N. Y. Disch'd July 20, 1865; constant support required; false joint. *Spec.* 2552.
48	Graham, J., Pt., B, 74th Illinois.	June 21, 21, 1864.	Right; middle third tibia excised. Surg. W. P. Pierce, 88th Illinois. Disch'd June 6, 1865; necrosis.
49	*Green, F. F.*, Pt., B, 12th Georgia, age 21.	July 1, 3, 1863.	Left; lower portion of fibula excised. Paroled Nov. 12, 1863.
50	*Gurley, W. H.*, Pt., D, 4th N. Carolina, age 30.	July 3, 3, 1863.	Left; 3 inches middle third tibia excised. Exch'd Nov. 12, 1863.
51	Hall, J., Corp'l, A, 107th New York.	Mar. 19, 19, 1865.	Left; portion of fibula excised. Discharged July 15, 1865.
52	Hannoway, J., Pt., A, 69th N. Y., age 39.	Aug. 15, 15, 1864.	Right; ½ inch fibula, lower third, excised. Surg. G. Chaddock, 7th Mich. Disch'd June 23, '65.
53	Harris, H. A., Lieut., B, 16th Mass., age 22.	July 2, —, 1863.	Left; 4 inches fibula, upper third. Disch'd Dec. 19, 1863. Died June 24, 1865.
54	Hatch, D. A., Pt., C, 2d Massachusetts, age 25.	July 3, 5, 1863.	Right; 2 inches mid. third tibia excised. Surg. W. H. Heath, 2d Mass. Amp. leg Dec. 16. Discharged April 2, '64. *Spec.* 2155.
55	Hendley, J. B., Pt., D, 46th Ohio.	June 27, 27, 1864.	Left; 3½ inches mid. third fibula exc'd. A. Surg. D. Halderman, 46th Ohio. Disch'd Apr. 10, '65.
56	Henry, C., Pt., I, 29th Pennsylvania, age 19.	May 15, 15, 1864.	Right; 3 ins. low. th'd tibia exc'd. Surg. G. P. Oliver, 111th Penn. Disch'd June 29, 1865; necrosed bone removed; deformity.
57	Hersh, Z. E., Capt., B, 87th Penn., age 24.	April 2, 2, 1865.	Left; 3 inches of fibula excised. Mustered out June 29, 1865.
58	Hinsdale, A., Pt., E, 137th N. York, age 20.	July 2, 2, 1863.	Left; 4 inches lower third tibia excised. Surg. H. E. Goodman, 28th Penn. Disch'd May 15, '65; ankle joint anchy.; deformity.
59	Hogan, J., Pt., F, 127th Pennsylvania, age 41.	Dec. 13, 14, 1862.	Right; 6 ins. middle tibia exc'd. Surg. J. P. Prince, 36th Mass. Exfol. of sequestra. Mustered out May 29, 1863; 8 ins. separation; deformity. Died May 14, 1877. *Spec.* 2237.
60	Hollcroft, W., Serg't, L, 2d N. Y. Cav., age 24.	April 8, 8, 1865.	Left; 3 inches middle third fibula excised. Disch'd July 3, 1865.
61	Hope, J., Pt., D, 51st New York.	July 30, 30, 1864.	Left; portion of tibia excised. Mustered out May 19, 1865.
62	Hoy, M., Pt., B, 61st New York.	May 3, 3, 1863.	Left; portion of fibula excised. Surg. T. C. Wallace, 61st N. Y. Recovery July 14, 1863.
63	Hurst, W. L., Corp'l, E, 115th Illinois.	Sept. 20, 20, 1863.	Left; 3 inches middle third fibula excised. Disch'd Aug. 3, 1864.
64	Ibach, F., Pt., A, 93d Pennsylvania, age 16.	May 5, 5, 1864.	Left; 2 inches middle third tibia excised. Disch'd Oct. 6, 1864; permanently disabled.
65	Johnson, J. F., Serg't, H, 9th Indiana, age 26.	June 20, 20, 1864.	Left; 4 ins. middle tibia excised. Disch'd Nov. 4, 1864; shortening 2 ins. and firm union.
66	*Johnson, S. P.*, Pt., B, 13th South Carolina, age 29.	July 28, 28, 1864.	Right; portion of tibia excised. Surg. D. W. Maull, 1st Del. Sent to prison Feb. 5, 1865.
67	Jones, S. W., Corp'l, A, 4th Delaware, age 29.	Oct. 8, 8, 1864.	Left; 2 inches fibula excised; lig. post. tibial and peroneal arteries. Surg. A. A. White, 8th Maryland. Disch'd June 22, 1865
68	Keech, H., Pt., K, 2d N. York Cavalry.	May 2, 3, 1864.	Left; 2 inches fibula, up. third, excised. Ass't Surg. C. H. Andrus, 128th N. Y. Furloughed June 19, 1864.
69	King, J. R., Serg't, H, 6th Maryland, age 21.	May 5, 6, 1864.	R't; 2 ins. mid. third fibula exc'd. Ass't Surg. R. L. Disbrow, 14th N. J. Disch'd May 18, 1865.
70	Koehler, J., Pt., I, 150th Pennsylvania, age 36.	May 5, 5, 1864.	Left; 4 ins. low. third fibula exc'd. Surg. W. T. Humphrey, 149th Penn. May 29, amp. leg. Disc'd April 19, '65. *Specs.* 2404, 3533.
71	Lamb, J. M., Pt., A, 58th Mass., age 22.	June 18, 18, 1864.	Right; 2 inches upper third fibula excised. Disch'd July 31, 1865; wears bandage.
72	Lawcock, T., Pt., K, 151st New York, age 31.	Oct. 19, 19, 1864.	Left; 2 ins. low. third fibula exc'd; caries. Disch'd June 12, 1865; ankle deformed.
73	Leichty, J., Pt., F, 8th Pennsylvania, age 21.	May 11, 11, 1864.	Left; 6 ins. mid. third fibula exc'd. Surg. T. Jones, 8th Penn. Res. Hæm., 32 oz.; lig. posterior tibial artery. Disch'd Jan. 11, 1865; bone discharged, 1867.
74	Lewis, J., Pt., G, 12th Mass., age 19.	May 30, 30, 1864.	Right; 3 inches mid. third fibula exc'd. Surg. W. H. W. Hinds, 12th Mass. Disch'd March 8, '65; regeneration of bone.
75	Lisle, J. D., Pt., C, 1st Maryland.	July 3, 4, 1863.	Left; portion of tibia exc'd. Surg. A. Chapel, U. S. V. Removal of fragments. Disch'd May 14, '64. *Spec.* 1655.
76	Lyon, C., Pt., D, 190th Pennsylvania, age 25.	May 12, 12, 1864.	Left; 1½ inch up. third tibia exc'd. Surg. B. Rohrer, 10th Penn. Res. Disch'd January 16, 1865; one inch shortening; deformity.
77	Mattern, L., Pt., F, 184th Pennsylvania, age 19.	May 30, 30, 1864.	Left; 4 inches middle third fibula excised. Surg. M. Rizer, 72d Penn. Disch'd May 27, 1865.
78	Mayes, J. H., Corp'l, F, 6th Ky. Cavalry.	Mar. 25, 25, 1863.	Right; 5 inches mid. tibia exc'd. Disch'd Sept. 16, 1863.
79	McCandless, A., Corp'l, K, 8th Ohio Cavalry, age 35.	Sept. 3, 6, 1864.	Left; 6 inches middle tibia exc'd. Discharged June 28, 1865; limb shortened 2 inches. Died Feb. 18, 1877; phthisis.
80	McCarty, C., Corp'l, E, 1st New York, age 28.	June 30, 30, 1862.	Right; 3 inches middle third tibia excised; nec.; slough. Aug. 28, leg amp. Disch'd May 11, 1863. Died August 21, 1867.
81	McCracken, R. W., S'g't, C, 170th N. Y., age 32.	June 17, 17, 1864.	Right; upper third fibula excised. Surg. F. Douglas, 170th N. Y. Also wound of anterior tibial artery and side. June 22, ligation. Disch'd Jan. 20, 1865; anchylosis of ankle joint.
82	McDonald, B., Pt., A, 8th Kansas, age 28.	Dec. 16, 1864.	Right; 3 inches lower third fibula excised. A. A. Surg. M. L. Herr. Duty August 1, 1865.
83	McGuire, J., Pt., F, 20th Massachusetts.	Dec. 13, 13, 1862.	Right; 4 inches mid. third fibula and splinters of tibia excised. Disch'd May 28, 1863; shortening; deformity.
84	McKim, W., Pt., L, 8th Penn. Cav., age 23.	June 11, 11, 1864.	Left; middle third fibula. Discharged Nov. 10, 1864.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
85	Measor, J., Serg't, C, 137th N. York, age 37.	Oct. 29, 29, 1863.	Left; post. portion up. third tibia exc'd. Surg. A. K. Fifield, 29th Ohio. Aug. 22, 1864, excision anterior portion. Disch'd April 5, 1865; shortening; deformity.
86	Montgomery, S., Pt., I, 130th Pennsylvania.	May 12, 12, 1864.	Left; 2 inches tibia excised. July 29, amputation thigh. Disch'd August 2, 1865.
87	Moore, J.W., Major, 97th Ohio.	June 22, 22, 1864.	Left; 2 inches lower third fibula excised. Surg. E. B. Glick, 40th Indiana. Resigned Oct. 7, 1864.
88	Moore, W., Corp'l, E, 71st Penn, age 29.	June 3, 3, 1864.	Right; portion of fibula excised. Discharged March 22, 1865.
89	Morse, F. E., Pt., H, 17th Maine, age 23.	May 12, 12, 1864.	Right; lower third tibia excised. Disch'd May 11, 1865; necrosis and exfoliation.
90	Morse, S. C., Pt., F, 97th New York, age 25.	May 10, 11, 1864.	Right; 2½ inches low. third fibula excised. Disch'd Dec. 12, 1864.
91	Mosier, W., Pt., C, 148th Pennsylvania, age 35.	May 10, 10, 1864.	Left; 3⅜ inches fibula excised. Disch'd May 9, '65. 1869, caries.
92	Moury, B. S., Pt., B, 137th New York.	Oct. 29, 29, 1863.	Left; portion of mid. third tibia exc'd. Surg. J. L. Dunn, 109th Penn. Disch'd May 24, 1865.
93	O'Connor, J., Pt., G, 90th Illinois, age 23.	Dec. 13, 13, 1864.	Right; 5 inches mid. third fibula excised. Ass't Surg. C. B. Richards, U.S.V. Disch'd June 6, '65.
94	O'Maley, J., Pt., L, 2d N. Y. M. R., age 32.	July 1, 1, 1864.	Left; upper third tibia. Disch'd July 31, 1865; leg flexed.
95	O'Rourke, P., Pt., F, 7th N.Y. H'vy Art., age 41.	May 31, 31, 1864.	Left; 6 ins. low. third tibia exc'd. Surg. G. L. Potter, 145th Penn. June 6, leg amputated. Disch'd July 28, '65. *Specs.* 1502, 3546.
96	Pattee, J. H., Pt., H, 26th Ohio, age 23.	Sept. 19, 21, 1863.	Left; 2 ins. low. third tibia exc'd. Jan. 21, 1864, amp. knee joint. Discharged July 14, 1864.
97	*Peden, W. H*, Corp'l, A, 17th Mississippi.	Nov. 29, 29, 1863.	Right; amp. left leg. Surg. J. P. Prince, 36th Mass. Exchanged.
98	Penroad, G. W., Pt., E. 13th Ohio Cavalry, age 22.	Sept. 30, 30, 1864.	Left; 2 inches middle third fibula excised. Surg. W. C. Shurlock, 51st Penn. Disch'd Nov. 21, '65; cartilaginous union to tibia.
99	Pitts, B. F., Pt., K, 123d New York, age 25.	May 25, 27, 1864.	Left; 2½ inches mid. third fibula exc'd. A. Surg. L. W. Kennedy, 123d N. Y. Disch'd April 3, '65.
100	Posey, O., Pt., H, 31st Illinois.	July 22, 22, 1864.	Left; 3 inches lower third fibula excised. Disch'd July 19, 1865; ligamentous union.
101	Powell, T., Pt., F, 6th Colored Troops, age 30.	Jan. 15, 15, 1865.	Left; 3 inches lower third tibia excised; necrosis. April 26, '65, amp. leg. Disch'd Oct. 14, '65.
102	*Powers, R. M.*, Serg't, E, 49th Tenn., age 25.	Nov. 30, 30, 1864.	Left; 2 inches upper third fibula excised. Transferred to Provost Marshal Jan. 3, 1865.
103	Ready, W. B., Corp'l, E, 2d Michigan, age 25.	Nov. 16, 16, 1863.	Right; por. low. third tibia exc'd. Disch'd June 11, 1864; permanently lame. Died Sept. 9, '66, ulterior effect of injury.
104	*Ried, J. H.*, Lieut., K, 3d Miss., age 20.	Nov. 29, 30, 1864.	Right; 5 ins. fibula excised. To Provost Marshal March 7, 1865.
105	Rogers, S. T., Lieut., A, 86th Illinois, age 23.	June 27, 27, 1864.	Left; 2 inches upper third fibula excised. July 17, excision head of fibula. Disch'd Oct. 25, 1864; passive motion only.
106	Ronald, J. S., Corp'l, A, 97th New York, age 30.	June 18, 18, 1864.	Left; 4 inches lower third fibula excised. Disch'd June 23, 1865; constant bandaging; anch. ank.
107	Rose, F., Pt., L, 1st Missouri Artillery, age 19.	Dec. 25, 26, 1863.	Left; 4½ inches middle third tibia excised. Disch'd Jan. 27, 1865.
108	Rosemond, W. E., Capt., A, 97th Ohio, age 23.	June 22, 22, 1864.	Left; 1½ inch middle third fibula excised. Surg. E. B. Glick, 40th Indiana. Disch'd Oct. 7, 1864.
109	Runyan, C. A., Musician, F, 9th New York H'vy Artillery, age 19.	May 3, 3, 1863.	Left; 4 ins. tibia excised. Surg. S. A. Sabin, 9th N. Y. Heavy Artillery. Oct. 17, leg amputated. Disch'd July 26, 1865.
110	Rusk, J. D., Pt., G, 107th Illinois, age 26.	May 31, 31, 1864.	Left; 4 inches lower third fibula excised. Surg. J. W. Lawton, U. S. V. Disch'd Dec. 12, 1864; uses crutches.
111	Ryan, P., Pt., K, 9th Connecticut, age 19.	Jan. 5, 5, 1864.	Right; 1½ inch upper third tibia excised. Surg. E. A. Thompson, 12th Me. Disch'd May 17, 1865; knee joint anchyl'd; 3 inches shortening. *Spec.* 2530.
112	Sieger, J., Pt., K, 16th Michigan, age 21.	May 8, 8, 1864.	Right; middle third tibia excised; caries. Disch'd Feb. 20, 1865; deformity.
113	Smith, E. J., Corp'l, H, 56th Pennsylvania.	May 23, 23, 1864.	Left; middle third tibia excised. Disch'd July 1, 1865; shortening ½ inch.
114	*Smith, S. B.*, Pt., I, 15th Alabama, age 25.	Oct. 7, 7, 1864.	Right; 4 ins. middle third fibula excised. Retired Feb. 9, 1865.
115	Snooks, I., Serg't, H, 23d Ohio.	Oct. 19, 19, 1864.	Left; mid. th'd tibia exc'd; necro. Disch'd May 9, 1865; deformity.
116	*Snow, H.*, Pt., L, 4th Va. Cavalry, age 23.	May 5, 5, 1864.	Right; portion of head of fibula excised. To prison Jan. 27, '65.
117	Sodon, R. D., Corp'l, I, 33d New Jersey.	May 25, 25, 1864.	Left; portion of tibia excised. Surg. J. Reily, 33d New Jersey. Disch'd July 14, 1865.
118	Sprague, O., Pt., I, 8th Connecticut.	June 15, 15, 1864.	Left; portion of fibula excised. Disch'd July 19, 1865; partial anchylosis of ankle joint.
119	Spring, W. F., Serg't, C, 44th Illinois, age 29.	May 14, 15, 1864.	Left; 6 ins. tibia excised. Surg. W. P. Pierce, 88th Ill. Disch'd Mar. 18, '65; non-union; useless.
120	Steih, D., Pt., F, 9th N. Y. H'vy Artillery.	Oct. 19, 20, 1864.	R't; inn. part low. th'd tibia exc'd. Disch'd June 20, 1865; necrosis.
121	Stermer, F., Pt., F, 5th Iowa, age 25.	Nov. 25, 25, 1863.	Left; 3 ins. low. third fibula exc'd. A. Surg. W. H. Darrow, 5th Iowa. Disch'd July 18, 1864.
122	Stevenson, J. A., Adj't, 11th Penn., age 27.	April 1, 1, 1865.	Right; 3 inches middle third tibia excised. Surg. J. W. Anawalt, 11th Penn. Disch'd July 1, '65; separation of 1½ inch.
123	Stief, P., Pt., K, 139th N. York, age 39.	July 30, 30, 1864.	Right; lower third tibia excised; hæm. Aug. 10, amp. leg. Disc'd.
124	Stineback, B., Serg't, E, 2d Michigan, age 27.	Nov. 24, 25, 1863.	Right; 3½ ins. fibula exc'd. Surg. J. P. Prince, 36th Mass. Disch'd May 25, 1864; lame.
125	Stoodale, W., Pt., B, 48th Indiana, age 28.	May 14, 14, 1863.	Right; portion of fibula excised. July 6, amputation thigh. Discharged July 15, 1865.
126	*Strass, G. N.*, Serg't, E, 10th Alabama, age 25.	June 30, 30, 1864.	Left; 2 inches of tibia excised. Furloughed Sept. 30, 1864.
127	Sweet, B. R., Pt., A, 26th Conn., age 45.	June 14, 14, 1863.	Left; upper third tibia excised. Mustered out August 17, 1863.
128	Sweitzer, C., Pt., A, 208th Pennsylvania, age 44.	Mar. 25, 25, 1865.	Left; 3 inches middle third fibula excised; gang. Disch'd July 15, 1865. Died March 14, 1875.
129	Taylor, W.C., Pt., M, 4th Wisconsin Cav., age 23.	Aug. 25, 27, 1864.	Right; 2 inches internal edge up. third tibia excised. A. A Surg. J. F. Musgrave. Dis. Mar. 5, '65.
130	Thiebeau, A., Serg't, I, 24th New York Cav.	April 6, 6, 1865.	Left; middle third fibula excis'd. Discharged June 28. 1865.
131	Thistlewood, R. K., Pt., E, 7th Maine.	Sept. 19, 19, 1864.	Left; lower third tibia excised. Surg. G. T. Stevens, 77th N. Y. Discharged April 3, 1865.
132	Thomas, W., Pt., K, 110th Ohio, age 24.	Mar. 25, 25, 1865.	Right; mid. third fibula excised. Discharged June 26, 1865.
133	Toomey, J. J., Pt., I, 29th Pennsylvania, age 21.	May 15, 15, 1864.	Left; lower third tibia excised. Surg. H. B. Whiton, 60th N. Y. May 31, amputation leg. Discharged July 2, '65. *Spec.* 3361.
134	Trent, J. L., Corp'l, B, 63d Penn., age 24.	May 5, 5, 1864.	Right; lower third tibia excised. Surg. G. T. Stevens, 77th N. Y. Disch'd May 4, '65; 3 ins. short.
135	Tucker, N., Pt., B, 43d Colored Troops.	July 30, 31, 1864.	Left; 2½ ins. low. third tibia exc'd. Surg. F. M. Weld, 27th C. T. Disch'd May 27, 1865. atrophy.
136	Verstrappen, J., Pt., H, 1st Maine, age 20.	April 6, 6, 1865.	Left; 4 inches middle third fibula excised. Must. out July 2, '65; anchylosis ankle joint.
137	Walsh, P., Pt., A, 69th New York N.G., age 29.	June 3, 3, 1864.	Left; portion of upper third tibia exc'd. Surg. J. A. Spencer, 69th N. Y. June 9, amputat'n thigh. Disch'd Sept. 20, 1865.
138	Warfield, A. B., Serg't, E, 7th Rhode Island.	May 25, 25, 1864.	Left; small portion fibula excis'd. Surg. J. Harris, 7th R. I. Discharged June 3, 1865.
139	Warren, D. A., Serg't, C, 55th Ohio, age 29.	Mar. 19, 19, 1865.	Left; lower third fibula excised. Discharged July 3, 1865.
140	Wehmhoff, H., Pt., F, 12th Missouri, age 30.	May 14, 14, 1864.	Left; 2 inches middle third tibia excised; necrosis. Discharged Sept. 19, 1864; anchy. ank. joint.
141	Weyl, J., Serg't, E, 5th Minnesota, age 32.	Dec. 16, 16, 1864.	Right; 2¾ inches lower third tibia excised. Disch'd April 14, '65. Died Jan. 20, '77; abse. of liver.
142	*Wiggs, H.*, Pt., K, 43d North Carolina, age 24.	July 11, 11, 1864.	Left; 3 inches middle third fibula exc'd. Surg. — Brewer, C.S.A. To prison February 5, 1865.
143	*Wilkins, J.S.*, Lieut., H, 21st Miss., age 20.	Sept. 3, —, 1864.	Left; 2 inches lower third fibula excised. To prison Dec. 9, '64.
144	Williams, J.O., Capt., D, 12th Mass., age 43.	July 3, —, 1863.	Right; upper third tibia excised. Disch'd June 8, '64. Died April 4, 1875; phthisis pulmonalis.
145	Williamson, R.J., Lieut., D, 66th Ill., age 27.	May 29, 29, 1864.	Left; 3 ins. up. third tibia exc'd. Surg. J. Pogue, 66th Illinois. Disch'd Jan. 4, '65; leg useless.
146	Wilson, S., Pt., E, 7th West Virginia.	Oct. 27, 27, 1864.	Right; lower third fibula excised. Surg. W. I. Burr, 42d N. York. Mustered out June 29, 1865.
147	*Wilson, T. C.*, Capt., D, 27th Virginia, age 23.	July 9, 9, 1864.	Left; 2 inches lower third fibula excised. To prison Oct. 9, '64.
148	Zimmerman, J., Serg't, E, 1st West Va., age 23.	Oct. 19, 22, 1864.	Right; 4 inches lower third fibula excised. Disch'd July 27, 1865; partial anchylosis ankle.
149	Adams, M., Pt, B, 130th Indiana, age 24.	July 21, 21, 1864.	Left; 2 ins. mid. third tibia exc'd. Surg. J. W. Lawton, U. S. V. Gangrene. Died Sept. 26, 1864.
150	Alley, S. D., Pt., B, 99th Indiana.	May 25, 25, 1864.	Left; ½ inch fibula exc'd. Surg. R. Morris, 103d Illinois. Died Sept. 3, 1864.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
151	Atwood, N. H., Pt., C, 6th Vermont, age 22.	April 2, 2, 1865.	Right; portion of fibula excised; slough'g. April 13, amp. thigh. Died May 23, 1865; pyæmia.
152	Babcock, E. H., Pt., K, 1st Michigan Cavalry, age 39.	July 3, 3, 1863.	Left; port. up. third fibula; gang. Oct. 18. hæm., 3 pts.; lig. ante. tibial artery. Died Oct. 18, '63, effects of hæm. *Spec.* 2611.
153	Barrett, J. E., Lieut., D, 91st Indiana.	June 15, 15, 1864.	Left; 2 inches middle third fibula excised. Surg. J. W. Lawton, U. S. V. Died July 20, 1864.
154	Biehl, N., Pt., I, 155th Pennsylvania, age 27.	June 19, 21, 1864.	Right; 2ins. mid. third tibia exc'd. Surg. J. A. E. Reed, 155th Penn. July 19, amp. thigh. Died July 21, 1864; exhaust'n. *Spec.* 3337.
155	Blair, W. F., Pt., H, 5th Penn. Res., age 28.	May 12, 12, 1864.	Left; 3 inches lower third fibula excised. Surg. B. Rohrer, 10th Penn. Res. Wire sutures. Died June 12, 1864; pyæmia.
156	Canfield, D., Serg't, M, 14th N.Y. H.A., age 20.	June 17 17, 1864.	Right; 2 ins. lower third excised. Died July 28, 1864.
157	Canter, J., Pt., E, 53d Ohio.	June 27, 28, 1864.	Left; 3 inches middle third tibia exc'd. Surg. A. C. Messenger, 57th Ohio. Died July 3, 1864.
158	Carpenter, J. H., Pt., E, 110th Penn., age 40.	June 22, 22, 1864.	Left; 1½ inch upper third fibula excised. July 5, 1864, amputation thigh. Died July 16, 1864; pyæmia. *Spec.* 2759.
159	Carroll, F., Pt., K, 45th Penn., age 23.	June 3, 4, 1864.	Right; 3 ins. middle third fibula excised; hæm., 8 oz. June 18, 1864, amput'n knee joint. Died June 22, 1864; exhaustion.
160	Carter, T. F., Pt., E, 12th Indiana.	May 13, 14, 1864.	Right; 2 inches tibia and fibula excised. Surg. W. Lomax, 12th Indiana. Died May 31, 1864.
161	Chaffee, A. J., Pt., E, 44th New York, age 28.	July 3, 4, 1863.	Right; 3 inches tibia exc'd; also wound left leg. Died Aug. 16, 1863; diarrhœa and erysipelas.
162	Cook, J. T., Pt., K, 2d N. York Cavalry.	April 1, 1, 1865.	Left; portion of tibia exc'd; also w'nd of arm. Died April 11, '65.
163	Cosman, W. T., Corp'l, F, 9th New York S. M.	Sept. 17, 20, 1862.	——; portions of tibia and fibula exc'd. Died Oct. 2, '62; pyæmia.
164	Cramp, T., Pt., G, 5th Minn., age 33.	Dec. 16, 17, 1864.	Right; 4 ins. low. third tibia exc'd. Surg. V. B. Kennedy, 5th Minn. Lac. wound post. tibial artery. Dec. 27, lig. Died Feb. 4, 1865.
165	Davis, S., Pt., F, 27th Michigan.	May 24, 24, 1864.	Left; portion of fibula excised. Surg. A. F. Whelan, 1st Mich. S. S. Died May 30, 1864.
166	Deegan, T., Capt., C, 107th Pennsylvania.	Dec. 13, 13, 1862.	Left; portion of fibula excised. Died January 9, 1863.
167	*Dewes, J. S.*, Pt., H, 18th Virginia.	May 12, 12, 1864.	——; portion of lower end fibula excised. May 14, amputation of leg. Died May 21, 1864.
168	Dodson, J. S., Serg't, H, 99th Indiana.	July 22, 23, 1864.	Right; 3½ inches tibia excised. Ass't Surg. D. Halderman, 46th Ohio. Died August 18, 1864.
169	Eaton, C. A., Pt., K, 39th Mass., age 40.	May 9, 9, 1864.	Left; portion of upper third fibula excised. May 17, hæmorrhage, 30 oz.; amputation thigh. Died May 29, 1864; exhaustion.
170	Greenstreet, J., Pt., F, 32d Missouri.	May 27, 27, 1864.	Left; 3 inches fibula exc'd. Surg. G. L. Carhart, 31st Iowa. Died June 20, 1864.
171	Haas, P., Pt., E, 64th Ohio.	Jan. 1, 4, 1863.	Left; middle third tibia excised. A. Surg. L. C. Fouts, 94th Ohio. Died Jan. 26, 1863; gangrene.
172	Harrison, G. C., Corp'l, K, 102d New York.	May 27, 27, 1864.	Left; portion of tibia excised. Surg. C. H. Lord, 102d N. York. Died June 9, 1864.
173	Heath, L., Serg't, D, 2d Michigan, age 22.	June 18, 18, 1864.	Right; 2 inches tibia. July 7, amp. thigh. Died July 28, '64. *Spec.* 2867.
174	Henderson, W., Serg't, E, 83d New York.	June 1, 1, 1864.	Right; middle third fibula exc'd. Died June 11, 1864.
175	Hensler, J., Pt., F, 29th Pennsylvania.	June 21, 21, 1864.	Right; fibula; lig. ant. tib. artery. Surg. J. A. Wolf, 29th Penn. Died July 9, 1864.
176	Herzog, F., Pt., C, 83d New York, age 29.	May 12, 12, 1864.	Right; 3 ins. fibula exc'd. Died May 30, 1864; exhaustion.
177	Hiney, W. H., Lieut., C, 50th Pennsylvania.	June 1, 1, 1864.	Right; 3 inches upper third fibula excised. Died July 8, 1864.
178	Hitchings, W., Pt., H, 8th Illinois.	April 9, 9, 1865.	Left; middle third fibula excised. Died April 17, 1865; gangrene.
179	Hughes, N., Pt., M, 3d Artillery.	Nov. 16, —, 1863.	Right; portion of tibia excised. Died December 18, 1863.
180	Jackson, C., Corp'l, G, 2d Michigan.	June 25, 25, 1864.	Left; partial excision of fibula. Surg. A. F. Whelan, 1st Mich. S. S. June 28, '64, amp. thigh. Died July 2, 1864.
181	Jackson, W., Pt., E, 97th New York, age 34.	May 11, 11, 1864.	Left; 4 inches middle third fibula exc'd. Surg. W. B. Chambers, 97th N. Y. Died June 1, 1864.
182	*Jamison, B. A.*, Pt., A, 21st Virginia, age 21.	July 3, 6, 1863.	Left; lower third tibia excised. Surg. J. A. Wolf, 29th Penn. Died July 18, 1863; tetanus.
183	Johnson, D. A., Pt., E, 43d New York, age 37.	Nov. 7, 7, 1863.	Right; portion of tibia excised; non-union. July 2, 1864, amp. thigh. Died August 6, 1864.
184	*Lancaster, W. B.*, Pt., B, 66th N. C., age 20.	June 18, 18, 1864.	Right; middle third tibia exc'd; gangrene. Died July 16, 1864.
185	*Lay, T. S.*, Pt., D, 53d Georgia, age 21.	Mar. 25, 25, 1865.	Left; head of fibula and part of tibia exc'd. Died April 21, '65.
186	Lemon, T. A., Corp'l, A, 61st Pennsylvania.	May 11, 11, 1864.	Left; 8 inches tibia excised. Died May 16, 1864.
187	Lohser, A., Pt., I, 24th Michigan, age 20.	May 25, 25, 1864.	Left; 3½ inches mid third fibula excised; also wound of right ankle. Died June 17, 1864.
188	Lovell, P., Corp'l, C, 10th Missouri, age 41.	Nov. 25, 25, 1863.	Left; 2½ inches lower third tibia exc'd. Jan. 10, '64, hæm. from post. tib. art.; amp. leg; slough.; hæm.; gang. Feb 2, amp. thigh. Died Feb. 3, 1864. *Spec.* 2108.
189	Mann, A. A., Corp'l, A, 16th Maine.	April 1, 1, 1865.	Right; middle third tibia exc'd. Died April 24, 1865.
190	Martz, S. V., Pt., I, 87th Pennsylvania.	May 18, 18, 1864.	Right; upper third fibula exc'd. Died June 4, 1864.
191	[1] McIntyre, A., Corp'l, D, 6th New York Heavy Artillery, age 37.	June 22, 23, 1864.	Left; 2 inches upper third fibula exc'd. Aug. 5, parench.; hæm. Died Aug. 10, 1864; pyæmia.
192	Meade, L., Pt., B, 2d N. York M. R., age 17.	June 18, 18, 1864.	Right; middle third tibia exc'd. Died July 17, 1864.
193	*Munn, J.*, Pt., E, 15th Alabama, age 32.	Oct. 7, 7, 1864.	R't; 3½ ins. mid. th'd tibia exc'd. Died July 9, '65; chr. diarrhœa.
194	Norman, C. H., Pt., K, 8th Maryland, age 20.	May 8, 8, 1864.	Left; portion of fibula excised. Died May 22, '64; hæmorrhage.
195	Rader, J., Pt., F, 59th Illinois, age 21.	Aug. 19, 19, 1864.	Left; 4½ inches middle third tibia exc'd. Dec. 7, '64, amp. thigh; gang. Died Jan. 4, '65; exhaus.
196	Reed, N. H., Pt., H, 30th Iowa.	June 15, 15, 1864.	Right; middle third tibia exc'd. Surg. B. A. Bond, 27th Missouri. Died July 10, 1864.
197	Rice, H., Corp'l, C, 36th Massachusetts.	May 25, —, 1864.	Right; head of fibula excised. Died June 1, 1864, of wound.
198	Rice, W., Pt., B, 14th Kentucky, age 29.	June 22, 22, 1864.	Right; 3 inches mid. third fibula excised. Surg. J. W. Lawton, U. S. V. Died Sept. 22, 1864.
199	Robbins, J. A., Capt., G, 129th Indiana.	June 29, 29, 1864.	Left; 2½ inches upper third fibula, including the head, excised. Surg. S. K. Crawford, 50th Ohio. Died July 24, 1864.
200	Root, W. R., Pt., E, 7th N. Y. H'vy Artillery.	June 3, 3, 1864.	——; portion of fibula excised. Surg. G. L. Potter, 145th Penn. Died June 9, 1864.
201	Rutledge, T., Lieut., G, 33d Missouri.	Dec. 15, 15, 1864.	Left; 2 inches middle third fibula excised. Surg. A. T. Bartlett, 33d Mo. Dec. 26, hæm., 32 oz. Died Dec. 28, 1864. *Spec.* 6634.
202	Sanders, G. W., Corp'l, K, 26th Ohio.	Sept. 19, 21, 1863.	Left; 2 inches lower third tibia excised. Died Oct. 22, 1863.
203	Schwerin, H. R., Capt., C, 119th New York.	May 2, 5, 1863.	Right (May 3, spicula and bal rem.); exc. in mid. third. Surg J. D. Hewett, 119th N. Y. May 9, amp. of leg. Died May 10, '63.
204	Sharpe, T., Corp'l, I, 38th Illinois, age 30.	Feb. 6, 7, 1864.	Right; por. of tibia exc'd. Surg. J. Y. Finley, 2d Ky. Cav. April 5, amp. knee joint. Died June 23, 1864; erysipelas.
205	Smith, J., Pt., I, 111th Pennsylvania.	July 20, 20, 1864.	Right; portion of fibula excised. Died July 21, 1864.
206	Smith, J., Pt., F, 17th Vermont, age 40.	June 17, 17, 1864.	Right; portion of fibula excised. Died July 6, 1864.
207	Springer, J. M., Chaplain, 3d Wis., age 37.	May 15, 15, 1864.	Right; 2½ inches mid. third tibia exc'd. Died May 22, '64; pyæm.
208	Thompson, W. B., Pt., K, 124th Ohio, age 19.	Dec. 17, 18, 1864.	Right; 3 inches excised. A. A. Surg. L. Sinclair. Died Feb. 2, 1865; gangrene.
209	*Utzey, G. C.*, Pt., G, 4th South Carolina Cav.	May 29, 30, 1864.	——; 5 inches of tibia excised. Surg. C. B. Gibson, C. S. A. Died June 24, 1864.
210	Walton, J., Corp'l, G, 20th Ohio, age 28.	July 27, —, 1864.	Left; port. of fibula exc'd. Died Sept. 26, 1864; dysentery.
211	Whistler, R., Pt., H, 49th Ohio.	June 2, 2, 1864.	Right; portion of tibia excised. July 5, leg amputated. Died July 14, 1864; pyæmia.
212	Williams, J. S., Pt., F, 127th New York, age 35.	Nov. 30. Dec. 2, '64.	Left; 4 inches of fibula excised. A. A. Surg. H. Leaman. Gangrene. Died Dec. 4, 1864.
213	Willingmire, S., Pt., C, 29th Pennsylvania.	May 25, 25, 1864.	Right; portion of tibia excised. Surg. G. P. Oliver, 111th Penn. Died June 17, 1864.
214	Wilson, J. M., Pt., D, 2d U. S. Sharpshooters.	May 5, 5, 1864	——; portion of upper third tibia excised. Died May 29, 1864.
215	Woodward, E. F., Pt., I, 53d Pennsylvania.	Dec. 13, 13, 1862.	Left; part of tibia and radius excised. Died Jan. 6, 1863.

[1] LIDELL (J. A.). *Resection of Fibula in Continuity for Gunshot Fracture, etc.*, in *United States Sanitary Commission Memoirs*, New York, 1870. Surgical Volume I, p. 530.

Of the two hundred and fifteen primary excisions in the continuity of the leg, forty-two with twelve deaths were in the upper, eighty-four with twenty-one deaths in the middle, forty-six with eight deaths were in the lower third of the leg, and in forty-three instances with twenty-six deaths the seat of the operation was not indicated.

Intermediary Excisions in the Continuity of the Bones of the Leg.—Eighty-seven excisions in the leg were intermediary operations; of these twenty-nine proved fatal, a mortality rate of 33.3 per cent. Portions of the tibia were excised in thirty-three, of the fibula in forty-six, and of both bones in seven instances, and in one case this point was not recorded.

Recoveries after Intermediary Excisions in the Continuity of the Bones of the Leg. The fifty-eight successful intermediary operations were performed on fifty-one Union and seven Confederate soldiers. One, an officer, is still (November, 1880) in active service, another has been placed on the retired list, and forty-nine became pensioners. Of the latter, five have died since the date of their discharge—two from debility, one from phthisis, and two from causes not recorded. Four patients submitted to subsequent operations—one to amputation in the leg[1] and three to ablation in the thigh.[2]

CASE 712.—Colonel H. A. Morrow, 24th Michigan, aged 33 years, received a shot fracture of the upper third of the fibula of the right leg, at the Wilderness, May 6, 1864. Five days after being wounded he entered the Seminary Hospital, Georgetown, where his injured limb was operated upon by Surgeon H. W. Ducachet, U. S. V., who reported the following: "When admitted the patient had no appetite and was feverish, very nervous and irritable, complaining of every noise. The wounded leg was very much swollen, painful, and discharging an unhealthy sanious pus. Resection of three inches of the upper third of the fibula was performed on May 11th, chloroform being used. The patient suffered intensely for twenty-four hours after the operation, when he began to improve. There were no unfavorable symptoms afterwards. Simple dressings were applied. The patient left the hospital on leave of absence July 1, 1864." Colonel Morrow subsequently returned to the field and again held active commands. He was mustered out of the Volunteer Service after the close of the war in 1865, and recommissioned in the 36th regiment of Infantry of the Regular Army in the following year, since when he has been promoted to Colonel of the 21st Infantry.

CASE 713.—Private G. Fuller, Co. H, 19th Maine, age 18 years, was wounded in the left leg, at Ream's Station, August 25, 1864, and entered Emory Hospital, Washington, three days afterwards. Acting Assistant Surgeon J. M. Downs forwarded the specimen (FIG. 275), with the following description of the injury: "The wound was produced by a musket ball, which passed through the leg near the ankle, shattering the lower third of the fibula in its course. Upon examination the operation of excision was thought advisable, and was performed, on August 29th, by Surgeon N. R. Moseley, U. S. V., who removed two and a half inches of the fibula near the ankle joint through an incision three and a half inches long. Ether and chloroform constituted the anæsthetic." The patient was subsequently transferred to Webster Hospital, Manchester, and on May 27, 1865, he was mustered out of service and pensioned. Various examining surgeons certified to the injury and operation, and Dr. C. B. Pearson, of Spring Green, Wisconsin, February 5, 1873, added: "The wound is healed, but the muscle has grown fast to the tibia so as to destroy action of the tendons," etc. Subsequent examiners corroborate the previous reports. The pensioner was paid December 4, 1879.

FIG. 275.—Two and a half inches of fibula excised. *Spec.* 1910.

CASE 714.—Private W. H. Curtin, Co. H, 23d Massachusetts, aged 20 years, was severely wounded in the left leg, at Whitehall, December 15, 1862. Surgeon C. A. Cowgill, U. S. V., reported: "The wounded man was admitted to Academy Hospital, New Berne, five days after receiving the injury. The fibula was badly comminuted and shattered. On December 26th, I excised six and a half inches of the bone, including the finely comminuted portion. The patient recovered pleasantly and has gone home on furlough, able to walk comfortably." He subsequently entered Foster Hospital, where he was discharged May 28, 1863. Examining Surgeon W. C. Robinson, of Portland, October 10, 1863, described the injury and reported: "A large cicatrix nearly the whole length of the leg, showing the nature of the operation. It appears that nature is in a measure restoring the bone. A large ulcer still exists at the point where the ball entered the leg. He has walked with a crutch until recently; is now able to walk with a cane." Several months after being discharged the man re-enlisted in the Veteran Reserve Corps, whence he was ultimately mustered out November 16, 1865, and pensioned. The Portland Examining Board reported, September 4, 1873, that "the nerves were injured so that the foot is greatly impaired in its motions." At a subsequent examination it was stated that "the tendo-achillis is contracted, so that there is but little antero-

FIG. 276.—Six and a half inches of fibula excised. *Spec.* 1326.

[1] Case of Private D. P. Griswold, Co. C, 76th New York, right leg, secondary amputation in the middle third.

[2] Cases of Pt. W. H. Burdick, Co. B, 82d Pennsylvania, right thigh, secondary operation in lower third (TABLE XL, p. 320, No. 17); Pt. I. A. Angell, Co. D, 1st Wisconsin Cavalry, right thigh, secondary amputation in lower third (TABLE XL, p. 320, No. 2); Pt. E. A. Bennett, Co. F, 44th New York, left thigh, secondary amputation in lower third (TABLE XL, p. 320, No. 7).

posterior motion of the ankle joint. The leg is atrophied and the parts bound down by the indurated cicatrix." The pensioner was paid December 4, 1879. The specimen represented in the wood-cut (FIG. 276) was contributed by the operator.

Fatal Cases of Intermediary Excisions in the Bones of the Leg.—The twenty-nine operations of this group were performed on Union soldiers. Pyæmia was noted in eleven, gangrene in eight, and erysipelas in one case. Subsequently, amputation in the leg was performed in one,[1] exarticulation at the knee in one,[2] and amputation through the thigh in five instances.[3] Reports of *post-mortem* examinations were received in five instances.

FIG. 277.—Four ins. of tibia, with fragment of ball, excis'd. *Spec.* 1307.

CASE 715.—Private H. M. Grimes, Co. C, 116th New York, aged 24 years, was wounded at Port Hudson, May 27, 1863. Surgeon C. B. Hutchins, 116th New York, reported his admission to the field hospital of the 1st division, Nineteenth Corps, with "shot wound of leg; severe." Assistant Surgeon P. S. Conner, U. S. A., who operated in the case and contributed the pathological specimens (FIGS. 277, 278), reported the following description of the injury and its results: "The man was wounded in the left leg by a minié ball, which was found to have struck the tibia anteriorly, causing compound comminuted fracture. He was admitted into University Hospital, New Orleans, May 30th, where, a few days later, several loose fragments of bone having been removed and the extent of the injury determined, the entire fractured portion was resected, amounting to nearly five inches of the tibia, and including the shaft to within less than an inch from the ankle joint. The ball was found to be wedged in among the fragments and the fibula uninjured. The case progressed very favorably until early in July, when diarrhœa came on, which caused the patient's death August 14, 1863. The bones of the injured leg (FIG. 278) indicate the extent of the reparative process, and the probabilities that the man would eventually have had a serviceable leg had he lived." The extremity of the lower fragment is carious, a spur from the upper fragment projecting three inches downward, and the face of the fibula is involved in callus.

FIG. 278.—Bones of the left leg, with four and a half inches of tibia excis'd. *Spec.* 2956.

CASE 716.—Private H. Mink, Co. H, 4th New York Heavy Artillery, aged 20 years, was wounded at Petersburg, April 2, 1865, and was conveyed to City Point two days afterwards. Acting Staff Surgeon J. Aiken recorded his admission to the Depot Hospital of the Second Corps with "compound fracture of left leg." On April 15th the wounded man was transferred to the First Division Hospital, Annapolis, where the injured limb was operated on by Surgeon B. A. Vanderkieft, U. S. V., who reported as follows: "The wound was produced by a minié ball, causing a compound comminuted fracture of the tibia and oblique fracture of the fibula at the middle third of the leg. Resection was performed on April 17th, removing a longitudinal portion of the fibula and parts of the upper and middle thirds of the tibia, one being five inches in length, two others one and a half inches each, and three smaller pieces. Very little inflammation existed at the time of the operation, and the patient was in good condition. Chloroform constituted the anæsthetic. Oakum dressings were applied and quill sutures used as means of partial coaptation of the flap. Purulent accumulations were removed by the syringe. Eight ounces of wine were given daily. Progress was favorable." Three weeks after the date of the operation the patient was transferred to the Second Division Hospital, Annapolis, where he died of exhaustion, May 11, 1865. Surgeon G. S. Palmer, U. S. V., in charge of the latter hospital, reported that the patient when admitted was in a moribund condition, also that the wound was in an unhealthy state and filled with maggots. The excised bone, shown in the wood-cut (FIG. 279), was contributed by the operator.

FIG. 279.—Six inches of left tibia excised. *Spec.* 4101.

CASE 717.—Corporal W. N. Esworthy, Co. E, 1st Pennsylvania Cavalry, aged 24 years, was wounded in the left leg, at White House Landing, June 21, 1864, and admitted to Carver Hospital, Washington, two days afterwards. Surgeon O. A. Judson, U. S. V., reported: "The missile, supposed to be a conoidal ball, entered the leg anteriorly about three inches below the knee joint, passed backward and outward, making its exit posteriorly and producing a compound comminuted fracture of the upper third of the tibia. Supporting treatment was adopted and simple dressings applied. Erysipelas attacked the wound on June 27th, but yielded readily to an application of solution of copperas. By July 1st no erysipelatous symptoms were present; constitutional state of patient good; wound secreting laudable pus in large quantity. On July 6th, the patient was anæsthetized and excision of about five inches of the upper third of the shaft of the tibia, by means of the chain saw, was performed by Acting Assistant Surgeon O. P. Sweet, making a straight incision over the crest of the tibia. The wound was then filled with scraped lint, cold-water dressings were applied, and stimulants given freely. The patient appeared to be doing quite well up to July 18th, the wound filling with healthy granulations and secreting laudable pus. For ten days previous, however, he had anorexia, and this morning he had a very severe chill. A recurrence of chills followed every morning and sometimes two or three times during the day, and these were followed by other pyæmic symptoms, the integuments assuming a deep icteric tinge; pulse rapid; slight cough;

FIG. 280.—Five ins. of left tibia exc'd. *Spec.* 2940.

[1] Case of Private A. E. Luther, Co. E, 3d Massachusetts Cavalry, left leg, intermediary operation at junction of upper and middle thirds.

[2] Case of Private S. M. Grainger, Co. A, 38th Indiana, left leg, secondary operation (TABLE LVII, page 469, No. 19).

[3] Cases of Pt. H. Conrad, I, 24th Mich., left thigh, intermediary operation in middle third, *Spec.* 3053 (TABLE XXXV, p. 283, No. 253); Pt. A. Allen, H, 5th U. S. Artillery, intermediary operation, lower third (TABLE XXXVI, p. 296, No. 223); Corp'l E. Gay, H, 18th Wisconsin, intermediary operation in lower third (TABLE XXXVI, p. 298, No. 357). Pt. M. Gilmore, D, 54th Mass., left thigh, intermediary operation in lower third (TABLE XXXVI, p. 298, No. 365); Pt. J. Bloomer, K, 170th N. Y., right thigh, intermediary operation in lower third, *Specs.* 3250, 3269, A. M. M. (TABLE XXXVI, p. 297, No. 246).

anorexia continuing. The treatment, decidedly stimulating and tonic, was continued. The symptoms continued in a more aggravated form and the patient steadily sank, the whole surface of his body being of a deep yellow color. He died on July 23, 1864. At the autopsy a large number of metastatic abscesses were found in both lungs; liver enlarged; spleen also enlarged, dark colored, and soft. A purulent offensive fluid mixed with lymph was shown in the left pleural cavity, and a large disintegrated clot in the femoral vein." The excised bone, contributed by Surgeon Judson and exhibiting superficial necrosis, is represented in the wood-cut (FIG. 280).

TABLE LXIV.

Summary of Eighty-seven Intermediary Excisions in the Bones of the Leg for Shot Injury.

[Recoveries, 1–58; Deaths, 59–87.]

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	Angell, I. A., Pt., D, 1st Wisconsin Cav'ry, age 23.	July 23, Aug. 1, 1864.	Right; gang.; 7 inches mid. third tibia excised. A. A. Surg. J. C. Thorpe. Sept. —, hæm.; 18th, amp. thigh. Disch'd Jan. 7,'65. Re-amp. June 16,'65. *Spec.* 5549.
2	Bennett, E. A., Pt., F, 44th N. York, age 41.	May 22, 31, 1864.	Left; middle third fibula excised. A.A. Surg. R. Ottman. Disch'd Oct. 11, '64. Amputation thigh March 2, 1869; re-amputation.
3	*Boger, G. C.*, Pt., H, 2d North Carolina, age 26.	Sept. 19, 25, 1864.	Left; 2 ins. in length, ¾ inch in depth of upper third tibia exc'd. Surgeon A. Atkinson, C. S. A. To prison Feb. 16, 1865.
4	Burdick, W. H., Pt., B, 82d Pennsylvania, age 24.	April 6, 13, 1865.	Right; 2 inches middle third tibia excised. Disch'd Oct. 12, 1865. Amp. thigh March 27, 1866.
5	Burke, J. C., Pt., H, 78th New York, age 20.	May 3, 18, 1863.	Right; 2 ins. mid. th'd tibia exc'd. Disch'd March 18, '64; caries.
6	Carse, G. B., Capt., C, 40th New York.	May 2, 30, 1863.	Right; 3 ins. fibula exc'd. Disc'd Dec. 15, 1863; slight shortening.
7	Casper, J. M., Corp'l, K, 7th Wisconsin, age 21.	May 23, June 13, 1864.	Right; partial excision of upper third fibula. A. A. Surg. P. C. Porter. Disch'd Mar. 24, 1865; partial paralysis foot.
8	Charles, R Y., Corp'l, G, 1st New York Drag's, age 22.	June 1, 15, 1864.	Left; 3 ins. mid. third tibia exc'd. Surg. R. B. Bontecou, U. S. V. Disch'd May 6, 1865; necrosis; shortening.
9	Collins, O., Pt., D, 151st New York, age 32.	Nov. 27, Dec. 9, 1863.	Left; 3 inches lower third fibula exc'd. Surg. E. Bentley, U.S.V. Ligation post. tibial art.; hæm. Disch'd Feb. 25, 1865.
10	Coyle, M., Pt., B, 81st Pennsylvania, age 23.	June 3, 15, 1864.	Right; 3 inches mid. third fibula exc'd. Surg. E. Bentley, U.S.V. Disch'd Oct. 3, 1865. Died Jan. 27, '76; debility, result of w'nd.
11	Crowley, J., Pt., E, 5th New York, age 25.	Sept. 29, Oct. 20, 1862.	Right; head and 3 ins. up. third fibula excised. Disch'd Nov. 22, 1862. Bone diseased. Died July 10, 1871.
12	Curtin, M. H., Pt., H, 23d Massachusetts, age 20.	Dec. 15, 26, 1862.	Left; 6½ inches fibula excised. Surgeon C. A. Cowgill, U. S.V. Disch'd May 28,'63. *Spec.* 1326.
13	Farran, J., Lieut., I, 1st Kentucky, age 25.	Dec.31,'62. Jan.5,'63.	Right; large portion mid. third tibia excised; fibula exfoliated. Disch'd June 18,'64; short. 1½ in.; deformity.
14	Fellows, J., Corp'l, D, 100th Illinois, age 24.	Sept. 19, 24, 1863.	Left; 3 inches middle third tibia excised. Disch'd Aug. 11, 1864; caries; shortening.
15	Fuller, G., Pt., H, 19th Maine, age 18.	Aug. 25, 29, 1864.	Left; 2½ inches lower third fibula excised. Surg. N. R. Moseley, U. S. V. Disch'd May 27, 1865. *Spec.* 1910.
16	Griffin, D. O., Pt., K, 17th Illinois, age 24.	April 6, —, 1862.	Left; 1½ inch lower third tibia excised Disch'd Oct. 15, 1862: toes and heel contracted.
17	Gould, J. A., Pt., H, 11th New Hamp., age 39.	Sept. 30, Oct. 9, 1864.	Left; 3 ins. low. third fibula exc'd. Surg. G. L. Pancoast, U. S. V. Gangrene. Disch'd Feb. 6, '65.
18	Green, W. C., Lieut., H, 37th New York, age 22.	June 1, 20, 1862.	Left; middle third fibula excised. Disch'd Sept. 13, 1862: bone united; ½ inch shortening.
19	Griswold, D. P., Pt., C, 76th N. York, age 19.	July 1, 5, 1863.	Right; portion of mid. third tibia excised. Disch'd Sept. 23, 1864. May 11, 1869, amputation leg.
20	Harvey, G., Pt., D, 63d Pennsylvania, age 24.	May 3, 12, 1863.	Right; 2 ins. lower third fibula excised. May 21, hæm., 12 oz. Disch'd Jan. 22, 1864.
21	Hayward, R., Pt., E, Knapp's Penn. Bat'ry, age 24.	Oct. 29, Nov. 12, 1863.	Right; upper third —— excised. Surg. I. Moses, U. S.V. Disch'd August 13, '64; union; deformity; shortening.
22	Herrald, S., Pt., H, 2d Kentucky Cavalry.	Sept. 19, 29, 1863.	Right; middle third tibia exc'd. Surg. I. Moses, U. S.V. Disch'd Nov. 12, 1864; reproduction of bone. *Spec.* 2148.
23	House, T. J., Pt., K, 16th Illinois, age 22.	Sept. 30, Oct. 15, 1863.	Right: head of fibula and part of shaft excised. Duty Nov. 14, 1863. Died Dec. 26, 1866.
24	Hough, S. R., Serg't, A, 107th Penn., age 32.	Sept. 17, Oct. 4,'62.	Left; 5½ inches upper third tibia excised. Disch'd Feb. 3, 1864; non-union; limb useless; deformed; should be amputated.
25	*Howard, J. M.*, Pt., F, 49th N. C., age 24.	May 16, 23, 1864.	Right; 3 inches of tibia excised. Furloughed August 22, 1864.
26	*Jenkins, W. H.*, Pt., Ashland Battery, age 25.	Sept. 17, Oct. 15, 1862.	Left; 3 inches fibula in middle third excised. To prison April 10, 1863.
27	Jordan, W. B., Corp'l, I, 6th Vermont, age 20.	Aug. 21, 29, 1864.	Right; 2¾ ins. lower third fibula excised. A. Surg. C. Bacon, jr., U. S. A. Disch'd July 19, 1865.
28	Langton, A., Pt., E, 27th Indiana.	May 3, 17, 1863.	Right; 4 inches middle third tibia excised. Disch'd Feb. 19, 1864; exfol.; short. 1 inch. *Spec.* 1280.
29	Lohr, S. G., Serg't, G, 19th Infantry, age 26.	Dec. 13, 25, 1862.	Right; 6 ins. middle third fibula excised; gang. Disch'd Feb. 25, 1863; paralysis of toes.
30	*Lotts, P.*, Pt., K, 5th ——	May 3, 9, 1863.	——; 2 inches upper third tibia exc'd. Recovery: useful limb.
31	Lucas, W. J., Pt., H, 148th Penn., age 21.	Aug. 25, 29, 1864.	Left; 2¼ ins. low. th'd fibula exc'd. Surg. N. R. Moseley, U. S. V. Disch'd Mar. 27, '65; anch. ank. Died June 7, 1868. *Spec.* 1982.
32	[1]Lynn, A., Pt., F, 47th Pennsylvania, age 18.	Oct. 19, Nov. 1, 1864.	Right; 2½ ins. middle third tibia excised. A. A. Surg. W. Kempster. Disch'd Oct. 14, 1865.
33	Lytle, H., Serg't, A, 83d Pennsylvania, age 22.	Sept. 30, Oct. 17, 1864.	Right; 2½ ins. mid. th'd fibula and half the thickness of tibia exc'd. A.A.Surg. J. H. Robinson. Discharged July 31, 1865; necrosis.
34	Malow, L., Pt., F, 24th Illinois.	Sept. 19, 29, 1863.	Left; upper third tibia excised. Surg. I. Moses, U. S. V. Disch'd August 6, '64; periostitis. Died June 10, 1876. *Spec.* 2149.
35	Mann, O. L., Lieut. Col., 39th Illinois, age 31.	May 20, June 8, 1864.	Left; portion of mid. tibia excised. A. Surg. E. McClellan, U. S. A. Disch'd Dec. 6, '65. 1870, bone discharging.
36	Merrihew, D. J., Corp'l, I, 121st N. Y., age 22.	Mar. 25, April 8, 1865.	Right; 2 inches lower third fibula excised. A. A. Surg. J. H. Robinson. Disch'd Aug. 2, 1865.
37	Minor, W. W., Pt., H, 2d Wisconsin, age 46.	May 5, 30, 1864.	Right; 8 inches lower part fibula excised. Disch'd Sept. 23, 1864; bone carious.
38	Morrow, H. A., Col., 24th Michigan, age 33.	May 6, 11, 1864.	Right; portion of up. third fibula excised. Surg. H. W. Ducachet, U. S.V. Disch'd June 30, 1865.
39	Nash, O. T., Pt., K, 12th Wisconsin, age 21.	Aug. 23, 29, 1864.	Left; 4 inches middle third fibula excised and artery lig. Surg. A. J. Miller, 13th Iowa. Disch'd June 30, 1865.
40	Oberrender, J. S., Lieut., E, 96th Penn., age 35.	May 6, 14, 1864	Left; 2 inches lower third fibula excised. A. A. Surg. J. O. Stanton. Disch'd Sept. 20, 1864; anchylosis ankle joint.
41	Olinger, G., Pt., D, 100th Ohio, age 22.	Aug. 6, Sept. 1, 1864.	Left; 4 inches mid. third fibula excised. Gangrene. Disch'd May 26, 1865.
42	Peters, M. H., Lieut., F, 74th Ohio, age 21.	May 9, 15, 1864.	Right; 2½ ins. middle third tibia excised. Surg. C. N. Ellinwood, 74th Ill. Disch'd July 10, 1865; bone discharging.
43	Pfeifer, J., Pt., F, 108th Ohio, age 19.	May 14, 21, 1864.	Left; 2 inches lower third fibula excised. A. Surg. C. C. Byrne, U. S. A. Disch'd May 23, 1865; anchylosis ankle joint.
44	Pierce, W. K., Serg't, D, 183d Penn., age 20.	May 10, June 5, 1864.	Left; 2 inches upper third tibia exc'd. Surg. E. Bentley, U.S.V. Disch'd July 15, 1865; ½ inch shortening; exfoliation.
45	Raymond, J. O., Serg't, E, 60th N. Y., age 29.	May 3, 17, 1863.	Left; 2 inches lower third tibia excised. Disch'd Mar. 21, 1864. Sept., 1877, exfol.; deformity.

[1] KEMPSTER (W.), *Report of an Exsection of Right Tibia; Recovery*, in *American Journal of Medical Sciences*, 1866, N. S., Vol. LI, p. 279.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
46	Salsbury, D., Pt., K, 24th Wisconsin, age 29.	De.31,'62, Ja. 15,'63.	Left; 2 inches middle third tibia excised. Disch'd Aug. 12, 1865; great lameness.
47	[1]Saunders, N., Pt., 18th ——	Oct. 21, 31, 1861.	Left; 5 inches lower third fibula exe'd (hæmorrhage). Sent home in two months.
48	Sloan, J., Pt., K, 100th Illinois.	Sept. 19, 23, 1863.	Left; 2 ins. low. third tibia exe'd. Disc'd Feb. 19, 1865; limb much deform.; false joint; short 3 ins.
49	Smith, J. E., Corp'l, E, 7th Conn., age 28.	Aug. 16, Sept. 7, 1864.	Right; 6 inches fibula excised. Disch'd May 22, 1865; club foot, anchylosis ankle joint.
50	*Stinson, W. C.*, Pt., H, 49th Virginia.	July 3, 8, 1863.	Right; middle third tibia excised. Surg. J. A. Wolf, 29th Penn. Paroled Sept. 25, 1863.
51	Swift, F. B., Pt., C, 8th Michigan, age 25.	May 12, 28, 1864.	Left; 2½ inches lower third fibula excised. A. Surg. S. B. Ward, U. S. V. Gangrene. Disch'd Oct. 6, 1864; anchy. ank. joint.
52	Taunt, H., Pt., B, 2d Wisconsin, age 19.	Oct. 19, 29, 1863.	Left; head and 2½ inches fibula and frag's of tibia exe'd. Surg. O. A. Judson, U. S. V. Disch'd January 17, 1865; lameness and paralysis foot.
53	Washburn, A. S., Serg't, C, 127th N. Y., age 27.	Nov. 30, Dec. 7, 1864.	Right; 5 inches lower third fibula excised. A. A. Surg. H. Leaman, Disch'd May 26, 1865.
54	Welch, P. H., Lieut., C, 111th New York, age 23.	May 6, 16, 1864.	Left; 4 ins. fibula, middle, exe'd. A. A. Surg. J. O. Stanton. Discharged Oct. 29, 1864; exfol.
55	Wilcox, M. B., Corp'l, B, 58th Mass., age 19.	May 12, 29, 1864.	Right; 3 inches mid. third fibula exe'd. Surg. E. Bentley, U.S.V. Disch'd July 20, 1865.
56	*Williams, F. M.*, Pt., D, 12th Tenn., age 24.	May 15, 30, 1864.	Right; 4 inches middle third tibia exe'd. To Pro. Mar. June 11,'65.
57	Wright, R. C., Capt., G, 42d New York, age 26.	May 7, 17, 1864.	Left; lower third fibula excised. A. A. Surgeon J. M. McCalla. Disch'd July 13, 1864; partial anchylosis ankle joint.
58	*Young, W. H.*, French's Division, age 34.	Nov. 30, Dec. 24, 1864.	Left; 1½ inch lower third fibula exe'd. A. A. Surg. M. L. Herr. To Provost Marshal Feb. 6, '65.
59	Allen, A., Pt., H, 5th Artillery.	April 6, 10, 1862.	——; por. of tibia and fibula exe'd. A. Surg. W. D. Turner, 1st Ill. L. A. Mortificat'n. April, 1862, amp. thigh. Died May 11, 1862.
60	Barney, W., Pt., F, 1st Ohio Artillery.	Jan. 2, 11, 1863.	Right; 6 inches lower part fibula excised. Died July 14, 1863; phthisis pulmonalis.
61	Bloomer, J., Pt., K, 170th New York, age 44.	Aug. 25, Sept. 12, 1864.	Right; mid. third fibula excised. A. A. Surg. W. H. Ensign. Gang.; hæm.; lig. femoral. Sept. 18,'64, amputation thigh. Died Sept. 21, 1864; constitutional irritability. *Specs.* 3250, 3269.
62	Brown, O., Pt., A, 147th New York.	July 1, 6, 1863.	Right; portion of tibia excised. Died July 14, 1863.
63	Bull, J. H., Serg't, H, 94th Ohio, age 21.	May 15, June 13, 1864.	Left (necrosis); 3½ ins. tibia exe'd. A. A. Surg. H. C. May. Died June 23,'64; pyæm. *Spec.* 3367.
64	Conrad, H., Pt., I, 24th Michigan, age 21.	May 6, 19, 1864.	Left; 1 inch up. third fibula exe'd. Surg. O. A. Judson, U. S. V. Post. tibial art. divided; gang. May 22, amp. thigh. Died May 27, 1864; pyæmia. *Spec.* 3653.
65	Curtis, F., Pt., 17th Vermont, age 31.	June 2, 9, 1864.	Right; 2½ inches low. third fibula excised. Surg. O. A. Judson, U. S. V. June 11, 1864, hæm. Died June 17, 1864; exhaustion.
66	DeWitt, J. E., Pt., A, 9th N. Y. Cavalry, age 23.	June 21, 25, 1864.	Right; por. up. third fibula exe'd and peroneal artery lig. A. A. Surg. O. P. Sweet. Prostration and hæmorrhage. Died June 25, 1864; exhaustion.
67	Esworthy, W. N., Corp'l, E, 1st Penn. Cavalry, age 24.	June 21, July 6, 1864.	Left; 5 ins. up. third tibia exe'd. A. A. Surg. O. P. Sweet. Died July 23,'64; pyæm. *Spec.* 2940.
68	Forester, G. W., Pt., A, 188th Penn., age 45.	June 3, 15, 1864.	Right; 4 ins. lower third fibula excised. A. A. Surg. F. G. H. Bradford. Died July 6, 1864; irritative fever.
69	Freeman, G. B., Pt., F, 58th Mass., age 32.	June 3, 9, 1864.	Right; lower third fibula exe'd and lig. posterior tibial artery. Surg. O. A. Judson, U. S. V. Died June 17, '64; exhaustion.
70	Gay, E., Corp'l, H, 18th Wisconsin.	April 6, —, 1862.	——. Ass't Surg. W. D. Turner, 1st Illinois L. Art'y. April, '62, amputation thigh. Died April 22, 1862; pyæmia.
71	Gilmore, M., Pt., D, 54th Massachusetts.	July 18, 23, 1863.	Left; 6 ins. tibia and 1 inch lower part fibula exe'd. Mortification. July 27, amputat'n thigh. Died July 27, 1863.
72	Golden, J. P., Pt., F, 6th New York H'vy Art'y, age 27.	May 19, 29, 1864.	Right; 4 inches lower third fibula exe'd. A. A. Surg. O. P. Sweet. Died June 9, 1864; pyæmia.
73	Grainger, S. M., Pt., A, 38th Indiana, age 23.	Dec. 31, 1862, Jan. 14, 1863.	Left; fract. portions of tibia and fibula excised. Gang. Mar. 15, amp. knee joint. April 1, hæm. Died April 23, 1863.
74	Grimes, H. M., Pt., C, 116th New York.	May 27, June —, 1863.	Left; 4½ inches lower third tibia excised. Died Aug. 14, 1863; diarrhœa. *Specs.* 1307, 2956.
75	Jones, A. M., Pt., H, 21st Mass., age 22.	June 2, 25, 1864.	Left; 4 ins. mid. th'd fibula exe'd. A. A. Surg. F. G. H. Bradford. Died June 30, '64; exhaustion.
76	Luther, A. E., Pt., E, 3d Mass. Cavalry, age 32.	Mar. 4, 13, 1864.	Left; 3 inches fibula, lower third, excised. A. A. Surg. R. W. W. Carroll. Peroneal art. wounded. Mar. 15, hæm.; 19th, amp. leg. Died April 6, 1864; pyæmia.
77	McGuire, T., Pt., D, 53d Pennsylvania, age 19.	Dec. 13, 31, 1862.	Left (hæm.); 3 ins. up. extremity fibula excised; lig. fem. artery; sphacelus. Died Jan. 3, 1863.
78	Mink, H., Pt., H, 4th N. York Heavy Artillery, age 20.	April 2, 17, 1865.	Left; portion upper third tibia and fibula exe'd. Surg. B. A. Vanderkieft, U. S. V. Died May 11, 1865; exhaustion. *Spec.* 4101.
79	Mitchell, S., Pt., D, 188th Pennsylvania, age 23.	June 3, 27, 1864.	Left; 2 inches fibula, upper third, exe'd (hæm.); lig. peroneal art. A. A. Surg. H. W. Merrill. Died Aug. 7, 1864; chronic diarrhœa.
80	Partridge, G. V., Saddler, B, 4th Mass. Cavalry, age 21.	April 2, 9, 1864.	Left; portion of tibia exe'd. also lig. ant. tibial art. A. A. Surg. W. A. Greenleaf. April 27, hæm. Died May 2, 1864; pyæmia.
81	Perkins, P. D., Pt., B, 12th New Hampshire, age 32.	June 3, 13, 1864.	Left; 1½ inch fibula exe'd, upper third. A. Surg. H. Allen, U. S. A. (Hæm.) Died June 25, 1864; pyæmia.
82	Shorey, B., Pt., D, 3d Maine, age 30.	May 10, June 8, 1864.	Right; 6 ins. tibia excised. A. Surg. A. Delany, U. S. V. June 26, gang. Died July 1, 1864.
83	Sprague, O., Pt., F, 73d New York, age 45.	May 5, June 2, 1864.	Right; 2 ins. middle third tibia excised. Surg. R. B. Bontecou, U. S. V. Died July 6, 1864; exhaustion.
84	Tobin, T., Pt., E, 61st New York, age 23.	June 3, 8, 1864.	Right; 3 inches lower third tibia exe'd. Surg. E. Bentley, U. S. V. Died June 22, '64; pyæmia.
85	Travis, S., Pt., H, 137th New York, age 22.	Oct. 28, No. 19,'63.	Left; portion middle third tibia exe'd. Died Nov. 23,'63; pyæm.
86	Welsh, D. G., Pt., F, 28th New Jersey.	Dec. 13, 26, '62.	Right; lower third fibula exe'd. Died Jan. 5, 1863.
87	White, S. G., Pt., A, 14th New York H'vy Artillery, age 37.	Aug. 21, Sept. 1, 1864.	Left; 2 inches lower third fibula exe'd. A. A. Surg. R. E. Price. Sloughing. Died Sept. 13, 1864; exhaustion.

Twenty-one intermediary excisions, with eight deaths, were in the upper third of the leg; thirty-five, with seven deaths, in the middle third; twenty-four, with nine deaths in the lower third; and in seven, with five deaths, the precise locality was not indicated.

Secondary Excisions in the Continuity of the Bones of the Leg.—In point of mortality, the secondary excisions in the bones of the leg were attended by better results than the primary and intermediary operations, only eight of the fifty cases of this group having fatal issues. The excision included both bones in five, the tibia alone in thirty-one, and the fibula in fourteen instances.

[1] Holloway (J. M.), *Consecutive and Indeterminate Hæmorrhage from Large Arteries after Gunshot Wounds; with Report of Cases treated by Different Methods; Appreciation*, in *American Journal Medical Sciences*, 1865, Vol. L, N. S., p. 348.

Recoveries after Secondary Excisions in the Continuity of the Bones of the Leg.—This group includes forty-two operations, five performed on Confederate and thirty-seven on Union soldiers. Three of the latter, it appears, never applied for pensions, and thirty-four became pensioners after their discharge from the service. Four have since died—two from remote results of the injuries, one from phthisis, and one from cause not stated. Of the complications during treatment are noted gangrene in five instances and hæmorrhage in one.

CASE 718.—Corporal J. Downey, Co. D, 56th Pennsylvania, aged 23 years, was wounded in the left leg, at Bull Run, August 28, 1862. He was admitted to Eckington Hospital, Washington, several days afterwards, where the injury was noted but no treatment recorded. Surgeon J. Hopkinson, U. S. V., in charge of Mower Hospital, Philadelphia, made the following record of the case: "The wound was caused by a ball, which entered the outer side of the tibia, fracturing the bone, and emerging on the inner side of the leg at the lower third. The tibia was resected at Eckington Hospital, from where the patient was transferred to this hospital September 23, 1863, the wound being nearly healed." Subsequent entries show that in addition to applications of water dressings to the wound the patient for a time received treatment for a syphilitic affection. He remained in the hospital until January 17, 1865, when he was mustered out and pensioned. Examining Surgeon D. W. Shindle, of Sunbury, Pennsylvania, certified to the fracture and excision, and added: "The wound healed, leaving the leg, however, very crooked, shortened, and necessarily much weakened, and rendering his locomotion unsteady, difficult, and at times painful, also liable to tire in standing as well as walking. General system much impaired." The pensioner died of phthisis pulmonalis, October 20, 1876, his attending physician testifying that the injury remained "a constant source of irritation until a short time previous to his death. Exfoliation of bone was frequent, resulting in nervous prostration, innutrition, and impairment of his general health, a condition favorable to the development of tubercle. He never would undergo an operation for the removal of sequestra," etc. The specimen (FIG. 281), embracing the removed portion of the tibia and showing some periosteal thickening, was forwarded by Surgeon J. R. Smith, U. S. A., having been excised on October 4, 1862.

FIG. 281.—Four ins. of left tibia excised. *Spec.* 555.

CASE 719.—Private J. Lagro, Co. F, 10th Vermont, aged 18 years, was wounded at Cold Harbor, June 3, 1864. Surgeon R. Barr, 67th Pennsylvania, reported his admission to the field hospital of the 3d division, Sixth Corps, with "shot fracture of left leg, caused by a musket ball." Assistant Surgeon W. Webster, U. S. A., described the injury as a "compound fracture of the tibia and fibula at the upper third," and reported: "The patient entered De Camp Hospital, David's Island, twelve days after he was wounded. On July 30th, the parts being gangrenous, excision was performed by Acting Assistant Surgeon H. Sanders, who removed about four inches of the tibia and three inches of the fibula. Ether was used as the anæsthetic. The patient did well after the operation." On February 10, 1865, he was transferred to Burlington, and subsequently to Sloan Hospital, Montpelier. Surgeon H. James, U. S. V., in charge of the latter, contributed a photograph (*Card Photographs*, A. M. M., Vol. II, p. 1), and reported that the patient was able to walk with crutches, but could not bear much weight on the limb. Several months afterwards the patient was re-transferred to De Camp Hospital for the purpose of having his wounded leg fitted with an apparatus, which was supplied by Dr. E. D. Hudson, of New York City. He was ultimately discharged October 26, 1865, and pensioned. Examiner O. F. Fassett, of St. Albans, certified, September 10, 1866: "Wound of left leg, with fracture of both bones. It is now an open sore from necrosis. The bones have never united except by ligament, so that a false joint now exists. The bone is much denuded and so much deformity exists that no treatment but amputation can be of any benefit; the leg is worse than useless." In 1877, the same examiner again reported "the wound still an open, suppurating, and discharging sore, the bone being extensively diseased. The disease is so near the joint that amputation must be above the knee. His condition now is worse than with loss of the leg above the knee. The leg is bent into a curve and greatly deformed." Three years later the disease of the bone was reported to be extending almost or quite to the joint, and the pensioner's health as failing in consequence of the suppuration, his appearance being pale, anæmic, emaciated, and weak. He was paid June 4, 1880.

CASE 720.—Private R. L. Noe, Co. D, 5th Michigan, aged 35 years, was wounded at Fair Oaks, May 31, 1862, and entered De Camp Hospital, David's Island, two weeks afterwards. Acting Assistant Surgeon J. E. Steel reported: "He was wounded by a rifle ball, which passed through the fibula of the left leg about the middle. The patient had received no previous treatment. After the removal of several small pieces of bone and some blue cloth the wound healed; but subsequently it again suppurated and continued to do so for two months. I then deemed it necessary to exsect (with the approval of Surgeon J. Simons, U. S. A., in charge of the hospital) the entire fibula. The patient having been placed under the influence of chloroform, I made an incision from the head of the bone to within an inch of the external malleolus and found that it was difficult to remove the bone in longer pieces than about three inches, some of them of course being much smaller and adherent to the tendons, which had to be pulled off with the forceps. On carefully examining the bone I found that about one inch of the external malleolus could be preserved, which was done, thereby avoiding the opening of the ankle joint. The operation was attended with a great deal of venous hæmorrhage; but there being no artery of any importance severed, it was not found necessary to apply any ligature. No sutures were employed, the lips of the wound being brought together by adhesive plaster and then firmly bandaged. The wound healed two-thirds of its length by first intention. The patient recovered in three weeks and was able to leave the hospital six weeks after the operation." He was discharged from service December 31, 1862, and pensioned. Examiner M. L. Green, of Pontiac, Michigan, certified, May 7, 1863: "The fibula has been removed and the leg is now useless, having no support upon the outer side. Can never be of any service to him." Examining Surgeon C. Earl subsequently reported: "There remains a cicatrix extending from knee to ankle, involving the tendons and muscles and causing loss of power of leg. The tibialis anticus muscle is destroyed." In September, 1877, the same examiner stated: "Near the ankle the cicatrix has the appearance of breaking out again soon, as the tissues are getting dark and infiltrated." The pensioner was paid March

4, 1880. The head of the removed fibula together with part of the necrosed shaft, contributed by the operator, constitute specimen 1003 of the *Surgical Section* of the Museum.

Three of the forty-two survivors of secondary excision in the bones of the leg afterwards submitted to amputation in the lower third of the thigh.[1]

Fatal Cases of Secondary Excisions in the Continuity of the Bones of the Leg.—The eight operations of this group were performed on Union soldiers. The fatal issue was ascribed to pyæmia in one, gangrene in one, hæmorrhage in one, shock of operation in one, and to exhaustion and typho-malarial fever in two cases each. In one instance the excision was followed by amputation in the leg and subsequent amputation in the thigh.[2]

CASE 721.—Private E. J. Wyman, Co. A, 6th Wisconsin, aged 22 years, was wounded in the right leg, at Hatcher's Run, February 7, 1865. Surgeon D. C. Chamberlain, 94th New York, reported his admission to the field hospital of the 3d division, Fifth Corps, and described the injury as a "fracture of tibia." From the field the wounded man passed to the Point Lookout Hospital, subsequently to Judiciary Square Hospital, Washington, and on June 15th to Harvey Hospital, at Madison. Surgeon H. Culbertson, U. S. V., in charge of the latter, who operated in the case, communicated the following description of the result: "The tibia was fractured in the upper fourth. On July 2d, when the operation was performed, the wound was apparently healing, but had recently been gangrenous. Venous hæmorrhage appeared, and the bone was carious and softened. Some new bone had been thrown out at the seat of the fracture and had also become diseased. This presence of diseased bone and unhealthy discharges induced the hæmorrhage and previous gangrene and caused the patient's constitutional condition to be much impaired. The operation consisted of the excision of five inches of the shaft of the tibia, beginning opposite the opening of the interosseus membrane, making an incision in the middle line of the bone, and separating the skin, periosteum, and muscles by enucleation. The chain saw was then passed beneath the bone below, the shaft sawn through and raised from below upward. At the upper part the bone was divided with the forceps. No vessels were divided or important nerves injured during the operation. Chloroform was used as the anæsthetic with good effects. The edges of the wound were approximated, having been packed with lint, and persulphate of iron was used at the seat of the venous hæmorrhage, a light bandage being applied over all. The limb was secured in a plaster-of-Paris splint and arranged so as to expose the wound. The treatment consisted of animal broths, alcoholic stimulants, quinine, and iron. The case did well for one week, when the patient had a slight chill, which recurred at regular intervals morning and evening, and was followed by fever and sweating. Antiperiodics were persistently used without any good effect. The patient died of exhaustion, resulting from typho-malarial fever, July 23, 1865. The wound had been lacking in action, but the matter, though sparse, was healthy."

TABLE LXV.

Summary of Fifty Secondary Excisions in the Bones of the Leg for Shot Injury.

[Recoveries, 1–42; Deaths, 43–50.]

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.	No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	Barber, C., Pt., E, 88th Penn., age 30.	July 1, Dec. 19, 1863.	Left; portion of upper third fibula exc'd. Surg. C. N. Chamberlain, U. S. V. Disch'd Sept. 17, 1864; ankle joint anchylosed.	9	Collins, M., Pt., G, 1st Michigan.	Aug. 30, 1862, Mar. 17, 1863.	Right; head of fibula exc'd. Surg. D. P. Smith, U. S. V. (Necro.) Disch'd April 27, '63; anchylosis knee joint. *Spec.* 1193.
2	Bounting, R. A., Corp'l, K, 16th Mich., age 26.	July 1, Sept. 4, 1862.	——; por. of up. third tibia exc'd. A. A. Surgeon A. W. Colburn. Disch'd Nov. 17, 1862; lame.	10	Davis, W., Pt., D, 89th Illinois, age 27.	Nov. 25, 1863, June 10, 1864.	Right; mid. third of tibia exc'd. Surgeon L. D. Harlow, U. S. V. Feb. 4, 15, 1865, sequestra rem'd. Disch'd June 17, '65. Died July 26, 1876; bone diseased.
3	Brown, J., Pt., D, 5th U. S. Artillery, age 25.	June 27, Sept. 6, 1862.	Left; por. of tibia, mid. th'd, exc'd. Disch'd Dec. 29, '62. Leg shortened and distorted. *Spec.* 412.	11	Downey, J., Corp'l, D, 56th Penn., age 23.	Aug. 28, Oct. 4, 1862.	Left; 4½ ins. low. third tibia exc'd. Disch'd Jan. 17, '65; leg crooked. Died Oct. 20, 1876; phth. pulmo. *Spec.* 555.
4	Brunett, N., Pt., G, 1st Penn. Rifles, age 22.	June 17, Nov. 28, 1864.	Left; head and 2 ins. fibula exc'd. A. A. Surg. C. B. King. (Necro.) To Vet. Res. Corps May 1, 1865.	12	Fergus, J., Pt., A, 70th Indiana, age 34.	May 14, June 24, 1864.	Left; 3 ins. mid. third fibula exc'd. A. A. Surg. T. H. Hammond. Gang.; post. tibial art. sloughed; hæm. Aug. 15, 1864, amputat'n thigh. Disch'd Jan. 20, 1865.
5	Bryant, J., Pt., B, 62d Pennsylvania, age 40.	June 27, July 29, 1862.	Right; portion of middle third tibia excised. Disch'd Jan. 30, 1863; necrosis; shortening and deformity.	13	*Fitzgerald, T. J.*, Pt., K, 6th Louisiana.	Sept. 19, De.—, '64.	Left; 2½ inches middle third tibia exc'd. Released Aug. 25, 1865.
6	Bullock, J. L., Corp'l, C, 5th Minnesota, age 36.	De. 16, '64, Jan. 25, 1865.	Left; 3¼ inches middle third tibia excised. A. A. Surg. J. Butterbaugh. Disch'd Nov. 23, 1865; leg scarcely of any use; cartilaginious union only.	14	Fowler, L., Pt., E, 6th Wisconsin, age 27.	Au. 30, '62, Feb. 16, 1863.	Right; 3 inches lower third tibia, ⅔ of its thickness excised. Duty July 1, 1863.
7	Canty, T. F., Pt., D, 63d New York, age 24.	Aug. 14, 1864, ——, '66.	Right; 5ins. low. th'd fibula exc'd. Dr. J. E. Pomfret. Disch'd May 30, '65; bone exfol.; unhealed in 1872; requires bandages, 1875.	15	Gray, E. T., Pt., B, 38th Ohio, age 23.	Aug. 4, Sep. 4, '64.	Left; 4 ins. tibia and 8 ins. fibula excised. Disch'd May 12, 1865.
8	Collins, J., Pt., B, 12th Mass., age 19.	Sept. 17, Nov. 11, 1862.	Left; por. of up. third tibia exc'd. A. A. Surg. A. V. Cherbonnier. To Vet. Res. Corps July 1, 1863.	16	*Harris, J.*, Pt., H, 12th South Carolina, age 30.	Sept. 17, 1862, Jan. 26, 1863.	——; fract. por. upper thirds tibia and fibula exc'd. A. A. Surg. A. North. To Provost Marshal May 16, 1863.

[1] Cases of: Pt. J. Fergus, A, 70th Indiana, left thigh, secondary operation in lower third (TABLE XL, page 320, No. 34); Corp'l T. O'Dell, Co. H, 5th Michigan, left thigh, secondary operation in lower third (TABLE XL, page 321, No. 73); Serg't J. Lowth, M, 4th Wisconsin Cavalry, right thigh, secondary operation in lower third (TABLE XL, p. 320, No. 57).

[2] Case of Pt. H. Linn, A, 6th Pennsylvania Reserves, left leg amputated Dec. 4, 1862, in middle third; January 15, 1863, amputation in thigh at middle third; hæmorrhage, Feb. 4, 1863, ligation of femoral artery; death March 31, 1863. *Specs.* 748, 3818, 3983 (TABLE XXXIX, p. 315, No. 137).

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
17	Holt, T., Pt., G, 15th Mass., age 19.	Sept. 17, 1862, Feb. 2, '63.	Left: head of fibula exc'd. Surg. S. D. Freeman, U. S. V. Disch'd Feb. 4, 1864. *Spec.* 1109.
18	Jones, E. P., Pt., K, 22d Michigan.	Sept. 20, 1863, Jan. 10, 1864.	Left; necrosed ends of mid. third tibia exc'd. A. A. Surg. D. O. Farrand. Gang. Disch'd Oct. 12, 1864.
19	Lagro, J., Pt., F, 10th Vermont, age 18.	June 3, 1864, July 30, 1864.	Left; 4 inches tibia and 3 inches fibula, up. third, exc'd. A. A. Surg. H. Sanders. (Gangrene.) Disc'd Oct. 26, '65; much deform.; false joint.
20	Lennox, W., Pt., F, 82d New York.	July 3, Sept. —, 1863.	Left; middle third tibia excised. Surgeon A. B. Mott, U. S. V. (Necrosis.) Discharged July 25, 1864.
21	*Lord, B. E.*, Pt., H, 24th Georgia, age 23.	Sept. 14, Nov. 26, 1862.	Left; 3½ inches upper third tibia excised (caries and necrosis). Paroled April 27, 1863.
22	Lowth, J., Serg't, M, 4th Wisconsin Cav., age 26.	Aug. 24, 1864, May 27, 1865.	Right; 6 inches upper part fibula excised. Surg. H. Culbertson, U. S. V. Lig. post. tibial artery (caries; gang.). June 2, amp. thigh. Disch'd July 17, 1865.
23	Luce, J. B., Pt., F, 179th New York, age 30.	June 17, Oct. 24, 1864.	Right; 8½ ins. tibia exc'd. A. A. Surg. W. P. Moon. (Sloughing; bone diseased.) Disch'd Dec. 31, 1864; leg useless.
24	McIlheran, J., Pt., C, 116th Illinois, age 24.	July 22, 1863, March 7, 1864.	Right; up. third and head of tibia, except shell of bone articulating, excised. Surg. J. G. Keenon, U.S.V. (Carious.) Disch'd Feb. 24, 1865.
25	McQuiggan, J., Pt., E, 82d Penn., age 20.	July 1, Sept. 1, 1862.	Left; middle third tibia excised. A. A. Surgeon G. H. Dare. December, 1862, another operation. Discharged July 3, 1863. *Spec.* 428.
26	Mears, J. E., Pt., G, 81st Pennsylvania, age 20.	July 1, Aug. 21, 1862.	Right: middle third tibia excis'd. Disch'd Feb. 27, 1863; considerable shortening and deformity. *Spec.* 398.
27	Noe, R. L., Pt., D, 5th Michigan, age 35.	May 31, Nov. —, 1862.	Left; almost entire fibula excis'd. A. A. Surg. J. E. Steele. Disc'd Dec. 31, 1862; leg of not much service. *Spec.* 1003.
28	Odell, T., Corp'l, H, 5th Michigan, age 20.	June 18, Sept. 7, 1864.	Left; up. third tibia exc'd. A. A. Surg. J. M. Boisnot. Sloughing. Jan. 13, '65, amp. thigh. Disch'd May 22, 1865.
29	Ohmit, S. K., Pt., D, 1st Penn. Res., age 20.	June 30, 1862. Sept. 23, 1862.	Left; 6 inches lower third tibia excised. A. A. Surgeon J. H. Boone. Disch'd Feb. 23, 1863; complete anchylosis ankle, and partial knee joints.
30	Peters, W., Pt., B, 8th Penn. Res., age 20.	June 27, 1862, Feb. 2, '63.	Left; 3½ inches upper third fibula exc'd. A. A. Surg. T. Artaud. Discharged November 28, 1865. *Spec.* 1110.
31	Pritchard, R., Pt., K, 119th Penn., age 29.	May 5, '64, Jan. 15, 1865.	Left; 3 inches lower third tibia excised. Discharged June 19, 1865. Necrosis. Died March 2, 1871.
32	Simmons, A. R., Pt., I, 2d N. Hamp., age 20.	Aug. 29, 1862, Sept. 16, 1864.	Left; 3 inches middle third fibula excised and sequestrum of tibia removed. Ass't Surg. H. Allen, U. S. A. (Discharged Nov. 20, 1862; non-union; necro.); w'nd re-opened. 1877, bone carious.
33	Smith, G., Pt., A, 1st N. York Cavalry, age 34.	March 9, Sept. —, 1863.	Left; portion of lower third tibia excised. Surgeon A. B. Mott, U. S. V. Discharged Aug. 5, 1864; 1866, bone diseased; 1873, bone healed.
34	Thompson, T. E., Corp'l, I, 89th New York, age 24.	May 20, 1864, July 1, 1864.	Right; 2 inches tibia, lower third, exc'd. Ass't Surg. W. D. Woolverton, U. S. A. Disch'd Oct. 11, 1865. Died May 3, 1873; lungs diseased.
35	*Vaughn, A. S.*, Pt., K, 57th Virginia, age 24.	July 1, Aug. 4, 1863.	——; 3½ inches lower third tibia exc'd. A. A. Surg. E. Borck, jr. (Necrosis.) Paroled August 22, 1863.
36	Vollmer, M., Pt., C, 136th New York, age 29.	July 4, Au. 25, '63.	Left; 1½ inch fibula, lower third, excised. Disch'd July 8, 1865.
37	Waldron, S. H., Pt., B, 17th Maine, age 19.	May 3, Nov. 3, 1863.	Right: 3 inches middle third fibula. A. A. Surgeon E. Seyffarth. (Caries; sloughing.) Disch'd July 6, 1865.
38	White, J. W., Pt., C, 113th Ohio, age 19.	June 27, J'y 30, '64.	Right; 3 inches tibia, lower third, excised. Disch'd Feb. 22, 1865; wound open.
39	*Williams, J. M.*, Serg't, G, 2d Georgia, age 23.	J'e 24, '63, Feb. 15, 1864.	Right; 3 inches lower third tibia excised. Assistant Surg. J. E. Link, 21st Ill. Provost Marshal April 15, 1864.
40	Williamson, J., Pt., G, 57th New York, age 42.	June 16, Nov. 7, 1864.	Left; 5 inches middle third tibia excised. A. A. Surgeon W. P. Moon. Discharged June 28, '65; new bone formed.
41	Wilson, G. E., Pt., D, 30th Mass., age 23.	Oct. 19, 1864, March 2, 1865.	Right; 3½ inches fibula, in middle third, excised. A. A. Surg. W. P. Moon. (Necrosis.) Disch'd July 22, 1865. *Spec.* 1479.
42	Wilson, J., Pt., E, 15th Infantry, age 21.	Aug. 7, Nov. 5, '64.	Right; 3 inches tibia excised. Disch'd April 1, 1865.
43	Ackley, J. B., Pt., I, 7th Infantry.	June —, J'y 29, '62.	Left; ½ of shaft of fibula excised; missile extracted. Died August 13, '62; typh. fever.
44	Evans, L., Pt., D, 11th Michigan, age 19.	July 26, Oct. 4, 1864.	Left; 3 inches middle third tibia excised. Ass't Surg. W. B. Trull, U. S. V. Died March 12, 1865; exhaustion.
45	Hockirk, O. D., Pt., A, 46th New York, age 25.	Sept. 29, Dec. 4, 1864.	Left; small por. upper thirds both bones exc'd. A. A. Surg. B. N. McCleery. July, 1865, erysip.; gang.; diarr. Died Aug. 14, '65.
46	Holmes, H., Pt., H, 50th Colored Troops.	Nov. 9, '64, J'y 20, '65.	Right; por. of tibia exc'd. Died July 24, '65; shock of operation.
47	Linn, H., Pt., A, 6th Penn. Res., age 25.	Sept. 17, Dec. 3, 1862.	Left; large por. of tibia and fibula exc'd. A. A. Surg. A. V. Cherbonnier. Dec. 4, amp. leg; hæm.; gang.; necro. Jan. 15, '63, amp. thigh. Feb. 4, lig. fem. artery; necro.; hæm. Died March 31, 1863. *Specs.* 748, 3818, 3983.
48	Pickell, G. F., Pt., K, 13th New York, age 17.	Aug. 30, Oct. 6, '62.	Left; fractured ends upper third tibia excised. Died October 29, 1862; pyæmia.
49	Richardson, H. S., Lieut., 27th Michigan.	July 12, 1863, Jan. 5, '64.	Left; 4 inches middle third tibia exc'd. Surg. C. S. Tripler, U. S. A. (Necrosis.) Died Jan. 31, 1864; malignant measles.
50	Wyman, E. J., Pt., A, 6th Wisconsin, age 22.	Feb. 7, July 2, 1865.	Right; 5 inches upper third tibia excised. Surg. H. Culbertson, U. S. V. (Bone carious; venous hæm.; gangrene.) Died July 23, 1865; typhoid malarial fever.

Excisions in the Continuity of the Bones of the Leg of Uncertain Date.—In thirty-five instances of excision in the bones of the leg, either the time of injury or of operation or of both were not recorded. Twenty-seven of the patients survived the operation, four died, and in four the final issue could not be ascertained. The excision was confined to the tibia in twenty-two, to the fibula in twelve instances, and in one case portions of both tibia and fibula were excised. Of the cases of recovery of this group nineteen were Union and eight Confederate soldiers. Seventeen of the nineteen Union soldiers were subsequently borne on the Pension Roll; one has since died, and another had the limb removed at the knee joint.[1] The four fatal operations were performed on three Confederate and one Union soldier; pyæmia being cited as the cause of death in two instances.

[1] Case of Pt. H. A. Steward, Co. B, 8th Pennsylvania Reserves, secondary operation at right knee joint (TABLE LVII, p. 409, No. 9).

TABLE LXVI.

Summary of Thirty-five Cases of Excisions in the Bones of the Leg for Shot Injury of Uncertain Date.

[Recoveries, 1—27; Deaths, 28—31; Unknown Results, 32—35.]

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.	No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1	Davis, J. L., Pt., F, 27th New York.	June 27, ——, '62.	Right; lower third tibia excised. Disch'd Sept. 24, 1862 necrosis.	19	Quirk, P., Lieut., 2d Cavalry.	June 9, '63, ——	Left; 3 inches lower third tibia excised. Retired Jan. 5, 1865; uses staff in walking.
2	Freeland, R., Pt., G, 1st Cavalry, age 22.	Nov. 8, ——, '63.	Right; portion of tibia excised; necrosis. Duty Feb. 16, 1865.	20	Steward, H. A., Pt., B, 8th Pennsylvania Reserves, age 23.	June 27, ——, '62.	Right; large portion tibia, upper third, excised. Disch'd Nov. 20, 1862. April 1, 1867, amputation at knee joint.
3	*Gardner, W. H.*, Lieut., K, 3d Alabama.	July —, ——, '63.	——; por. of tibia excised. Paroled October 24, 1863.	21	Stineman, M. C., Pt., M, 62d Penn., age 25.	July 2, ——, '63.	Right; 5½ inches mid. third tibia excised. Disch'd Sept. 8, 1864; leg shortened and bent.
4	*Garrett, J.*, Pt., H, 12th Miss., age 24.	Aug. 21, '64, ——	Right; 4 ins. middle third fibula excised. Retired Mar. 25, 1865.	22	Walker, R., Serg't, I, 104th New York.	Sept. 17, ——, '62.	Left; 3 inches lower third tibia excised. Disch'd Dec. 20, 1862; 1½ inch shortening.
5	Harrell, J. P., Pt., F, 82d Indiana.	Sept. 19, '63, ——	Right; portion upper third fibula excised. To Vet. Res. Corps. Disch'd June 17, 1865.	23	Walker, W. T., Pt., G, 12th Massachusetts.	Sept. 14, ——, '62.	Left; 5 inches upper third fibula excised. Disch'd Dec. 13, 1862.
6	*Harris, J. D.*, Serg't, C, 14th Alabama, age 31.	May 6, —— '64.	Right; portion of fibula excised. Retired Feb. 15, 1865.	24	*Warren, O.*, Serg't, B, 44th N. C., age 24.	Oct. 27, ——, '64.	Right; portion of tibia, low. third, excised. Retired Feb. 28, 1865; partial anchylosis ankle joint.
7	Hull, F. S., Pt., G, 8th Vermont, age 34.	June 14, '63, ——	Right; por. of middle third fibula excised. Disch'd June 22, '64. 1865, exfoliation necrosed bone.	25	Wheeler, G., Pt., K, 6th N. Y. Artillery, age 43.	May 19, ——, '64.	Left; middle third fibula excised. Disch'd Jan. 7, 1865.
8	Imbrie, D., Pt., K, 10th Penn. Res., age 19.	June 27, ——, '62.	Right; 1 inch of fibula excised. Disch'd Nov. 27, 1862.	26	Williams, J. H., Corp'l, E, 15th Massachusetts.	Oct. 21, '61, ——	Left; por. low. third tibia exc'd. Disch'd Oct. 14, 1862. Died April 6, 1863.
9	Johnson, W. B., Lieut., E, 26th Ohio.	Nov. 25, '63, ——	Left; 2 inches lower third tibia excised. Disch'd Oct. 19, 1864. 1866, bone carious and exfol'ing.	27	Williams, J. O., Pt., E, 143d Penn., age 25.	July 1, ——, '63.	Left; 3 inches lower third fibula excised. Disch'd May 9, 1864; shortening; anchy. ankle joint.
10	*Jordan, N.*, Pt., C, 19th Tennessee, age 19.	Nov. 30, '64, ——	Left; 3 ins. mid. third tibia exc'd. To Pro. Marshal April 6, 1865.	28	Baldwin, H. J., Pt., E, 27th Indiana.	May 3, ——, '63.	Left; 4 ins. tibia exc'd. (Necrosis.) Died June 15, 1863; pyæmia. *Spec.* 1283.
11	Kuhn, H., Pt., H, 111th Pennsylvania, age 21.	Sept. 17, 1862.	Left; portion of lower third fibula excised. Disch'd Jan. 10, 1863; anchy. ankle joint.	29	[1] *Dukay, S. L.*, Pt., D, 15th Texas, age 24.	———	Left; 4 inches middle third tibia excised; erysipelas; gangrene. Died of pyæmia.
12	Lautenslager, S., Pt., G, 24th Michigan.	July 1, '63, ——	Left; por. of low. third tibia exc'd. Disch'd March 28, 1864; false joint in tibia; unable to bear his weight on leg.	30	*Farr, T. A.*, Serg't, B, 11th South Carolina.	———	Left; portion of tibia excised. Died May 29, 1864.
13	*Lewis, W. B.*, Pt., B, 1st Texas, age 20.	July 1, '62, ——	Right; 4 ins. middle third tibia excised. Recovery.	31	*Gray, J. F.*, Pt., B, 4th Georgia.	Mar. —, ——, '65.	Left; 12 inches of fibula excised. Died April 28, 1865.
14	Marshall, M. F., Pt., B, 5th New Jersey.	May 5, ——, '62.	Right; por. of middle third tibia excised. Disch'd Sept. 25, 1862.	32	*Knowles, L. T.*, Pt., F, 9th Georgia.	Aug. 15, '64, ——	Right; portion of fibula excised.
15	*Metcalf, J.*, Serg't, I, 54th North Carolina, age 29.	Mar. 25, ——, '65.	Left; 1½ inch of lower third tibia excised. Released Aug. 25, '65.	33	*Parnell, J.*, Pt., I, 14th South Carolina.	Aug. 16, '64, ——	Right; portion of tibia excised.
16	Mullins, J., Serg't, D, 12th Massachusetts.	July 1, ——, '63.	Left; 5 ins. tibia and por. of fibula, upper third, exc'd; gang. Discharged May 6, '64. 1877, bone still diseased.	34	*Sullnot, J. B.*, Pt., C, 44th Georgia.	Oct. 19, '64, ——	Left; partial excision of tibia.
17	*Perrin, J. T.*, Capt., E, 26th Virginia.	May 20, ——, '64.	Right; portion of upper third tibia exc'd. Furloughed Aug. 29, '64.	35	*Tatley, S.*, Pt., C, 41st Virginia, age 25.	Aug. 19, '64, ——	Left; 2½ inches fibula excised.
18	Pettee, L., Lieut., 11th Infantry.	July 2, ——, '63.	Right; 1½ inch lower third tibia excised. Duty Nov. 24, 1863.				

The side injured was not indicated in twelve of the three hundred and eighty-seven cases of excisions in the continuity of the bones of the leg. The right limb was fractured in one hundred and sixty-three—one hundred and sixteen recoveries, forty-five deaths, two unknown results,—and the left in two hundred and twelve—one hundred and fifty-four recoveries, fifty-six deaths, and two unknown results.

AMPUTATIONS IN THE CONTINUITY OF THE LEG FOR SHOT FRACTURES.—The precept of Guthrie[2] that "a leg should be seldom amputated for a fracture from a musket ball" seems to have been very generally disregarded by the surgeons of the American civil war. Of eight thousand nine hundred and eighty-eight cases of shot fractures in the continuity of the bones of the leg, of which 88.4 per cent. were caused by musket balls,[3] amputation was performed in four thousand seven hundred and ten,[4] or 52.4 per cent. Of these four thousand seven hundred and ten cases of amputations for shot

[1] ANDERSON. *Pyæmia supervening upon Hospital Gangrene*, in *U. S. Sanitary Commission Memoirs*, New York, 1871, Surgical Volume II, p. 443.

[2] GUTHRIE (G. J.), *Commentaries on the Surgery of the War, etc.*, sixth edition, London, 1855, p. 150: "The bones of the leg being more exposed, admit of greater liberties being taken with them, and of larger portions, or even parts, being taken away successfully, than ought to be attempted in the thigh. A leg should therefore be seldom amputated for a fracture from a musket ball."

[3] The nature of the missile was reported in 6,336 of the 8,988 cases of shot fractures in the continuity of the bones of the leg without primary injury to the knee or ankle joints: 79 were caused by cannon or solid shot; 654 by shells; 5,603 by musket, pistol, or other small balls; and in 2,052 instances the missile was not specified.

[4] See TABLE LI, p. 432, *ante*. The cases are: 19 excisions in the leg followed by amputations in the leg; 2 excisions in the leg with subsequent amputations in the leg and thigh; 5 excisions in the leg followed by amputations at the knee joint; 22 excisions in the leg followed by amputations in the thigh; 3,728 amputations in the leg; 3 amputations in the leg and subsequent amputation at the knee joint; 39 amputations in the leg followed by amputations in the thigh; 100 amputations at the knee joint; 7 amputations at the knee joint followed by amputations in the thigh; and 785 amputations of thigh; a total of 4,710 amputations following shot fractures in the bones of the leg.

fractures of the bones of the leg, eight hundred and seven performed in the thigh and one hundred and twelve performed at the knee joint have already been considered in the preceding two sections of this chapter. Deducting these from the four thousand seven hundred and ten cases of amputations for shot fractures in the bones of the leg, there remain three thousand seven hundred and ninety-one cases of ablation in the leg, to which should be added one thousand six hundred and sixty-one amputations in the leg following shot fractures of the ankle joint or foot, making a total of five thousand four hundred and fifty-two cases of amputations in the leg to be considered in this section. A numerical statement of the cases is contained in the following table:

TABLE LXVII.

Numerical Statement of Fifty-four Hundred and Fifty-two Amputations in the Leg for Shot Injury.

OPERATIONS.	CASES.					UPPER THIRD.				MIDDLE THIRD.				LOWER THIRD.				SEAT NOT RECORDED.			
	Total.	Recovery.	Death.	Undetermined.	Mortality rate of Determined cases.	Total.	Recovery.	Death.	Undetermined.	Total.	Recovery.	Death.	Undetermined.	Total.	Recovery.	Death.	Undetermined.	Total.	Recovery.	Death.	Undetermined.
Primary	3,392	2,307	1,032	53	30.9	1,029	771	249	9	892	736	150	6	900	676	215	9	571	124	418	29
Intermediary	1,046	682	364	....	34.7	296	194	102	..	368	258	110	..	335	215	120	..	47	15	32	....
Secondary	444	327	117	....	26.3	133	96	37	..	174	137	37	..	121	86	35	..	16	8	8	....
Time between injury and operation not specified	570	245	240	85	49.4	51	33	18	..	47	39	8	..	51	34	17	..	421	139	197	85
Aggregates	5,452	3,561	1,753	138	32.9	1,509	1,094	406	9	1,481	1,170	305	6	1,407	1,011	387	9	1,055	286	655	114

In one hundred and thirty-eight of the five thousand four hundred and fifty-two instances of amputations in the leg the final result could not be ascertained; three thousand five hundred and sixty-one had successful, and one thousand seven hundred and fifty-three fatal terminations, a mortality rate of 32.9 per cent. Three thousand three hundred and ninety-two were primary, one thousand and forty-six intermediary, four hundred and forty-four secondary, and five hundred and seventy were operations of unspecified date, the primary amputations, by far the most numerous, comprising 69.4 per cent. of the cases in which the time between the injury and the operation could be ascertained.

PRIMARY AMPUTATIONS IN THE CONTINUITY OF THE LEG FOR SHOT INJURY.—Of the three thousand three hundred and ninety-two primary operations, one thousand and twenty-nine were in the upper third, eight hundred and ninety-two in the middle third, nine hundred in the lower third, and in five hundred and seventy-one the seat of the operation was not indicated.

Primary Amputations in the Upper Third of the Leg for Shot Injury.—The results in nine of the one thousand and twenty-nine instances of this group were not ascertained; seven hundred and seventy-one had successful, and two hundred and forty-nine fatal terminations, a mortality of 24.4 per cent.

Examples of Successful Primary Amputations in the Upper Third of the Leg.—The seven hundred and seventy-one amputations of this group were performed on seven hun-

dred and sixty-six patients, five being successful amputations of both legs in the upper third. One of the cases of double amputation will be given in detail:

CASE 722.—Private S. L. Willson, Co. D, 72d New York, aged 18 years, was wounded at Gettysburg, July 2, 1863. He was admitted to the field hospital of the 2d division, Third Corps, whence Surgeon C. K. Irwin, 72d New York, reported: "Compound comminuted fracture of right and left leg by minié ball, followed by amputation of both legs." Surgeon H. Janes, U. S. V., forwarded the following history: "The patient entered Camp Letterman August 30th. Both of his legs had been shattered at the lower third, and amputation was performed at the upper third on the day following the injury. The stumps granulated well and the patient's general health was good. Simple dressings, with tonics and stimulants, constituted the treatment. On October 21st, when the man was transferred to another hospital, the stumps were in tolerable good condition. There had been ulcers in the cicatrices, threatening gangrene, which was controlled with citrine ointment, leaving small abrasions." The patient subsequently passed through hospitals at Baltimore and Alexandria, and lastly he was transferred to Rochester, where he was discharged May 31, 1865, and pensioned. Since leaving the service he has been furnished at regular intervals with artificial legs of the "Bly" pattern, which he reports as satisfactory, and the use of which enabled him to accept and hold employment as messenger of the U. S. Senate at the Capitol building for a number of years. In his several applications for these artificial limbs he described the stumps as being in good condition. His pension was paid March 4, 1880.

Brief histories of the remaining four instances of successful primary amputation in the upper third of the leg are related in the foot-note.[1]

CASE 723.—Corporal J. H. Wilkins, Co. E, 1st Louisiana, aged 25 years, was wounded at Port Hudson, June 14, 1863, and conveyed to New Orleans three days afterwards. Assistant Surgeon P. S. Conner, U. S. A., recorded his admission to University Hospital, with "amputation of left leg performed on the battle field," also his departure on furlough October 26th. Several weeks afterwards the patient entered Central Park Hospital, New York City, whence Surgeon B. A. Clements, U. S. A., reported the following history: "The wound was caused by a musket ball, which passed through the middle of the leg antero-posteriorly, comminuting both bones badly and wounding the arteries. There was much hæmorrhage. Amputation through the upper third, by antero-posterior flaps, was performed under chloroform one-half hour after the injury. At first sutures and water dressings were applied. The parts united mostly by first intention and had entirely healed at the end of six weeks. When admitted to this hospital, November 12th, the stump was in good condition and the patient's general health good. On December 20th, he contused the stump by a fall, which was followed by great swelling, heat, and pain. Four days later an abscess, which had formed two inches above the cicatrix on the anterior face of the stump, was opened, when one-half ounce of pus was discharged. By February 25, 1864, the inflammation and swelling had subsided, but there remained considerable rigidity of the knee joint, flexion and extension being imperfect. Three weeks later the swelling of the stump had entirely subsided, and several months afterwards flexion was again restored, though extension was not perfect. When discharged from service, August 9, 1864, the patient had had an artificial limb for about one month, not being able to use it very well owing to the want of perfect extending power, but improving with it constantly." The pensioner was paid March 4, 1880. A cast of the stump (*Spec.* 4371, A. M. M.), presenting an excellent appearance, with the wound well united, was contributed by Acting Assistant Surgeon G. F. Shrady, and is represented in the wood-cut (FIG. 282).

FIG. 282.—Appearance of stump one year after amput'n. *Spec.* 4371.

CASE 724.—Private Z. Holcomb, Co. B, 36th Ohio, aged 26 years, was wounded at Opequan Creek, September 19, 1864. He was admitted to the field hospital at Winchester, and thence removed, on November 12th, to Frederick Hospital. Assistant Surgeon R. F. Weir, U. S. A., in charge of the latter hospital, made the following report: "On examining the patient it was found that he had undergone an amputation of the right leg at the upper third, which was performed for a shell wound of the same at the middle and lower thirds. The stump is nearly healed. He had also a shot wound of the thigh of the same limb, the ball lodging. The latter wound was supposed to be a simple flesh wound and had entirely healed, the missile having evidently passed downward, for it could not be felt. On December 1st, there was evidence of the formation of an abscess on the posterior portion of the thigh, at the lower part of the upper third, and poultices were ordered to be applied. On December 5th, the fluctuation being well marked over the abscess, a free incision was made and about an ounce of pus evacuated. On introducing the finger the missile was then discovered, which proved to be a cast-iron ball from a Shrapnell shell, and was removed by means of a forceps by Acting Assistant Surgeon W. S. Adams. On further examination of the limb quite an amount of callus was found around the femur at the junction of the upper and middle thirds, and on questioning the patient he stated that his surgeon had informed him that a non-comminuted fracture was produced by the missile; also that a coaptation splint had been applied for the same. On measurement there was found to be a little over one inch shortening. On December

[1] The remaining four successful primary double amputations in the upper third of the leg are: 1. Lieut. E. H. Fisher, Co. A, 21st Indiana, wounded at Atchafalaya Bay, La., October 20, 1862. Half an hour after the injury Surgeon Ezra Read, 21st Indiana, removed both legs about four inches below the knee, on board Steamer St. Mary. The Lieutenant was discharged November 20, 1863, and pensioned. Examiner S. T. Williams certified, June 16, 1875, that the cicatrices of both stumps were very tender. The pensioner was paid September 4, 1878.—2. Corp'l John Lorence, Co. K, 9th New Jersey, age 35, wounded at Roanoke Island, February 8, 1862, by a cannon ball. Two hours after the injury Surgeons J. H. Thompson, U. S. V., and H. W. Rivers, 4th Rhode Island, removed both legs about two inches below the knee joint. The patient was discharged and pensioned September 30, 1862. In 1875, the pensioner declared that the knee joints are without motion and the stumps tender. He was paid March 4, 1877.—3. Pt. *S. H. Trim*, Co. B, 41st Alabama, age 19, wounded at Drury's Bluff, May 21, 1864, by explosion of a shell. On the same day Surgeon John D. Jackson, 44th Tennessee, removed both legs at point of election by circular operation. He recovered without the intervention of a single bad symptom, and was furloughed to Beaverdale, Alabama.—4. Corp'l James Tanner, Co. C, 87th New York, received a shell wound of both legs, at Bull Run, Virginia, August 30, 1862. Both limbs were removed on the field, at the upper thirds. The stumps healed perfectly, and the patient was discharged October 15, 1862, and pensioned. In 1874, he declared that the cicatrices had become adherent to bone and were very tender. He was paid June 4, 1880.

21st, when the patient was transferred, his general condition was good and the wounds were entirely healed." The missile was contributed to the Museum by the operator, and constitutes specimen 1498 of the *Surgical Section*. The patient subsequently entered Camden Street Hospital, Baltimore, and afterwards Broad and Cherry Streets Hospital, Philadelphia, and on May 20, 1865, he was discharged from Chester Hospital and pensioned. Two months afterwards he was supplied with an artificial limb by the Palmer Arm and Leg Company of Philadelphia. Examiner A. B. Monahan, of Jackson, Ohio, September 6, 1876, certified: "The pensioner has lost his right leg three inches below the knee joint. The stump is tender and he cannot wear an artificial leg. There is also a wound of the right thigh, the ball striking the femur, upper third, and passing down about three inches, where it lodged and was removed. There is caries of the femur and the wound is open, small spiculæ of bone being sloughed through the opening. The thigh is painful, lame, etc." The pensioner was paid September 4, 1880.

In the following instance the amputation was performed close to the knee joint, through the tuberosity of the tibia, and the fibula was disarticulated—a method advocated and frequently performed by the elder Larrey:[1]

CASE 725.—Private *J. Strider*, Co. K, 56th North Carolina, aged 34 years, was wounded at Plymouth, April 20, 1864, by a minié ball, which produced a compound comminuted fracture of the right tibia. Surgeon C. H. Ladd, C. S. A., who amputated the leg on the day of the injury, reported: "The operation was performed by the circular skin-flap method close to the knee joint, and the fibula was disarticulated. The stump healed by first intention. I have never before or since performed an amputation so close to the knee joint; think it might often replace disarticulation at the knee joint or amputation above." The patient recovered and was retired from service January 17, 1865.

One of the seven hundred and seventy-one survivors after primary amputation in the upper third of the leg subsequently underwent amputation at the knee joint, and nine, amputation in the thigh:

CASE 726.—Private J. Morrin, Co. G, 126th New York, aged 21 years, was wounded at Gettysburg, July 3, 1863, and admitted to the field hospital of the 3d division, Second Corps. Surgeon I. Scott, 7th West Virginia, recorded: "Compound comminuted fracture of left leg by minié ball, followed by posterior flap amputation by Surgeon J. Aiken, 71st Pennsylvania." The patient remained in hospital at Gettysburg for three months and was then transferred to Philadelphia, whence Surgeon J. Hopkinson, U. S. V., in charge of Mower Hospital, reported the following description and progress of the case: "The tibia and fibula had been shattered to such an extent that amputation below the knee was rendered necessary on the field. When admitted to this hospital, September 9th, the flaps were open and the ends of the bones exposed. Gangrene had set in and the patient was in a low and typhoid condition. A solution of sulphate of copper was applied to the stump, and quinine with tincture of chloride of iron was prescribed internally; milk punch and beef tea at pleasure. The patient improved under the treatment until November 3d, when hæmorrhage from the anterior tibial took place at 11½ P. M. Amputation of the lower third of the thigh (see TABLE XL, No. 69, p. 321, *ante*) by antero-posterior flaps was then resorted to by Assistant Surgeon T. C. Brainerd, U. S. A. Sixteen ounces of blood were lost. Injections of brandy and carbonate of ammonia were given to induce reaction, which took place six hours after the operation. After reaction had fully set in the patient continued to improve until recovered. The ligatures were removed on November 19th. By January 9, 1864, the cicatrix had entirely healed, leaving a most excellent stump." The subsequent record of the case was furnished by Surgeon B. A. Clements, U. S. A., who reported that "the patient was admitted, March 30, 1864, to Central Park Hospital, New York City, where several months later two sinuses were discovered in the cicatrix of the stump, leading to necrosed bone. On November 23d, the patient was put under the influence of chloroform and a transverse incision, three inches long, was made across the lower edge of the flap, when it was found that a ring of bone had exfoliated from the end of the femur, but was still bound down by an overlapping growth of new bone from the endosteum. This, with a portion of the new growth, was removed by Acting Assistant Surgeon S. Teats, assisted by Acting Assistant Surgeon J. K. Merritt." The patient remained under treatment until June 17, 1865, when he was discharged from service and pensioned. Examining Surgeon R. C. Dunham, of Seneca Falls, N. Y., August 6, 1873, certified to amputation of the thigh and added: "There is no amount of flesh over the end of the bone; it is covered by the skin only, and it appears to be very tender to the touch. He cannot wear an artificial limb very long at any time to be of any use to him by way of walking or standing," etc. The pensioner was paid June 4, 1880. The stumps of the tibia and fibula, removed at the second amputation, and the nearly circular sequestrum, together with four small fragments removed at the last operation, were contributed to the Museum by the operators. They constitute specimens 2604 and 1416, respectively, of the *Surgical Section*. A representation of the former appears in the wood-cut (FIG. 283).

FIG. 283.—Bones of stump of left leg three months after amputation. *Spec.* 2604.

Six hundred and twenty-seven of the patients who recovered after primary amputation in the upper third of the leg were Union soldiers. Of these, three officers were retired from the service, and six hundred and twenty-one enlisted men became pensioners. The

[1] LARREY (D. J. (*Memoires de Chirurgie Militaire et Campaigns*, Paris, 1812, T. II, p. 194): "Les auteurs conseillent l'amputation de la cuisse pour les coups de feu à la jambe, lorsque les os de ce membre sont fracturés jusqûà l'articulation du genou: ce précepte n'est réellement fondé que pour les fractures du tibia; car l'expérience m'a appris que, quand même le péroné serait fracassé jusqu'à son articulation avec le condyle du tibia, pourvu que ce dernier soit intact dans son extremité supérieure, a l'attache du tendon rotulien, l'opération est encore practicable à la jambe: il faut seulement, dans ce cas, après avoir scié les deux os an niveau de la tubérosité, faire une incision, en dehors sur les parties molles qui recouvrent le péroné, en suivant sa direction, ouvrir son articulation, le séparer du tibia, et en faire l'extraction totale."

names of three of the patients cannot be found on the Pension Rolls. Fifty-one of the pensioners have died since the date of their discharge.

FIG. 284.—Bones of left leg fractured in upper third. *Spec.* 4081.

CASE 727.—Private J. Walsh, Co. A, 57th Massachusetts, aged 39 years, was wounded at Fort Steadman, March 25, 1865, by a musket ball, which fractured the left leg in the upper third, perforating the tibia transversely and completely destroying the upper part of the fibula. Surgeon M. K. Hogan, U. S. V., reported the wounded man's admission to the field hospital of the 1st division, Ninth Corps, where the leg was amputated below the knee by Surgeon W. C. Shurlock, 51st Pennsylvania. Assistant Surgeon S. Adams, U. S. A., who contributed the amputated bones (*Spec.* 4081), represented in the annexed wood-cut (FIG. 284), reported that the patient nearly died during the operation from the effects of chloroform, having become pulseless and his respiration having ceased. One week after the reception of the injury the patient was sent to City Point, and afterwards he passed through various hospitals, being ultimately discharged from service September 12, 1865, and pensioned. In the statement subsequently furnished by B. F. Palmer, of Philadelphia, for an artificial leg, the amputation was described as having been performed by the "flap method." In his application for commutation, dated 1870, the pensioner described the condition of the stump as "sound and free from pain," and its length as "one inch and three-fourths from the patella." The pensioner was paid March 4, 1875. He is reported as having died since that date.

Examples of Fatal Primary Amputations in the Upper Third of the Leg. Two hundred and forty-nine cases of amputation in the upper third of the leg were performed on two hundred and forty-eight patients, in one instance both legs having been primarily amputated in the upper third:

CASE 728.—Private J. H. Metz, Co. G, 9th Regiment Veteran Reserve Corps, aged 33 years, was wounded in the left leg, near Fort Stevens, Defences of Washington, July 11, 1864. Surgeon O. A. Judson, U. S. V., made the following report of the injury: "A conoidal ball entered the limb anteriorly, passed through transversely, and produced a compound comminuted fracture at the upper third of the tibia, the man by his weight soon after fracturing the fibula. He was conveyed to Carver Hospital, Washington, where the leg was amputated at the upper third, by the lateral flap method, by Medical Inspector J. Wilson, U. S. A., on the day of the injury. The patient was anæmic and very nervous at the time of the operation. Cold-water dressings were applied. On the following day the clot had formed beneath the flaps, rendering it necessary to cut the suture and reopen the wound. The clot was then turned out and the flaps, after remaining open for some time, were closed up again. On July 13th, the flaps looked dark and were opened again, when a strong solution of sulphate of copper was applied. Sloughing commenced the next day, causing the tibia to protrude. Citrate of iron and quinine, with stimulants, were administered freely and the external applications repeated. By July 17th granulations were starting up over a portion of the surface of the flaps. Secondary hæmorrhage occurred on the following day. The patient appeared greatly exhausted, had very poor appetite, and was troubled with diarrhœa. Dry dressings were now applied to the stump. On July 23d an abscess was found to have formed above the knee, after which sloughing extended upwards. The patient continued to sink, his diarrhœa resisting all treatment; pulse rapid; skin of an icteric tinge. Death occurred from exhaustion, July 28, 1864. At the autopsy pus was found to have burrowed up the outer and posterior portion of the leg, extending to the dorsum of the ilium. The pus was of a dark color and contained a large quantity of free fat. The right lung adhered to the wall of the chest anteriorly, otherwise healthy. Both lobes of the left lung were slightly congested; heart normal; liver somewhat congested and gall-bladder distended with bile; spleen covered on lower portion with patches of lymph; stomach distended with dark fluid. The mucous membrane of the small intestine was thickened and covered with pseudo-membrane, easily removable." The amputated bones of the leg (*Spec.* 3166), represented in the wood-cut (FIG. 285), were contributed to the Museum by Acting Assistant Surgeon A. W. Merrill.

FIG. 285.—Fracture of left tibia and fibula in upper third. *Spec.* 3166.

CASE 729.—Private G. Kronmiller, Co. C, 14th New York Heavy Artillery, aged 38 years, was wounded before Petersburg, July 9, 1864, and admitted to the field hospital of the 1st division, Ninth Corps. Surgeon M. K. Hogan, U. S. V., reported: "Fracture of left tibia by minié ball; leg amputated at junction of upper and middle thirds by Surgeon T. F. Oakes, 56th Massachusetts." The wounded man was sent to the Depot Hospital at City Point the day following the injury, and two weeks later he was transferred to Philadelphia. Acting Assistant Surgeon R. J. Levis recorded the following result of the case: "The patient was admitted to South Street Hospital on July 26th. He stated that he reacted tolerably well after the amputation was performed, but felt weak from diarrhœa and previous loss of blood. At the time of his admission the tibia was exposed nearly two inches anteriorly, caused by the sloughing of the flaps. The granulations were healthy, but his condition was weak. On August 3d, his general condition was much improved and the granulations were apparently extending themselves over a portion of the bone, which, however, was black in color. Some days afterwards the patient was attacked with diarrhœa, and on August 16th the parts showed some disposition to slough, when diluted creasote and afterwards Labarraque's solution was applied. By August 20th the diarrhœa had changed into dysentery; general condition weak; pulse 100 to 110 and feeble; some enlargement of liver, and icteroid complexion. On August 30th the sloughing had ceased and the diarrhœa was relieved; but the patient had cough, dulness and crepitation being heard over the inferior portion of the right lung. This condition continued nearly the same for some days, expectoration being more free and the diarrhœa again increasing for a time. By September 20th the stump was gradually healing, excepting where the bone protruded. October 3d, liver less large; subcrepitant rales in lower portion of right lung posteriorly up to the middle of the base of the scapula; rales heard in left lung posteriorly also, but no change in resonance. In this manner the patient remained, with occasional improvements, until October 7th, when the diarrhœa

increased much and he began to sink gradually. Death occurred on October 8, 1864. The autopsy showed the lower lobe of the right lung partly solidified and studded with unsoftened tubercles. The rest of the posterior right lung was congested and filled with frothy exudation; left lung congested and likewise filled with frothy liquid. In the anterior lower lobe a small abscess was found containing about a drachm of pus; the anterior portions of both lungs were mostly respirable. The liver was somewhat enlarged and undergoing fatty degeneration; spleen congested and enlarged. The lower part of the colon showed evidence of chronic inflammation, the mucous membrane being dark, thickened, and degenerated. This condition diminished higher up, but in no part was the colon healthy. Part of the ilium was inflamed; mucous coat of stomach much thickened but not inflamed." The upper part of the amputated tibia, exhibiting the seat of the fracture, was contributed to the Museum by Surgeon H. Ludington, 100th Pennsylvania, and constitutes specimen 6529 of the *Surgical Section*.

In one of the two hundred and forty-nine fatal cases of primary amputation in the upper third of the leg the operation was followed by exarticulation at the knee joint, and in nine by amputation in the thigh:[1]

CASE 730.—Private B. G. Waters, Co. H, 19th Maine, aged 19 years, was wounded at Petersburg, October 15, 1864. Surgeon I. Scott, 7th West Virginia, reported that "he entered the field hospital of the 2d division, Second Corps, with shot fracture of leg, caused by a minié ball, for which Surgeon W. J. Burr, 42d New York, performed amputation." Surgeon E. Bentley, U. S. V., reported the following result of the case: "The patient was admitted to Baptist Church Hospital at Alexandria six days after being wounded. His left leg had been amputated at the upper third by anterior and posterior flaps on the day of the injury. When admitted his general health was fair, although he complained of considerable pain and required opiates to procure sleep. The integument over the spine of the tibia was black and had commenced to slough. This continued until the ends of both bones were exposed and the stump around presented a large mass of sloughing tissue. Stimulating lotions were applied and some improvement followed; all sloughing ceased and granulations commenced; but the granulations were pale and flabby, the edges of the integument everted, and the patient suffered excessive pain. On November 18th, sloughing reappeared and extended rapidly towards the popliteal region. He was also troubled some with diarrhœa, having about four passages daily. He was daily growing weaker from suffering and loss of appetite, and the stump became so painful that he would cry out frequently, complaining of spasmodic twitching. Taking these circumstances and the danger of secondary hæmorrhage into consideration, the limb was reamputated in the lower third of the femur (see TABLE XL, No. 200, p. 323, *ante*) on November 24th, by Assistant Surgeon W. A. Harvey, U. S. V., who used sulphuric ether as the anæsthetic and performed the operation by the circular method. Three days after the operation the patient's appetite had improved and he could sleep well, was more cheerful, and complained of but little pain. No union had yet taken place in the stump, but suppuration had commenced. On December 7th, when transferred to Prince Street Hospital, he was still doing well.". The subsequent records show the patient died of exhaustion April 25, 1865. The stumps of the tibia and fibula, removed at the second amputation, together with portion of the popliteal vein, external and internal popliteal nerves, were contributed to the Museum by Surgeon E. Bentley, and constitute specimens 3445, 3446, 3447, and 3448, respectively, of the *Surgical Section*.

In the next case hæmorrhages from the stump occurred twenty-four days after the operation. The patient died from exhaustion four days later:

CASE 731.—Private G. Hoasch, Co. E, 110th Ohio, aged 45 years, was wounded in the left leg, at Monocacy, July 9, 1864, and admitted to hospital at Frederick the following day. Assistant Surgeon R. F. Weir, U. S. A., reported: "The injury was produced by a minié ball, which fractured both bones at the lower third. The leg was removed on July 11th, at the upper third, by the circular method, by Acting Assistant Surgeon W. S. Adams. At the time of the operation the patient's condition was very poor from diarrhœa and the fatigue of marching; the leg swollen, sloughing, and threatened by gangrene. On July 20th there was slight sloughing of the flaps, and yeast poultices were applied. On the following day the slough was carefully trimmed away with scissors, and permanganate of potassa was applied in full strength by means of a mop, after which the end of the stump was covered with oakum wet with a dilution of the permanganate of potassa, and the whole enwrapped with oiled silk. On July 25th the slough came away nicely and a good granulating surface was found beneath it; general condition of patient slightly improved. Hæmorrhage occurred at 1 A. M. on August 4th, and another at 5 A. M., when thirty-two ounces of blood were lost. Bleeding was controlled by the application of a tourniquet before the attending medical officer arrived, and no attempt to ligate was made. At 9 A. M. the patient was found with his extremities cold and pulseless, and when the tourniquet was removed the bleeding had ceased. Stimulants were then ordered to be given freely and a hot-air bath, a nurse being placed by the side of the bed to watch the stump. At 11 A. M., a slight oozing was observed from the posterior tibial, which was drawn out and ligated. On the morning of August 6th the ligature came away during the dressing of the stump; the patient had not yet rallied from the attack of hæmorrhage; treatment continued. The patient died of exhaustion on August 8, 1864. An examination of the stump showed total absence of the clot in the cut extremities." The amputated bones of the leg, exhibiting a bad comminution throughout the lower third of the tibia and a transverse fracture in the fibula, were contributed to the Museum by the operator, and constitute specimen 3829 of the *Surgical Section*.

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[1] The limb was subsequently amputated at the knee joint in the case of Pt. C. Rhinehart, K, 74th Pennsylvania (TABLE LVI, CASE 42, p. 407); intermediary operation. Amputation in the thigh was performed in the following 9 cases: Pt. G. Tompkins, G, 1st N. Y. Battery, intermediary operation in upper third of thigh (TABLE XXXIV, No. 137, page 277); Pt. W. L. Hindman, E, 155th Pennsylvania, secondary operation in middle third of thigh (TABLE XXXIX, No. 125, page 315); Pt. *L. Winters*, K, 50th Georgia, secondary operation in middle third of thigh (TABLE XXXIX, No. 166, page 316); Corp'l H. G. Brown, B, 37th Wisconsin, secondary operation in middle third of thigh (TABLE XXXIX, No. 108, page 315); Pt. O. M. Corey, H, 114th New York, intermediary operation, lower third of thigh (TABLE XXXVI, No. 286, page 297); Pt. E. De Hoff, H, 38th Ohio, secondary operation, lower third of thigh (TABLE XL, No. 127, page 321); Pt. H. E. Eldred, E, 2d U. S. S. S., intermediary operation, lower third of thigh (TABLE XXXVI, No. 327, page 298); Pt. J. Morse, B, 2d Pennsylvania Heavy Artillery, intermediary operation, lower third of thigh (TABLE XXXVI, No. 502, page 300); Pt. B. G. Waters, H, 19th Maine, secondary operation, lower third of thigh. *Specs.* 3445, 3446, 3447, 3448 (TABLE XL, No. 200, page 323).

TABLE LXVIII.

Summary of One Thousand and Twenty-nine Cases of Primary Amputations in the Upper Third of the Leg for Shot Injuries.

[Recoveries, 1—771; Deaths, 772—1020; Result unknown, 1021—1029.]

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1	Abrams, A. J., Serg't, K, 9th N. Y. Heavy Artillery, age 33.	June 22, 22, '64.	Right; ant. post. flap. Surg. S. A. Sabin, 9th N. Y. H'vy Art'y. Disch'd Feb. 25, 1865.
2	*Adams, J. H.*, Pt., F, 3d Arkansas, age 21.	July 2, 2, '63.	Left. Surg. — Rouch, C. S. A. Paroled Nov. 12, 1863.
3	*Adams, W.*, Pt., D, 7th South Carolina, age 38.	May 16, 16, '64.	Right. Furloughed July 28, '64.
4	Alkin, A. S., Serg't, K, 18th Indiana, age 27.	July 20, 20, '64.	Left: flap. Disch'd Mar. 13, '65.
5	*Allen, J. W.*, Pt., King William Artillery.	Sept. 14, 14, '63.	——. Surg. — Robertson. Recovery.
6	Allen, L. F., Pt., I, 35th New York.	Dec. 13, 13, '62.	Left. Discharged June 6, 1863.
7	Andrews, A., Pt., G, 27th Ohio, age 39.	July 3, 3, '63.	Right. Discharged Jan. 11, 1864.
8	*Andrews, J. N.*, Serg't, F, 5th Ala., age 29.	July 1, 1, '63.	Left; circular. Exchanged Sept. 25, 1863.
9	Andrews, O. T., Lieut., C, 15th Illinois.	April 6, 8, '62.	Right. Discharged August 21, 1862.
10	Andrus, C. E., Pt., K, 106th Penn., age 20.	June 3, 3, '64.	Left; circ. Surg. M. Rizer, 72d Penn. Disch'd Dec. 28, 1864.
11	Aney, T. L., Pt., K, 56th Penn., age 18.	July 1, 3, '63.	Right; circular. Disch'd Jan. 17, 1865.
12	Arnell, J., Pt., B, 14th Iowa, age 19.	April 30, 30, '64.	Right; flap. Discharged Nov. 15, 1864.
13	Ayers, J. M., Pt., F, 76th Pennsylvania.	July 11, 13, '63.	Left; circ. Mustered out Nov. —, 1864.
14	*Bagwell, N. B.*, Serg't, B, 38th Georgia.	Sept. 17, 19, '62.	Left. Union surgeon. Retired Dec. 30, 1864.
15	Barrett, F. J., Corp'l, D, 59th New York.	May 3, 4, '63.	Right; flap. A. Surg. W. J. Burr, 59th N. Y. Disch'd April 18, '64.
16	Barron, W., Serg't, B, 2d Corps d'Afrique, age 24.	April 9, 9, '63.	Right; post. flap. Disch'd Oct. 5, 1863. *Spec.* 1420.
17	Bartholomew, G., Corp'l, D, 67th Penn., age 23.	Sept. 19, 19, '64.	Left; flap. Disch'd June 1, 1865. Died Nov. 14, 1867.
18	Bartlett, J., Pt., G, 5th N. Y. H'vy Artillery, age 20.	Oct. 19, 19, '64.	Right; lateral flap. Confederate surgeon. Disch'd July 4, 1865. *Spec.* 3092.
19	Basine, C., Pt., H, 8th Penn. Res., age 20.	Sept. 17, 17, '62.	Right. Discharged Dec. 6, 1862; gang. Dec., 1862, amp. thigh. 1870, stump sound.
20	Battelle, C. P., Serg't, A. 59th Mass., age 20.	Mar. 25, 25, '65.	Left; ant. post. flap. Discharged July 13, 1865.
21	Baughman, J., Pt., M, 5th Col'd Cavalry, age 20.	Aug. 15, 15, '64.	Right; flap. Surg. G. W. Bowen and A. Surg. J. Swan, 5th Col'd Cavalry. Disch'd Feb. 15, 1865.
22	Beach, J. (alias Smith), Pt., D, 28th Mass., age 20.	Mar. 25, 25, '65.	Left; circular. Surg. M. C. Rowland, 61st N. Y. Disch'd July 15, 1865.
23	*Bean, W. H.*, Pt., K, 8th North Carolina, age 26.	June 17, 17, '64.	Left; circular. Furloughed Sept. 16, 1864.
24	Beardsley, W. W., Pt., H, 82d Ohio.	Aug. 29, 30, '62.	R't; flap. A. Surg. A. W. Munson, 82d Ohio. Disch'd Nov. 3, 1862.
25	Beaumont, S., Capt., E, 29th Penn., age 26.	Dec. 17, 17, '64.	Left; circ. Surg. J. A. Wolf, 29th Penn. Must. out July 11, 1865.
26	Beeson, W. H., Pt., G, 82d Penn., age 22.	June 1, 2, '64.	Right; flap. Disch'd July 20, 1865. Died Jan. 3, 1870.
27	Berschig, A., Pt., A, 23d Ohio, age 20.	Sept. 22, 22, '64.	Left; ant. post. flap. Discharged Jan. 5, 1865.
28	Bierce, P., Pt., A, 1st Ohio Artillery, age 20.	Nov. 13, 13, '63.	Left; flap. Dec. 25, amp. arm. Disch'd August 29, 1864.
29	*Bigby, W. A.*, Pt., K, 1st South Carolina.	June 27, 27, '62.	Right. Surg. — Evans, C. S. A. Disch'd August 6, 1864.
30	Bingenheimer, C., Corp'l, A, 33d Wis., age 30.	Mar. 30, 30, '65.	Left; flap. Surg. J. W. Green, 95th Ill. Disch'd June 20, 1865.
31	*Bird, S. A.*, Pt., G, 12th South Carolina, age 26.	July 1, 2, '63.	Right. Exchanged Nov. 12, '63.
32	*Black, L. C.*, Lieut., F, 12th Georgia, age 21.	Sept. 19, 19, '64.	Left. Surg. J. M. Lawson, 30th N. C. To prison Dec. 9, 1864.
33	Blake, C. A., Pt., C, 14th New Jersey, age 24.	Oct. 19, 19, '64.	Right; ant. post. flap. Disch'd July 7, 1865.
34	Blomley, A., Corp'l, A, 91st Penn., age 27.	June 18, 20, '64.	Right; circ. Surg. J. Kerr, 62d Penn. Disch'd Sept. 27, 1864.
35	*Bobo, J. E.*, Pt., E, Holcomb's Legion, age 18.	Mar. 29, 29, '65.	Right; circ. Released June 14, 1865.
36	Bodwell, J., Serg't, G, 71st Ohio, age 22.	Dec. 15, 15, '64.	Right; ant. post. flap. Surg. D. C. Patterson, 124th Ohio. Discharged May 12, 1865.
37	*Bohannan, J. W.*, Corp'l, G, 8th Georgia, age 24.	Aug. 14, 14, '64.	Left; double flap. Released June 28, 1865.
38	*Boon, W. J.*, Pt., A, 5th North Carolina, age 27.	May 3, —, '63.	——. Furloughed July 23, 1863.
39	Bornman, J. M., Corp'l, I, 61st Penn., age 28.	Sept. 22, 22, '64.	Right (also w'd left leg and hand); flap. Surg. G. R. Lewis, 61st Penn. Disch'd July 21, 1865.
40	*Bonner, N. J.*, Pt., I, 33d Mississippi, age 22.	July 10, 11, '64.	Left; circular. Provost Marshal March 7, 1865.
41	Bouch, W. B., Pt., B, 139th Penn., age 24.	Sept. 21, 22, '64.	Left; ant. post. flap. Surg. E. R. Umberger, 93d Penn. Disch'd July 11, 1865.
42	Bovee, J. N., Pt., E, 18th New York, age 19.	June 27, 29, '62.	Right. Confed. surgeon. Discharged Sept. 15, 1862.
43	Boyle, J., Pt., G, 34th Mass., age 20.	Oct. 13, 14, '64.	Right. Disch'd March 18, 1865.
44	Bradley, H., Corp'l, Ordnance Depart., U.S.A., age 34.	Aug. 9, 9, '64.	Left; circ. Surg. W. O Meagher, 69th N. Y. Disch'd May 31, '65. (Also wound of left foot.)
45	Bradley, L. F., Corp'l, I, 8th Conn., age 22.	Sept. 29, 29, '64.	Left; flap. Disch'd Oct. 8, 1865.
46	Bradley, P., Pt., E, 164th New York, age 38.	June 16, 16, '64.	Left; ant. post. flap. Discharged July 31, 1865. *Spec.* 257. Died July 30, 1870.
47	Brady, J., Capt., G, 26th Massachusetts, age 33.	Sept. 19, 20, '64.	Left. Surg. J. G. Bradt, 26th Mass. Disch'd Dec. 31, 1864.
48	Branch, E. B., Pt., D, 77th N. York, age 20.	May 3, 3, '63.	Left; circ. Surg. G. T. Stevens, 77th N. Y. May 17, '64, re-amp. leg. Disch'd Sept. 20, 1864.
49	Brandenberg, A., Serg't. H, 6th Maryland.	April 2, 2, '65.	Right; circ. Surg. E. K. Foreman, 6th Maryland. Disch'd July 13, 1865.
50	Brannan, J., Pt., C, 44th New York, age 26.	July 2, 4, '63.	Right; flap. July 12, hæm.; post. tibial lig.; 15th, hæm.; femoral ligated. Recovery.
51	[1]Brannan, M., Corp'l, B, 9th Mass., age 30.	June 3, 4, '64.	Right; dou. skin flap. A. Surg. J. Ryan, 9th Mass. Disch'd August 20, 1864.
52	Breen, J., Pt., B, 15th Connecticut.	Dec. 13, 13, '62.	Right. Discharged June 18, '63.
53	Breeze, S., Pt., C, 76th Penn., age 45.	Aug. 16, 16, '64.	Left; flap. Disch'd Nov. 29, '64. Died of prostration August 11, 1869.
54	Brest, J. P., Pt., E, 100th Penn., age 24.	June 2, 3, '64.	Left; ant. post. flap. Surg. H. Ludington, 100th Penn. Discharged May 6, 1865.
55	Bridge, J., Pt., K, 57th New York, age 20.	May 3, 3, '63.	Right; circ. Surg. C. S. Wood, 66th N. Y. Gangrene. Disch'd Sept. 24, 1863.
56	*Bridges, J. W.*, Pt., K, 6th Georgia, age 24.	Aug. 19, 20, '64.	Left; lat. flap. To prison March 28, 1865.
57	Briggs, H. E., Pt., G, 3d Wisconsin.	Sept. 17, 17, '62.	Right. Discharged Dec. 27, '62.
58	*Brith, J. H.*, Surgeon, 1st Missouri.	June 9, 9, '63.	——. Surg. B. D. Lay, C. S. A. Recovered.
59	Britten, W. B., Serg't, F, 60th Ohio, age 23.	June 17, 17, '64.	Left; flap. Surg. W. B. Fox, 8th Mich. Disch'd Jan. 10, 1865.
60	Britton, J., Serg't, H, 18th Massachusetts.	Sept. 30, 30, '64.	Left; double flap. Disch'd Aug. 21, 1865.
61	Brockham, A., Pt., E, 58th Penn., age 47.	Sept. 29, 29, '64.	Left; post. flap. Disch'd June 27, 1865.
62	Broderick, J., Pt., D, 36th New York.	May 3, 3, '63.	Right; circ. Surg. C. N. Chamberlain, U. S. V. Disch'd Aug. 7, 1863.
63	Brondstetter, W., Pt., G, 9th N. Jersey, age 21.	Dec. 16, 16, '62.	Left; double flap. Surg. G. A. Otis, 27th Mass. Disch'd Jan. 21, 1864.
64	Brown, H., Pt., K, 22d Col'd Troops, age 19.	July 30, 30, '64.	Right. March 19, 1865, amp. left thigh. Disch'd Mar. 20, 1865.
65	Brown, M., Pt., E, 99th Ohio, age 20.	Aug. 6, 7, '64.	Left. Surg. A. M. Wilder, U. S. V. Nov. 14, re-amp. Mustered out May 30, 1865.
66	Bruback, D., Pt., B, 1st Penn. L. Art'y, age 21.	June 30, J'y 1, '62.	Right. Confed. surgeon. Discharged Dec. 3, 1862.
67	Bryan, D. M., Pt., B, 84th Penn., age 19.	Oct. 27, 28, '64.	Left; flap. Disch'd Sept. 2, '65.
68	Buckner, R., Pt., G, 16th New York H'vy Art'y, age 43.	Aug. 13, 13, '64.	Right; ant. post. flap. Disch'd Nov. 17, 1864. Died March 3, 1865; inflammation of stump.
69	Bullett, J., Pt., C, 13th Col'd Troops, age 24.	Dec. 16, 16, '64.	Right; flap. A. A. Surg. J. S. Giltner, U. S. A. Disch'd July 15, 1865.
70	Bumm, J., Pt., F, 29th Pennsylvania, age 20.	June 15, 15, '64.	Right; flap. Surg. J. A. Wolf, 29th Penn. Disch'd Aug. 4, '65.
71	*Burk, J.*, Pt., F, 38th Georgia, age 23.	Feb. 6, 7, '65.	Right; circular. To prison June 8, 1865.
72	Burnett, J., Pt., D, 107th New York, age 24.	May 3, 5, '63.	Right; circ. Disch'd Sept. 18, '63.
73	Burrell, J., Pt., K, 9th New Jersey.	Feb. 8, 8, '62.	Left. Surg. L. Braunn, 9th New Jersey. Disch'd Aug. 18, 1862.
74	Byers, A. F., Pt., H, 1st Tennessee.	Jan. 6, 6, '65.	Right; circular. Disch'd May 26, 1865.
75	*Byrne, J.*, Pt., F, 11th North Carolina.	July 3, 5, '63.	Left. Surg. — White, C. S. A. Recovered.
76	*Cadon, Z. P.*, Pt., E, 11th Virginia, age 26.	July 2, 3, '63.	Left. Union surgeon. Exch'd Nov. 12, 1863.

[1] LIDELL (J. A.), *Primary Amputation of Right Leg, for Injury inflicted by a Cannon Ball; Pyæmia developed thirty-one days afterwards with well-marked symptoms*, in *U. S. Sanitary Commission Memoirs*, Surgical Volume I. New York, 1870, page 535.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
77	*Cage, J.*, Serg't, E, 7th Tennessee, age 24.	April 2, 2, '65.	Left; circular. Released May 30, 1865.
78	*Cahill, T. J.*, Lieut., D, 7th N. C., age 26.	July 3, 4, '63.	R't. Surg. R. Gibbon, 28th N. C. Retired March 1, 1865.
79	Calkins, E. D., Pt., A, 6th Wisconsin.	Sept. 17, 17, '62.	Left. Disch'd January 5, 1863.
80	Callaghan, D., Pt., C, 1st Kansas.	Oct. 5, 5, '62.	Left; flap. Discharged May 30, 1863.
81	Callahan, R., Corp'l, G, 203d Penn., age 23.	Jan. 15, 15, '65.	Right; circ. Surg. G. C. Jarvis, 7th Conn. Discharged.
82	*Campbell, W. R.*, Pt., K, 2d Arkansas, age 24.	Nov. 30, 30, '64.	Right; circ. To Provost Marshal March 15, 1865.
83	Cantelli, A., Pt., A, 1st Artillery.	May 27, 27, '63.	Left; circular. Disch'd Feb. 27, 1864. *Spec.* 1026.
84	*Carbeny, J.*, Corp'l, Chesapeake Artillery.	May 2, 2, '63.	——. Surg. — Hunter, C. S. A. Recovery.
85	Carey, J., Pt., H, 3d N. Hampshire, age 37.	May 16, 18, '64.	Right; circular. Disch'd May 30, 1865.
86	Carmady, R., Pt., B, 13th Michigan, age 34.	Jan. 2, 2, '63.	Right; flap. Surg. F. Pratt, 13th Mich. V. R. Corps. Died 1876.
87	Carpenter, J. V., Pt., B, 70th New York, age 43.	May 12, 12, '64.	Right; post. flap. Mustered out Dec. 5, 1864.
88	Carson, W., Pt., K, 11th New Jersey, age 22.	July 2, 3, '63.	Right; flap. Disch'd June 10, 1865.
89	*Casada, A. P.*, Serg't, E, 11th Ga., age 20.	July 2, 2, '63.	Right. Surg. — Means, C. S. A. Exchanged Jan. 10, 1864.
90	Cashdollar, L. W., Pt., C, 128th N. Y., age 21.	Sept. 19, 20, '64.	Right; flap. Surg. C. H. Andrus, 176th N.Y. Oct. 27, hæm.; post. tib. lig. Disch'd May 30, 1865.
91	Castatar, A. J., Serg't, G, 20th Indiana.	Aug. 29, 29, '62.	——. Discharged Feb. 11, 1863.
92	Cavanaugh, G. E., Serg't Major, 20th Indiana.	Dec. 13, 13, '62.	Left. Discharged April 9, 1864.
93	Cavanagh, W., Pt., D, 5th N. Y. H. A., age 30.	July 18, 19, '64.	Right; ant. post. flap. Confed. surgeon. Disch'd Oct. 21, 1865.
94	*Cavil, E.*, Pt., B, 44th Miss., age 19.	Dec. 16, 17, '64.	Right; circ. Surg. — Brothers, C. S. A. Pro. Mar. Mar. 30, '65.
95	Champeau, A. L., Pt., E, 11th Vermont, age 24.	Aug. 21, 21, '64.	Left; circ. Surg. C. B. Park, 11th Vermont. Disch'd July 25, '65.
96	Chapin, A., Pt., B, 10th Wisconsin.	Oct. 8, 10, '62.	Right; flap. Surg. S. Marks, 10th Wis. Disch'd Dec. 9, 1862.
97	Cherry, I., Pt., C, 19th Indiana, age 17.	June 18, 19, '64.	Right; flap. Disch'd June 13, 1865. Died Oct. 13, 1867.
98	*Childers, N. A.*, Pt., F, 2d N. C., age 19.	Oct. 19, 19, '64.	Right; circ. Exchanged October 27, 1864.
99	Christner, W., Corp'l, B, 2d Maryland, age 26.	July 26, 26, '64.	Right. Disch'd March 8, 1865.
100	Clark, J., Pt., I, 41st Ohio, age 45.	Nov. 25, 25, '63.	Left. Disch'd July 28, 1864.
101	Clark, L. R., Capt., F, 117th New York.	Oct. 27, 27, '64.	Right; flap. Surg. H. W. Carpenter, 117th N. Y. Disch'd March 20, 1865.
102	Clark, P. D., Corp'l, E, 3d Vermont, age 24.	May 5, 5, '64.	Right; circ. Disch'd June 5, '65. Died Nov. 14, '68; dis. of liver.
103	*Clark, S.*, Pt., F, 12th Georgia Bat'ry, age 20.	July 9, 9, '64.	Left. Exchanged Sept. 21, 1864.
104	Clark, S. W., Corp'l, G, 2d Penn. H. A.	June 17, 17, '64.	Left; circ. (also wound right leg). Disch'd April 29, 1865.
105	Clay, R., Pt., B, 65th Illinois, age 23.	Nov. 26, 26, '64.	Right. Discharged June 5, 1865.
106	Cleary, M., Pt., D, 5th Cavalry, age 24.	Nov. 4, 4, '62.	Left; circular. Disch'd August 18, 1863.
107	Clements, J., Pt., F, 18th Massachusetts.	Dec. 13, 14, '62.	Left. Disch'd August 28, 1863.
108	Clements, S. W., Pt., F 40th Indiana.	Nov. 25, 27, '63.	Right; flap. Surg. H. McHenry, 125th Ohio. Disch'd Oct. 7, '64.
109	Closser, S., Pt., F, 104th New York, age 26.	July 1, 2, '63.	Right; flap. Disch'd March 25, 1864.
110	Cobaugh, W. D., Pt., H, 3d Penn. Cav., age 27.	Jan. 7, 7, '64.	Left. Disch'd June 15, 1864.
111	Cobett, G. W., Serg't, F, 22d Mass., age 30.	May 10, 10, '64.	Right; ant. post. flap. Disch'd October 17, 1864.
112	Cole, E., Pt., F, 120th New York, age 24.	July 2, 4, '63.	Right; flap; hæm.; lig. muscular branch. Disch'd April 20, 1864.
113	[1]*Coles, H. C.*, Pt., B, 4th Tenn. Cav., age 18.	May 19, 19, '64.	Right; circ. Furloughed June 30, 1864.
114	Colestock, W. W., Corp'l, K, 16th Mich., age 24.	May 8, 9, '64.	Right; ant. post. flap. Disch'd Dec. 9, 1864.
115	*Collier, J. W.*, Pt., Hart's Battery.	May 3, 3, '63.	——. Surg. A. Bowie, C. S. A. Recovered.
116	Conklin, A., Pt., K, 109th New York.	June 17, 17, '64.	Left; flap. Disch'd May 15, '65.
117	Conklin, A. J., Pt., D, 106th Penn., age 23.	Dec. 13, 13, '62.	Left; circ. Disch'd Oct. 1, 1863.
118	*Conley, J. H.*, Serg't, G, 11th Virginia, age 30.	Nov. 27, 27, '64.	Right; circular. Recovery.
119	Conley, W., Pt., G, 17th New York, age 25.	Mar. 16, 17, '65.	Left; ant. post. flap. Surg. E. Batwell, 14th Mich. Disch'd July 25, 1865.
120	Connel, J., Pt., C, 7th Missouri.	May 12, 12, '63.	Left; circ. Disch'd Dec. 3, 1863.
121	Conner, C. R., Corp'l, B, 19th Ohio, age 19.	May 27, 28, '64.	Right; circ. Surg. T. F. Duncan, P. A. C. S. Disch'd Aug 2, '65.
122	Connolly, D., Pt., B, 164th N. Y., age 22.	June 3, 3, '64.	R't; flap. Con. surg. (Also other wounds.) Disch'd June 19, '65.
123	Conover, J., Pt., C, 82d Pennsylvania.	May 3, 3, '63.	Left; flap. Surg. L. M. Emanuel, 82d Penn. Disch'd Sept. 5, '63.
124	*Cook, N. W.*, Pt., F, 55th North Carolina.	May 2, 2, '63.	Right. A. Surg. W. J. Green, 44th N. C. Recovery.
125	Cook, W. W., Pt., G, 2d Vermont.	May 3, 3, '63.	Left; flap. Surg. W. J. Sawin, 2d Vt. Disch'd April 12, 1864.
126	Coons, H., Pt., I, 103d Illinois, age 28.	Nov. 25, 27, '63.	Left. Discharged June 8, 1864.
127	Copps, W. P., Pt., A, 40th Mass., age 27.	June 3, 3, '64.	Right; flap. Surg. D. M. Goodwin, 3d Vermont. Gangrene. Disch'd Feb. 15, 1865.
128	Corley, J. D., Corp'l, H, 1st Arkansas, age 32.	Oct. 15, 17, '64.	Right; flap. Surg. W. B. Waterman, 1st Ark. Disch'd July 20, 1865.
129	Coughlin, M., Pt., A, 15th Infantry, age 42.	Aug. 7, 7, '64.	Left; flap. Disch'd July 15, '65. Died April 13, 1870.
130	Cowan, W., Pt., E, 21st Michigan, age 33.	Mar. 19, 19, '65.	Left; circ. Disch'd July 20, '65.
131	Coyle, P., Pt., E, 90th Penn., age 22.	May 5, 6, '64.	Right. Mustered out July 1, '65.
132	Crabtree, N., Pt., F, 112th Illinois, age 22.	Nov. 18, 18, '63.	Left; flap. Disch'd July 23, '64.
133	Craig, W., Pt., K, 53d Indiana, age 33.	Mar. 10, 10, '65.	Left; circ. Mustered out Aug. 11, 1865.
134	Crallwell, W. H., Pt., A, 14th Ohio, age 19.	Sept. 1, 2, '64.	Right; flap. Surg. C. N. Fowler, 105th Ohio. Disch'd Nov. 18, '65.
135	Cranston, D. J., Pt., H, 26th Iowa, age 21.	Nov. 27, 27, '63.	Left; flap. Disch'd April 26, '65.
136	Cresswell, W., Pt., C, 1st New York Rifles.	Jan. 9, 11, '63.	Left; circ. Surg. —White, C. S. A. Gang. Disch'd Sept. 26, 1863.
137	Critchett, T., Pt., I, 12th Massachusetts.	April 30, 30, '63.	Right; flap. Surg. A. M. Clark, U. S. V. Disch'd Aug. 19, 1863.
138	Crocker, A. B., Corp'l, I, 64th New York.	Sept. 17, 18, '62.	Left. Surg. D. E. Kelsey, 64th N. Y. Bone cut off. Disch'd Dec. 6, 1862.
139	Crocker, P. B., Serg't, F, 14th New York.	Aug. 29, 30, '62.	Left. Disch'd January 15, 1863.
140	Crooks, A., Pt., D, 149th Pennsylvania, age 23.	July 1, 2, '63.	Right; post. flap. Surg. W. T. Humphrey, 149th Penn. Disch'd July 26, 1865
141	Crowe, J., Pt., I, 63d New York.	Feb. 1, 1, '62.	Left. Disch'd April 30, 1862.
142	Curie, H., Pt., F, 7th Connecticut, age 27.	Aug. 16, 17, '64.	Left. Confed. surg. Re-amp. in thigh Aug. 19, 1864. Disch'd June 10, 1865.
143	Currier, C. P., Serg't, I, 39th Mass., age 27.	May 8, 9, '64.	Left; flap. Surg. — Mitchell, C. S. A. Disch'd March 10, 1865.
144	*Currey, J. B.*, Corp'l, F, 4th Texas.	Sept. 19, 20, '63.	Left. Surg. W. O. Hudson, 4th Alabama. Recovery.
145	*Dale, G. H.*, Pt., B, 22d North Carolina.	July 2, 2, '63.	Right. Surg. — McCadden, C. S. A. Retired Feb. 13, 1865.
146	Damon, A., Serg't, I, 19th Mass., age 20.	July 2, 3, '63.	Left; flap. Surg. N. Hayward, 20th Mass. Disch'd April 12, '64.
147	Danbert, J., Pt., D, 24th Michigan, age 23.	Feb. 7, 7, '65.	Right; circ. Surg. J. H. Beech, 24th Michigan. Disch'd May 16, 1865.
148	*Davenport, J. C.*, Pt., C, 53d Georgia.	May 3, 3, '63.	——; flap. Furloughed July 1, 1863.
149	David, A., Pt., H, 1st New York.	Aug. 29, —, '62.	——. Disch'd Nov. 30, 1862.
150	Davis, C., Pt., G, 48th Colored Troops, age 23.	April 2, 2, '65.	Left; ant. post. skin flap; circular sect. mus. Surg. N. N. Horton, 47th C. T. Disch'd Aug. 7, '65.
151	Davis, J. H., Pt., D, 97th Ohio, age 22.	June 27, 27, '64.	Right; flap. Surg. E. B. Glick, 40th Ind. Gangrene. Disch'd October 31, 1865.
152	*Davis, J. S.*, Pt., G, 17th North Carolina, age 38.	Mar. 10, 12, '65.	Left; circ. Released May 19, '65.
153	Decker, B., Pt., E, 38th New York.	May 3, 3, '63.	Left. Disch'd August 28, 1863.
154	Decker, H., Pt., B, 95th New York, age 42.	Oct. 27, 28, '64.	Left; circ. Ass't Surg. F. Whitman, 58th Mass. Mustered out. Died Sept. 25, 1867, of injury.
155	DeForrest, D., Pt., H, 100th N. York, age 26.	Dec. 10, 10, '63.	Right; ant. post. flap. A. Surg. J. W. Applegate, U. S. V. Discharged Sept. 22, 1864.
156	DeJean, C., Corp'l, H, 55th Ohio.	May 2, 4, '63.	Left; flap. Disch'd December 29, 1863.
157	Delany, W., Corp'l, A, 5th N. Hamp., age 29.	Aug. 25, 27, '64.	Left. Confed. surgeon. Disch'd October 29, 1864.
158	Delbriger, W., Pt., E, 25th Indiana, age 24.	Oct. 5, 5, '62.	Left; flap. Disch'd April 7, '63.
159	Dempsey, J., Pt., C, 116th Penn., age 26.	Dec. 13, 14, '62.	Left; flap. Disch'd April 19, '64.
160	Devlin, J., Pt., I, 61st New York, age 20.	Dec. 7, 8, '64.	Left; ant. post. flap. Surg. — Richards, C. S. A. Discharged Nov. 7, 1865.
161	Deyoe, N. W., Corp'l, E, 61st New York, age 21.	July 2, 2, '63.	Left; ant. post. flap. Discharged March 2, 1864. *Spec.* 4374.
162	Dickson, A. S., Corp'l, H, 125th Ill., age 26.	June 27, 27, '64.	Right; ant. flap. Surg. J. W. McGee, 57th N. C. Mustered out June 9, 1865.
163	Diedrich, H., Corp'l, I, 30th Iowa, age 23.	Oct. 21, 21, '63.	Right; circ. Surg. J. C. Morgan, 29th Mo. Gangrene. Disch'd May 15, 1865.

[1] O'Keefe (D. C.), *Surgical Cases of Interest, treated at Institute Hospital, Atlanta, Ga., etc.*, in *Confed. States Med. and Surg. Jour.*, Vol. 2, p. 30

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
164	Dines, D., Pt., D, 27th Ohio, age 21.	July 22, 22, '64.	Right; flap. Surg. A. B. Monohan, 63d Ohio. Disch'd July 24, 1865.
165	Dolley, T. W. Corp'l, K, 30th Maine, age 22.	April 9, 9, '64.	Left; circ. Disch'd Nov. 22, '64. Died Aug. 4, '67; phth. pulmo. and chr. diarrhœa. *Spec.* 4299.
166	Donaghy, W., Seaman, gunboat Tamah, age 27.	Nov. 4, 4, '64.	Right; circ. Surg. L. C. Fouts, 2d Tenn. Duty Feb. 7, 1865.
167	Donahue, J., Pt., H, 67th Penn., age 38.	Oct. 19, 21, '64.	Right; circ. Disch'd June 28, 1865.
168	Donaldson, L. J., Pt., F, 20th Ohio.	May 12, 12, '63.	Left; flap. Surg. E. L. Hill, 20th Ohio. Disch'd August 14, 1863.
169	Donnelly, J., Pt., A, 124th Illinois.	May 17, 17, '63.	Left; flap. Surg. E. Harrison, 68th Ohio. Disch'd Aug. 10, '63.
170	Doolan, P., Pt., B, 90th Penn., age 45.	May 5, 5, '64.	Right; flap. Disch'd Dec. 10, '64.
171	Dooley, H. C., Pt., C, 20th Indiana, age 27.	Mar. 27, 27, '65.	Right. Surg. T. W. Flora, 26th Ind. Disch'd June 2, 1865.
172	Dorsey, J., Corp'l, H, 16th Kentucky, age 21.	Nov. 29, 30, '64.	Right; gangrene. Disch'd July 17, 1865.
173	*Dorsey, E. W.*, Lieut., B, 11th N. C., age 24.	July 2, 2, '63.	Right; circ. To prison January 29, 1864.
174	Dougall, J. S., Pt., H, 44th New York.	Aug. 30, 30, '62.	Left. Surgeon W. Frothingham, 44th N. Y. Disch'd Oct. 27, '62.
175	Dougherty, H., Colonel, 22d Illinois.	Nov. 7, —, '61.	Left (also w'nds of arm and lung). Mustered out May 7, '63. Died April 7, '68; wound of lung.
176	*Douglass, J. C.*, Capt., H, 2d Missouri.	Oct. 4, 4, '62.	——. Recovered.
177	Dow, J. H., Pt., H, 29th Massachusetts, age 36.	July 30, 30, '64.	Left; circular. Disch'd May 26, 1865.
178	Dowling, W., Pt., F, 50th New York, age 28.	Aug. 14, 15, '64.	Left; long ant. post. flap. Surg. S. H. Plumb, 59th N. Y. Hæm. Disch'd August 18, 1865.
179	Downing, F. T., Corp'l, F, 108th New York.	Dec. 13, 14, '62.	Right. Surg. J. F. Whitbeck, 108th N. Y. Disch'd Aug. 6, '63.
180	Dresson, G. F., Pt., A, 35th New York.	Dec. 13, 13, '62.	Left. Disch'd August 29, 1863.
181	Duffy, J. P., Pt., O, 28th Pennsylvania.	Sept. 17, 17, '62.	Right. Disch'd June 27, 1863.
182	Duffey, O., Serg't, G, 48th New York, age 23.	Aug. 16, 16, '64.	Right; double flap. Confederate surgeon. Disch'd Nov. 30, 1864.
183	*Dunlap, J. R.*, Pt., C, Davis Cavalry, age 20.	July 3, 3, '63.	Right. Exchanged September 25, 1863.
184	Dunn, W. F., Serg't, E, 93d Illinois, age 36.	Oct. 5, 5, '64.	Left; flap. Disch'd June 14, '65.
185	Durand, E., Pt., K, 31st Wisconsin, age 37.	June 4, 5, '64.	Right; circ. Surg. P. S. Arndt, 31st Wis. Disch'd Feb. 9, '65. Died April 28, '70; consumption.
186	*Durnap, J. R.*, Pt., D, Perrin's Ala. Battery.	June 20, 20, '63.	——. Surg. W. H. Lipscomb, C. S. A. Recovery.
187	Dwyer, A., Serg't, G, 3d New York.	Oct. 7, 7, '64.	Right; flap. Disch'd March 28, 1865.
188	*Eakes, M.*, Pt., I, 23d North Carolina, age 19.	July 1, 2, '63.	Left. Exchanged Sept. 25, 1863.
189	*Echols, J.*, Pt., H, 24th Virginia.	May 16, 17, '64.	——: flap. Surg. C. B. Gibson, C. S. A. Transferred.
190	Edmunds, C., Pt., L, 1st Ohio Battery.	May 3, 3, '63.	Right. Surg. C. S. Wood, 66th N. Y. Disch'd Feb. 22, 1864.
191	Edson, S. W., Pt., D, 22d Massachusetts, age 29.	May 10, 10, '64.	Left; ant. post. flap. Surg. I. H. Stearns, 22d Mass. Disch'd Jan. 8, 1865.
192	Edwards, F. W., Pt., H, 1st Mass., age 22.	May 19, 19, '64.	Right; flap. Disch'd July 8, '64.
193	Elliott, J. H., Corp'l, G, 34th Mass., age 21.	Oct. 13, 14, '64.	Right; circ. Disch'd February 4, 1865.
194	Elliott, P., Pt., K, 15th Massachusetts.	Sept. 17, 17, '62.	Left; circ. Disch'd Dec. 4, 1862. Died Dec. 4, 1863. *Spec.* 4200.
195	Ellis, A., Pt., A, 142d N. York, age 40.	May 16, 16, '64.	Left; flap. Discharged.
196	Ellis, T. S., Pt., G, 2d U. S. Sharpshooters.	Aug. 29, 30, '62.	Left; circ. Disch'd April 25, '63.
197	Ellis, W., Pt., A, 14th Illinois.	April 6, 6, '62.	Right. Disch'd June 7, 1862.
198	*Ellis, W. T.*, Capt., B, 24th N. C., age 32.	Aug. 21, 21, '64.	Left; comb'n flap and circ. Surg. —— Wilson, C. S. A. Furl'd Oct. 21, 1864.
199	*Ellison, N. A.*, Pt., B, 16th Georgia, age 18.	July 3, 3, '63.	Right. Surgeons Schaffer and Busch, C. S. A. Retired Feb. 1, 1865.
200	English, W. W., Pt., H, 71st Indiana.	Aug. 30, 30, '62.	Right; circ. Confed. surgeon. Disch'd Nov. 28, 1862.
201	Erway, J. B., Pt., G, 149th Pennsylvania.	May 3, 3, '63.	Left. Surg. W. F. Humphrey. 149th Penn. Discharged.
202	Evans, A., Serg't, H, 66th New York.	Dec. 13, 13, '62.	Right. Surg. C. S. Wood, 66th N. Y. Disch'd Feb. 21, 1863.
203	Evans, J., Pt., C, 96th Penn., age 30.	May 12, 13, '64.	Left; circ. Disch'd March 23, 1865.
204	Evans, S. P., Capt., A, 5th Tennessee.	May 14, 15, '64.	Left; circ. Mustered out, 1865.
205	Evans, W., Lieut., F, 100th N. Y., age 27.	May 16, 17, '64.	Left; circ. Confederate surgeon. Disch'd Jan. 26, 1865.
206	Evers, B., Pt., G, 16th Michigan, age 20.	May 23, 23, '64.	Right; flap. Disch'd June 19, 1865.
207	Evercost, G., Corp'l, B, 27th Ohio, age 26.	July 4, 4, '64.	Left; flap. Surg. F. M. Rose, 43d Ohio. Gangrene. Disch'd July 17, 1865.
208	Everett, D., Pt., L, 15th Kansas Cav., age 18.	June 15, 17, '64.	Right; ant. post. flap; slough.; gangrene. June 20, re-amp. in thigh. Disch'd Aug. 19, 1864.
209	Failing, J., Pt., A, 122d New York, age 21.	May 6, 7, '64.	Left. Disch'd July 6, 1865.
210	Farnsworth, J. W., Pt., F, 57th Massachusetts.	June 17, 18, '64.	Left; flap. Surg. T. F. Oakes, 56th Mass. Mar. 23, '65, re-amp. Disch'd June 2, 1865.
211	Farry, M., Pt., I, 38th Massachusetts, age 30.	Oct. 19, 19, '64.	Right; flap. Disch'd July 12, '65. Died Oct. 12, '69; consumption.
212	Fehrman, H., Corp'l, I, 1st Maryland, age 25.	Aug. 18, 19, '64.	Left; flap. Disch'd June 2, 1865.
213	Felloon, R., Pt., E, 6th Michigan, age 43.	June 27, 27, '63.	Right; post. flap. Disch'd Oct. 5, 1863. Died Nov. 6, 1867; chronic diarrhœa.
214	*Fentress, H.*, Pt., C, 6th Virginia.	Aug. 30, 31, '62.	——. Surgeon J. H. Clairborne, P. A. C. S. Recovered.
215	*Ferguson, A.*, Lieut., 33d Alabama, age 32.	Nov. 30, 30, '64.	Right; ant. post. flap. To Prov. Marshal Feb. 14, 1865.
216	Fink, J., Pt., E, 8th N. Y. Heavy Artillery.	June 16, 17, '64.	Right; flap. Surg. N. Hayward, 20th Mass. Disch'd July 4, '65.
217	Fisher, C. S. M., Pt., H, 2d Penn. Art'y, age 23.	June 18, 19, '64.	Right. Disch'd Feb. 7, 1865.
218	Fisher, E. H., Lieut., A, 21st Indiana.	Oct. 20, 20, '62.	Both. Surg. E. Reed, 21st Ind. Disch'd Nov. 20, 1863.
219			
220	Fitch, G., Serg't, C, 6th Vermont.	June 3, 3, '64.	Right; double flap. Discharged Oct. 28, 1864.
221	Flaherty, T., Pt., C, 8th New Hampshire.	May 27, 27, '63.	Left; circ. Disch'd Nov. 1, 1863.
222	Flanders, W. M. F., S'g't, G, 16th Mass., age 23.	June 18, 19, '64.	Right; circ. Disch'd December 28, 1865.
223	Flanigan, M., Lieut.-Col., 24th Mich., age 37.	July 1, 1, '63.	Left. Disch'd Nov. 24, 1863.
224	[1]*Fleming, R. J.*, Serg't, D, 20th Tenn., age 25.	May 14, 14, '64.	Right; flap. Surgeon — Hall, C. S. A. Sloughing. Recovery.
225	Fletcher, D. M., Pt., 10th Ind. Battery, age 24.	Oct. 27, 28, '64.	Right; flap; re-amput'n in thigh. Mustered out July 10, 1865.
226	Foley, W., Pt., I, 62d N. York, age 43.	Mar. 25, 25, '65.	Right; ant. post. flap. Disch'd Oct. 26, 1865.
227	Ford, T., Pt., K, 35th Mass., age 33.	Aug. 19, 20, '64.	Right; ant. post. flap. Surg. G. W. Snow, 35th Mass. Disch'd April 1, 1865.
228	Foreman, R., Pt., D, 151st N. York, age 17.	July 9, 10, '64.	Right; flap. A. A. Surg. G. M. Paullin. Disch'd Sept. 4, 1865. *Spec.* 2341.
229	*Forrester, M.*, Pt., E, 26th North Carolina.	July 3, 3, '63.	Left. Exchanged March 3, 1864.
230	Foster, W. G., Pt., E, 16th Maine.	July 2, 3, '63.	Right; flap. Disch'd Nov. 24, 1863.
231	Foust, E., Sergeant, C, 126th Ohio.	Oct. 19, 19, '64.	Right; flap. Disch'd May 17, 1865.
232	Fowler, E. B., Pt., F, 27th Connecticut.	July 3, 4, '63.	Left. Surg. G. L. Potter, 145th Penn. Disch'd July 27, 1863.
233	Francis, W., Pt., A, 117th New York, age 21.	Sept. 29, 30, '64.	Left; ant. posterior flap. Disch'd May 31, 1865.
234	Frank, C., Pt., K, 149th New York, age 34.	May 25, 26, '64.	Left; circ.; gangrene. Disch'd August 18, 1865.
235	Freed, J. M., Pt., G, 89th Indiana, age 23.	April 9, 9, '65.	Right; flap. Disch'd June 5, '65.
236	Freeman, J. D., Pt., F, 15th W. Va., age 33.	Sept. 19, 19, '64.	Right; lateral flap. Discharged June 19, 1865.
237	French, B. F., Pt., H, 20th Maine, age 21.	July 2, 4, '63.	Right; circ. Disch'd June 14, 1864.
238	Frum, P., Corp'l, F, 3d West Virginia, age 28.	Aug. 29, 29, '62.	Left. Surg. R. W. Hazlett, 2d W. Va. Gangrene; re-amp. in thigh Sept. 21, 1862. Disch'd July 7, 1864. *Spec.* 1665.
239	Fuller, W. H., Pt., H, 5th New York Cavalry, age 23.	Sept. 19, 19, '64.	Right; oval flap. Surg. O. H. Armstrong, 5th N. Y. Cavalry. Disch'd March 16, 1865.
240	Furman, R., Corp'l, B, 8th New York Heavy Artillery, age 24.	June 3, 4, '64.	Left; long post. flap. Ass't Surg. C. H. Pegg, 8th N. Y. H. Art'y. Gang. Disch'd Aug. 30, 1865.
241	Galavan, D., Pt., H, 26th Connecticut.	June 14, 14, '63.	Right; circ. Disch'd August 17, 1863.
242	Gale, A., Pt., B, 51st New York.	Sept. 14, 15, '62.	Right. Surg. J. L. Dodge, 51st N. Y. Disch'd March 4, 1863.
243	Gallant, W. H., Pt., F, 122d Ohio, age 23.	Mar. 25, 25, '65.	Left. Discharged July 1, 1865.
244	Gant, M., Pt., B, 8th Penn. Reserves, age 18.	Sept. 14, 14, '62.	Left; flap; gangrene. Disch'd January 16, 1863.
245	*Ganto, L. M.*, Pt., H, 9th Georgia.	Oct. 7, 7, '64.	Left. Surg. T. C. Pugh, C. S. A. Recovery.
246	*Garland, J. C.*, Capt., A, Glen's Reg't, age 31.	July 4, 4, '63.	Right. Union surgeon. Hæm. To prison April 21, 1864.
247	Geary, M., Serg't, C, 128th Pennsylvania.	Sept. 17, 19, '62.	Left; flap. Ass't Surgeon T. A. Helwig, 128th Penn. Mustered out May 19, 1863.
248	Geddes, G., Pt., K, 126th Pennsylvania.	Dec. 13, 14, '62.	Left; circ. Disch'd March 19, 1863.

[1] O'KEEFE (D. C.), *Surgical Cases of Interest, treated at Institute Hospital, Atlanta, Ga., May and June*, 1864, in *Confederate States Medical and Surgical Journal*, Richmond, 1865, Vol. 2, p. 30.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
249	Gerhard, P., Corp'l, K, 1st Maryland, age 45.	Mar. 31, 31, '65.	Left; large post., short semi-lunar flap. Disch'd Oct. 11, 1865.
250	Gervin, J. C., Corp'l, D, 8th Tenn. Cav., age 31.	Dec. 17, 17, '64.	Right. Surg. G. W. Brady, 8th Tenn. Disch'd June 26, 1865.
251	Getchell, H. W., Pt., K, 1st Me. H. Art., age 24.	June 18, 19, '64.	Left; ant. post. flap. Disch'd June 6, 1865.
252	Gibbony, S. H., Pt., C, 7th Mich., age 25.	May 31, J'e 2, '62.	Right. Surg. G. Chaddock, 7th Mich. Disch'd Sept. 25, 1862.
253	Gibbs, G., Pt., G, 25th Indiana, age 36.	Oct. 5, 5, '62.	Right. Surg. B. F. Stephenson, 14th Ill. Disch'd April 7, 1863.
254	Gibson, T., Pt., B, 5th New Jersey.	Aug. 29, 29, '62.	Left; circ. Disch'd Feb. 9, 1863.
255	Gibson, W. B., Pt., F, 33d Iowa, age 24.	April 30, M'y 2, '64.	Left; flap. Discharged Sept. 2, 1865.
256	*Gillighen, J. M.*, Pt., A, 16th Georgia, age 20.	Jan. 11, 11, '65.	Right. Transferred to Confederate hospital.
257	Gillis, S., Pt., K, 68th Ohio.	May 16, 16, '63.	Left; flap. Surg. E. Harrison, 68th Ohio. Disch'd Dec. 10, 1863.
258	*Gillroy, B.*, Pt., H, 6th Tennessee.	April 6, 6, '62.	Left. Recovered.
259	Godfrey, A. A., Pt., A, 2d Maine, age 23.	Dec. 13, 13, '62.	Left. Discharged July 23, 1863.
260	Godfrey, C. P., Pt., F, 109th N. Y., age 22.	May 12, 13, '64.	Left; flap. Surg. W. B. Fox, 8th Mich. Disch'd May 23, 1865.
261	Gough, J. F. K., Pt., B, 173d New York.	June 14, 14, '63.	Right; flap. Disch'd October 19, 1863.
262	Good, A., Col'd laborer, Quartermaster Department, age 30.	Aug. 9, 9, '64.	Right; circ. Ass't Surg. W. Blundell, 5th N. J. Recovered June 26, 1865. *Spec.* 4153.
263	Goodsell, J. B., Corp'l, K, 114th N. Y., age 23.	Sept. 19, 20, '64.	Left; flap. Ass't Surgeon C. H. Allen, 8th Vermont. Disch'd April 13, 1865.
264	Goodwin. S. U., Pt., E, 188th Penn., age 24.	June 3, 3, '64.	Right; flap. Surg. D. Merritt, 55th Penn. (also wound left leg). Disch'd Sept. 19, 1864. Died August 12, 1867.
265	Graham, J. Q., Pt., D, 11th Infantry, age 18.	May 12, 12, '64.	Right; flap. Disch'd April 30, 1865.
266	Gray, E., Pt., C, 11th Pennsylvania, age 21.	April 2, 2, '65.	Right; flap. Surg. J. W. Anawalt, 11th Penn. Disch'd Sept. 30, '65.
267	Gray, J., Pt., K, 1st West Virginia, age 26.	July 18, 18, '64.	Right; flap. Disch'd Nov. 26, '64. Died December 17, 1873.
268	*Gray, J. R.*, Pt., C, 2d Arkansas, age 25.	Nov. 30, De. 1, '64.	Right; ant. post. flap. To Prov. Marshal March 7, 1865.
269	Greaney, P., Serg't, D, 80th New York, age 43.	Sept. 17, 19, '62.	Left; flap. Surg. R. Loughran, 80th N. Y. Disch'd Dec. 6, '62. Died July 31, 1874.
270	Green, B., Pt., H, 37th Col'd Troops, age 27.	Sept. 30, 30, '64.	Right; ant. post. flap. Disch'd April 14, 1865.
271	Green, G., Corp'l, H, 11th Ohio.	May 14, 14, '64.	Left. Surgeon J. McCurdy, 11th Ohio. Mustered out June, 1864.
272	Green, J., Pt., H, 65th Indiana, age 36.	Aug. 6, 6, '64.	Left; flap. Surg. A. M. Wilder, U. S. V. Disch'd June 9, 1865.
273	*Green, W. H.*, Pt., H, 2d South Carolina.	Sept. 19, 19, '64.	——. Transferred Nov. 15, 1864.
274	Greenwald, A., Seaman, U. S. Steamer J. P. Jackson, age 22.	June 28, 28, '62.	Right. Discharged April 24, '63.
275	Gridley, C. W., Corp'l, G, 53d Penn., age 27.	Mar. 31, 31, '65.	Left; circ. Mustered out Sept. 8, 1865.
276	Griffin, J., Pt., G, 2d Colored Troops.	Mar. 5, 5, '65.	Right; flap. Surg. W. A. McCulley, 2d Col'd Troops. Disch'd June 9, 1865.
277	Grimaldi, M., Pt., I, 82d New York, age 23.	May 12, 13, '64.	Right; circ. Surg. S. H. Plumb, 82d N. Y. Disch'd Dec. 6, 1864.
278	*Grimes, W. M.*, Pt., B, 3d South Carolina.	Dec. 13, 13, '62.	Left. Surg. J. Evans, 3d S. C. Recovery.
279	Grimm, L., Pt., A, 121st Penn., age 44.	Dec. 13, 13, '62.	Right. Disch'd August 10, 1863.
280	Groove, W. S., Pt., B, 93d Penn., age 16.	May 6, 6, '64.	Right. Surg. E. R. Umberger, 93d Penn. Disch'd June 15, '65.
281	Gross, E., Pt., E, 102d Penn., age 28.	Sept. 19, 19, '64.	Right; flap. Disch'd May 31, '65.
282	Grove, G. W., Serg't, D, 6th Maryland, age 24.	June 22, 23, '64.	Right; flap. Disch'd August 18, 1865.
283	*Gulledge, J. W.*, Pt., K, 59th Alabama.	May 16, 17, '64.	——; flap. Surg. C. B. Gibson, C. S. A. Retired Jan. 2, 1865.
284	Gulseth, O., Pt., K, 3d Wisconsin, age 24.	Mar. 16, 16, '65.	Left; ant. post. flap. Disch'd July 18, 1865.
285	Hafferin, C., Pt., F, 65th New York, age 19.	Oct. 19, 20, '64.	Right; circ. Surg. C. B. Hutchins, 116th N. Y. Hæmorrhage. Disch'd October 28, 1865.
286	Hagancier, F. H., Pt., F, 73d N. York, age 23.	May 3, 4, '63.	Right; post. flap. Discharged October 6, 1864.
287	Halderman, P., Pt., K, 13th Penn. Cav., age 20.	Oct. 28, 29, '64.	Left; flap. Discharged March 29, 1865.
288	*Haley, R. F.*, Corp'l, E, 18th Mississippi.	Sept. 17, 19, '62.	Right. Surgeon G. Chadwick, 7th Michigan.
289	Hall, L. J., Pt., I, 147th New York, age 19.	May 6, 6, '64.	Left; double flap. Surg. H. H. Hubbard, P. A. C. S. Disch'd March 18, 1865.
290	Halleck, S. K., Pt., B, 148th N. York, age 18.	Oct. 27, 28, '64.	Left; circ. Disch'd October 5, 1865.
291	Hammond, G., Pt., A, 1st Maryland Cav., age 25.	Aug. 16, 16, '64.	Left; ant. flap. Surg. R. A. Dodson, 1st Maryland Cav. Disch'd May 18, 1865.
292	Hancock, E. A., Capt., B, 9th Penn. Cav., age 25.	Mar. 16, 16, '65.	Left; flap. Surg. C. Helms, 92d Ill. Mustered out July 18, 1865.
293	Harlocker, H. H., Pt., C, 6th Wisconsin, age 18.	May 5, 7, '64.	Right; flap. Discharged May 26, 1865.
294	*Harris, W. C.*, Lieut., D, 2d Louisiana.	Nov. 27, 27, '63.	Left. Surg. — Mitchell, C. S. A. Recovery.
295	Harris, W. H., Pt., K, 1st Potomac Home Brigade, age 22.	July 9, 9, '64.	Left; circ. Surgeon — Newell, C. S. A. Disch'd June 6, 1865.
296	Hart, A. W., Pt., B, 185th New York, age 19.	Mar. 29, 30, '65.	Right; flap. Discharged Sept. 25, 1865.
297	Hart, W. H., Serg't, C, 111th N. York, age 41.	July 2, 3, '63.	Right; flap. Surg. F. Wolf, 39th N. Y. Disch'd March 12, 1864.
298	*Hartley, H. H.*, Pt., 7th Mississippi Artillery.	June 2, 3, '63.	——. Surgeon F. M. Hereford, P. A. C. S. Recovery.
299	*Harwood, T. F.*, Serg't, K, 53d Virginia.	July 1, 3, '62.	——. Surgeon — Harris, C. S. A. Recovery.
300	Hastings, W., Pt., E, 2d Artillery, age 27.	April 4, 4, '64.	Left; ant. post. flap; profuse primary hæmorrhage. Discharged Jan. 20, 1865.
301	Hastness, O., Pt., E, 11th Penn. Cav., age 21.	June 14, 14, '63.	Left. Surg. G. C. Harlan, 11th Penn. Cav. Disch'd May 3, '64.
302	*Hawkins, F. A.*, Pt., B, 13th North Carolina.	Sept. 17, 18, '62.	Right. Surg. McAden, 13th N. C. Recovery.
303	Hayes, A. G., Pt., C, 110th Pennsylvania, age 20.	May 6, 6, '64.	Left; flap. Surg. D. S. Hays, 110th Penn. Disch'd April 6, '65.
304	Haynes, S. M., Corp'l, B, 59th Mass., age 32.	Sept. 30, Oct. 1, '64.	Left; flap. Disch'd July 3, 1865.
305	*Hays, J. R.*, Pt., G, 28th Georgia, age 18.	June 17, 17, '64.	Right. Transferred July 14, '64.
306	Heary, P., Pt., B, 46th New York, age 20.	July 30, 31, '64.	Left; ant. post. flap. Surg. W. B. Fox, 8th Mich. Disch'd March 30, 1865.
307	Helm, E. B., Pt., B, 4th New Jersey, age 28.	April 2, 2, '65.	Right; flap. Disch'd June 20, 1865.
308	*Henderson, W. P.*, Pt., 1, Hampton Legion.	Oct. 27, —, '63.	——. Recovery.
309	Henry, E., Pt., C, 1st Col'd Troops, age 21.	Feb. 20, 20, '65.	Left; flap. Ass't Surgeon H. C. Merryweather, 5th Col'd Troops. Disch'd Oct. 18, 1865.
310	Henthorne, E., Pt., E, 116th Ohio, age 24.	June 5, 6, '64.	Left; flap. Surg. D. Baguley, 1st W. Va. Disch'd July 5, 1865.
311	Herron, J., Pt., I, 4th Delaware, age 23.	Aug. 21, 21, '64.	Right; flap. Disch'd May 29, '65.
312	Hershberg, D., Pt., F, 62d New York.	Nov. 23, 23, '61.	Right; post. flap. Ass't Surg. J. R. Smith, U. S. A. Discharged April 23, 1862.
313	Hill, C. M., Pt., G, 64th New York, age 28.	May 12, 12, '64.	Left; circ. Surg. J. W. Wishart, 140th Penn. Disch'd July 13, '64.
314	Hill, G. A., Pt., K, 13th West Virginia, age 18.	Oct. 19, 19, '64.	Right; ant. post. flap. Disch'd June 7, 1865.
315	Hill, R. A., Pt., A, 155th Pennsylvania, age 20.	Sept. 14, 15, '62.	Left; ant. post. flap. A. A. Surg. W. H. Butler. Gang. Disch'd June 9, 1863. *Spec.* 179.
316	Hill, S. P., Pt., A, 7th Kentucky Cavalry.	Aug. 23, 24, '62.	Right; flap. Surg. — Gurley, C. S. A. Disch'd July 14, 1863.
317	Hilton, N., Pt., B, 16th Infantry.	Dec. 31, 31, '62.	Right. Surg. C. S. Muscroft, 10th Ohio. Recov'd June 27, 1863.
318	Hiltz, J. W., Capt., C, 23d Ohio, age 33.	Sept. 19, 19, '64.	Right; flap. Surg. W. S. Newton, 91st Ohio. Disch'd Aug. 2, '65.
319	Himelberger, H., Pt., F, 5th Mich., age 26.	June 16, 17, '64.	Right; circ. Surg. H. F. Lyster, 5th Mich. Disch'd April 11, '65.
320	[1]*Hobart, H.*, Lieut., 2d Louisiana, age 26.	Sept. 17, 17, '62.	Right; post. flap. Recovery.
321	Hodge, A. D., Corp'l, A, 11th Penn. Cav., age 32.	Jan. 30, 30, '63.	Left; flap. Surg. G. C. Harlan, 11th Penn. Cavalry. Disch'd August 27, 1864.
322	*Hodge, T.*, Pt., A, 17th Alabama.	July 20, 20, '64.	Left. To prison Oct. 31, 1864.
323	Holcomb, Y., Pt., B, 36th Ohio, age 26.	Sept. 19, 19, '64.	Right; flap. Disch'd May 20, '65. *Spec.* 1498. (Also w'd at thigh.)
324	Holley, J. H., Pt., C, 38th Col'd Troops, age 19.	Sept. 29, 29, '64.	Right; flap. Disch'd Sept. 7, '65.
325	Hollinger, C., Pt., F, 55th Ohio, age 21.	Mar. 16, 16, '65.	Left; flap. Disch'd July 19, '65.
326	Hopes, J., Pt., M, 2d Cavalry.	June 9, 9, '63.	Right. Disch'd Nov. 10, 1863. Died 1868.
327	*Horton, F. B.*, Pt., D, 8th North Carolina, age 18.	Sept. 29, 30, '64.	Left. Sent to prison May 30, '65.
328	Horton, J. R., Serg't, D, 17th Penn., age 41.	Mar. 31, Ap. 2, '65.	Right; ant. post. flap. Disch'd August 12, 1865.
329	*Horton, S. J.*, Corp'l, E, 7th Texas, age 23.	July 22, 22, '64.	Left; ant. post. flap. To Provost Marshal Dec. 8, 1864.
330	Hovatter, M. J., Pt., F, 15th West Va., age 40.	Oct. 13, 13, '64.	Right; ant. post. flap. Surg. W. S. Walsh, 15th West Virginia. Disch'd July 4, 1865.
331	Howard, E., Pt., F, 3d Infantry, age 32.	July 2, 4, '63.	Right; circ. Disch'd October 12, 1863.
332	*Howard, J. W.*, Corp'l, D, 61st Virginia.	May 12, 12, '64.	Left. Confederate surgeon. Recovery.

[1] FISCHER (G. J.), *Report of Fifty-seven Cases of Amputations in the Hospitals near Sharpsburg, Md., after the battle of Antietam, etc.*, in *American Journal Medical Sciences*, 1863, Vol. XLV, p. 48.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
333	Hubbard, G. E., Pt., F, 9th New Hamp., age 18.	Sept. 17, 17, '62.	Left; flap. Ass't Surg. J. S. Emerson, 9th N. H. Disch'd Feb. 4, 1863.
334	Hummel, G., Lieut., B, 28th Ohio.	Sept. 17, 18, '62.	Left. Disch'd Feb. 15, '63. Died May 25, 1865; cong. pneumonia.
335	Huston, R., Corp'l, I, 58th Illinois, age 19.	May 11, 12, '64.	Right; flap. Surg. H. M. Crawford, 58th Ill. Mustered out.
336	Hutchinson, J., Pt., I, 2d Connecticut, age 20.	Oct. 19, 19, '64.	Left; long post. flap. Surg. H. Plumb, 2d Conn. H'vy Artil'ry. Disch'd Sept. 13, 1865. Died Sept. 10, 1869.
337	Hutson, W., Pt., G, 28th Pennsylvania.	Sept. 17, 19, '62.	Right; circ. Surg. H. E. Goodman, 28th Penn. Disch'd July 21, 1863.
338	Ingram, J., Pt., A, 1st Pennsylvania Artil'ry.	Dec. 13, 13, '62.	Right; circ. Disch'd July 11, 1863. *Spec.* 1775.
339	*Jackson, G. L.*, Serg't, B, 17th Alabama, age 21.	July 28, 29, '04.	Right; circ. To Provost Marshal Dec. 1, 1864.
340	*Jarrell, C.*, Pt., G, 30th Virginia.	June 3, 3, '64.	——. Surg. — Hunter, C. S. A. Recovery.
341	Jensen, P., Corp'l, G, 15th N. Y. H. A., age 24.	Feb. 6, 6, '65.	Right; double flap. Discharged Nov. 20, 1865.
342	*Jesse, T. H.*, Pt., A, 15th Georgia.	June 27, 28, '62.	Right; ant. Surg. R. Q. Stoney, C. S. A. Recovery.
343	*Johnson, A. O.*, Pt., C, 11th Georgia, age 19.	July 2, 3, '63.	Right. Exchanged Nov. 12, '63.
344	Johnson, E. B., Pt., E, 4Cth Indiana, age 26.	Sept. 2, 2, '64.	Right; circ. Disch'd January 28, 1865.
345	Johnson, G., Col'd servant, age 21.	Dec. 14, 14, '64.	Left; flap. Surg. W. F. Smith, 73d Penn. Duty June 1, 1865.
346	Johnson, J., Pt., D, 9th New Jersey, age 20.	Aug. 18, 18, '64.	Left; circ. Disch'd April 14, '65.
347	*Jones, G. H.*, Pt., I, 2d Mississippi, age 20.	July 1, 3, '63.	——; flap. Surg. — Hubbard, 2d Miss. Retired Aug. 29, 1864.
348	Jones, L., Pt., E, 5th Conn., age 40.	Mar. 16, 16, '65.	Right; post. flap; gang. Disch'd August 11, 1865.
349	Jones, W. B., Pt., B, 5th Kentucky, age 38.	Nov. 25, 26, '63.	Left; circ. flap. Disch'd June 22, 1864.
350	Joseph, C., Pt., B, 100th Pennsylvania.	June 16, 16, '62.	Left. Surg. H. Luddington, 100th Penn. Disch'd Sept. 17, 1862.
351	Joyce, A. J., Pt., E, 16th Michigan, age 20.	July 3, 3, '63.	Left; antero-post. flap. Surg. J. Thomas, 118th Penn. Hæm. Disch'd March 18, 1864.
352	Jubb, O. A., Pt., M, 7th Mich. Cavalry, age 24.	Aug. 25, 25, '64.	Left; circ. Surg. G. S. Dilts, 5th N. Y. Artillery. Gang. Disch'd August 9, 1865.
353	Keenan, L., Pt., E, 140th Pennsylvania, age 18.	July 3, 4, '63.	Right. Surg. C. S. Wood, 66th N. Y. Disch'd Jan. 25, 1864. Died Feb. 22, 1868.
354	Kelly, P., Pt., G, 3d Artillery, age 27.	May 4, 4, '62.	Left. Disch'd June 26, 1862.
355	Kenney, J., Corp'l, E, 10th Conn., age 33.	April 2, 2, '65.	Left; circ. Mustered out Sept. 29, 1865.
356	Kenney, J., Pt., K, 20th Massachusetts.	Sept. 17, 17, '62.	Left. Discharged Feb. 10, 1863.
357	*Kennidy, I. S.*, Pt., H, 5th Virginia.	May 3, 4, '63.	Right; circular. Recovery.
358	Keiner, W., Serg't, E, 6th Penn. Reserves.	July 24, 24, '61.	Left; circ. Surg. C. Bower, 6th Penn. Reserves. Disch'd Mar. 26, 1862.
359	Kerrin, J., Pt., G, 19th Infantry, age 27.	Aug. 13, 13, '64.	Right; flap; gang.; re-amputat'n thigh. Disch'd June 4, 1865.
360	Kiscaden, J., Pt., C, 99th Pennsylvania, age 21.	Oct. 27, 28, '64.	Left; ant. post. flap. Discharged August 7, 1865.
361	Kitson, T. W., Miss. Marine Brigade.	Mar. 26, 26, '62.	Left. Surgeon J. Roberts, Miss. Mar. Brig. Disch'd Nov. 21, '63.
362	Knight, M., Pt., D, 56th Colored Troops.	May 27, 27, '65.	Left; flap. Surg. D. A. La Force, 56th Col'd Troops. Discharged.
363	Knittle, J., Pt., D, 150th Pennsylvania, age 19.	June 1, 3, '64.	Right; circ. Discharged June, 1865.
364	Koehler, F., Pt., I, 7th Connecticut.	July 11, 11, '63.	Left; circ. Disch'd May 14, 1864. Died Oct. 4, 1875. *Spec.* 1510.
365	Kuchman, D., Pt., B, 29th New York.	Aug. 29, 29, '62.	Right. Disch'd January 27, 1863.
366	Knemmel, H., Corp'l, H, 2d Michigan, age 22.	July 30, 30, '64.	Right; lateral flap. Surg. A. F. Whelan, 1st Mich. S. S. Disch'd March 17, 1865.
367	Kuen, W., Corp'l, E, 55th Pennsylvania, age 22.	May 16, 16, '64.	Right; flap. Disch'd April 29, 1865.
368	Kuhn, L., Serg't, B, 88th Indiana, age 24.	Nov. 25, 25, '63.	Right; flap. Surg. L. D. Waterman, 39th Ind. Disch'd July 4, 1864.
369	Kyner, J. H., Pt., F, 46th Ohio.	April 6, 8, '62.	Right; flap. Disch'd June 30, '62.
370	Lackey, L., Pt., A, 209th Pennsylvania, age 20.	Nov. 17, 18, '64.	Right; long post. and short ant. flap; gangrene. Disch'd April 11, 1865.
371	*Lahon, R. E.*, Lieut., F, 23d Georgia.	Aug. 30, 30, '63.	——. Surg. — Morgan, C. S. A. Recovery.
372	Latimer, O. P., Pt., E, 105th Ohio, age 29.	Sept. 1, 1, '64.	Left; circ. Surg. C. N. Fowler, 105th Ohio. Disch'd Mar. 7, '65.
373	Lawrence, R. E., Pt., F, 81st New York, age 20.	June 3, 3, '64.	Right; circ. flap. Disch'd May 23, 1865.
374	Laws, B., Pt., E, 30th Col'd Troops, age 23.	Feb. 11, 11, '65.	Right; flap. Disch'd Oct. 18, 1865. Died Oct. 5, 1868.
375	Lawson, B. F., Corp'l, F, 89th Illinois, age 23.	Dec. 16, 16, '64.	Left; flap. Transferred July 31, 1865.
376	Lee, C. P., Pt., H, 8th New Jersey, age 21.	May 5, 6, '64.	Left; flap. Disch'd Sept. 12, '64. Died May 18, 1867.
377	Lee, D. L., Serg't, E, 71st Ohio, age 21.	Dec. 16, 16, '64.	Left; flap. Surg. C. N. Hoagland, 71st Ohio. Disch'd April 22, '65.
378	Leggett, R., Lieut. Col., 10th Connecticut.	July 25, 25, '63.	Left. Surg. M. T. Newton, 10th Conn. Disch'd Aug. 23, 1864. Died Sept. 18, '74; chr. phthisis.
379	*Lennox, J. H.*, Pt., B, 3d ——	April 6, 6, '62.	——. Confederate surgeon. Recovery.
380	Leonard, H. D., Corp'l, D, 92d N. Y., age 29.	June 2, 2, '64.	Right; flap. Disch'd Jan. 19, '65. Died Mar. 21, '70; consumption.
381	Lewis, E. C., Pt., K, 8th New Jersey, age 18.	April 2, 2, '65.	Right; circ. Disch'd Nov. 4, '65.
382	Leuscher, W., Pt., C, 6th Conn., age 36.	July 18, 20, '63.	Left. Surg. — Colton, C. S. A. Disch'd Sept. 6, '64. Died since.
383	*Lewis, E.*, Lieut., B, Palmetto S. S., age 23.	Oct. 7, 7, '64.	Left; flap. Released May 8, '65.
384	Lewis, W., Corp'l, C, 39th Ohio, age 30.	July 22, 22, '64.	Left; flap. Discharged June 27, 1865.
385	*Linker, J.*, Corp'l, B, 7th North Carolina, age 24.	July 3, 4, '63.	Left. Surg. — Higginbotham, C. S. A. Transferred Nov. 25, '63.
386	*Little, G. W.*, Pt., I, 24th Georgia.	May 6, 6, '64.	Right. Surg. — Mitchell, C. S. A. Recovery.
387	Livermore, W. H., Pt., H, 55th Illinois, age 17.	July 28, 28, '64.	Right; circ. Surg. I. N. Barnes, 116th Illinois. (Hæm.) Disch'd February 5, 1865.
388	Loafman, W. J., Pt., F, 9th Kentucky.	April 7, 7, '62.	Left. Disch'd June 24, 1862.
389	Loeweg, M., Pt., D, 125th New York, age 19.	June 17, 17, '64.	Right; lateral flap. Discharged October 21, 1865.
390	Lohr, N., Pt., F, 55th Pennsylvania, age 26.	June 17, 18, '64.	Left; flap. Surg. G. T. Stevens, 77th New York. Disch'd March 16, 1865.
391	Long, G. P., Pt., 4th Indiana Battery.	Mar. 16, 16, '62.	Left; flap. Surg. E. Swift, U. S. A. Disch'd Dec. 8, 1863.
392	Long, J. J., Pt., C, 139th Pennsylvania, age 30.	May 12, 13, '64.	Left. Surg. S. F. Chapin, 139th Penn. Disch'd May 12, 1865.
393	Long, J. S., Pt., F, 33d Ohio.	Mar. 19, 21, '65.	Right; flap. Disch'd June 28, 1865.
394	Long, L. R., Pt., I, 17th Pennsylvania.	July 14, 14, '63.	Left; flap. Discharged Nov. 16, 1863.
395	Loomis, J., Serg't, B, 56th New York, age 23.	April 9, 9, '65.	Right; double flap. Surg. C. E. Briggs, 54th Mass. Discharged October 13, 1865.
396	Loomis, R. D., Pt., H, 57th Mass., age 32.	May 12, 13, '64.	Left; circ. Ass't Surg. S. Adams, U. S. A. Disch'd Sept. 12, 1865.
397	[1] Lorence, J., Corp'l, K,	Feb. 8,	Both; flap. Surg. H. W. Rivers, 4th
398	9th New Jersey, age 35.	8, '62.	R. I., and Surg. J. H. Thompson, U. S. V. Disch'd Sept. 30, '62.
399	Lovering, H. B., Pt., C, 3d Mass. Cav., age 23.	Sept. 19, 19, '64.	Left; circ. Surg. D. F. Leavit, 3d Mass. Cavalry. Discharged June 10, 1865.
400	Lovett, J. H., Corp'l, F, 40th Mass., age 19.	May 16, 16, '64.	Left; circ. Disch'd June 14, '65.
401	Lowell, C., Lieut., C, 7th Maine, age 29.	May 5, 5, '64.	Right; flap. Surg. W. Buck, 6th Maine. Disch'd Oct. 3, 1864.
402	Lowry, T., Pt., F, 48th New York.	July 18, 20, '63.	Right; circ. Surg. G. W. Miller, 97th Penn. Disch'd Aug. 25, '63.
403	Luckenbach, O. A., Capt., C, 46th Pennsylvania.	Aug. 9, 11, '62.	Right; flap. Surg. T. Antisell, U. S. V. Disch'd Oct. 2, 1862.
404	Luffman, M. M., Pt., A, 3d Delaware, age 22.	June 18, 19, '64.	Right; flap; gangrene. Disch'd.
405	Luke, J., Pt., K, 99th Pennsylvania, age 20.	May 5, 5, '64.	Left; flap; gangrene. Disch'd March 16, 1865.
406	Lunon, G., Pt., B, 22d Iowa.	Sept. 19, 20, '64.	Right; circ. Surgs. J. W. H. Vest, 28th Iowa, and J. C. Shrader, 22d Iowa. Disch'd May 29, '65.
407	Lupton, T., Corp'l, A, 2d N. Y. H. Art'y, age 19.	June 16, 17, '64.	Right; circ. Surg. J. W. Wishart, 140th Penn. Disch'd Nov. 28, '64.
408	Macomber, C., Pt., B, 20th Mich., age 29.	May 12, 12, '64.	Left; flap. Surg. S. S. French, 20th Mich. Disch'd Jan. 26, '65.
409	*Maggard, J.*, Pt., K, 13th Mississippi, age 18.	Oct. 19, 20, '64.	Left; post. flap. Ass't Surg. E. L. De Long, 77th New York. To Provost Marshal April 1, 1865.
410	*Mahony, G.*, Pt., B, 19th Georgia.	Aug. 29, 29, '62.	Right. Surg. R. Batty, 19th Ga. Recovery.
411	Manchez, E., Pt., B, 17th Missouri, age 23.	May 27, 27, '64.	Right; circ. Ass't Surg. D. C. Greenleaf, 4th Iowa. Disch'd September 15, 1864.
412	Mangan, M., Lieut., E, 6th Wisconsin, age 33.	July 2, 3, '63.	Right; flap. Resigned April 3, 1864.
413	Mann, E. M., Pt., 11th New York Battery.	May 3, 3, '63.	Right. Discharged.
414	Manning, W., Corp'l, I, 20th Mass., age 21.	Aug. 16, 16, '64.	Left; flap. Surg. N. Hayward, 20th Mass. Disch'd May 10, '65.
415	Mars, U., Pt., K, 34th Indiana.	May 2, 2, '63.	Right. Disch'd July 17, 1863.
416	*Martin, A. B.*, Pt., G, 17th Ala., age 39.	July 28, 28, '64.	Left; ant. post. flap. To Provost Marshal Dec. 28, 1864.
417	Martin, E. T., Pt., B, 56th Pennsylvania, age 21.	June 20, 20, '64.	Right; circ. Disch'd Mar. 31, '65. Died Jan. 18, '69; abse. of brain.
418	Martin, F., Pt., H, 19th Massachusetts.	July 1, 2, '62.	Right; flap. Disch'd April 9, 1863.

[1] Thompson (J. H.), *Report of Cases occurring at the Battle of Roanoke Island, Virginia*, in *Am. Med. Times*, Vol. IV, 1862, page 199.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
419	Martin, R., Pt., A, 13th Col'd Troops, age 40.	Dec. 17, 17, '64.	Left; flap. A. A. Surg. J. S. Giltner. Disch'd August 12, 1865.
420	Martin, R., Pt., 57th N. York, age 24.	June 20, 21, '64.	Left; circ. Duty Sept. 12, 1864.
421	Martin, W., Corp'l, I, 6th Indiana, age 30.	Sept. 19, 21, '63.	Left; Surg. — Gardner. Disch'd June 8, 1864.
422	*Mason, R. O.*, Pt., Ashland's Va. Bat'y, age 36.	July 2, 3, '63.	Right. Confed. surgeon. Retired March, 1865. (Also w'd left leg.)
423	*Mathis, W. M.*, Pt., I, 11th Ala., age 27.	Aug. 21, 21, '64.	Right; circular. Transferred.
424	Matthews, D., Pt., B, 39th New Jersey, age 28.	April 2, 2, '65.	Left; circ.; gangrene. Recovery August 2, 1865.
425	*Matthews, S. J.*, Serg't, I, 9th Ala., age 22.	July 2, 3, '63.	Right; circ. Paroled Sept. 25, 1863.
426	Matthews, T., Lieut., F, 46th Pennsylvania.	Aug. 9, 11, '62.	Left; circ. Disch'd Dec. 29, '62.
427	Maxwell, W. E., Corp'l, G, 95th N. Y., age 22.	May 8, 8, '64.	Right; flap. A. Surg. J. T. Duffield, 7th Indiana. Disch'd Jan. 7, 1865.
428	McCaigue, S. B., Corp'l, H, 183d Pennsylvania.	May 12, 12, '64.	Left. Surg. W. J. Burr, 42d New York. May 27, amp. knee joint. Mustered out July 13, 1865.
429	McCarty, J., Pt., M, 4th Artillery.	Nov. 5, 5, '64.	Left; flap; gangrene; subsequent operation. Discharged.
430	McClure, W. H., Pt., A, 137th N. York, age 46.	July 2, 3, '63.	Left; post. flap; hæm. Disch'd May 17, 1864.
431	McCluskey, P., Pt., B, 69th New York.	Dec. 13, 13, '62.	Right. Discharged August 17, 1863.
432	McConnell, J. E., Pt., B, 24th Mich., age 19.	June 18, 18, '64.	Left; flap. Surg. J. H. Beech, 24th Mich. (Also wound right leg.) Disch'd Sept. 12, 1865.
433	McCord, M. D., Corp'l, A, 4th N. Y. H. Art'y, age 25.	Aug. 25, 27, '64.	Left; flap. Confederate surgeon. Disch'd May 20, 1865.
434	*McGalliard, W. M.*, Cap., E, 8th La., age 25.	July 2, 3, '63.	Right; circ. Hæmorrhage. To prison Mar. 2, 1864.
435	*McGee, A.*, Serg't, D, 7th South Carolina, age 23.	Oct. 19, 20, '64.	Right; post. flap. Ass't Surg. W. A. De Long, 77th New York. To Provost Marshal April 1, '65.
436	McGee, A. S., Pt., D, 5th Vermont, age 43.	June 29, 30, '62.	Right; flap. Confed. surgeon. Disch'd Feb. 11, 1863.
437	McGlynn, M., Pt., D, 63d New York, age 36.	Sept. 17, 17, '62.	Left. Discharged Dec. 30, 1862.
438	McGowan, J., Pt., C, 94th New York.	April 2, 3, '65.	Right; circ. Disch'd July 27, 1865.
439	McGrath, W., Pt., E, 3d Rhode Island H. Art'y, age 48.	Feb. 2, 2, '64.	Right; ant. post. flap. Surg. M. S. Kittinger, 100th New York. Disch'd Oct. 14, '64. *Spec.* 2910.
440	McGuire, C., Corp'l, G, 19th Indiana, age 31.	July 1, 2, '63.	Left; flap; hæm. Disch'd June 11, 1864. Died Feb. 7, 1870.
441	*McHane, H.*, Major, 12th Louisiana, age 25.	Nov. 30, Dec. 1, '64.	Left; oval flap. To Pro. Marshal March 27, 1865.
442	McHenry, G. W., Pt., K, 105th Penn., age 21.	July 2, 2, '63.	Right; flap. Disch'd July 11, 1865.
443	McIntire, G., Pt., I, 7th Maine, age 24.	May 10, 10, '64.	Right. Surg. F. M. Everleth, 7th Maine. Oct. 16, amp. thigh. Disch'd June 16, 1865.
444	McIntosh, J. B., Brig. General U. S. V.	Sept. 19, 19, '64.	Right. Retired July 30, 1870.
445	McKalvey, J., Pt., D, 102d Pennsylvania.	May 31, 31, '62.	Left. Discharged June 10, 1863.
446	*McKennon, M. J.*, Pt., F, 8th Georgia.	June 27, 28, '62.	Right. Confederate surgeon. Recovery.
447	McKnight, J., Pt., B, 2d Delaware, age 45.	Dec. 13, 14, '62.	Right; circ. Disch'd April 13, 1864. Died in 1864.
448	*McLaughlin, A.*, Pt., C, 24th N. C., age 17.	Mar. 25, 25, '65.	Left; circ. A. Surg. E. P. Roche, 35th Mass. Releas'd June 14, '65.
449	McLaughlin, T. A., Pt., K, 29th Maine, age 22.	Oct. 19, 20, '64.	Left; circ. Surg. G. T. Stevens, 77th N. Y. Disch'd July 19, '65.
450	McLean, G., Pt., E, 173d New York, age 28.	April 9, 9, '64.	Right; circ. Disch'd August 21, 1864.
451	McMurtrie, T., Lieut., 12th Pennsylvania.	Dec. 13, 14, '62.	Left; flap. Confederate surgeon. V. R. Corps Oct. 18, 1863.
452	McNab, J. H., Pt., G, 3d Tennessee, age 21.	May 10, 12, '64.	Left. Surg. D. L. Heath, 23d Mich. Disch'd July 6, 1865.
453	*McNamee, G.*, Pt., 1st Virginia Art'y, age 19.	July 1, 2, '63.	Left; flap. A. Surg. J. W. Jones, C. S. A. Retired Sept. 28, 1864.
454	*McRay, G. A.*, Pt., G, 5th N. C. Cav., age 22.	April 2, 2, '65.	Left. Released June 29, 1865.
455	*Measels, J.*, Pt., G, 31st Georgia, age 42.	Oct. 19, 19, '64.	Right; flap. Surg. H. F. Butt, P.A.C.S. To prison Jan. 5, '65.
456	Medley, J., Pt., A, 22d Col'd Troops, age 25.	Oct. 27, 27, '64.	Right; circ. Mustered out Mar. 16, 1865.
457	Meekins, J. D., Pt., E, 18th Penn., age 23.	June 3, 3, '64.	Left; circ. Surg. J. W. Wishart, 140th Penn. Disch'd May 29, '65.
458	*Merry, T. H.*, Pt., E, 4th North Carolina, age 20.	May 3, 3, '63.	Left; flap. Transferred Sept. 8, 1863.
459	Messmore, J., Pt., D, 10th Infantry, age 22.	May 19, 19, '64.	Right; ant. post. flap. Disch'd April 8, 1865. Died May 27, 1871; epilepsy and consumpt'n.
460	Meyer, P., Serg't, A, 16th Indiana, age 26.	Aug. 24, 24, '64.	Right; flap. Disch'd Jan. 13, 1865. Died Dec. 4, 1868.
461	Meyers, J., Pt., E, 5th New Jersey, age 36.	July 3, 3, '63.	Left. Disch'd December 13, '63.
462	Meyers, W., Pt., G, 2d Infantry.	Aug. 30, 31, '62.	Left. Disch'd November 13, '62.
463	Michaels, J., Pt., A, 16th Wisconsin.	April 6, 8, '62.	Left; circ. Surg. G. W. Eastman, 16th Wis. Disch'd Aug. 15, '62.
464	Micue, P., Pt., G, 34th Massachusetts, age 33.	Oct. 13, 13, '64.	Left; ant. post. flap. Disch'd May 20, 1865.
465	Miles, A., Pt., G, 15th N. Y. H. Art'y, age 18.	Mar. 31, Ap. 1, '65.	Right; lateral flap. Discharged August 2, 1865.
466	Miles, F. N., Pt., F, 20th Maine.	Oct. 19, 20, '64.	Left; flap. Disch'd January 21, 1865.
467	Miller, J. K., Serg't, E, 205th Pennsylvania.	April 2, 3, '65.	Right; post. flap. Disch'd Aug. 18, 1865.
468	Miller, W., Pt., E, 15th Iowa, age 25.	July 5, 5, '64.	Right; flap. Surg. E. M. Rogers, 12th Wis. Must. out Feb. 11, '65.
469	Mink, J., Pt., A, 61st N. York, age 18.	April 7, 7, '65.	Right; ant. post. flap. Disch'd November 25, 1865.
470	Mishaw, E., Pt., C, 118th Pennsylvania.	Sept. 20, 22, '62.	Right. Surg. J. Thomas, 118th Penn. Disch'd April 21, 1863.
471	Mitchell, W., Pt., K, 27th Pennsylvania.	June 8, —, '62.	Right. Disch'd Oct. 17, 1862.
472	Mizner, W., Pt., H, 34th Illinois, age 21.	Mar. 19, 20, '65.	Left; circ. Disch'd June 16, '65.
473	Moats, M., Pt., F, 15th West Virginia, age 24.	Sept. 19, 19, '64.	Right; flap. Disch'd June 9, '65.
474	Moffatt, R., Serg't, K, 121st Penn., age 23.	July 15, 15, '64.	Left; flap. Surg. F. C. Reamer, 143d Penn. (Also excis. hum.) Disch'd June 29, 1865.
475	Moneyhan, B. F., Pt., D, 24th Indiana, age 26.	April 17, 17, '65.	Right. Surg. V. H. Coffman, 34th Iowa. Disch'd Sept. 12, 1865.
476	Monroe, H., Pt., I, 20th Maine, age 25.	June 22, 22, '64.	Right; flap; hæm.; lig. temoral. Disch'd January 13, 1865. Died May 16, 1870; phthisis pulmo.
477	Mooney, J., Pt., D, 13th New York, age 29.	May 10, 11, '64.	Left; flap. Disch'd May 27, '65.
478	Moore, C. W., Lieut., 15th Ohio Battery.	Dec. 10, 10, '64.	Left; flap. Mustered out June 20, 1865.
479	Moore, D., Colonel, 21st Missouri.	April 6, 6, '62.	Right. Mustered out Feb. 12, 1865.
480	Moore, D. A., Capt., B, 61st New York, age 29.	June 30, 30, '62.	Right; flap. Surg. A. N. Dougherty, U. S. V. To V. R. C.
481	*Moore, J. A.*, Pt., G, 38th Virginia, age 26.	May 16, 16, '64.	——: circ. Furloughed July 29, 1864.
482	Morgan, J., Pt., K, 142d Pennsylvania.	Dec. 13, 15, '64.	Right; flap. Confed. surgeon. Disch'd June 22, 1865.
483	*Morgan, J.*, Pt., B, 26th Virginia, age 21.	Oct. 19, 19, '64.	Right. Surg. G. McDonald, 22d Va. To prison Feb. 16, 1865.
484	Morgan, J. C., Serg't, D, 7th Wisconsin, age 25.	Mar. 31, 31, '65.	Right; oval flap. Surg. D. C. Ayres, 7th Wis. Disch'd July 20, 1865.
485	Moris, U., Pt., K, 34th Indiana, age 36.	May 16, 16, '63.	Right; flap. Disch'd July 18, '63.
486	Morningstar, J. J., Pt., D, 76th Penn.	July 11, 13, '63.	Left; circ. Confederate surgeon. Disch'd Jan. 17, 1864. *Spec.* 473.
487	Morrin, J., Pt., G, 126th New York, age 21.	July 3, 4, '63.	Left; post. flap. Surg. J. Aiken, 71st Penn. Hæm.; amp. thigh Nov. 3. Disch'd June 18, 1865. *Specs.* 1416, 2604.
488	Morris, A. W., Pt., B, 6th Iowa, age 21.	June 16, 16, '64.	Left; circ. Ass't Surg. D. Halderman, 46th Ohio. Disch'd July 10, 1865.
489	Morrison, A., Pt., K, 23d Illinois, age 23.	July 24, 24, '64.	Left; circ. Discharged March 1, 1865.
490	Moss, J. E., Corp'l, E, 36th Illinois.	Nov. 25, 27, '63.	Left; flap. Surg. H. McHenry, 125th Ohio. Disch'd Sept. 24, 1864.
491	Mount, D. M., Serg't, B, 35th New York.	Dec. 13, 13, '62.	Right. Mustered out June 5, '63.
492	Mullen, J., Pt., C, 30th Mass., age 20.	Oct. 19, 20, '64.	Right; flap. Disch'd February 12, 1865.
493	Muller, H., Pt., E, 45th New York.	June 3, 3, '62.	Left; ant. post. flap. Surg. H. Ideler, 45th N. Y. Discharged Nov. 1, 1862.
494	Muller, M., Pt., F, 4th N. Y. H'vy Artillery.	April 2, 2, '65.	Left; flap. Disch'd October 1, 1865.
495	Mulligan, J., Pt., E, 5th N. Y. Cavalry, age 18.	Mar. 22, 23, '64.	Right; flap; gangrene. Disch'd October 28, 1864.
496	*Munday, L. G.*, Pt., I, 26th Virginia, age 38.	June 20, 20, '64.	Right; circular. Recovery.
497	Mundy, F. H., Pt., G, 83d New York, age 20.	Dec. 13, 14, '62.	Left; circ.; gangrene. Disch'd Nov. 22, 1863
498	Murray, J. H., Pt, D, 2d Vermont.	May 3, 3, '63.	Left; double flap. Ass't Surg. A. A. Atwood, 2d Vt. Disch'd April 13, 1864.
499	Myers, H., Pt., F, 119th Penn., age 39.	Nov. 7, 7, '63.	Lett. Surg. P. Leidy, 119th Penn. Disch'd June 27, 1864.
500	Neal, T., Pt., C, 28th Iowa, age 19.	May 15, 15, '63.	Left; flap. Disch'd Oct. 3, 1863.
501	Neff, J., Corp'l, B, 25th Mass., age 25.	May 16, 18, '64.	Right; circ. Confed. surgeon. Disch'd Sept. 6, 1865.
502	*Newton, W. J.*, Lieut., K, 40th Virginia.	May 3, 3, '63.	——. Surg. W. A. Spence, C.S.A. Recovery.
503	Nicholson, J., Pt., C, 8th N. Y. Cavalry, age 47.	Aug. 20, 20, '64.	Left; lat. skin flap. Surg. A. Hard, 8th Illinois Cav. Disch'd Nov. 19, 1864.
504	Nimocks, R. J., Pt., B, 25th Wis., age 44.	July 22, 23, '64.	Right; circ. Disch'd June 30, 1865.
505	Nolan, K., Pt., K, 22d Indiana, age 20.	May 17, 17, '64.	Right; circ. Disch'd Feb. 13, 1865. Died May 26, 1867.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
506	Norton, E. D., Corp'l, I, 11th Conn., age 21.	June 17, 19, '64.	Left; post. flap. Disch'd Nov. 26, 1864.
507	Norton, J., Seaman, U. S. S. Montauk, age 25.	July 9, 9, '64.	Left. Surg. — Johnson, U. S. N. Disch'd Oct. 24, 1864.
508	*Nowell, W. W.*, Corp'l, F, 49th Va., age 22.	May 31, J'e 1, '62.	Right. Surg. J. M. Holloway, C. S. A. Retired Mar. 15, 1865.
509	O'Brien, J., Pt., A, 7th Missouri.	May 22, 22, '63.	Right; circ. Disch'd June 4, '64.
510	O'Brien, M., Pt., E, 2d Massachusetts, age 26.	Aug. 9, 11, '62.	Right. Surgeon E. McDonnell. U. S. V. Disch'd Dec. 6, 1862.
511	Ogden, M. H., Pt., H, 18th Penn., age 21.	June 18, 18, '64.	Left; flap. Disch'd July 21, '65.
512	Ohm, F., Pt., G, 37th Wisconsin, age 40.	April 2, 2, '65.	Left; flap. Surg. W. C. Shurlock, 51st Penn. Disch'd Sept. 7, '65.
513	*Oliver, J. W.*, Corp'l, D, 12th Georgia, age 21.	May 3, 3, '63.	Left; flap. Furloughed.
514	O'Neil, J., Pt., O. 28th Pennsylvania:	Sept. 17, 17, '62.	Left. Surg. H. E. Goodman, 28th Penn. Disch'd Nov. 15, 1862.
515	Opperman, P., Pt., E, 6th Missouri Cavalry.	Aug. 16, 17, '62.	Right; flap. Surg. B. E. Osborn, 1st Mo. S. M. Cav. Disch'd Jan. 9, 1863.
516	Ormsby, S. S., Corp'l, K, 50th Penn., age 26.	June 18, 19, '64.	Right; circ. Surg. W. C. Shurlock, 51st Penn. Disch'd May 29, 1865.
517	Osborn, J. H., Serg't, I, 8th N. Y. Cav., age 24.	June 29, 29, '64.	Left; circ. A. Surg. O. H. Adams, 8th N. Y. C. M. O. June 7, '65.
518	O'Shaughnessy, J., Pt., D, 42d Mass.	Jan. 1, 3, '63.	Right; circ. Surg. A. I. Cumming, 42d Mass. Discharged.
519	O'Sullivan, D., Corp'l, F, 3d Infantry, age 28.	July 2, 2, '63.	Right; circ. A. Surg. C. Wagner, U. S. A. Disch'd Jan. 8, 1864. *Spec.* 4375.
520	Overman, A. A., Serg't, A, 93d Indiana.	May 19, 19, '63.	Left; flap. Disch'd August 10, 1863.
521	Owens, J. P., Serg't, D, Purnell Legion.	Sept. 17, 17, '62.	Right; circ. Disch'd December 6, 1862.
522	Paden, P., Fireman, U. S. Gunboat Diana.	Mar. 28, 30, '63.	Right; post. flap. Surg. — Ellis, U. S. N. Disch'd Dec. 31, 1863.
523	Palin, R. D., Pt., B, 9th N. Y. H'vy Art., age 26.	June 8, 8, '64.	Left; post. flap. Surgeon S. A. Sabin, 9th N. Y. Disch'd Jan. 20, 1866.
524	*Parker, B.*, Pt., G, 2d South Carolina, age 27.	July 3, 3, '63.	Right. Paroled Nov. 12, 1863.
525	Parker, C., Pt., C, 150th Penn., age 23.	July 1, 1, '63.	Right; ant. post. flap. Disch'd January 29, 1864.
526	Parker, C. W., Pt., D, 13th New Hamp., age 21.	Sept. 30, 30, '64.	Left. Discharged June 21, 1865.
527	*Parker, H.*, Pt., H, 44th Georgia, age 21.	May 2, 3, '63.	——; circ. Transferred May 26, 1863.
528	*Parkes, J. M.*, Serg't, B, 20th N. C., age 27.	July 20, 21, '64.	Left; ant. post. flap. Surg. J. H. Ayers, 34th Ohio. To Provost Marshal Nov. 1, 1864.
529	Parlon, A. B., Pt., G, 193d New York.	Oct. 14, 14, '65.	Right; flap. A. Surg. L. Phinney, 193d N. Y. Discharged.
530	Parmenter, J., Capt., E, 118th N. Y., age 42.	June 3, 3, '64.	Right; ant. skin flap. A. Surg. J. G. Porteous, 118th N. Y. Disch'd Nov. 15, 1864.
531	Paxton, J. T., Pt., H, 13th Iowa, age 21.	Mar. 27, 27, '65.	Right; circ. Surg. P. Harvey, U. S. V. Must. out July 10, 1865.
532	Peet, G. W., Serg't, A, 20th N. Y. S. M., age 26.	Dec. 13, 13, '62.	Left. Discharged March 8, 1863.
533	Pels, A., Pt., B, 4th New York Artillery, age 29.	June 17, 19, '64.	Right; circ. Disch'd Sept. 28, 1864.
534	*Pennington, J. E.*, Pt., D, 26th Alabama, age 18.	May 3. 4, '63.	Left; flap. Transferred May 24, 1863.
535	Perkins, M. V. B., Corp'l, I, 7th New Hampshire.	July 18, 20, '63.	R't; circ. A. Surg. F. B. Kimball, 3d N. H. Disch'd Nov. 14, '63.
536	Perry, A., Pt., C, 44th New York.	Dec. 13, 13, '62.	Left; flap. Disch'd Feb. 28, '63.
537	Peters, A., Pt., E, 37th Wisconsin, age 37.	June 17, 18, '64.	Left; circ. Surg. W. C. Shurlock, 51st Penn. Gangrene. Disch'd May 23, 1865. *Spec.* 3129.
538	Peters, S., Pt, C, 139th Pennsylvania, age 19.	Sept. 21, 21, '64.	Left; ant. post. flap. Discharged June 6, 1865.
539	*Petersfield, W. J.*, Pt., C, 1st Alabama, age 21.	Nov. 30, Dec. 2, 1864.	Right; circ. Surg. — Hamilton, 1st Ala. To Provost Marshal May 6, 1865.
540	*Pettigrew, F.*, Pt., K, 13th North Carolina.	June 1, 1, '64.	Right; circ. Retired Jan. 18, '65.
541	Petty, G. B., Corp'l, E, 5th Vermont.	June 29, 30, '62.	Right; flap. Confed. surgeon. Disch'd Jan. 31, 1863.
542	*Phillips, B. F.*, Captain, age 29.	Nov. 30, Dec. 1, '64.	Right; circ. To Provost Marshal April 6, 1865.
543	*Phillips, J. J.*, Serg't, H, 32d Tennessee, age 32.	May 15, 17, '64.	Right; ant. post. flap. A. Surg. H. E. Goodman, U. S. V. To Provost Marshal Dec. 1, 1864.
544	Pidgeon, J., Pt., G, 22d Colored Troops, age 38.	Sept. 18, 20, '64.	Right; flap. Disch'd May 22, '65.
545	Pierce, D. M., Pt., A, 4th Delaware, age 19.	June 18, 18, '64.	Right; circ. Disch'd May 12, 1864.
546	*Pierce, W.*, Lieut., Austin's Sharpshooters.	Sept. 20, 20, '63.	Right. Surg. — Kratty, C. S. A. Recovery.
547	Pike, H. L., Lieut., Battery H, 1st Artillery.	May 5, 5, '62.	Left. Surg. St. John W. Mintzner, 26th Penn. Retired Feb. 21, '67. Died March 25, 1875.
548	Plant, R., Pt., D, 7th Infantry, age 19.	Dec. 13, 14, '62.	Left. Disch'd September 8, 1865.
549	Platz, A., Musician, A, 19th Infantry, age 18.	May 22, 22, '64.	R't; flap. A. Surg. J. C. Norton, U. S. V. Disch'd Jan. 17, 1865.
550	Popp, M., Pt., E, 55th Illinois.	May 22, 22, '63.	Left; flap. Disch'd Sept. 26, '63. Died June 13, 1874.
551	Porter, H., Pt., G, 13th Massachusetts.	July 1, 2, '63.	Left; circ. July 30, re-amputat'n. Disch'd Jan. 30, 1864.
552	Pyle, J. M., Pt., H, 89th Indiana, age 24.	May 18, 18, '64.	Right; flap. Disch'd May 21, 1865.
553	Rabbidan, L., Pt., F, 14th Wisconsin, age 21.	June 23, 23, '64.	Right; flap. Surg. H. McKennan, 17th Wis. Disch'd Sept. 1, '65.
554	Radichel, C., Pt., F, 6th Wisconsin, age 40.	Feb. 5, 7, '65.	Right. Disch'd August 23, 1865.
555	Rady, D., Colored.	May 14, 14, '63.	Left. Recovery. *Spec.* 1809.
556	Ralston, R., Musician, C, 26th Iowa, age 22.	Oct. 26, 26, '63.	Right; flap. Surg. A. T. Hudson, 26th Iowa. Disch'd June 25, '64.
557	Ralyea, A., Pt., G, 147th New York, age 25.	Feb. 6, 6, '65.	Left; ant. post. flap. Surg. A. S. Coe, 147th New York. Disch'd June 14, 1865.
558	Rauscher, C., Pt., B, 42d Indiana, age 26.	Aug. 15, 15, '64.	Left; flap. Disch'd April 5, 1865.
559	*Rawls, H.*, Pt., D, 2d Georgia.	Aug. 31, 31, '62.	——; anterior. Ass't Surg. F. R. Gregory, C. S. A. Recovery.
560	Read, C. A., Serg't, A, 1st Mass. Cav., age 24.	Sept. 13, 13, '63.	Right; flap. Surg. W. H. Wilbur, 1st R. I. Cav. Disch'd April 16, 1864.
561	Rech, F., Pt., E, 2d Delaware, age 21.	May 10, 10, '64.	Right; flap. Surg. J. W. Wishart, 140th Penn. Mustered out June 3, 1864.
562	Redman, T., Serg't, K, 5th Cavalry, age 26.	July 10, 10, '63.	Right; post. flap. Veteran Reserve Corps Oct. 30, 1863.
563	Reeder, G. W., Pt., B, 11th Penn., age 31.	May 5, 5, '64.	Left; circ. Surg. J. W. Anawalt, 11th Penn. Disch'd Aug. 16, '64.
564	Reeves, J. H., Pt., G, 39th Illinois, age 24.	May 16, 18, '64.	Left; flap. Surg. ——, C. S. A. Disch'd March 19, 1865.
565	Refolt, E., Pt., G, 22d Indiana.	Oct. 9, 10, '62.	Right; flap. Disch'd Feb. 28, '63. Died April 16, '64; small-pox.
566	Reider, G. W., Pt., C, 14th Infantry, age 34.	May 24, 24, '64.	Right; circ.; erysipelas; gang. Disch'd March 6, 1866.
567	Reiff, E., Pt., A, 12th Infantry, age 19.	July 2, 3, '63.	Left; circular. Discharged.
568	Reiley, J., Pt., C, 7th N. York Heavy Artillery, age 29.	June 17, 18, '64.	Left; lat. flap. Surg. J. W. Wishart, 140th Penn. Disch'd May 16, 1865. Died Feb. 14, 1876; consumption.
569	Restle, M., Serg't, G, 52d New York, age 28.	Feb. 3, 3, '65.	Left; long post. and short anterior flap. Disch'd Dec. 1, 1865.
570	Reynolds, J. S., Lieut., H, 10th N. Y. Cavalry, age 38.	May 28, 29, '64.	Left; circ. Surg. H. K. Clark, 10th N. Y. Cav. Disch'd Sept. 8, 1864.
571	Rice, F. R., Lieut., F, 1st Michigan.	Dec. 13, 13, '62.	Left; flap. Surg. D. P. Chamberlin, 4th Michigan. Veteran Reserve Corps July 2, 1863.
572	*Rider, J. A.*, Pt., A, 4th Virginia, age 30.	May 3, 4, '63.	——; circ. Surg. — Walls, C. S. A. Nov. 12, 1877; good stump.
573	Riley, J., Ordinary Seaman, U. S. S. Wabash.	Jan. 15, 16, '65.	Right. Disch'd July 14, 1865.
574	Roberts, G. W., Pt., B, 1st Maryland Artillery, age 16.	July 1, 1, '62.	Right; circular. Ass't Surg. J. S. O'Donnell, Purnell Legion. Disch'd May 18, 1863.
575	Roberts, H., Lieut., H, 1st Massachusetts.	Aug. 29, 29, '62.	Left; circ. A. Surg. T. F. Oakes, 1st Mass. Disch'd Feb. 5, 1864.
576	Roberts, J. B., Corp'l, K, 88th Indiana, age 31.	Mar. 19, 20, '65.	Left; oblique flap. Confederate surgeon. Gangrene. Mustered out June 7, 1865.
577	Roberts, M., Pt., H, 21st N. Y. Cavalry, age 18.	April 1, 3, '65.	Right; double flap. Discharged September 14, 1865.
578	Robinson, J. B., Lieut., C, 2d Penn. Reserves, age 32.	May 12, 12, '64.	Right; ant. post. flap. Surg. C. Bowers, 6th Penn. Res. Disch'd June 16, 1864. *Spec.* 4511.
579	Robinson, W., Pt., D, 82d New York, age 41.	May 10, 11, '64.	Right; circ. Surg. S. H. Plumb, 82d N. Y. Disch'd Nov. 10, '64. *Spec.* 4372.
580	*Rodgers, T. J.*, Pt., D, 50th Georgia.	July 3, 3, '63.	Right. Confed. surgeon. Exchanged March 17, 1864.
581	Rodgers, W. H., Corp'l, A, 146th N. Y., age 38.	May 5, 6, '64.	Right; flap. Surg. LeG. Capers, C. S. A. Disch'd Nov. 19, 1864.
582	Ross, I. C., Pt., F, 15th Indiana, age 29.	Nov. 25, 27, '63.	Left; circular flap. Surg. H. E. Hasse, 24th Wisconsin. Disch'd April 21, 1864.
583	Rosselit, M., Pt, F, 118th Ohio, age 25.	Dec. 29, 30, '63.	Left. Surg. J. W. Alexander, 15th Penn. Cav. Disch'd Nov. 21, '64. Died July 11, '71; tuber. disease.
584	Rouischkolb, F., Pt., E, 66th New York, age 41.	Sept. 17, 17, '62.	R't; lat. flap. Surg. C. S. Wood, 66th New York. Disch'd Dec. 31, 1862.
585	*Rouse, T. B.*, Pt., F, 2d North Carolina, age 20.	July 2, 2, '63.	Right. Exchanged Nov. 12, '63.
586	Rudrauff, W. H., Lieut., F, 82d Penn., age 24.	June 1, 1, '64.	Left; circ. Surg. L. Emanuel, 82d Penn. Disch'd Sept. 22, '64.
587	Russell, E. M., Pt., A, 1st Penn. Reserves.	Sept. 14, 14, '62.	Left. Disch'd November 29, '62.
588	Russell, J. H., Pt., B, 29th Connecticut, age 20.	Oct. 27, 28, '64.	Right; flap. Surg. A. C. Barlow, 62d Ohio. Disch'd May 16, '65.
589	Russell, P. A., Corp'l, G, 89th New York, age 24.	June 18, 18, '64.	Left; flap. Discharged Nov. 4, 1864.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
590	Ruth, R. A., Pt., E, 59th Massachusetts, age 19.	June 2, 4, '64.	Right; flap. Disch'd June 13, 1865.
591	Ryan, J., Pt., E, 10th Wisconsin, age 23.	Sept. 19, 21, '63.	Left; circ. Surg. I. Moses, U.S.V. Disch'd Sept. 30, 1864.
592	Sampson, C. H., Serg't, A, 3d Maine, age 30.	July 1, 1, '62.	Right; flap. Disch'd Dec. 4, '62. Died Jan. 28, 1870; effects of sunstroke.
593	*Sanders, J. A.*, Corp'l, E, 7th S. C. Bat'y, age 30.	Aug. 21, 21, '64.	Left; flap. Exchanged.
594	Santy, J., Pt., C, 91st Ohio, age 21.	Oct. 6, 7, '64.	Left; flap. Surgeon J. M. Leet, U. S.V. Disch'd May 20, 1865.
595	Saul, F., Pt., G, 183d Pennsylvania, age 21.	June 16, 17, '64.	Right; circ. Surg. J. W. Wishart, 140th Penn. Disch'd Apr. 27, '65.
596	*Saxon, T. H.*, Pt., E, 4th North Carolina, age 20.	May 3, 3, '63.	——; ant. and post. flap. Rapidly improving.
597	Scott, J. G., Pt., D, 77th New York, age 23.	May 6, 6, '64.	Left; circ. (also amp. right at low. third). Surg. E. B. P. Kelly, 95th Penn. Disch'd Nov. 3, '64. *Spec.* 513.
598	Scott, O. D., Pt., F, 17th Vermont, age 21.	June 7, 7, '64.	Right; ant. post. flap. Disch'd May 18, 1865.
599	*Scroggs, W.*, Pt., I, 39th North Carolina, age 19.	June 18, 19, '64.	Right; flap. Provost Marshal October 21, 1864.
600	Scroth, J., Serg't, C, 19th Infantry, age 24.	May 14, 14, '64.	Left; circ. Disch'd November 10, 1864.
601	Seaman, W. P., Pt., C, 11th Missouri.	Aug. 14, 14, '62.	Right; flap. Disch'd October 10, 1862.
602	Seaver, C. E., Pt., I, 13th Vermont, age 28.	July 3, 4, '63.	Right; flap. Surg. G. Nichols, 13th Vt. Disch'd Nov. 7, 1863.
603	Secor, J. S., Pt., A, 9th N.Y. H'vy Art., age 19.	Oct. 19, 20, '64.	Right; flap. Disch'd June 29, 1865.
604	Segar, E., Pt., K, 22d New York, age 21.	April 29, May 1, 1863.	Left; ant. posterior flap. Surg. J. Ebersole, 19th Indiana. Disch'd Nov. 19, 1864. *Spec.* 1146.
605	Seiforth, M., Pt., I, 124th Indiana, age 17.	Mar. 10, 10, '65.	Left; post. flap. Surg. V. H. Gregg, 124th Indiana. Disch'd June 30, 1865.
606	Sellers, J. B., Pt., I, 27th Indiana, age 21.	May 25, 26, '64.	Left; circular. Discharged.
607	Shanger, A., Serg't, B, 86th New York, age 31.	July 2, 2, '63.	Left. Disch'd June 4, 1864.
608	Shappee, W. A., Pt., A, 81st Pennsylvania.	April 6, 8, '65.	Right; flap. Disch'd June 28, 1865.
609	Sharp, W. H. H., Serg't, L, 9th Penn. Cavalry, age 24.	Mar. 16, 16, '65.	Left; ant. post. flap. Surg. C. Helm, 92d Illinois. Discharged Sept. 12, 1865.
610	Shaw, J., Pt., C, 19th Maine, age 28.	July 3, 4, '63.	Right. Surg. N. Hayward, 20th Mass. Disch'd Feb. 8, 1865.
611	Sheehan, M., Pt., H, 100th New York.	July 18, 18, 63.	Right; ant. post. flap. Assistant Surg. W. D. Murray, 100th N.Y. Disch'd Feb. 3, 1864.
612	Shephard, G., Pt., K, 3d Vermont, age 32.	Oct. 19, 19, '64.	Right; flap. Disch'd September 1, 1865.
613	Shields, T., Pt., G, 62d New York.	May 3, 3, '63.	Left; post. flap. Discharged.
614	Shoals, J., Corp'l, C, 27th Mass., age 19.	Mar. 8, 10, '65.	Left; flap. Confederate surgeon. Disch'd Sept. 4, 1865.
615	Sibley, R., Pt., E, 6th Missouri, age 27.	Aug. 31, 31, '64.	Right; circ. Disch'd July 15, 1865.
616	Siegrist, J. E., Serg't, C, 7th Pennsylvania.	Sept. 17, 17, '62.	Left; flap. Disch'd Feb. 17, '63.
617	*Simmons, H. H.*, Capt., F, 2d Miss., age 24.	July 2, 2, '63.	Right; circ. Surg. — Hill, C.S.A. Hæm.; lig. fem. Provost Marshal March 17, 1864.
618	Simmons, W. S., Lieut., A, 5th Colored Troops, age 24.	Feb. 20, 20, '65.	Left; post. flap. A. Surg. H. C. Merryweather, 5th Col'd Troops. Disch'd May 15, 1865.
619	Sine, J. F., Pt., G, 90th Pennsylvania.	Dec. 13, 14, '62.	Left; flap. Disch'd April 15, 1863.
620	Singleton, J. R., S'g't, M, 16th N.Y. Cav., age 26.	Sept. 19, 19, '64.	Left; ant. post. flap. Discharged June 1, 1865.
621	Skelton, J., Serg't Major, 27th Ohio, age 27.	June 28, 28, '64.	Right; flap. Surg. A. B. Monahan, 63d Ohio. Disch'd Feb. 17, 1865.
622	Skinner, M. C., Pt., E, 36th Illinois, age 22.	June 18, 18, '64.	Left; circ. Surg. W. P. Pierce, 88th Ill. Disch'd Feb. 27, 1865.
623	Slavan, J., Pt., B, 170th New York, age 48.	June 16, 17, '64.	Left; ant. post. flap. Discharged Nov. 7, 1865. Died March 30, 1873; pyæmia.
624	Small, R., Pt., F, 34th Colored Troops, age 18.	Nov. 30, 30, '64.	Right; ant. post. flap. Disch'd Dec. 23, 1865.
625	Smallwood, W. J., Lieut., A, 7th Kentucky.	Oct. 1, 1, '62.	Left; circ. Surg. C. W. McMillin, 1st Tenn. Resigned Jan. 23, '63.
626	Smith, A. A., Pt., A, 3d Rhode Island Art'ry.	April 9, 9, '63.	Left; flap. Surg. F. L. Dibble, 6th Conn. July 10, amp. right leg. Disch'd August 25, 1864. *Spec.* 1103.
627	Smith, G. T., Pt., F, 13th Mass., age 22.	June 21, 21, '64.	Left; flap. Surg. A. W. Whitney, 13th Mass. Disch'd Oct. 17, '64.
628	Smith, H., Pt., E, 11th Vermont, age 19.	Sept. 13, 13, '64.	Left; flap (amp. arm). Surg. C. B. Park, 11th Vermont. Sept. 26, hæm.; ant. tib. lig. Disch'd Sept. 14, 1865.
629	*Smith, H. C.*, Pt., E, 5th Mississippi, age 24.	July 22, 23, '64.	Right; circ. Provost Marshal and exchanged.
630	Smith, J., Pt., C, 22d Indiana, age 22.	June 27, 27, '64.	Right; post. flap. A. Surg. S. A. Simpson, 52d Ohio. Disch'd June 26, 1865.
631	Smith, J., Pt., C, 69th New York, age 24.	May 16, 16, '64.	Left; flap. Surg. J. W. Wishart, 140th Penn. Disch'd Mar. 10, '65.
632	Smith J. B., Pt., H, 9th Michigan.	July 13, 14, '62.	Right; flap. Discharged.
633	Smith, J. L., Lieut., F, 4th Michigan.	June 27, 28, '62.	Left. Resigned March 7, 1863.
634	*Smith, J. R.*, Pt., C, 14th South Carolina.	July 1, 2, '63.	Right. Surg. J. J. Knott, P. A. C. S. Recovery.
635	Smith, P., Pt., K, 12th Illinois, age 42.	April 7, 7, '62.	Left. Surg. H. Wardner, U.S.V. Disch'd August 1, 1862.
636	Smith, V., Pt., E, 49th Indiana.	Dec. 28, 28, '62.	Left; flap. Disch'd March 29, 1863.
637	Smith, W., Pt., H, 92d Pennsylvania, age 23.	Sept. 22, 22, '64.	Left; ant. post. flap. Recovered Nov. 27, 1864.
638	Smith, W. D., Serg't, D, 6th N. Jersey, age 35.	July 2, 3, '63.	Left; flap. A. Surg. C. Bacon, jr., U. S. A. Disch'd Nov. 21, 1863.
639	*Smith, W. H.*, Pt., F, 4th Georgia.	May 5, 5, '64.	——. Surg. W. P. Young, 4th Georgia. Recovery.
640	Smith, W. N., Pt., H, 52d Penn., age 19.	Aug. 12, 12, '64.	Right; ant. post. flap. Assistant Surg. J. Flowers, 52d Penn. Disch'd Nov. 14, 1864.
641	*Smith, W. P.*, Pt., 1st Richmond Howitzers.	July 2, 3, '63.	Right. Surg. — Jones, C. S. A. Disch'd Feb. 18, 1864.
642	*Snarr, P. H.*, Lieut., B, 18th Va. Cav., age 33.	Sept. 19, 20, '64.	Left. Exchanged November 22, 1864.
643	*Snodgrass, J. A.*, Pt., F, 6th Texas.	Jan. 10, 10, '63.	Right. To prison May 4, 1863.
644	Snyder, J., Pt., B, 4th N. Y. H'vy Art'y, age 48.	Aug. 25, 26, '64.	Left; single flap. Disch'd Feb. 7, 1865.
645	Snyder, J., Pt., G, 149th Pennsylvaaia, age 19.	May 10, 11, '64.	Right; flap (amp. left leg, lower third). Disch'd July 21, 1865.
646	Southard, S. M., Pt., I, 14th Vermont, age 33.	July 3, 3, '63.	Left; ant. post. flap. Surg. O. Munson, 108th N. Y. Disch'd Dec. 2, 1864.
647	Spare, A., Pt., K, 187th Penn., age 37.	June 18, 19, '64.	Left; flap. Disch'd Jan. 13, '65.
648	[1]*Spath, J. F.*, Serg't, 1st Louisiana, age 26.	Sept. 17, 18, '62.	Right; posterior flap.
649	Spenard, B., Pt., G, 11th Vermont, age 21.	Oct. 19, 19, '64.	Right; ant. post. flap. Surg. C. B. Park, 11th Vermont. Discharged July 21, 1865.
650	*Spence, J. D.*, Corp'l, C, 3d S. Carolina, age 20.	Oct. 19, 20, '64.	Right; posterior flap. Surg. J. G. Hardy, 6th N. C. To Provost Marshal April 8, 1865.
651	Spencer, M. L., Pt., K, 4th Kentucky, age 24.	July 30, Au. 1, '64.	Right; circ. Disch'd March 27, 1865.
652	Sperry, E. F., Pt., B, 3d Iowa, age 20.	April 6, 7, '62.	Right; flap. Disch'd August 4, 1862.
653	Sprague, O., Pt., B, 9th Vermont, age 18.	Sept. 29, 30, '64.	Left; ant. post. flap. Discharged Sept. 6, 1865.
654	Sprowl, T. J., Corp'l, C, 12th N. Jersey, age 19.	May 12, 12, '64.	Left; flap. Disch'd Jan. 15, 1865.
655	Starin, F. D., Pt., H, 43d Wisconsin, age 19.	Nov. 5, 5, '64.	Right; flap (amp. left leg, lower third). Disch'd July 2, 1865.
656	Stebbins, M. M., Serg't, K, 26th Mass., age 23.	Sept. 19, 19, '64.	Left; posterior flap. Surg. J. G. Bradt, 26th Mass. Disch'd July 3, 1865.
657	Steineman, J., Pt., K, 37th Ohio, age 19.	Aug. 31, 31, '64.	Right; flap. A. Surg. C. B. Richards, 30th Ohio. Disch'd May 18, 1865.
658	Steingraber, W., Pt., E, 25th Iowa, age 20.	July 22, 23, '64.	Left; lateral flap. Disch'd July 12, 1865.
659	*Steinwater, J.*, Pt., Purcell's Battery, Virginia.	Aug. 30, 30, '62.	Right. Disch'd August 14, 1863.
660	Stephens, J., Serg't, K, 19th Illinois, age 25.	Sept. 20, 21, '63.	Left; flap. Confederate surgeon. Disch'd June 24, 1864.
661	Stevens, R., Pt., F, 107th New York, age 25.	May 25, 26, '64.	Right; flap. Surg. P. H. Flood, 107th N. Y. Disch'd Mar. 2, '65.
662	Stevens, W. P., Corp'l, B, 184th N. York, age 19.	Oct. 19, 19, '64.	Right; ant. post. flap. Disch'd July 27, 1865.
663	Stitle, W., Pt., I, 29th Ohio, age 21.	May 8, 9, '64.	Right; circ. Surg. A. K. Fifield, 29th Ohio. Disch'd Aug. 16, '65. March 15, 1866, amp. thigh.
664	Stoddard, T., Pt., G, 64th New York, age 19.	Mar. 25, 26, '65.	Left; circ. Surg. W. J. Burr, 42d N. Y. Disch'd August 2, 1865.
665	Stone, J. G., Pt., K, 7th N. Hampshire, age 21.	Oct. 1, 1, '63.	Right; circ. A. A. Surg. W. H. Finn. Disch'd April 28, 1864. *Spec.* 4188.
666	Stone, S. H., Serg't, B, 37th Wis., age 27.	Dec. 28, 28, '64.	Left. Surg. W. C. Shurlock, 51st Penn. Disch'd June 18, 1865.
667	Stonebreaker, D. T., Pt., F, 14th W. Va., age 22.	Sept. 22, 22, '64.	Right; flap. Disch'd June 16, '65.
668	Stonehouse, J., Pt., F, 7th Wisconsin, age 21.	June 18, 18, '64.	Left; lateral flap. Disch'd Sept. 28, 1864.
669	Storey, J. H. R., Serg't, F, 109th Penn., age 25.	May 28, 28, '64.	Right; circ. Mustered out Jan. 17, 1866.
670	Storm, H. F., Pt., C, 71st Indiana.	Aug. 30, 30, '62.	Left. A. Surg. J. D. Gatch, 16th Ind. Disch'd Nov. 27, 1862.
671	Stout, J., Pt., D, 101st Illinois, age 25.	May 15, 15, '64.	Right; ant. post. flap. Disch'd January 18, 1865.
672	Stratton, C. H., Pt., F, 25th Massachusetts.	Feb. 8, 8, '62.	Right; circ. Disch'd August 7, 1862.

[1] Fisher (G. J.), *Report of Fifty-seven Cases of Amputations in Hospitals near Sharpsburg, Md., etc.*, in *Am. Jour. Med. Sciences*, Vol. XLV, p. 48.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
673	*Strider, J.*, Pt., K, 56th North Carolina, age 34.	April 20, 20, '64.	Right; circ. skin flap; fibula disarticulated. Surg. C. H. Ladd, 56th N. C. Retired Jan. 17, '65.
674	Strock, S. D., Corp'l, F, 140th Penn., age 36.	July 2, 3, '63.	Right; circ. Surg. J. W. Wishart, 140th Penn. Disch'd Jan. 4, '64.
675	Sullivan, J., Pt., E, 64th Illinois.	Oct. 4, 6, '62.	Left; flap. Disch'd April 6, '63. Died Dec. 2, 1867.
676	Sullivan, M., Pt., H, 2d Michigan, age 27.	June 17, 18, '64.	Left; flap. Surg. S. S. French, 20th Mich. Disch'd Mar. 29, '65.
677	*Summers, J.*, Capt., B, 5th Alabama.	May 3, 4, '63.	Left; circular; gang. Recovery.
678	*Sumner, A.*, Pt., B, 3d North Carolina.	May 2, 3, '63.	——. Ass't Surg. R. E. Dennis, C. S. A. Recovery.
679	Swank, H. J., Pt., G, 126th Ohio, age 23.	Sept. 19, 19, '64.	Right; flap. Discharged April 3, 1865.
680	Swarman, F., Corp'l, E. 12th Massachusetts.	Sept. 17, 18, '62.	Right. Disch'd and pensioned.
681	Swarthout, O., Corp'l, G, 86th N. Y., age 19.	May 12, 12, '64.	Left; ant. post. flap. Disch'd Nov. 10, 1864.
682	Sweet, J. O., Serg't, C, 12th Ohio, age 21.	June 9, 9, '64.	Right; flap. Surg. S. Maguire, 45th Ky. Disch'd Dec. 20, 1864.
683	Sweetland, L. D., Pt., E, 128th Ohio.	June 14, 15, '63.	Left; flap. Disch'd August 26, 1863.
684	Sweezy, L. A., Pt., F, 7th Mich. Cavalry.	July 3, 4, '63.	Right; flap. Disch'd December 14, 1863.
685	Swett, G. W., Serg't, K, 30th Maine.	April 23, 23, '64.	Right; circ. Surg. S. C. Gordon. 1st La. Disch'd June 23, 1864.
686	Swett, V. W., Pt., A, 14th Infantry, age 22.	July 2, 4, '63.	Left; flap. Disch'd Jan. 19, '64. Died Mar. 24, '72; phth. pulmo.
687	*Swords, W. J.*, Pt., H, 51st Georgia, age 20.	Oct. 19, 20, '64.	Left; posterior flap. Surg. G. T. Stevens, 77th N. Y. Exchanged Feb. 16, 1865.
688	Tanner, J., Corp'l, C,	Aug. 30,	Both; flap. Discharged October
689	87th New York.	30, '62.	15, 1862.
690	*Tanton, H. J. D.*, Pt., C, 47th Alabama, age 33.	July 2, 3, '63.	Right. To Pro. Marshal Sept. 10, 1863.
691	Tatro, L., Pt., E, 27th Massachusetts, age 19.	May 16, 16, '64.	Right; flap. Disch'd August 23, 1865.
692	Taylor, J., Pt., K, 8th Kansas, age 23.	Sept. 20, 20, '63.	Left; flap. Surg. E. M. Seeley, 21st Ill. Disch'd May 20, 1864.
693	Taylor, S., Pt., E, 22d New York, age 24.	Sept. 14, 14, '62.	Left; flap. Surg. W. F. Hutchinson, 22d N.Y. Disch'd Dec. 19, 1862. *Spec.* 2303.
694	Tebbetts, E. W., Pt., D, 7th N. Hamp., age 44.	May 10, 10, 64.	Right; flap. Disch'd June 3, 1865.
695	Thomas, C., Pt., D, 121st Pennsylvania, age 26.	Dec. 13, 13, '62.	Left; gangrene. Disch'd Aug. 12, 1863.
696	Thompson, A. E., Pt., A, 29th Wisconsin, age 16.	July 12. 12, '63.	Left. Surg. J. L. Dicken, 47th Indiana. Disch'd Oct. 1, 1863. Died July 16, 1864.
697	*Thompson, J. M.*, Pt., F, 21st Miss., age 20.	July 2, 3, '63.	Left; flap. Paroled November 12, 1863.
698	*Thompson, J. S.*, Pt., F, 31st Miss., age 21.	Nov. 30, Dec. 1, '64.	Right; circular. Transferred.
699	Thompson, L., Pt., B, 78th Illinois, age 22.	Sept. 1, 1, '64.	Right; circ. Surg. S. C. Moss, 78th Ill. Disch'd May 26, 1865.
700	Thompson, R., Pt., I, 5th Artillery, age 20.	Sept. 17, 17, '62.	Right; circ. A. Surg. S. Adams, U. S. A. Disch'd Mar. 30, 1863.
701	Tinker, W. H., Pt., B, 5th Mo. S. M., age 23.	Sept. 27, 27, '61.	Right. Dr. E. McCuen, Louisiana, Mo. Disch'd Feb. 10, 1862.
702	Traut, W., Pt., C, 20th Michigan, age 31.	June 17, 17, '64.	Right; half circ., with posterior flap. Surg. S. S. French, 20th Mich. Disch'd June 24, 1865.
703	*Trim, S. H.*, Pt., B, 41st	May 21,	Both; circ. Surg. J. D. Jackson.
704	Alabama, age 19.	21, '64.	44th Tenn. Furl'd July 13, '64.
705	Troy, B. F., Pt., G, 10th Iowa.	May 16, 16, '63.	Right; left leg amp., mid. third. Disch'd Sept. 3, 1863.
706	Tucker, J. M., Pt., A, 20th Indiana.	Aug. 29, 29, '62.	Left; circ. Disch'd Mar. 6, 1863. Died March 20, 1864.
707	Turner, C. A., Pt., I, 13th Mass., age 21.	June 5, 5, '64.	Left; ant. post. flap. Surg. A. W. Whitney, 13th Mass. Disch'd Nov. 6, '65. Died Aug. 17, 1875.
708	Twaits, J. B., Serg't, H, 14th N. Y. S. M., age 24.	Aug. 29, 30, '62.	Left. Discharged Feb. 9, 1863.
709	Twinem, H., Pt., A, 122d New York.	May 6, 7, '64.	Left; flap. Surg. Gillispie, C. S. A. Disch'd July 20, '65. Died, 1874.
710	Uncleson, J., Landsman, U. S. Gunboat Com. Barney, age 23.	May 3, 4, '63.	Right. Disch'd April 3, 1865. 1875, chronic ulcer; necrosis.
711	VanAlstyne, I., Pt., B, 7th N. Y. Heavy Artillery, age 23.	June 3, 3, '64.	Left; circ. Surg. J. W. Wishart, 140th Penn. Disch'd Aug. 9, 1865.
712	*Van Fosson, W. E.*, Pt., F, 52d Virginia.	July 3, 5, '63.	Right; circ. Surg. C. B. Gibson, C. S. A. Retired Feb. 17, 1865.
713	Vincent, G. W., Pt., D. 88th New York, age 44.	June 16, 18, '64.	Right; ant. post. flap. Surg. J. W. Wishart, 140th Penn. Discharged March 2, 1865.
714	Vining, R. H., Pt., H, 112th Illinois, age 16.	June 15, 15, '64.	Left; circular. Surg. G. A. Collamore, 100th Ohio. Discharged Feb. 21, 1865.
715	Vogt, G., Pt., D, 61st Ohio, age 27.	July 20, 21, '64.	Left. Discharged June 22, 1865.
716	Vorce, E., Pt., B, 14th Infantry, age 35.	May 12, 12, '64.	Left; flap. Disch'd May 20, '65. Died August 23, 1870.
717	Vossler, J., Pt., G, 16th N. Y. H. Art'y, age 20.	Oct. 7, 7, '64.	Right; circ. Disch'd July 6, '65.
718	Wagner, D., Pt., H, 90th Penn., age 23.	Dec. 13, 13, '62.	Right. Disch'd August 24, 1864.
719	Wagner, J., Pt., C, 69th Penn., age 36.	Dec. 13, 13, '62.	Left. Disch'd December 16, '63.
720	Walbert, J., Pt., D, 25th Michigan, age 21.	June 16, 16, '64.	Right; circ.; gangrene. Disch'd Sept. 13, 1865.
721	Wallace, D., Corp'l, A, 10th N. Y. Cavalry.	June 19, 19, '64.	Left; flap. Discharged.
722	Walker, J., Corp'l, C, 139th Penn., age 24.	Sept. 19, 20, '64.	Left; flap. Surg. S. F. Chapin, 139th Penn. Disch'd Apr. 20, '65.
723	Walker, J. S., Pt., K, 11th Penn., age 22.	July 1, 2, '63.	Right; flap. Disch'd May 31, 1865.
724	*Walker, L. J.*, Pt., B, 13th N. C., age 21.	July 1, 2, '63.	Left; flap. Surg. J. H. McAden, 13th N. C. Paroled Oct. 22, '63.
725	*Walker, W. S.*, Brigadier General, age 42.	May 20, 20, '64.	Left (also other wounds). Exchanged Sept. 19, 1864.
726	Walsh, J., Pt., A, 57th Mass., age 39.	Mar. 25, 25, '65.	Left; flap. Surg. W. C. Shurlock, 51st Penn. Disch'd Sept. 12, '65. *Spec.* 4018. Died after 1875.
727	Ward, J., Corp'l, H, 56th Penn., age 31.	July 1, 2, '63.	Left; circ. Disch'd May 21, '65.
728	Warner, J. C., Pt., A, 121st Ohio, age 21.	Mar. 19, 20, '65.	Right; flap. Surg. T. B. Williams, 121st Ohio. Disch'd June 25, '65.
729	Warner, N. C., Lieut., E, 39th Illinois, age 34.	Aug. 16, 16, '64.	Right; flap. Disch'd Dec. 15, 1864.
730	Warner, T., Pt., H, 8th N. Y. H. Art'y, age 32.	June 3, 4, '64.	Right; flap. Surg. G. Chaddock, 7th Mich. Disch'd Dec. 12, '65.
731	Warren, J. M., Pt., H, 106th N. York, age 21.	June 1, 1, '64.	Right; circ. Disch'd Oct. 16, 1864.
732	Washburne, J., Pt., A, 142d N. York, age 32.	Sept. 29, Oct. 1, '64.	Left; circ. Confederate surgeon. Disch'd June 14, 1865.
733	Wathier, F., Pt., D, 2d Artillery, age 28.	Nov. 8, 8, '63.	Left. Discharged July 2, 1864.
734	Weber, A., Pt., D, 20th New York.	Sept. 17, 17, '62.	Left; ant. post. flap. Surg. J. Hausen, 20th N. Y. Disch'd Dec. 6, 1862.
735	Weber, J., Pt., H, 150th New York.	Mar. 2, 3, '65.	Left; circ. Disch'd August 30, 1865.
736	Webner, C., Pt., E, 111th New York, age 22.	June 1, 1, '64.	Left; flap. Surg. P. E. Hubon, 28th Mass. Disch'd July 4, '65. *Spec.* 4878.
737	Weeks, H. C., Serg't, E, 6th N. Y. H. A., age 21.	Oct. 19, 19, '64.	Left; circ. Disch'd June 8, '65.
738	*Weeks, T.*, Pt., G, 1st South Carolina, age 19.	July 3, 3, '63.	Left. Surg. — Frost, C. S. A. Exchanged Sept. 25, 1863.
739	Welch, J., Corp'l, A, 52d New York, age 35.	June 16, 16, '64.	Left; flap. Surg. J. W. Wishart, 140th Penn. May, '65, necrosed end of tibia removed. Disch'd July 29, 1865.
740	Welsh, A., Pt., H, 9th Pennsylvania Cavalry.	June 29, —, '62.	Left. Surg. — Kelly, 12th Ala. Disch'd Sept. 26, 1862. Died Oct. 16, 1865.
741	Werner, F., Pt., C, 13th New York.	July 21, 23, '61.	Right; flap. Disch'd March 6, 1862.
742	*Whatley, T. J.*, Pt., D, 8th Alabama, age 23.	July 2, 2, '63.	Left; circ. To Provost Marshal Sept. 17, 1863.
743	Wheeler, W. W., Corp'l, D, 22d Indiana, age 25.	May 27. 28, '64.	Right; circ. Disch'd January 8, 1865.
744	Whitbeck, G. H., Pt., E, 134th N. Y., age 19.	July 2, 3, '63.	Right; flap. Disch'd May 30, '64. Died July 21, '77; cerebritis.
745	Whitney, A., Pt., B, 5th Vermont.	June 29, 30, '62.	Left. Oct. 11, 1862, re-amputation. Disch'd Sept. 25, 1863.
746	Whitten, L. T., Pt., B, 40th Mass., age 23.	Aug. 19, 19, '63.	Right; circ. Surg. S. A. Green, 24th Mass. Discharged.
747	Wieland, J., Pt., A, 43d Illinois.	April 6, 6, '62.	Right; flap. Disch'd October 10, 1862.
748	Wike, G., Pt., F, 55th Pennsylvania, age 23.	Sept. 29, 29, '64.	Left; flap. A. Surg. H. C. Merryweather, 5th Col'd Troops, and Surg. T. H. Squire, 89th N. Y. Disch'd May 17, 1865.
749	Wilbur, M. J., Pt., C, 26th Maine.	May 27, 27, '63.	Right; circ. Surg. B. B. Wilson, U. S. V. Disch'd Aug. 17, 1863.
750	Wilds, J., Pt., K, 121st Pennsylvania, age 25.	Feb. 6, 6, '65.	Right; circ. Mustered out May 18, 1865.
751	Wilkins, J. H., Corp'l, E, 1st Louisiana, age 25.	June 14, 14, '63.	Right; ant. post. flap. Disch'd Aug. 9, 1864. *Spec.* 4371.
752	Williams, G., Pt., G, 50th Colored Troops, age 35.	April 10, 10, '65.	Left; ant. post. flap; circ. sect. muscles. Disch'd June 10, '65.
753	Williams, G., Lieut., 4th Infantry.	July 2, 3, '63.	Right; flap. Retired November 11, 1863.
754	Williams, G., Quartermast's employé, age 20.	May 25, 26, '65.	Left; flap. Act. Staff Surg. C. B. Richards, U. S. A.
755	Willson, C. C., Pt., I, 6th Michigan.	Aug. 5, 5, '62.	Left; flap. Disch'd October 16, 1862.
756	Willson, S. L., Pt., D, 72d	July 2,	Both; flap. Surg. C. K. Irwin,
757	New York, age 18.	3, '63.	72d N. Y. Disch'd May 31, '65.
758	Wilson, J. E., Pt., G, 67th New York, age 23.	June 16, 16, '64.	Left; flap. Mustered out July 15, 1865.
759	Winklehaus, J., Pt., K, 66th New York.	Sept. 17, 17, '62.	Left; lat. flap. Surg. C. S. Wood, 66th N. Y. Disch'd Nov. 6, '62.
760	Winn, B. D., Pt., A, 143d Pennsylvania, age 24.	May 6, 8, '64.	Left; circ. Disch'd June 15, '65.
761	Winn, J. W., Corp'l, B, 6th Wisconsin.	Sept. 14, 14, '62.	Left. Disch'd December 22, '62.
762	*Winstead, T. T.*, Pt., I, 30th N. C., age 18.	July 2, 2, '63.	Right; flap. Surg. J. W. Tracey, 14th N. C. Exch'd Nov. 12, '63.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
763	Wisner, J. W., Capt., D, 97th Illinois.	April 9, '65.	Left. Surg. C. Davis, 97th Ill. Mustered out May 15, 1865.
764	Wondens, G., Pt., B, 14th Pennsylvania.	June 2, '61.	Right. Discharged Aug. 6, 1861.
765	Wood, J. B., Lieut., M, 17th Penn. Cav., age 24.	June 21, '63.	Right; post. flap. Disch'd Oct. 6, 1863.
766	*Woolley, H. A.*, Pt., F, 8th Alabama, age 52.	July 2, '63.	Right. For exchange Nov. 12, 1863.
767	Wucherer, C., Pt., D, 61st Ohio.	Aug. 22, '62.	Left. Confederate surgeon. Discharged Nov. 27, 1862.
768	Yarian, J., Pt., A, 35th Indiana, age 27.	Dec. 16, '64.	Left; ant. posterior flap. Disch'd May 25, 1865.
769	Yoder, A., Corp'l, E, 55th Pennsylvania, age 24.	May 16, '64.	Left; flap. Confederate surgeon. Disch'd June 8, 1865.
770	Young, L. R., Pt., K, 31st Maine.	June 17, '64.	Right; circ. Surg. J. D. Mitchell, 31st Maine. Disch'd Jan. 14, '65.
771	Yunkings, E., Pt., H, 42d Pennsylvania.	Dec. 13, '62.	Left; circ. Disch'd June 29, '63.
772	Abbert, C., Pt., A, 38th Wisconsin.	June 17, '64.	Left. Died June 21, 1864.
773	Adams, I. N., Serg't, K, 125th Illinois.	Sept. 1, '64.	Left. Died November 4, 1864.
774	Adams, J., Pt., G, 59th Massachusetts, age 21.	June 30, '64.	Right; ant. posterior flap. Died August 8, 1864; pyæmia.
775	Albert, J., Pt., F, 91st New York, age 19.	Oct. 12, '64.	Both. Died November 4, 1864; pyæmia.
776	Alexander, R., Pt., L, 2d N.Y. H'vy Art., age 42.	Aug. 14, '64.	Right; circ. Died Sept. 7, 1864; gangrene.
777	Atkinson, J., Pt., I, 4th Iowa.	July 12, '63.	Left; flap; head of fibula excised. Died August 3, 1863.
778	Babcock, E., Pt., B, 10th N.Y. H'vy Art., age 39.	April 2, '65.	Left. Died May 9, 1865; exhaustion.
779	Barry, J., Pt., D, 2d N. Hampshire, age 20.	May 16, '64.	Right; hæm., 20 oz. May 25, amp. thigh. Died May 30, '64; exhaustion.
780	Bartholomew, A. L., Pt., F, 3d Vermont, age 25.	June 5, '64.	Left. Died June 28, '64; pyæmia.
781	Basum, A., Pt., F, 63d Pennsylvania.	May 5, '64.	——. Surg. G. T. Stevens, 77th N. Y. Died May 18, 1864.
782	Bell, J. W., Corp'l, I, 73d Ohio.	Mar. 19, '65.	Right. Died March 30, 1865.
783	Bennett, C., Pt., G, 2d New York Artillery.	June 28, '64.	Right. Surg. J. W. Wishart, 140th Penn. Died July 27, 1864.
784	Bernhard, A., Pt., K, 4th Ohio Cavalry, age 35.	Feb. 25, '64.	Right. Mar. 5, 18, hæm., 16 oz. each time; lig. popliteal. Died March 22, 1864; pyæmia.
785	Bing, A., Lieut., A, 2d Iowa.	Oct. 3, '62.	Left (hæmorrhage). Died Oct. 5, 1862.
786	Blair, L., Pt., F, 9th Vermont.	Sept. 28, '64.	Left. Died November 13, 1864; pyæmia.
787	*Boring, R. M.*, Pt., K, 4th Georgia.	July —, '63.	Right. Died July 23, 1863.
788	Boughton, S. E., Pt., G, 134th N. York, age 21.	June 27, '64.	Right; flap. Surg. W. H. Hoag, 134th N. Y. Died Feb. 17, '65, typhoid pneumonia.
789	Bowen, F. P., Lieut., L, 4th Penn. Cav., age 26.	May 28, '64.	Left; circ. Died June 15, 1864; pyæmia.
790	Boyd, J., Pt., D, 52d Ohio, age 20.	June 28, '64.	Right; circ. Died Aug. 7, 1864; exhaustion.
791	Boyer, J., Pt., I, 102d New York.	July 2, '63.	Right. Died July 3, 1863.
792	*Boyle, P.*, Pt., B, 19th Georgia, age 51.	Aug. 26, '64.	Right (also wound of thigh and scrotum); ant. post. flap. Died Sept. 2, 1864; exhaustion.
793	Bradley, J., Maj., 142d Pennsylvania.	Dec. 13, '62.	Left. Died Jan. 3, 1863; tetanus.
794	Branson, W., Pt., I, 8th New York Cavalry.	July 5, '63.	Right (also wound lung). Died July 25, 1863. *Spec.* 3843.
795	*Briley, E.*, Pt., F, 2d Tennessee, age 26.	Sept. 27, '64.	Left; circ. Died Nov. 9, 1864; exhaustion.
796	Brodes, E., Pt., E, 8th Maryland, age 23.	Aug. 21, '64.	Right; circ. Died Oct. 6, 1864; gangrene.
797	Brooks, H., Pt., K, 20th Michigan, age 22.	Mar. 25, '65.	Right; typhoid symptoms. Died April 14, 1865.
798	Brown, G., Laborer, Quartermaster's Dep't-ment.	Aug. 9, '64.	Right. A. Surg. J. T. Calhoun, U. S. A. Died August 29, 1864; pyæmia. *Spec.* 4152.
799	Brown, H. G., Corp'l, B, 37th Wisconsin, age 21.	June 17, '64.	Right; circ. July 21, amputat'n thigh; 31, three inches femur removed. Died Aug. 3, 1864; pyæmia. *Specs.* 2897, 2945.
800	Brown, W., Pt., B, 174th Ohio, age 32.	Dec. 7, '64.	Left; ant. post. flap. Surg. F. W. Morrison, 174th Ohio. Died Dec. 23, 1864; pyæmia.
801	Bryan, C., Pt., H, 119th Pennsylvania, age 24.	May 10, '64.	Left. Died June 23, 1864.
802	[1] Bundy, C., Pt., F, 6th Wisconsin, age 30.	May 10, '64.	Left; circ. Died June 17, 1864; pyæmia.
803	Burns, J., Pt., F, 140th Indiana, age 22.	Dec. 7, '64.	Left; flap. Surg. H. B. Johnson, 115th Ohio. Died Feb. 26, 1865.
804	Burns, J., Pt., F, 140th Indiana, age 22.	Dec. 7, '64.	Left; flap. Surg. H. B. Johnson, 115th Ohio. Died Feb. 26, 1865.
805	Cain, C., Pt., D, 52d New York.	June 16, '64.	Right. Surg. G. L. Potter, 145th Penn. Died June 24, 1864.
806	Cain, T., Pt., E, 96th N. York, age 40.	Sept. 29, '64.	Right. Died October 15, 1864; exhaustion.
807	*Camp, W. H.*, Pt., I, 40th Alabama.	June —, '64.	Left. Died July 3, 1864.
808	Campbell, D., Pt., E, 11th N. Hampshire, age 28.	June 3, '64.	Right; circular; bone necrosed. Died July 12, 1864.
809	[2] *Cannon, S. D.*, Pt., D, 2d Ala. Cav., age 22.	May 18, '64.	Left. Died June 25, 1864; gangrene.
810	Carman, L. A., Serg't, A, 24th Iowa, age 22.	Oct. 19, '64.	Right. Ass't Surg. H. M. Lyons, 24th Iowa. Died Nov. 14, 1864; irritative fever; exhaustion.
811	Carney, P., Pt., A, 48th Illinois.	July 12, '63.	L't. A. Surg. R. L. Von Harlingen, 53d Ohio. Died July 26, 1863.
812	Carr, C. C., Pt., D, 14th N. Hampshire, age 21.	Oct. 19, '64.	Left; circular; sloughing. Died Nov. 25, 1864; anæmia.
813	Carroll, P., Corp'l, C, 22d Kentucky.	Dec. 29, '62.	Left; erysipelas. Died Feb. 2, 1863.
814	*Carter, J.*, Pt., I, 10th Florida, age 46.	Aug. 21, '64.	Left; flap. Died Sept. 15, 1864; pyæmia.
815	Cecil, H., Pt., B, 3d Iowa.	July 12, '63.	Left. Died July 22, 1863.
816	Chaffee, W. R., Pt., A, 142d N. York, age 28.	May 16, '64.	Right; flap. Died August 31, 1864.
817	Chase, H. C., Serg't, B, 30th Maine, age 28.	April 9, '64.	Right. July 18, bone exfoliated. Died July 20, 1864; gangrene.
818	Clark, G. W., Pt., C, 93d Penn., age 36.	April 2, '65.	Left; circular. Died April 28, 1865; pyæmia.
819	Clark, J. W., Serg't, I, 129th Indiana, age 37.	July 19, '64.	Left. Surg. E. Shippen, U. S. V. July 19, hæm.; lig. of ant. tibial; gangrene. Died Sept. 19, 1864.
820	[3] *Cloar, W. F.*, Pt., A, 33d Tennessee, age 24.	Aug. 30, '64.	Right; flap. Sept. 21, gangrene. Oct. 5, hæmorrhage. Died Oct. 12, 1864; pyæmia.
821	Closson, I. H., Capt., H, 91st Pennsylvania.	Oct. 27, '64.	Right. Died November 22, 1864.
822	Coehrane, J., Lieut., K, 67th Ohio, age 28.	May 16, '64.	Left. Died May 28, '64; exhaustion from hæmorrhage.
823	Coleman, J., Pt., F, 75th Ohio.	May 7, '62.	Left. Died May 10, 1862.
824	Collins, T., Pt., K, 1st Me. H'vy Art., age 21.	June 18, '64.	Left; ant. post. flap; gangrene. Died July 9, 1864.
825	Corey, O. M., Pt., H, 114th N. York, age 21.	Oct. 19, '64.	Right. Oct. 29, hæm.; amputation thigh. Died Nov. 11, 1864.
826	Corser, C. M., Pt., H, 1st Ohio Artillery.	June 19, '64.	Right (wound of arm, hip, and foot). Died June 25, 1864.
827	Coverdale, J. B., Pt., A, 22d Illinois.	Nov. 7, '61.	Left. Died November 28, 1861.
828	Croyle, J., Pt., I, 54th Pennsylvania, age 20.	Sept. 19, '64.	Right; ant. posterior flap. Died Dec. 20, 1864; typhoid fever.
829	Cummings, J. S., Pt., B, 70th Ohio, age 16.	June 18, '64.	Left; circ. Surg. B. N. Bond, 27th Mo. Died July 7, 1864; pneumonia.
830	Davis, J. D., Corp'l, D, 33d Missouri, age 23.	June 6, '64.	Left; ant. post. flap. Surg. A. T. Bartlett, 33d Mo. Died Oct. 11, 1864.
831	Dawson, H., Pt., A, 49th New York, age 25.	May 10, '64.	Left; ant. post. flap. Surg. F. M. Everleth, 7th Me. Died June 16, 1864; exhaustion.
832	Dean, W., Pt., B, 1st Cavalry, age 39.	Oct. 29, '64.	Right; flap. Died March 25, '65; chronic diarrhœa.
833	DeHoff, E., Pt., H, 38th Ohio, age 33.	Aug. 7, '64.	Left; ant. post. flap; gangrene. Dec. 5, amp. thigh. Died Jan. 16, 1865.
834	Dempson, C., Corp'l, G, 32d Mass., age 32.	May 12, '64.	Left. Died June 9, '64; pyæmia.
835	Densmore, F. M., Pt., F, 40th Indiana.	July 20, '64.	Left. Died July 24, 1864.
836	*Dewes, J. S.*, Pt., H, 18th Virginia.	May 12, '64.	——; post. flap. May 12, partial exc. Surg. C. B. Gibson, C.S.A. Died May 21, 1864.
837	Dillon, J., Pt., E, 56th Mass., age 43.	July 30, '64.	Right; long posterior flesh flap. Surg. T. F. Oakes, 56th Mass. Died Aug. 6, 1864; exhaustion.
838	Dimond, J., Serg't, K, 61st New York.	May 12, '64.	Left. Surg. J. W. Wishart, 140th Penn. (Tibial artery wounded.) Died May 12, 1864.
839	Droker, A., Pt., B, 57th Indiana.	Dec. 31, '62.	Left. Died January 8, 1863.
840	Dunham, J. H., Pt., D, 117th N. Y., age 32.	Oct. 27, '64.	Right. Surg. N. Y. Lect. 76th Penn. Died Nov. 17, '64; pyæm.
841	Eldred, H. E., Pt., E, 2d U.S. Sharpshooters, age 27.	June 18, '64.	Left; circ. June 25, gangrene. July 1, amputation thigh. Died July 6, 1864; tetanus.
842	Engleman, W., Pt., K, 9th Iowa Cav., age 14.	June 10, '64.	Right; circ. Surg. J. Wasson, 9th Iowa Cavalry. Died July 1, 1864; exhaustion.
843	*Evans, M.*, Pt., E, 25th South Carolina, age 45.	Aug. 21, '64.	Right. Died September 11, 1864.

[1] LIDELL (J. A.), *Example of Pyarthrosis and Spreading Ostcomyelitis*, in *U. S. Sanitary Commission Memoirs*, New York, Surg. Vol. I. p. 395.

[2] O'KEEFE (D. C.), *Surgical Cases of Interest, treated at Institute Hospital, Atlanta, Ga., May and June*, 1864, in *Confederate States Medical and Surgical Journal*, Volume 2, p. 29.

[3] JONES (J.), *Case of Pyæmia Supervening upon Hospital Gangrene*, in *U. S. San. Com. Memoirs*, New York, 1871, Surg. Vol. II, pp. 337 and 439.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
844	Everson, J., Pt., F, 111th New York.	June 19, 19, '64.	Right. Surg. G. L. Potter, 145th Penn. Died July 8, 1864.
845	Fieger, J., Corp'l, B, 98th Pennsylvania, age 30.	April 2, 2, '65.	Right; circ. Died May 18, 1865; exhaustion.
846	Fleshman, E., Pt, E. 118th Ohio.	June 27, 27, '64.	Left. Surg. A. M. Wilder, U.S.V. Died July 19, 1864.
847	Fry, G., Pt., K, 16th Kentucky.	May 14. 14, '64.	Left. Died May 19, 1864.
848	*Fuller, B. H.*, Pt., B, 12th Georgia.	July 9. 10, '64.	——; double flap. Surg. C. H. Todd, C. S. A. Died Aug. 19, 1864; exhaustion; diarrhœa.
849	Gaylord, A., Pt., B, 75th Illinois.	Oct. 8, 8, '62.	Right. Died October 14, 1862.
850	Gibson, W., Serg't, C, 27th Michigan.	June 17, 17, '64.	Right. Died June 18, 1864.
851	Gillatt, C. W., Pt., A, 56th Pennsylvania, age 19.	July 1, 2, '63.	Right. Died June 23, 1864; chr. diarrhœa; phthisis pulmonalis.
852	Gillespie, J., Pt., F, 59th Illinois, age 29.	Dec. 15, 15, '64.	Right; ant. post. flap; gangrene. Died Feb. 2, 1865; gangrene.
853	*Goddard, J. F.*, Pt., A, 57th Georgia, age 28.	July 22, 22, '64.	Right; ant. post. flap. Died Jan. 1, 1865; chronic diarrhœa.
854	Goodell, L., Pt., C, 2d Vermont, age 23.	Nov. 4, 4, '63.	Left; ant. post. flap. Surg. W. J. Sawin, 2d Vt. Erysip.; gang.; tibia exfol. Died June 6, 1864; pseudo-membranous croup.
855	*Gould, J. L.*, Serg't, G. 4th Texas.	July 2, —, '63.	Left. Died July 8, 1863.
856	Greenhart, H., Pt., G, 9th Connecticut, age 45.	Oct. 19, 19, '64.	Left; flap; erysipelas. Died Oct. 31, 1864; tetanus.
857	Groesbeck, W., Pt., B, 74th Indiana.	Aug. 6, 6, '64.	Right. Died August 25, 1864.
858	Hagan, P., Pt., A, 7th Michigan.	Sept. 19, 19, '64.	Left; oval skin flap; anæmia; gang. Died Oct. 19, '64; pyæm.
859	Hammer, H., Pt., F, 15th Indiana, age 24.	Nov. 25, 27, '63.	Right; circ.: gang. Died Dec. 6, 1863.
860	Hammond, S., Pt., B, 97th Indiana.	July 12, 12, '63.	Left. Surg. W. Lomax, 12th Ind. Died August 5, 1863.
861	Harrison, W. H., Pt., B, 4th Michigan, age 24.	May 10, 10, '64.	Right; ant. post. flap; sloughing. Died May 21, 1864; pyæmia.
862	Haskill, J. M., Serg't, A, 32d Mass., age 28.	July 2, 3, '63.	Left (also right knee); sloughing. Died Aug. 25, 1863; diarrhœa.
863	Hawkins, G. W., Capt., I, 97th Pennsylvania.	Oct. 27, 27, '64.	Left. Surg. M. S. Kittenger, 100th N. Y. Died Oct. 27, 1864.
864	Hayden, F. W., Serg't, F, 34th Mass., age 25.	Oct. 13, 14, '64.	Left; ant. post. flap. Died Nov. 9, 1864; exhaustion.
865	[1]Hill, J., Pt., A, 32d Massachusetts, age 49.	May 11, 12, '64.	Right; ant. post. flap. May 22, hæm. Died May 22, '64; pyæm.
866	Hindman, W. S., Pt., E, 155th Penn., age 20.	May 23, —, '64.	Left. June 24, amputation thigh. Died June 24, 1864.
867	Hoasch, G., Pt., E, 110th Ohio, age 45.	July 9, 11, '64.	Left; circ. A. A. Surg. W. S. Adams. Aug. 4, hæm.; lig. post. tib. Died Aug. 8, '64; hæmorrhage. *Spec.* 3829.
868	Holmes, R. A. R., Pt., I, 3d N. Hamp., age 35.	May 16, 16, '64.	Right; circ. Died May 27, 1864; exhaustion.
869	Hough, J., Serg't, H, 15th N.Y. H'vy Art., age 47.	Aug. 19, 19, '64.	Right; flap. Died Aug. 31, 1864; exhaustion.
870	Hufnagle, J., Pt., A, 4th Vermont, age 34.	May 12, 12, '64.	Right; circ. Died June 8, 1864; dysentery.
871	*Hughes, G.*, Pt., I, 8th North Carolina.	June 1, 2, '64.	Left; apparently flap. Died July 9, 1864; exhaustion.
872	Hunt, T., Pt., A, 44th New York.	July 3, —, '63.	Right. Died July 25, 1863.
873	Hunter, J., Corp'l, B, 7th Illinois.	Oct. 5, 5, '64.	Left; flap. Died Oct. 21, 1864; exhaustive suppuration.
874	Ingram, G. W., Pt., A, 68th Penn., age 25.	July 2, 4, '63.	Left. July 20, hæmorrh., 12 oz. Died July 24, '63; hæmorrhage.
875	Johnson, C. L., Pt., B, 1st Tennessee.	Aug. 6, 6, '64.	Right (also amputat'n left thigh). Died August 21, 1864.
876	Johnson, F., Pt., D, 117th Col'd Troops, age 20.	Oct. 27, 27, '64.	Right (also flesh wound). Died Nov. 16, 1864; exhaustion.
877	Johnson, J., Pt., E, 57th Indiana, age 31.	May 27, 27, '64.	Right; flap. Surg. E. B. Glick, 40th Indiana. Died Sept. 1, '64.
878	Johnson, H., Pt., D, 7th N. Hampshire, age 21.	June 17, 17, '64.	Left. Died June 29, 1864.
879	Johnson, R. H., Pt., C, 139th New York.	Sept. 29, 29, '64.	Right. Surg. T. H. Squire, 89th New York. Death (?).
880	Kahler, N., Pt., A, 100th Illinois, age 24.	Nov. 25, 27, '63.	Left; including head of fibula; gang. Died Dec. 16, 1864.
881	*Kennedy, E.*, Pt., E, 13th Virginia, age 25.	Feb. 7, 7, '65.	Left; circular. Died ————; exhaustion.
882	Kennedy, J., Pt., A, 69th New York, age 30.	June 3. 5, '64.	Right; flap. Surg. J. A. Spencer, 69th N. Y. N. G. Died June 12, 1864; exhaustion.
883	Kenion, R., Pt., E, 149th New York, age 25.	June 27, 27, '64.	Left; flap. Surg. J. L. Dunn. 109th Penn. Died Mar. 4, 1865; small-pox.
884	Kennerson, A., Serg't, K, 17th Maine, age 33.	June 16, 16, '64.	Right; lateral flap. Died Aug. 4, 1864.
885	Kimple, A., Lieut., C. 25th Iowa.	Aug. 31, 31, '64.	Right. Died September 17, 1864.
886	King, H. M., Corp'l, H, 145th Penn., age 27.	May 5. 7, '64.	Right. Surg. J. W. Wishart, 140th Penn. (Gangrene.) Died May 27, 1864; exhaustion.
887	King, T., Serg't, C, 71st New York, age 20.	July 2, 3, '63.	Left. July 15, hæm. Died July 15, 1863.
888	Knapp, A. J., Pt., F, 93d Indiana.	May 14, 14, '63.	——. Surg. J. B. Rice, 72d Ohio. Died July 27, 1863.
889	Knowlton, C. C., Pt., I, 22d Mass., age 22.	Sept. 20, 20, '62.	Left. Oct. —. slough.; maggots; bed-sores. Died Oct. 13, 1862.
890	Krommiller, G., Pt., C, 14th New York Heavy Artillery, age 38.	July 9, 10, '64.	Left. Surg. T. F. Oakes, 56th Mass. Died October 8, 1864. *Spec.* 6529.
891	Laws, C., Pt., E, 43d Colored Troops.	July 30, 30, '64.	Left; circ. Surg. D. MacKay, 29th Col'd Troops. Died Aug. 6, '64.
892	Lease, H. A., Pt., E, 14th Missouri.	Oct. 4, —, '62.	Left. Died Nov. 14, '62; wound and amputation.
893	Lee, H., Pt., D, 9th Colored Troops, aged 21.	Dec. 5, 6, '64.	Right; flap. A. A. Surg. J. S. Giltner. Died Dec. 23, 1864; pyæmia.
894	Leininger, A., Pt., E, 98th Pennsylvania.	April 2, 2, '65.	Right; flap. Died May 17, 1865; exhaustion.
895	Lenzenmeyer, R., Serg't, F, 2d Pennsylvania.	July 3, 3, '63.	Right. Died July 23, 1863.
896	*Lewis, J. R.*, Pt., G, 53d North Carolina, age 32.	July 3, 3, '63.	Right (also amputat'n left thigh). Surgeon J. J. Knott, P. A. C. S. Died July 10, 1863.
897	Limb, W. F., Pt., B, 26th Ohio.	June 20, 20, '64.	Right. Surg. W. B. McGavran, 26th Ohio. Died Aug. 8, 1864.
898	Linch, N., Pt., B, 163d New York.	Dec. 13, 13, '62.	Right. Died December 21, 1862.
899	Lympus, N. S., Pt., K, 10th Iowa.	Dec. 13, 13, '64.	Left; flap. Acting Staff Surg. C. B. Richards, U.S.A. (Also w'nd of arm.) Died Dec. 14, 1864.
900	Lynch, M., Serg't, C, 2d Vermont, age 22.	Oct. 19, 19, '64.	Right. Died December 14, 1864.
901	*Maddox, W. J.*, Pt., A, 53d Georgia.	May 3, —, '63.	Right. Surg. J. J. Knott, P. A. C. S. Died June 18, 1863.
902	Marcey, H. P., Pt., K, 11th Penn. Cav., age 23.	May 17, 17, '64.	Right; flap. June 8, hæmorrhage. Died June 25, 1864; hæm.
903	Martin, D., Pt., C, 28th Pennsylvania.	Nov. 27, 27, '63.	Right. Died December 17, 1863.
904	McCardle, J., Pt., E, 2d Penn. Artillery, age 23.	July 2, 2, '64.	Left (also amp. right, low. third). Died July 3, 1864.
905	*McCarmichael, A.*, Pt., D, 7th Miss., age 43.	Nov. 30, Dec. 1, '64.	Left; ant. post. flap. Died Mar. 3, 1865.
906	McCluskey, P., Serg't, F, 26th N. Y., age 27.	Dec. 13, 13, '62.	Left. Jan. 3, '63, hæm.; lig. post. tibial. Died January 11, 1863.
907	McDemitt, T. J., Pt., E. 49th Penn., age 25.	May 10, 10, '64.	Right; flap. Died September 8, 1864.
908	McDermott, O., Pt., M. 1st Mass. H'vy Art'y, age 30.	June 20, 20, '64.	Left; ant. post. flap. Surg. C. C. Jewett, 16th Mass. Died July 17, 1864. *Spec.* 4579.
909	McDevitt, J., Pt., I, 7th Rhode Island, age 27.	June 3, 3, '64.	Left; circ. Surg. J. Harris, 7th R. I. Gangrene. Died July 8, 1864; pyæmia.
910	McElhannon, W. J., Pt., B, 45th Illinois.	June 26, —, '63.	Right (also five other wounds). Died July 15, 1863; pyæmia.
911	McLean, M., Pt., B, 80th Illinois.	May 27, 27, '64.	Right. Surg. J. T. Woods, 99th Ohio. Died June 1, 1864.
912	McMillan, J., Pt., H, 4th Penn. Cavalry, age 18.	June 24, 26, '64.	Right; circ. A. Surg. W. B. Price, 4th Penn. Cavalry. Died July 9, 1864; asthenia.
913	McNeil, F., Pt., E, 114th New York, age 23.	Sept. 19, 19, '64.	Right; circ. Surg. L. P. Wagner, 114th N. Y. Died Oct. 8, 1864; pyæmia.
914	Mensen, M., Pt., E, 22d Wisconsin.	May 25, 25, '64.	Left. Died June 12, 1864.
915	Metz, J. H., Pt., G, 9th Veteran Reserve Corps, age 33.	July 11, 11, '64.	Left; lat. flap. Surg. J. Wilson, Med. Insp. U. S. A. Died July 28, 1864; exhaust'n. *Spec.* 3166.
916	Mier, J., Pt., I, 113th Ohio.	June 27, 27, '64.	Left. Died July 6, 1864.
917	Miller, J., Pt., D, 157th Pennsylvania.	June 17, 17, '64.	——. Died June 23, 1864.
918	*Miller, L.*, Pt., K, 56th N. Carolina, age 26.	April 19, 19, '64.	Left; ant. skin and post. mus. skin flap. Surg. C. H. Ladd, 56th N. C. Probably died.
919	Miller, M., Pt., B, 40th Indiana.	Dec. 31, 31, '62.	Left. Died December 31, 1862.
920	Miller, W., Serg't, G, 45th New York.	May 2, 3, '63.	Left; flap. Died May 28, 1863.
921	Moffitt, B. L., Lieut., —, 1st New Jersey.	May 5, 5, '64.	Right (also flesh wound of leg). Died May 8, 1864.
922	Molter, P., Pt., H, 6th Wisconsin, age 23.	May 10, 11, '64.	Left; circ.; diarrhœa. Died July 6, 1864; exhaustion. *Spec.* 3574.
923	Monaghan, M., Pt., C, 2d Michigan, age 43.	June 16, 17, '64.	Left; circ. July 20, lig. femoral; gangrene. Died July 25, 1864; hæmorrhage.
924	*Moody, J.*, —, —, age 20.	May —, —, '63.	——. Died May 28, 1863.
925	Moore, J. H., Lieut., A. 100th Indiana.	Sept. 1, 2, '64.	Left. Surg. W. Lomax, 12th Ind. Died October 1, 1864.
926	Moore, W., Pt., K, 14th West Virginia, age 34.	July 20, 21, '64.	Left. Died Aug. 4, '64; nervous prostration and emaciation.
927	Morse, J., Pt., B, 2d Penn. H'vy Artillery, age 22.	July 16, —, '64.	Right. Hæmorrhage. July 25, 1864, amp. thigh. Died August 10, 1864; pyæmia.

[1] Lidell (J. A.), *Example of Osteomyelitis with Thrombosis*, in *U. S. Sanitary Commission Memoirs*, New York, 1870, Surgical Volume I, p. 404, and *American Journal Medical Sciences*, N. S., 1872, Vol. LXIV, p. 358.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
928	Morris, S. P., Serg't, K, 26th Pennsylvania.	July 2, 2, '63.	Left. Died July 12, 1863.
929	Mullen, W., Pt., I, 105th Pennsylvania, age 40.	Aug. 12, 12, '64.	Left; flap; diarrhœa. Died Aug. 29, 1864.
930	*Murphy, R. J.*, Pt., C, 45th Georgia, age 35.	May 3, 3, '63.	Left; ant. post. flap; erysipelas. Died May 24, 1863; gangrene of stump.
931	*Murphy, T. J.*, Pt., H, 30th North Carolina.	Sept. 19, 19, '64.	——; circ.; typhoid fever. Died October 10, 1864; cachexia.
932	Newell, R. J., Corp'l, D, 19th Maine.	July 1, —, '63.	Right. Surg. S. H. Plumb, 82d N. Y. Died July 16, 1863.
933	Nichols, F. C., Pt., F, 159th New York.	Sept. 19, 19, '64.	Right; flap. Died October 5, 1864; gangrene.
934	O'Daniel, T., Pt., F, 37th Kentucky, age 18.	June 11, 11, '64.	Right. Died July 4, 1864.
935	*Odom, J.*, Serg't, H, 21st South Carolina, age 30.	Aug. 21, 21, '64.	Right. Surg. A. A. White, 8th Md. Died Sept. 13, 1864.
936	Oliver, H., Pt., K, 19th Maine.	July 3, 3, '63.	Right. Surg. A. J. Billings, 19th Maine. Died July 11, 1863.
937	Osborne, W., Serg't, K, 57th New York, age 42.	June 17, 17, '64.	——. Surg. G. L. Potter, 145th Penn. Died July 2, 1864.
938	Owens, T. D., Pt., H, 81st Illinois, age 25.	May 22, 23, '63.	Left; pyæmia. Died July 12, 1863.
939	Parks, J., Pt., E, 91st Pennsylvania, age 38.	June 18, 18, '64.	Left; lat. flap. June 30, hæm.; femoral lig. July 6, fem. delig. Died July 12, '64; hæmorrhage.
940	Parsell, M., Pt., K, 5th Wisconsin, age 33.	April 6, 8, '65.	Left; ant. post. flap. Died April 19, 1865.
941	Parsons, J., Pt., F, 80th Indiana.	May 14, 14, '64.	Right. A. A. Surg. L. Darling. Died July 15, 1864.
942	Phillips, N., Pt., A, 188th New York, age 20.	Feb. 6, 6, '65.	Right; circ. Died February 18, 1865; pyæmia.
943	*Pierson, E. J.*, Pt., B, 19th Virginia.	Mar. 31, Ap. 1, '65.	Left. A. Surg. W. B. Hartman, 116th Penn. Died April 12, '65.
944	Pierson, J., Pt., F, 80th Indiana.	May 14, —, '64.	Right. Died June 15, 1864.
945	Posey, E., Corp'l, E, 30th Colored Troops, age 41.	Oct. 4, 4, '64.	Right; circ. Died November 9, 1864; pyæmia.
946	Posey, J., Pt., D, 21st Kentucky, age 34.	June 20, 20, '64.	Right; flap. Surg. J. T. Woods, 99th Ohio. Died Aug. 12, 1864.
947	*Pouge, L. G.*, Corp'l, E, 17th North Carolina.	Mar. 25, 25, '65.	Right. Surg. D. C. Roundy, 37th Wisconsin. Died April 10, '65; irritative fever. *Spec.* 4032.
948	Ramer, J. P., Corp'l, K, 5th N. Hamp., age 25.	June 6, 6, '64.	Left. Died June 25, 1864.
949	Ranaghan, J., Pt., E, 69th New York.	May 18, 18, '64.	——. Surg. G. L. Potter, 145th Penn. Died June 10, 1864.
950	Ratiburn, J. H., Pt., F, 149th Penn., age 22.	June 16, 16, '64.	Right; ant. post. flap; dysentery. Died July 10, 1864.
951	*Reddick, W. J.*, Pt., C, 20th North Carolina.	Sept. 19, 19, '64.	——; circular. Died November 7, 1864; pyæmia.
952	Reinhart, C., Pt., K, 74th Pennsylvania, age 21.	Aug. 27, —, '62.	——; ant. post. flap; sloughing; re-amp. knee joint. Died Sept. 23, 1863; gangrene.
953	Rhodes, J. H., Pt., K, 5th New Jersey.	May 3, 3, '63.	Right. Surg. G. P. Oliver, 111th Penn. Died May 13, 1863.
954	Ring, P., Pt., E, 69th New York, age 45.	June 3, 3, '64.	Right; circ. Died June 21, 1861.
955	Rouch, J. T., Pt., A, 8th Maryland.	May 5, 5, '64.	Left. Died May 18, 1864.
956	Rouse, G. W., Adjutant, 100th Illinois.	July 28, 28, '64.	Right. Died August 4, 1864.
957	Ryan, J. C., Corp'l, K, 6th New Hampshire.	Dec. 13, 13, '62.	——. Died January 6, 1863.
958	*Sanders, C. W.*, Pt., B, 4th S. C. Cav., age 23.	May 31, 31, '64.	Right; ant. post. flap; sloughing. Died June 11, 1864; pyæmia.
959	Savage, J., Major, 2d Massachusetts, age 20.	Aug. 9, 9, '62.	——. Died October 22, 1862; hæmorrhage.
960	Sawney, L., Serg't, F, 79th Pennsylvania.	June 25, 26, '63.	Left; flap. Died July 1, 1863; pyæmia.
961	Schoeneck, J., Pt., B, 55th Pennsylvania, age 30.	June 3, 5, '64.	Left; ant. post. flap; sloughing. Died July 9, 1864; gangrene.
962	Scott, S., Pt., A, 48th Colored Troops.	April 1, 1, '65.	——. Surg. H. Osborne, 51st C. Troops. Died April 3, 1865.
963	Sheridan, S., Pt., B, 12th Colored Troops, age 28.	Dec. 15, 17, '64.	Right; flap. A. A. Surg. J. S. Giltner. Died Jan. 2, 1865.
964	[1] Shields, R., Corp'l, G, 4th Iowa. age 24.	Nov. 27, 27, '63.	Right. Surg. D. B. Allen, 30th Iowa. Died Jan. 14, '64; pyæm.
965	Sholan, A., Pt., D, 121st Pennsylvania, age 40.	May 18, 18, '64.	Right; circ.; slough.; diarrhœa. Died May 26, 1864; exhaustion.
966	Shull, V., Pt., D, 13th Indiana, age 22.	May 19, 19, '64.	Right. Died June 16, 1864.
967	Sill, W. J., Lieut., C, 75th Pennsylvania.	July 1, —, '63.	Left. Died July 21, 1863.
968	Skinner, J., Col'd teamster, age 56.	Sept. 20, 20, '64.	Right. Died September 25, 1864.
969	*Smith, G. W.*, Pt., E, 63d Tennessee, age 30.	Sept. 29, 29, '64.	Right; flap; sloughing. Died October 21, 1864.
970	Smith, J. C., Corp'l, A, 14th N.Y. H. A., age 27.	April 2, 2, '65.	Right; ant. post. flap. Died May 16, 1865.
971	Smith, J. J., Pt., D, 5th Tenn. Cavalry, age 21.	April 7, 9, '62.	Right; circular. Died May 21, 1862.
972	Smithus, E., Pt., F, 127th Illinois, age 25.	July 28, 28, '64.	Right; double flap. Act. Staff Surg. C. B. Richards, U. S. A. Died Aug. 18, 1864.
973	Snoddery, L., Pt., H, 57th Indiana.	June 14, —, '64.	Left. Died July 14, 1864.
974	Snodgrass, J., Pt., C, 36th Illinois.	June 27, 27, '64.	Left; circ. Surgs. H. E. Hasse, 24th Wis., and W. P. Pierce, 88th Illinois. Died July 17, '64.
975	Snow, J., Pt., C, 169th New York, age 27.	June 30, 30, '64.	Left; large post. and inus. flap; sloughing; hæmorrhage. Died October 15, 1864.
976	Stalze, W. B., Corp'l, B, 62d Ohio.	July 18, —, '63.	Right; hæm. from gangrenous stump, fatal July 31, 1863.
977	Stanley, W., Lieut., G, 12th Mo. Cav., age 36.	Dec. 15, 17, '64.	Left; circ. A. A. Surg. A. Rolls. Mortification. Died Dec. 19, '64.
978	Sullivan, H., Pt., D, 11th Mass., age 39.	July 2, 4, '63.	Left. Died November 25, 1864.
979	Swain, F. F., Capt., E, 123d Indiana, age 45.	Aug. 6, —, '64.	Right. Surg. J. W. Lawton, U. S. V. Gang. Died Aug 23, '64.
980	Taft, G. R., Capt., A, 53d Massachusetts.	June 14, 14, '63.	Right; gangrene; hæmorrhage; lig. femoral. Died July 21, 1863; pyæmia.
981	Theobald, D., Pt., G, 97th New York.	June 18, 18, '64.	Right. Died June 22, 1864.
982	Thewing, H. S., Pt., C, 4th Michigan, age 18.	May 31, 31, '64.	Right; ant. post. flap; sloughing. Died June 19, 1864; exhaustion.
983	Tichenor, G., Pt., F, 9th N. Y. Ilvy Artillery.	Oct. 19, 19, '64.	Left. Died November 20, 1864; pyæmia.
984	Titan, N., Pt., H, 7th New York, age 21.	April 7, 8, '65.	Right; circ. Died May 8, 1865; pyæmia.
985	Tompkins, G., Pt., G, 1st N. Y. Heavy Artillery, age 45.	July 3, 4, '63.	Right (also wound of left); gang. July 17, amp. thigh; 21, hæm.; femoral ligated. Died July 26, 1863; pyæmia; hæm.; gang.
986	Toomey, J., Pt., I, 1st New Jersey Cavalry, age 30.	Aug. 29, 29, '64.	Left; ant. post. skin flap. Surg. A. Hard, 8th Ill. Cav. Died Sept. 28, '64; pneumonia. *Spec.* 3158.
987	Torrence, G. A., Corp'l, A, 4th Iowa.	May 13, 13, '64.	Left. Surg. A. T. Hudson, 26th Iowa. Died May 20, 1864.
988	Tripp, J. W., Pt., A, 1st Michigan, age 18.	May 25, 25, '64.	Right; ant. post. flap. Surg. A. F. Whelan, 1st Michigan S. S. Died June 8, 1864; pyæmia.
989	*Turner, H. W.*, Serg't, G, 1st Alabama, age 24.	Nov. 30, Dec. 1, '64.	Right; ant. post. flap. Surg.—McMahon, C. S. A. Died Mar. 4, 1865; small-pox.
990	Unknown, I. B., 148th Pennsylvania.	May 3, —, '63.	——. Surg. C. S. Wood, 66th N. York. Hæm. Died of pyæmia.
991	Unknown, J., Colored servant, age 30.	Dec. —, —, '64.	Right. Died December 19, 1864.
992	Vail, W., Pt., A, 2d N. York.	Oct. 19, 19, '64.	Right; oval skin flap. Surg. D. B. Van Slyck, 22d N. Y. Cav'y. Died Oct. 27, 1864; tetanus.
993	Valentine, R. H., Pt., D, 5th New York.	April 7, 7, '65.	Right. Died April 11, 1865.
994	Van Garder, J., Pt., F, 58th Penn., age 22.	Sept. 28, —, '64.	Left. Died October 30, 1864; exhaustion.
995	Vannatter, W. A., Pt., I, 121st Penn. Reserves.	Dec. 13, 15, '62.	Right. Confed. surgeon. Gangrene. Died Feb. 13, 1863.
996	Walker, F., Corp'l, K, 47th Ohio.	May 22, 22, '63.	Right. Died May 22, 1863.
997	Walker, J. B., Serg't, K, 12th Missouri Cavalry, age 22.	Sept. 14, 14, '64.	Right; ant. lat. flap. A. Surg. J. M. Study, U. S. V. Gangrene. Died Sept. 19, 1864; pyæmia.
998	Wallick, E. F., Pt., E, 126th Ohio.	Sept. 19, 19, '64.	Left. Died Sept. 23, 1864; shock of operation.
999	Walters, B. G., Pt., H, 19th Maine, age 19.	Oct. 15, 15, '64.	Left; flap. Surg. W. J. Burr, 42d N. Y. Slough. Nov. 27, amp. thigh. Died April 28, '65; exh'n. *Specs.* 3445, 3446, 3447, 3448.
1000	*Wannamaker, J. W.*, Pt., F, 25th S. C., age 27.	Aug. 22, 22, '64.	Right. Surg. G. W. Metcalf, 76th N. Y. Died Aug. 26, '64; exh'n.
1001	Ward, L., Corp'l, B, 94th New York, age 18.	June 18, 19, '64.	Right. Died August 5, 1864.
1002	Warren, R., Pt., C, 17th Connecticut.	July 1, —, '63.	Left. Died July 17, 1863.
1003	*Weaver, C. D.*, Pt., H, 43d Mississippi, age 33.	Dec. 15, 15, '64.	Left; ant. post. flap. Died Dec. 25, 1864; shock.
1004	*Weed, A. N.*, Pt., C, 10th Georgia, age 24.	May 3, 4, '63.	——; flap. Died July 9, 1863; gangrene.
1005	Weight, J., Pt., A, 148th Pennsylvania.	July 3, 3, '63.	Left. Died July 24, 1863.
1006	Westerman, W., Pt., C, 2d New Hamp., age 28.	June 3, 3, '64.	Left; flap. Died June 14, 1864; gangrene.
1007	White, L., Serg't, F, 7th New Jersey.	May 5, 5, '64.	Right. Died May 5, 1864.
1008	Whiting, T. J., Serg't-Major, 2d Michigan.	May 6, 6, '64.	Left (also amp. finger). Died May 13, 1864.
1009	*Whittaker, J. P.*, Pt., A, 17th N. C., age 44.	June 16, 16, '64.	Right; circular. Died July 20, 1864.
1010	*Williams, C. D.*, Pt., E, 35th North Carolina.	June 19, 19, '64.	Left. Surg. P. E. Hubon, 28th Mass. Died June 20, 1864.
1011	Williams, J. M., Pt., H, 26th Ohio.	Sept. 19, 19, '63.	Left; mortification. Sept. 26, amputation of thigh. Died.
1012	Williams, J. H., Major, 18th Indiana.	Oct. 19, 20, '64.	Right (also w'nd left thigh); circ. Died Oct. 24, '64; shock of op'n.
1013	Wilson, R., Pt., E, 29th Colored Troops.	July 30, 31, '64.	Left; flap. Surg. F. M. Weld, 27th Col'd Troops. Died Aug. 20, 1864; diarrhœa and exh'n.

[1] LIDELL (J. A.), *Pyæmia connected with Thrombosis*, in *U. S. Sanitary Commission Memoirs*, Surgical Volume I, New York, 1870, page 550.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1014	*Winters, L.*, Pt., K, 50th Georgia.	July 3, 3, '63.	Right. Aug. 25, slough.; hæm. Sept. 11, amput'n thigh. Died Sept. 30, 1863; pyæmia.
1015	*Wise, G. A.*, Pt., F, 25th South Carolina, age 24.	Aug. 21, 21, '64.	Right. Died September 2, 1864; effects of wound.
1016	Wolf, A. M., Pt., C, 62d Pennsylvania.	May 8, 8, '64.	Right. Died July 20, 1864.
1017	*Wood, R.H.*, Pt., D, 19th Virginia Art'y, age 18.	April 12, 12, '65.	Left. Died May 14, 1865; meningitis.
1018	Yates, T., Pt., F, 21st Ohio.	Sept. 19, 19, '63.	Right. Died.
1019	*Zellman, I. C.*, Pt., B, 58th Alabama, age 18.	May 25, 25, '64.	Right. A. Surg. J. P. Dowling, 29th Penn. Died Aug. 28, 1864.
1020	Zimmerman, M., Pt., H, 81st Pennsylvania.	Dec. 13, 13, '62.	Left (thigh and chest wound). Surg. C. S. Wood, 66th N. Y. Died Dec. 13, 1862.
1021	Bennett, M., Pt., A, 69th New York.	May 18, —, '64.	Left. Surg. N. Hayward, 20th Massachusetts.
1022	*Gorntoe, M. Z.*, Pt., H, 9th Georgia.	Oct. 7, —, '64.	Left.
1023	*McCowan, W. C.*, Pt., 2d Mississippi.	July —, —, '63.	——. Surg. C. S. Wood, 66th New York.
1024	*Mast, D. P.*, Lieut., D, 1st North Carolina.	Mar. 31, 31, '65.	Right.
1025	[1]*O'Brien, M. J.*, Pt., 10th Georgia, age 31.	Sept. 17, 18, '62.	Right; circular; sloughing.
1026	*Scott, J. C.*, Corp'l, A, 42d Miss., age 30.	July 1, 2, '63.	Left; flap.
1027	*Steward*, ——, Lieut., I, 11th Georgia, age 41.	Nov. 22, 22, '64.	Left. Surg. W. Graham, 40th Illinois.
1028	*Tutter, G. W.*, Pt., G, 3d Arkansas.	May 18, —, '64.	Left. Surg. G. L. Potter, 145th Penn. (Also wound of right leg.)
1029	*Vanzoger, J.*, 2d Mississippi Battery.	Oct. 5, —, '62.	

Primary Amputations in the Middle Third of the Leg for Shot Injury.—Eight hundred and ninety-two of the three thousand three hundred and ninety-five primary amputations in the continuity of the bones of the leg were performed in the middle third. The result in six of these cases was not determined; seven hundred and thirty-six proved successful, and one hundred and fifty were fatal, a mortality of 16.9 per cent., or 7.5 per cent. less than that of the primary ablations in the upper third of the leg.

Examples of Successful Primary Amputations in the Middle Third of the Bones of the Leg.—The operations of this group numbered seven hundred and thirty-six; one hundred and fifty-five were performed on Confederate and five hundred and eighty-one on Union soldiers. Of the latter the names of five hundred and seventy-six are found on the Pension Rolls; two are retired officers, and three do not seem to have applied for pensions. Twenty-seven have died since the date of their discharge from the service—one of erysipelas, one of epilepsy, one of congestion of the brain, seven of phthisis, three of accidents, and fourteen of causes not stated.

FIG. 286.—Bony stump of right leg, five months after amputation. *Spec.* 4225.

CASE 732.—Private D. S. Crawford, Co. A, 47th Pennsylvania, aged 20 years, was wounded at Cedar Creek, October 19, 1864, and admitted to Camden Street Hospital, Baltimore, one week afterwards. Assistant Surgeon G. M. McGill, U. S. A., contributed the pathological specimen shown in the adjoining wood-cut (FIG. 286), with the following description: "The patient had received a shot fracture of the right leg at the lower third, for which amputation was performed the same day at the middle third. Necrosis of the stump of the tibia ensued to the extent of several inches, necessitating resection, which was performed by Acting Assistant Surgeon W. G. Smull on March 24, 1865, chloroform being used and the operation performed by lateral flaps. The patient did very well afterwards. The upper portion of the stump healed by first intention." The patient was subsequently transferred to Jarvis Hospital, where he was discharged from service May 31, 1865, and afterwards supplied with a "Palmer" artificial leg. His pension was paid June 4, 1880. In his applications for commutation he described the condition of the stump as "continuing good." The specimen, No. 4225, *Surgical Section*, A. M. M., consists of bones of the stump, removed at the second operation, and measuring five inches in length. A large sequestrum extends the entire length, embraced by an involucrum, which is wanting on the anterior border; and the fibula, well rounded, has joined its extremity to the tibia.

CASE 733.—Private D. Jerman, Co. F, 190th Pennsylvania, aged 23 years, was wounded before Petersburg, July 11, 1864. He was admitted to the field hospital of the 3d division, Fifth Corps, whence Surgeon L. W. Read, U. S. V., reported: "Severe wound, with fracture of right leg, caused by a solid shot, and followed by amputation at middle third." The operation was performed by the flap method. From the field the patient was transferred to City Point, thence to Beverly Hospital, and subsequently he passed through various hospitals in Philadelphia, where he was supplied with a "Palmer" artificial leg. On August 7, 1865, he was discharged from service and pensioned. In his subsequent application for commutation for an artificial limb he represented the stump as being "sore occasionally," and mentioned Surgeon L. W. Read, U. S. V., as the operator. The pensioner died May 9, 1880, his attending physician certifying that "the stump of the limb was diseased and in an ulcerating condition, resulting in his death." The colored lithograph opposite (PLATE LXXVI) is a copy of a drawing by Hospital Steward E. Stauch, made immediately after the amputation, and shows the comminution of the bone, and especially the terrible laceration of the soft parts, caused by the missile, a solid shot.

[1] FISHER (G. J.), *Report of Fifty-seven Cases of Amputations in the Hospitals near Sharpsburg, Md.*, in *Am. Jour. Med. Sci's*, 1863, Vol. XLV, p. 48.

Opp page 476

Ed Stanch paint

T. Sinclair & Son Chromolith

PLATE LXXVI. — LACERATION OF RIGHT LEG BY SOLID SHOT.

Case of D Jerman P. 190 Pennsylvania

UNIVERSITY

CASE 734.—Private F. W. Knight, Co. E, 11th Vermont, aged 21 years, was wounded in the right leg, at Winchester, September 19, 1864, by a minié ball, which passed through the ankle joint. He was conveyed to the Depot Hospital of the Sixth Corps, where amputation was performed but not recorded. Surgeon F. V. Hayden, U. S. V., noted the following history: "The wounded man was admitted to Sheridan Hospital, Winchester, October 5th, with amputation of the right leg at middle third, performed the day after the injury by Surgeon W. A. Barry, 98th Pennsylvania, the flap method being used, with circular section of the muscles. Erysipelas appeared a few days after the operation. One and a half inches of protruding bone was removed on October 10th. The treatment consisted of stimulants and tonics, including quinine, etc." On December 5th, the patient was transferred to Frederick Hospital, and two weeks later to Central Park, New York City, whence Acting Assistant Surgeon S. Teats contributed the specimen, No. 4330, *Surgical Section*, A. M. M., represented in the annexed cut (FIG. 287), with the following result of the case: "The stump became painful and tender, its end cold and bluish in appearance, and a circular exuberant ulcer formed in the cicatrix. On February 15, 1865, chloroform was administered and re-amputation was performed by the circular method by Surgeon B. A. Clements, U. S. A. Sutures, adhesive straps, and water dressings were applied after the operation. The result was favorable and the stump healed." The patient was discharged from service August 17, 1865, and pensioned, having been previously furnished with an artificial leg by Dr. E. D. Hudson, of New York City. In his applications for commutation the pensioner reported the stump as remaining in "good condition." His pension was paid March 4, 1880. The specimen consists of the re-amputated stumps of the tibia and fibula, showing an excellent deposit of callus but being carious internally.

FIG. 287.—Bony stump of the left leg, five months after amputat'n. *Spec.* 4330.

FIG. 288.—Stump after antero-posterior flap amputation. *Spec.* 4305.

CASE 735.—Private J. Shaud, Co. K, 93d Pennsylvania, aged 26 years, was wounded at Fair Oaks, May 31, 1862. He was conveyed to White House Landing and thence by transport steamer to New Haven, Connecticut. Surgeon P. A. Jewett, U. S. V., in charge of Knight Hospital, recorded the wounded man's admission, June 9th, with "amputation of leg," and reported that he recovered and was transferred to New York City January 19, 1864, "to be furnished with a wooden leg." Surgeon B. A. Clements, U. S. A., reported that the patient was discharged from service at Central Park Hospital March 9, 1864, by reason of "loss of right leg by primary amputation, performed for shot fracture involving the ankle joint." A cast of the stump (*Spec.* 4305, *Surgical Section*, A. M. M.), showing the cicatrix to be located on the anterior face above the extremity, was contributed by Acting Assistant Surgeon G. F. Shrady, and is shown in the adjoining wood-cut (FIG. 288). Dr. E. D. Hudson, of New York City, who supplied the pensioner with an artificial leg before he left the hospital, described the stump as having been formed by an "antero-posterior flap amputation at the junction of the middle and lower thirds" of the limb. The pensioner was paid June 4, 1880. He reports the condition of the stump as remaining sound and healthy.

In the following instance both legs were successfully amputated at the middle thirds one day after the injury:

CASE 736.—Private *E. B. Higginbotham*, Co. F, 38th Georgia, appears recorded on a Confederate hospital register as having had "both legs fractured by gunshot, at Spottsylvania Court House, May 12, 1864," for which "both limbs were amputated at the middle third by Surgeon W. J. Arrington, P. A. C. S., on the following day." The man recovered, and was subsequently furnished with artificial legs by the Confederate Association for the relief of maimed soldiers.

Fatal Primary Amputations in the Middle Third of the Bones of the Leg.—The one hundred and fifty operations of this group were performed on twenty-two Confederate and one hundred and twenty-eight Union soldiers. Exhaustion, pyæmia, and gangrene were reported as the principal causes of death.

CASE 737.—Private E. J. Valleley, Co. A, 3d Rhode Island Artillery, aged 18 years, was wounded by the explosion of the magazine of the Gunboat "George Washington," near Beaufort, S. C., April 10, 1863. His injuries comprised two scalp wounds of no great importance, a compound fracture of the upper fifth of the right ulna, a fracture of the right femur at its middle, and compound comminuted fracture of the bones of the right leg and foot. There was most alarming nervous depression. Stimulants and nourishment were liberally supplied, but no decided reaction followed. Forty-eight hours after the receipt of the injuries it was thought best to amputate the leg, which operation was performed at the middle third on April 12th. After the operation the thigh continued to swell till it reached an enormous size, which circumstance gave reason to believe that the femoral artery had been ruptured by the fractured ends of the femur. The patient was delirious a good part of the time after the operation. He died on the morning of April 14, 1863. There was no attempt at union in the incisions that were made for the removal of the limb, and the stump had an unhealthy look, the discharge being of an ashy color and pasty consistence. For two days before he died he was isolated from the other wounded patients. After death a large quantity of bloody serum was found in the cellular tissue of the thigh; the artery and vein were entire in their whole length. The lower fragment of the femur was pushed up behind the lower end of the upper fragment, denuding the latter of its periosteum for more than three inches. The amputated portions of the tibia and fibula were found to be both broken at the junction of the malleoli with these bones, the tibia being stripped of periosteum for about four inches upward from the joint. The fibula was also broken about three inches above the joint. The posterior end of the os-calcis was broken off, and this bone was extensively fissured and otherwise injured; the cuboid bone was comminuted. The wound in the soft parts was about four inches long, running upward from the superior surface of the astragalus on the inner side of the leg, and the tibia protruded some two inches. The history, together with the specimen (No. 1165, *Surg. Sect.*, A. M. M.), consisting of the amputated bones of the leg, was contributed by Surgeon F. L. Dibble, 6th Connecticut.

CASE 738.—Brigadier General G. W. Taylor, U. S. V., was wounded in the left leg, at Bull Run, August 27, 1862. The character of the injury and its result was reported by Assistant Surgeon J. B. Brinton, U. S. A., as follows: "A ball entered at the inner edge of the tibia, about six inches above the internal malleolus, passed directly through and comminuted the bone very badly for about six inches above and below, making two openings of exit on the anterior and outer aspect of the leg about five inches above the external malleolus. The patient was admitted into the Mansion House Hospital, Alexandria, thirteen hours after the reception of the injury, where Surgeon J. H. Brinton, U. S. V., amputated the limb by the double flap method at the middle third. The operation was performed twenty-six hours after the reception of the injury, the patient losing considerable blood and all the vessels requiring ligation. He had been with the army through the Peninsular campaign and his blood appeared to be very much vitiated by morbific influence of malaria. After the amputation it was discovered, what was previously suspected, that the fibula was not broken by the force of the ball, but by the weight of the patient coming upon it suddenly when the support from the tibia was destroyed by its fracture. The patient's arterial system did not fully react; his pulse, which was feeble, tremulous, and very irregular at times, evidently denoted a depraved condition of the system. He refused to take stimulants except sparingly. This condition continued until September 1, 1862, when he died at 4 o'clock A. M. He was under the influence of chloroform during the operation." The amputated parts of the tibia and fibula (*Spec.* 313, *Surg. Sect.*, A. M. M.), represented in the wood-cut (FIG. 289), were contributed to the Museum by the operator.

FIG. 289.—Left tibia fractured by a musket ball; fibula fractured by the subject's weight suddenly coming upon it.—*Spec.* 313.

CASE 739.—Lieutenant C. J. Sergeant, Co. F, 7th Iowa, aged 31, was wounded in the left leg, during the siege of Atlanta, August 11, 1864. Surgeon J. M. Woodworth, 1st Illinois Light Artillery, described the injury as an "extensive fracture of both bones of the leg, produced by a musket ball, for which amputation was performed on the same day by Surgeon W. R. Marsh, 2d Iowa, at the field hospital of the 2d division, Sixteenth Corps." Five days after the date of the injury the patient was moved to the field hospital at Marietta, and two months later he was transferred to Chattanooga, thence to Nashville, and later to the Officers' Hospital at Louisville. Surgeon F. Greene, U. S. V., in charge of the latter, described the amputation to have been performed by the "antero-posterior flap method at the middle third," and reported that "for a month after the operation oozing of blood continued from the stump, the patient's condition being feeble. Gangrene supervened in the latter part of September, chiefly attacking the anterior flap. The bone became necrosed, and in October two pieces were removed and the gangrene controlled." The patient was lastly admitted to Grant Hospital, Cincinnati, where he obtained a leave of absence on December 12th. He died at his home in Ottumwa, Iowa, April 10, 1865, his attending physician, Dr. J. C. Hinley, certifying that "his disease was pyæmia, being caused by the amputation of one of his lower extremities, the stump of which never healed."

TABLE LXIX.

Summary of Eight Hundred and Ninety-two Cases of Primary Amputations in the Middle Third of the Leg for Shot Injuries.

[Recoveries, 1—736; Deaths, 737—886; Results unknown, 887—892.]

NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.	NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	Abbott, F. A., Pt., K, 7th N. Hampshire, age 38.	May 16, 17, '64.	Left; double flap. Mustered out December 22, 1864.	17	*Bailey, D.*, Pt., D, 7th S. Carolina Bat'ry, age 44.	Aug. 21, 21, '64.	Right. Provost Marshal April 1, 1865.
2	Ackerman, J. H., Pt., C, 31st Iowa, age 24.	Jan. 11, 11, '63.	Left; flap. Surg. G. L. Carhart, 31st Iowa. Disch'd April 13, '63.	18	Baird, J. N., Corp'l, A, 34th Illinois.	April 7, 9, '62.	Left. Discharged.
3	Allen, B. F., Pt., F, 120th New York, age 20.	Nov. 2, 2, '64.	Left; flap. Surg. H. A. Reynolds, 1st Me. H'vy Art'y. Recovery. April 9, 1870, stump good.	19	*Baird, J. T.*, Lieut., C, 16th Virginia, age 31.	Aug. 19, 20, '64.	Left; circular; gangrene. Transferred Nov. 9, 1864.
4	Alt, M., Pt., F, 26th Missouri.	May 16, 17, '63.	Right; circ. Surg. J. S. Prout, 26th Missouri. Gang.; erysip. Disch'd Oct. 21, 1863.	20	Baldis, J., Pt., C, 39th New York, age 27.	July 2, 2, '63.	Left; ant. post. flap. Surg. F. Wolf, 39th N. Y. Discharged April 16, 1864.
5	Ambrose, R., Pt., F, 8th Conn., age 27.	May 7, 7, '64.	Right; flap. Surg. M. Storrs, 8th Conn. Disch'd May 7, 1865.	21	Ball, R. G., Serg't, D, 147th N. York, age 20.	Mar. 31, Ap. 1, '65.	Left; lateral flap. Surg. A. S. Coe, 147th New York. Disch'd August 2, 1865.
6	Anderson, J., Pt., K, 18th Missouri, age 20.	July 22, 22, '64.	Right; flap. Surg. A. B. Monohan, 63d Ohio. Disch'd Aug. 2, 1865.	22	*Ballentine, G. W.*, Pt., H, 14th Tennessee, age 25.	Oct. 1, 1, '64.	L't; oval flap. Surg. A. G. Emory, C. S. A. Retired Jan. 20, 1865.
7	Anderson, W., Pt., H, 5th Col'd Troops, age 18.	Sept. 29, 29, '64.	Left; circ. Surg. H. C. Merryweather, 5th Colored Troops. Disch'd May 8, 1865.	23	Barber, S. M., Capt., H, 42d Ohio.	May 22, 22, '63.	Right; flap. Surg. J. Pomerene, 42d Ohio. Disch'd Mar. 15, '64.
8	*Andrews, A. S.*, Capt., B, 2d North Carolina.	June 9, 9, '63.	——. Surgeon — Gill, C. S. A. Recovery.	24	Bates, C., Corp'l, G, 51st New York, age 23.	Sept. 17, 18, '62.	Left; ant. post. flap. Surg. W. H. Leonard, 51st N. Y. Disch'd January 17, 1863.
9	*Anglim, N. J.*, Pt., I, 24th Tennessee.	De. 31, '62, Jan. 2, '63.	——. Recovery.	25	Bates, O. W., Pt., M, 1st Me. H'vy Art., age 37.	April 6, 6, '65.	Right; flap. Discharged September 12, 1865.
10	*Apple, L.*, Pt., I, 1st Florida Cavalry, age 30.	Dec. 7, 8, '64.	Right; circ. Provost Marshal March 4, 1865.	26	Baum, F. W., Pt., C, 16th Missouri.	Nov. 25, 25, '63.	Left; circ. Surgeon R. J. Mohr, 10th Iowa. Disch'd Apr. 22, '64.
11	Armstrong, J. M., Pt., K, 13th Iowa.	July 21, 21, '64.	Left; flap. Surg. M. W. Thomas, 13th Iowa. Disch'd July 21, '65.	27	Baxter, W. H., Lieut., K, 113th Ohio, age 21.	June 27, 27, '64.	Right; flap. Discharged Dec. 29, 1864.
12	Ashlerman, J., Pt, B, 51st Ohio.	June 17, 18, '62.	Left; flap. Surg. M. C. Woodworth, 51st Ohio. Disch'd Feb. 23, 1863.	28	Bean, W. B., Pt., 7th Maine Bat'ry, age 27.	May 12, 12, '64.	Left; circ. Discharged September 5, 1864.
13	Augustine, F., Pt., I, 21st Wisconsin, age 21.	May 14, 14, '64.	Left; flap. Discharged. 1870, stump sound.	29	Beaton, D. P., Serg't, M, 2d Ohio Cav., age 21.	June 9, 10, '63.	Right; flap. Surg. W. H. McReynolds, 2d Ohio Cavalry. Disch'd Oct. 15, 1864.
14	Averill, J. B., Pt., E, 8th Vermont, age 23.	Sept. 19, 19, '64.	Right; circ. Surg. J. G. Thompson, 77th N. York. Gangrene. Disch'd Oct. 11, 1865.	30	Beatty, T., Pt., I, 4th N. York Artillery, age 39.	June 3, 3, '64.	Left; flap. Discharged January 26, 1864.
15	Babbitt, J. W., Pt., C, 24th Michigan.	July 1, 2, '63.	Right; flap. Surg. A. J. Ward, 2d Wis. Disch'd Nov. 6, 1863.	31	Bee, D. H., Pt., A, 61st Penn., age 25.	July 12, 12, '64.	Right; ant. post. flap. A. A. Surg. M. F. Price. M. O. Sept. 7, '64.
16	Bailey, A. W., Pt., A, 24th New York.	Sept. 14, 16, '62.	Left; flap. Disch'd Dec. 13, '62. Died October 11, 1867.	32	Beeman, G. W., Pt., K, 2d Conn. H. Art., age 20.	Oct. 19, 20, '64.	Right; circ. Surg. W. A. Barry, 98th Penn. Disch'd July 25, '65.
				33	Beer, A. G., Pt., D, 26th Ohio.	De. 31, '62, Jan. 1, '63.	Left. Surg. M. M. Stimmel, 26th Ohio. Disch'd Aug. 9, 1863.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
34	Beers, B., Pt., D, 69th Ohio, age 21.	Nov. 25, 27, '63.	Right; circ. Disch'd May 20, 1864.
35	Beers, J. B., Pt., E, 146th New York, age 29.	Sept. 16, 17, '64.	Right; circ. Surg. A. A. White, 8th Md. Disch'd March 23, '65.
36	Bennett, M., Pt., B, 125th New York.	Mar. 31, 31, '65.	Left; flap. Surg. W. S. Cooper, 125th N. Y. Disch'd Aug. 12, '65.
37	Bennett, R. H., Pt., D, 7th C. Troops, age 23.	Sept. 29, 30, '64.	Right; flap. Disch'd May 17, 1865.
38	Benson, L. W., Pt., I, 16th Conn., age 40.	Sept. 17, 19, '62.	Right; flap. Surg. A. S. Warner, 16th Conn. Disch'd Jan. 23, '63.
39	Berg, M., Pt., B, 7th Kansas Cavalry.	Dec. 24, 24, '62.	Left. Discharged April 7, 1863.
40	Biddle, A. H., Pt., K, 24th New Jersey.	Dec. 13, 14, '62.	Left. Discharged June 29, 1863.
41	Biggert, H., Pt., L, 15th Penn. Cavalry.	July 2, 2, '63.	Right; flap. Surg. J. W. Alexander, 15th Pennsylvania Cavalry. Disch'd June 16, 1864.
42	Bitten, L. C., Pt., K, 1st U. S. S. S., age 21.	May 31, 31, '64.	R't; circ. Surg. G. M. Brennan, 1st Sharpshooters. Disch'd Sept. 13, 1864. Re amp. April 7, '66.
43	Bixby, L. C., Pt., G, 45th Illinois.	Feb. 11, 11, '62.	Right; flap. June, 1862, re-amp. Disch'd July 23, 1862.
44	Blake, J., Pt., K, 20th Massachusetts.	Dec. 13, 15, '62.	Left. Surg. N. Hayward, 20th Mass. Disch'd Oct. 1, 1863.
45	*Blakeley, H. P.*, Pt., F, 14th South Carolina.	July 2, 3, '63.	Right. Confederate surgeon. Paroled Sept. 5, 1863.
46	Blakla, W., Pt., E, 46th New York, age 29.	Aug. 16, 16, '64.	Right; flap. Surg. W. B. Fox, 8th Michigan. Discharged.
47	Blevins, J., Pt., E, 49th Illinois, age 21.	April 9, 9, '64.	Right; ant. post. flap. Surg. G. L. Lucas, 47th Ill. Mustered out Sept. 9, 1865.
48	Bloxon, W. N., Pt., E, 22d C. Troops, age 20.	Sept. 7, 8, '64.	Left; flap. Disch'd May 26, '65.
49	Bocklay, H., Pt., D, 2d Maryland, age 22.	Dec. 13, 13, '62.	Right; circular. Disch'd April 21, 1863.
50	Bodley, C., Corp'l, K, 28th Iowa, age 24.	May 16, 16, '63.	Right; flap. Disch'd June 16, 1865. Died June 17, 1870.
51	Boehme, F., Pt., C, 20th Mass., age 27.	May 6, 7, '64.	Left; circ. Confederate surgeon. Discharged. 1870, stump good.
52	Bond, J. D. M., Pt., C, 78th Ill., age 28.	Sept. 1, 2, '64.	Right; flap. Surg. T. B. Williams. 121st Ohio. Disch'd May 6, '65.
53	*Bonedun, C. W.*, Pt., G, 7th Virginia Cavalry.	July 1, 1, '63.	Left. Union surgeon. Recovery.
54	Book, G., Pt., E, 6th Colored Troops.	Feb. 11, 11, '65.	Left; circ. Surg. N. S. Barnes, U. S. V. Recovery May 6, 1865.
55	Booth, J. L., Pt., B, 12th W. Virginia, age 22.	June 13, 14, '63.	Right; ant. post. flap. Confed. surgeon. Disch'd May 15, '65.
56	Boucher, P., Pt., I, 28th Massachusetts, age 26.	June 3, 3, '64.	Right; lateral flaps. Surg. P. E. Hubon, 28th Mass. Disch'd Nov. 28, 1864.
57	Bowen, J., Pt., C, 42d Illinois, age 21.	Dec. 30, 31, '62.	Right. Surg. T. D. Fitch, 42d Illinois. Hæm. June 20, 1863, amp. thigh. Dis. April 28, 1864.
58	Bowland, W., Pt., C, 142d New York, age 21.	Oct. 13, 13, '64.	Left; flap. Surg. D. McFalls, 142d N. Y. Gang. Oct. 27, re-amput'n. Disch'd Sept. 11, '65.
59	Bowman, H. A., Pt., G, 2d N. Hampshire.	July 21, 23, '61.	Left; flap. Surg. E. T. Perkins. 71st N. Y. S. M. Disch'd Nov. 1, 1861.
60	*Boyd, J. E.*, Pt., I, 44th Tennessee.	Dec. 14, 14, '63.	Right. Surgeon G. McDonald, 22d Virginia. Recovery.
61	Bradin, R., Lieut., E, 7th N. York Heavy Artillery, age 34.	June 16, 17, '64.	Right; ant. post. flap. Surg. J. E. Pomfret, 7th N. Y. H'vy Art. Disch'd January 27, 1865.
62	*Bragg, J. W.*, Pt., G, 25th Virginia.	Dec. 13, 13, '61.	——. Surg. — Blandy, C. S. A. Recovery.
63	Braillie, J., Pt., A, 1st Artillery, age 33.	July 3, 3, '63.	Right; circ. Disch'd February 29, 1864.
64	Brannon, P., Pt., E, 28th Illinois.	Oct. 5, 5, '62.	Left. Surg. W. F. West, 28th Illinois. Disch'd April 7, 1863.
65	*Brantley, L. G.*, Pt., C, 33d North Carolina.	July 3, 4, '63.	Left. Surg. J. A. Vigae, 33d N. Carolina. Recovery.
66	Bray, P., Pt., G, 1st Massachusetts H'vy Artillery, age 33.	Oct. 2, 4, '64.	Right; circ. Surg. O. Everts, 20th Indiana. Gangrene. Discharged June 14, 1865.
67	Bremenkamp, F., Pt., A, 9th Illinois.	April 6, 7, '62.	Left; circular. Disch'd March 13, 1863.
68	Bridgem, L. H., Serg't, H, 26th New Jersey.	May 3, 3, '63.	Right. Disch'd Sept. 15, 1863.
69	Britting, J., Pt., E, 116th New York, age 19.	Oct. 19, 20, '64.	Right; flap. Discharged Aug. 1, 1865.
70	Bronson, D., Pt., H, 6th N. Y. Artillery, age 29.	May 30, 31, '64.	Right; ant. post. skin flap; circ. sect. mus. Disch'd Feb. 25, '65.
71	Bronson, J. B., Pt., I, 14th Ohio, age 18.	Aug. 5, 5, '64.	Right. Surg. G. E. Sloat, 14th Ohio. Amputation thigh. Discharged June 21, 1865.
72	Brookings, D., Serg't, H, 17th Maine, age 22.	June 16, 16, '64.	Right; ant. skin and post. muse. flaps. Disch'd Jan. 10, 1865. Died Dec. 6, 1870.
73	Brotherson, C., Pt., G, 151st N. Y., age 30.	Sept. 19, 19, '64.	Left; ant. post. flap. Discharged August 11, 1865.
74	Brott, J. C., Pt., B, 2d N. Y. H'vy Art., age 24.	June 2, 2, '64.	Left; circ. Surg. G. L. Potter, 145th Penn. Recovery.
75	Brower, H. H., Serg't, D, 10th N. Y., age 21.	May 10, 10, '64.	Right; flap. Surg. M. Rizer, 72d Penn. May 15, amputation leg. Disch'd Nov. 2, 1865.
76	Brown, C. K., Pt., A, 7th Wisconsin, age 24.	May 8, 9, '64.	Left; circ. Surg. A. J. Ward, 2d Wis. Disch'd July 16, 1864. Feb. 6, '65, amp. leg. Recovery.
77	*Brown, J. M.*, Pt., D, 5th Alabama, age 28.	July 2, 2, '63.	Right. A. Surg. T. C. Hill, 5th Ala. Paroled Sept. 25, 1863.
78	Brown, W. M., Pt., F, 91st Ohio, age 23.	July 20, 21, '64.	Left; ant. post. flap. A. Surg. A. Titus, 31st W. Virginia Cavalry. Disch'd January 31, 1865.
79	Bullard, F. W., Pt., B, 57th Mass., age 19.	May 6, 8, '64.	Left; flap. Confederate surgeon. July 7, 1865, re-amputation leg. Disch'd Nov. 23, 1865.
80	Bumgardner, S., Serg't, F, 14th W. Va., age 35.	Sept. 22, 23, '64.	Left (also amputation right foot). Disch'd March 4, 1865.
81	Bunger, W., Pt., G, 118th Illinois.	May 1, 1, '63.	Left; flap. Disch'd August 1, 1863.
82	Burd, S., Corp'l, B, 188th Pennsylvania, age 24.	Sept. 29, Oct. 1, '64.	Right; ant. post. flap. Disch'd September 23, 1865.
83	Burke, J., Pt., A, 13th New Hamp., age 23.	June 4, 4, '64.	Left; flap. Disch'd May 25, '65. Died March 31, 1870; epilepsy.
84	Burns, B., Pt., B, 22d New York, age 24.	Sept. 17, 17, '62.	Right; circ. Disch'd May 6, '63. *Spec.* 2540.
85	Burns, R., Pt., A, 35th Illinois.	Mar. 7, 7, '62.	Right; flap. Disch'd August 2, 1862.
86	*Burns, R. R.*, Pt., C, 14th Tennessee, age 25.	June 26, 26, '64.	Left. Retired February 20, 1865.
87	Burr, D. B., Pt., A, 14th Connecticut, age 28.	Dec. 13, 13, '62.	Right. Surg. G. T. Stevens, 77th N. Y. Re-amp. Disch'd May 23, 1864. Died April 28, 1868; consumption.
88	Burst, J. W., Lieut., 105th Illinois, age 22.	May 26, 26, '64.	Right; flap. Surg. A. M. Reagan, 70th Ind. Gangrene. Disch'd October 19, 1864.
89	*Bush, J. F.*, Pt., G, 13th Georgia.	July 9, 11, '64.	Left; circ. Surg. C. H. Todd, C. S. A. Exchanged Sept. 21, '64.
90	Bushnell, M. D., Corp'l, H, 154th New York, age 22.	June 24, 24, '64.	Right; flap. Surg. J. Reily, 33d N. J. Gangrene. Disch'd Aug. 12, 1865. Died June 5, 1866.
91	*Busick, D. W.*, Serg't, E, 22d North Carolina.	July 2, 2, '63.	Left. Surg. P. G. Robinson, 22d N. C. Paroled Sept. 12, 1863.
92	Butler, J. H., Pt., E, 30th Col'd Troops, age 26.	June 20, 20, '64.	Right; circ. Surg. G. J. Potts, 23d Colored Troops. Disch'd July 25, '65. Died Nov. 10, '67.
93	*Butts, J. W.*, Capt., H, 4th Georgia, age 25.	July 12, 12, '64.	Left. Surg. W. P. Young, 4th Ga. To prison Feb. 5, 1865.
94	Cady, E. A., Pt., H, 33d New York, age 21.	May 3, 3, '63.	Left; circ.; re-amp.; gangrene. Disch'd Nov. 14, 1863.
95	Cain, F., Pt., E, 40th Indiana, age 19.	Nov. 25, 26, '63.	Right; gangrene. Disch'd Oct. 12, 1864.
96	*Cain, R. M.*, Pt., C, 18th Mississippi.	Sept. 9, 9, '63.	Left. Surg. — Green, C. S. A. Recovery.
97	*Campbell, J. F.*, Pt., G, 9th Alabama.	June 27, 27, '63.	——. Surg. C. C. Clarke, C. S. A. Recovery.
98	Canfield, M., Pt., B, 34th Mass., age 34.	June 5, 5, '64.	Left; flap. Surg. R. R. Clarke, 34th Mass. Disch'd May 31, '65.
99	Carpenter, C. G., Pt., Battery H, 1st Art., age 25.	May 3. 5, '63.	Right; flap. Surg. C. S. Wood, 66th N. Y. Disch'd Feb. 23, '64.
100	Carroll, F., Pt., D, 32d Col'd Troops, age 29.	Dec. 6, 6, '64.	Left; post. flap. Surg. C. M. Wight, 32d Col'd Troops. Discharged May 24, 1865.
101	Carroll, P., Pt., G, 19th Penn. Cavalry.	Feb. 16, 16, '65.	Right. A. A. Surg. J. E. Lynch. Disch'd June 7, 1865.
102	Carter, S. H., Corp'l, A, 36th Mass., age 20.	June 6, 6, '64.	Left; circ.; gangrene. Disch'd June 16, 1865.
103	Catlin, I. S., Col., 109th New York, age 30.	July 30, 30, '64.	Left. Surgeon W. B. Fox, 8th Mich. Mus. out June 4, 1865.
104	Caywood, P., Pt., B, 110th Ohio.	June 14, 14, '63.	Right; flap. Ass't Surg. R. R. McCandliss, 110th Ohio. Discharged Aug. 26, 1863.
105	Chadwick, J. A., Pt., D, 9th Maine, age 22.	Aug. 16, 17, '64.	Left. Disch'd January 20, 1865.
106	Chalfant, F. D., Serg't, F, 4th W. Va., age 21.	July 18, 19, '64.	Right. Confed. surgeon. Disch'd June 24, 1865.
107	Chamberlain, D., Serg't, D, 21st Penn. Cavalry, age 30.	April 1, 2, '65.	Left; flap. Disch'd June 28, '65.
108	Chamberlain, T., Corp'l, B, 79th Penn., age 26.	Mar. 19, 19, '65.	Right; double flap. Confederate surgeon. Disch'd June 28, 1865.
109	Chamberlain, W. H., Pt., H, 42d Illinois, age 21.	Nov. 25, 27, '63.	Left; circ. Surg. A. M. McMahon, 64th Ohio. Gangrene. Disch'd Sept. 27, 1864.
110	Chapman, J. H., Capt., B, 5th Connecticut.	Aug. 9, 11, '62.	Right. Surg. A. M. Helmer, 28th N. Y. Veteran Reserve Corps September 2, 1863.
111	Charlton, O., Pt., E, 34th Ohio.	Sept. 10, 10, '62.	Right; flap. Disch'd March 15, 1863. Died Sept. 4, 1870.
112	Chichester, A., Pt., E, 127th N. Y., age 24.	Nov. 30, 30, '64.	Right; post. muse. flap. Disch'd May 23, 1865.
113	Chiddes, C., Pt., D, 13th Colored Troops.	Dec. 17, 18, '64.	Right; flap. A. A. Surg. J. S. Giltner. Disch'd Aug. 8, 1865.
114	Christenson, W., Pt., I, 115th N. Y., age 23.	May 7, 7, '64.	Right; circ. Confed. surgeon. Disch'd May 30, 1865.
115	*Clardy, J. B.*, Pt., C, 24th Alabama.	Sept. 20, 20, '63.	——. Surg. J. L. Cunningham, 24th Alabama. Recovery.
116	Clark, E. T., Pt., E, 77th Penn., age 20.	Nov. 30, Dec. 1, '64.	Right; flap. Surgs. White and Hanna, C. S. A. Disch'd April 21, 1865.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
117	Clark, H. B., Pt., F, 20th Maine.	May 4, 6, '64.	Left; circular. Confed. surgeon. Disch'd Nov. 22, 1864.
118	Clark, J. B., Pt., 11th Vermont, age 29.	Sept. 19, 19, '64.	Right; flap. Surg. C. B. Park, 11th Vt. (W'nd arm, necrosed.) Disch'd Sept. 28, 1865.
119	Class, C., Pt., G, 25th Mass., age 26.	Feb. 8, 8, '62.	Left; circ. Surg. G. A. Otis, 27th Mass. Disch'd Aug. 14, 1862.
120	Clayton, H., Pt., E, 77th New York, age 20.	Oct. 19, 19, '64.	Right; ant. post. flap. Surg. G. T. Stevens, 77th N. Y. Disch'd.
121	*Clement, J. M.*, Serg't, I, 43d Georgia, age 25.	July 22, 23, '64.	Left; ant. post. flap. Returned to Provost Marshal Dec. 1, 1864.
122	Clements, F. S., Pt., D, 6th N. Y. H. A., age 22.	June 1, 1, '64.	Right; circ. Disch'd September 17, 1864.
123	Clingman, G.W., Pt., A, 88th Penn., age 33.	May 8, 8, '64.	Left; circ. Disch'd September 21, 1864.
124	Clinton, F. D., Pt., C, 25th New Jersey.	Dec. 13, 14, '62.	Right; circ. Surg. J. Riley, 25th N. J. Disch'd Feb. 2, 1863.
125	Closs, W., Pt., K, 10th N. Y. Heavy Artillery, age 37.	April 2, 3, '65.	Left; circ. Surg. G. H. Blickhahn, 28th C. Troops. Disch'd August 11, 1865.
126	Clunk, J., Pt., F, 76th Ohio, age 18.	June 18, 18, '64.	Right; flap. Surg. A. Sabine, 76th Ohio. Disch'd May 23, '65.
127	Cobb, G.W., Pt., K, 20th Maine, age 21.	May 5, 7, '64.	Left; ant. post. flap. Confederate surgeon. Disch'd May 7, 1865.
128	*Cobb, J. P. C.*, Capt., H, 2d North Carolina.	Sept. 19, 20, '64.	Left; circ. Surg. B. M. Crowell, 1st N. C. Exch'd Dec. 9, 1864.
129	*Cobb, M. A.*, Lieut., K, 23d Alabama, age 37.	Dec. 15, 17, '64.	Right; circ. A. A. Surgs. J. C. Thorpe and J. R. Holmes. Gangrene. Jan. 9, '65, amp. thigh. Provost Marshal June 3, 1865.
130	Cochennour, J. S., Capt., H, 60th Illinois, age 34.	Sept. 1, 1, '64.	Left: circ. Surg. E. Batwell, 14th Mich. Disch'd Dec. 14, 1864.
131	Cogswell, A. H., Pt., B, 1st Mass. H. A., age 18.	Oct. 27, 29, '64.	Left; flap. Confederate surgeon. Disch'd Sept. 11, 1865.
132	Cole, A. J., Pt., C, 44th New York.	Dec. 13, 15, '62.	Right; circular. Disch'd April 8, 1863.
133	Cole, W., Pt., H, 31st Massachusetts, age 21.	May 18, 18, '64.	Right; flap. To Veteran Reserve Corps Nov. 19, 1864.
134	Coogan, R., Pt., E, 4th Artillery.	Oct. 16, 16, '62.	Right. Disch'd Jan. 12, 1863.
135	Cook, A., Pt., E, 31st Iowa, age 34.	June 27, 27, '64.	Right; flap. Surg. E. J. McGorrisk, 9th Iowa. Gang. Disch'd January 26, 1865.
136	Coombs, L., Pt., K, 4th Infantry, age 28.	May 24, 26, '64.	Right; flap. Confed. surgeon. Disch'd November 14, 1865.
137	Cooper, J., Pt., F, 47th Ohio, age 25.	July 22, 23, '64.	Right; flap. Surg. I. N. Barnes, 116th Ill. Disch'd Dec. 3, 1864.
138	Corbet, J., Pt., G, 12th Maine, age 26.	Oct. 19, 20, '64.	Left; double flap. Ass't Surg. W. C. Towle, 12th Maine. Discharged June 21, 1865.
139	Corlew, H. M., Corp'l, G, 11th Vermont, age 19.	June 2, 2, '64.	Right; double flap. Surg. C. B. Park, 11th Vt. Dis. Oct. 27, '64.
140	Costello, H., Pt., D, 24th Massachusetts, age 30.	Aug. 16, 16, '64.	Left; post. flap; necro. Disch'd January 25, 1865.
141	*Cotton, S. O.*, Capt., A, 4th Louisiana.	May 6, 6, '64.	——. Union surgeon. Recovery.
142	Crago, G.W., Pt., D, 89th Ohio.	Sept. 20, 22, '63.	Right; circular. Disch'd Feb. 7, 1864.
143	Crane, A. F., Serg't, H, 145th Penn.	Dec. 13, 13, '62.	Left. Disch'd February 6, 1863.
144	*Crawford, D.*, Pt., G, 1st S. C. Rifles, age 34.	July 28, 28, '64.	Right; flap. Surg. D. W. Maull, 1st Del. To prison Jan. 21, '65.
145	Crawford, D. S., Pt., A, 47th Penn., age 20.	Oct. 19, 19, '64.	Right; flap. A. A. Surg. W. G. Smull. Necrosis. Discharged May 31, 1865. *Spec.* 4225.
146	*Crosby, D. P.*, Pt., I, 6th South Carolina.	Sept. 30, 30, '64.	——. Union surgeon. Recovery.
147	Crowe, D., Pt., E, 107th New York.	Sept. 17 19, '62.	Right. Discharged May 15, 1863.
148	Cuniff, J., Pt., H, 35th New Jersey, age 26.	Feb. 15, 15, '64.	Left; flap. Ass't Surg. J. T. Lanning, 35th N. J. Disch'd June 4, 1865.
149	Cunningham, C., Pt., D, 140th Penn., age 22.	July 2, 4, '63.	Right; ant. post. flap. Confed. surgeon. Disch'd Feb. 22, 1864.
150	Curley, M., Pt., G, 2d Conn. H. A., age 26.	June 1, 1, '64.	Left: circ. Surg. H. Plumb, 2d Conn. H. A. Disch'd Mar. 18, '65.
151	Curran, T., Pt., H, 2d Iowa.	April 6, 6, '62.	Left; flap. Subsequent operation. Disch'd Oct. 14, 1862.
152	Curry, J., Pt., H, 7th Maryland, age 21.	May 5, 6, '64.	Right. Confed. surgeon. May 19, 1865, re-amp. Discharged November 3, 1865.
153	Daley, G. W., Corp'l, D, 53d Penn., age 29.	June 3, 3, '64.	Left: circ. Surg. G. L. Potter, 145th Penn. Disch'd July 6, '65.
154	Dale, H., Pt., F, 5th N. Hampshire, age 26.	June 3, 3, '64.	Right; flap. Surg. J. H. Buckman, 5th N. H. Disch'd May 6, 1865.
155	Daller, J., Pt., D, 11th Indiana, age 25.	May 16, 16, '63.	Right; flap. Surg. J. A. Comingor, 11th Indiana. Disch'd July 31, 1863.
156	Dalrymple, J., Pt., B, 79th N. York, age 29.	Oct. 10, 10, '63.	Left; circ. Surg. J. P. Prince, 36th Mass. Gangrene. Disch'd Feb. 15, 1865. Re-amp. 1868.
157	*Dangerfield, L. J.*, Pt., Richard's Cavalry.	June 3, 3, '61.	Left. Surgs. Yost and White, C. S. A. Recovery.
158	Daniels, H., Pt., C, 5th N. Hampshire, age 22.	June 2, 2, '64.	Left; circ. Surg. J. W. Buckman, 5th N. H. Disch'd Oct. 15, 1864.
159	Daniels, J., Pt., K, 47th Indiana.	May 16, 17, '63.	Right; circular. Disch'd Oct. 14, 1863.
160	Danniker, E. T., Serg't, A, 1st Maryland Art'y.	Sept. 17, 17, '62.	Right; flap. Surg. M. Rizer, 72d Penn. Disch'd July 4, 1863.
161	*Davey, T. P.*, Pt., I, 6th Texas.	Mar. 5, 5, '64.	——. A. Surg. R. E. Hill, C. S. A. Retired December, 1864.
162	Davis, B. W., Corp'l, B, 24th N. Y. Cav., age 23.	June 17, 19, '64.	Left; circ. Surg. W. C. Shurlock, 51st Penn. Disch'd May 31, '65.
163	*Davis, F. M.*, Serg't, A, 32d Tennessee.	Sept. 19, 21, '63.	——. Surg. J. T. Grant, 32d Tennessee. Recovery.
164	Davis, H. T., Pt., G, 5th Vermont, age 24.	May 5, 7, '64.	Right; ant. post. flap. Disch'd January 13, 1865.
165	Davis, J. B., Pt., I, 96th Pennsylvania.	Sept. 14, 15, '62.	Right; circular. Disch'd March 1, 1863.
166	*Dawson, A. J.*, Pt., G, 49th Virginia, age 30.	Mar. 25, 25, '65.	Left. Released June 24, 1865.
167	Day, C. H., Pt., A, 32d Maine, age 30.	May 12, 12, '64.	Right; circular. Disch'd Aug. 26, 1864.
168	Deeker, P., Pt., I, 23d Indiana.	May 12, 14, '63.	Left; flap. Surg. M. Brueker, 23d Ind. Disch'd Aug. 8, 1864.
169	Deckertt, A., Pt., B, 79th Penn., age 19.	Mar. 19, 19, '65.	Right; flap. Disch'd June 11, 1865.
170	DeForest, A., Pt., D, 15th N. Y. Vy Art., age 40.	Mar. 31, 31, '65.	Left: circ. Disch'd September 20, 1865.
171	Demasner, J. G., Pt., H, 30th Mass., age 36.	Oct. 19, 20, '64.	Left; flap. Discharged September 5, 1865.
172	Deniston, W. H., Corp'l, A, 15th Ohio.	April 7, 8, '62.	Left; flap. Surg. S. T. Trowbridge, 8th Illinois. Disch'd June 2, 1862.
173	Dennis, A., Pt., G, 79th Pennsylvania.	Sept. 19, 19, '63.	Left; flap. Surg. W. M. Wright, 79th Penn. Disch'd Feb. 9, '64.
174	Dennis, A., Pt., D, 38th Indiana, age 32.	Dec. 11, 12, '64.	Left; ant. post. flap. A. A. Surg. E. Jennings. Dis. Mar. 10, 1865.
175	Denny, F. J., Serg't, A, 1st Cavalry, age 26.	July 28, 28, '64.	Right; circ.; gangrene. Disch'd Nov. 22, 1864.
176	*Depratto, J.*, Pt., H, 11th Virginia, age 27.	July 2, 3, '63.	Left. Surg. J. Harrison, C. S. A. Exchanged Nov. 12, 1863.
177	Devall, E., Pt., K, 11th Connecticut, age 19.	Mar. 14, —, '62.	Right; flap. Surg. G. Derby, 23d Mass. Hæm. Disch'd Oct. 15, '62.
178	Dewalt, J. S., Pt., M, 100th Penn., age 19.	June 2, 3, '64.	Left; ant. post. flap. Surg. H. Ludington, 100th Penn. Mustered out Sept. 7, 1864.
179	Dewey, G., Pt., D, 51st New York.	Dec. 13, 14, '62.	Left; slough. Dec. 28, re-amp. Jan., 1863, amp. thigh. Disch'd Oct. 23, 1863.
180	Dibble, C. A., Serg't, E, 29th Wisconsin.	May 1, 3, '63.	Left; circular. Disch'd September 7, 1863.
181	Dibble, H., Corp'l, G, 14th New York Cav.	June 15, 15, '63.	Left; circular. Disch'd September 24, 1863.
182	*Dickerson, J. M.*, Pt., I, 18th Alabama, age 23.	May 15, 15, '64.	Right; circ. Surg. C. J. Bellows, 7th Ohio. To Provost Marshal December 1, 1864.
183	Dickson, J. H., Pt., C, 11th Infantry, age 19.	May 12, 12, '64.	Right; flap. Discharged January 3, 1865.
184	Dickson, W., Pt., I, 109th Pennsylvania, age 24.	July 20, 20, '64.	Right: ant. post. flap. Surg. J. A. Wolf, 29th Penn. Disch'd April 20, 1865.
185	Donley, J. P., Pt., L, 18th Penn. Cavalry, age 40.	June 15, 15, '64	Left; ant. post. flap. Dec. 23, re-amp. Disch'd Mar. 15, 1865.
186	[1] Donsheidt, W., Pt., I, 5th Artillery, age 29.	Sept. 19, 19, '62.	Left; circ. Ass't Surg. S. Adams, U. S. A. Disch'd May 3, 1863.
187	Doty, J. S., Pt., D, 19th Michigan.	June 16, 16, '64.	Left; flap. July 7, re-amputat'n. Disch'd July 17, 1865.
188	Dougherty, J. L., Serg't, M, 18th Penn. Cavalry, age 24.	July 6, 7, '63.	Left: flap. Drs. F. Dorsey and N. B. Scott, Hagerstown, Md. Disch'd Dec. 19, 1864.
189	Dougherty, S., Pt., I, 8th Penn., age 27.	Dec. 13, 13, '62.	Left; flap. Disch'd March 14, 1864.
190	Douglas, W., Pt., B, 6th Wisconsin, age 34.	June 18, 19, '64.	Left; ant. post. flap. Ass't Surg. J. C. Hall, 6th Wis. Disch'd May 4, 1865.
191	Downing, D. J., Capt., H, 97th N. Y., age 22.	July 1, 1, '63.	Left: flap. Surg. E. G. Chase, 104th N.Y. Resig'd Feb. 12, '64.
192	Drake, A. H., Pt., C, 13th Michigan.	Mar. 18, 20, '65.	Left; flap. Disch'd July 26, '65.
193	Drake, C. N., Pt., C, 12th N. Hampshire, age 24.	July 2, 3, '63.	Left. Surg. H. B. Fowler, 12th N. H. Disch'd March 16, 1864.
194	Duddenhausen, A., Pt., G, 17th N. Y., age 24.	Sept. 2, 3, '64.	Right. Discharged May 4, 1865.
195	Dudley, W. F., Pt., F, 1st Maine Cavalry.	Mar. 1, 2, '64.	Left. Surg. W. A. Spence, C. S. A. June 14, amp. thigh. Disch'd August 14, 1865.
196	Duey, J., Pt., C, 54th Ohio, age 25.	July 22, 23, '64.	Left; circ. Surg. I. N. Barnes, 116th Ill. Mustered out Oct. 24, 1865. Died July 22, 1870.
197	Duffy, P. H., Pt., B, 2d Colorado.	Feb. 22, 23, '62.	Left; flap. Ass't Surg. B. Norris, U. S. A. Disch'd July 16, 1862.
198	Durkee, W. P., Pt., B, 4th Vermont, age 22.	Dec. 13, 14, '62.	Left: circ.; gangrene. Disch'd April 25, 1863.
199	Eades, J. M., Corp'l, F, 70th Indiana, age 23.	June 15, 15, '64.	Right; flap. Surg. A. W. Reagan, 70th Ind. Disch'd June 8, 1865.

[1] Fisher (G. J.), *Report of Fifty-seven Cases of Amputations, in the Hospitals near Sharpsburg, Md., after the Battle of Antietam September* 17, 1862, in *American Journal Medical Sciences*, 1863, Vol. XLV, p. 48.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
200	Eaton, D. C., Corp'l, H, 5th N. Hamp., age 30.	Sept. 17, 17, '62.	Left. Surg. L. M. Knight, 5th N. H. Gangrene. Dec. 29, amp. thigh, lower third. Discharged Mar. 13, 1863. Died July 1, '63.
201	Eaton, G., Pt., D, 121st New York, age 27.	Nov. 7, 7, '63.	Right. Disch'd June 15, 1864.
202	Eckerman, D. F., Pt., H, 2d Iowa.	Aug. 5, 5, '64.	Right; flap. Surg. W. R. Marsh, 2d Iowa. Disch'd June 20, 1865.
203	Edleman, W., Pt., K, 129th Ill., age 26.	June 15, 16, '64.	Right; circ. Surg. D. Johnson, 129th Ill. Gangrene. Disch'd June 6, 1865.
204	Ehret, J., Pt., G, 1st N. Jersey Cav., age 19.	July 28, 28, '64.	Left; circ. Surg. W. W. L. Phillips, 1st N. J. Cavalry. Disch'd Nov. 11, 1864.
205	Ehrman, C., Serg't, C, 17th Mo., age 28.	June 25, 25, '64.	Right; circ. Surg. A. Sabine, 76th Ohio. Disch'd March 14, 1865.
206	Eisert, C. H. F., Pt., C, 17th Infantry, age 38.	May 12, 12, '64.	Left; ant. post. flap; sloughing; exfol. Veteran Reserve Corps March 3, 1865.
207	Elliott, T., Corp'l, A, 119th Penn., age 20.	May 10, 10, '64.	Right; circ. Surg. P. Leidy, 119th Penn. Disch. June 15, '65. Died Oct. 29, '73; cong. brain.
208	Erving, R. M., Pt., B, 26th Mass., age 20.	Sept. 19, 19, '64.	Right; long post. flap; slough.; necrosis. Disch'd Nov. 7, 1864.
209	*Estis, F. M.*, Pt., D, 34th Virginia.	July 30, 30, '64.	——. Surg. — Mason, C. S. A. Retired Feb. 17, 1865.
210	Everts, D., Pt., H, 142d New York, age 24.	Oct. 27, 27, '64.	Right; circ. Surg. G. C. Jarvis, 7th Conn. Disch'd June 26, '65.
211	Faas, C., Serg't, I, 7th Massachusetts.	June 1, 1, '62.	Right. Surg. O. Adams, 7th Mass. Disch'd Sept. 28, 1862.
212	Facks, J., Corp'l, B, 6th Wisconsin, age 32.	July 1, 3, '63.	Left; flap. Disch'd March 16, 1864.
213	Fairley, H., Pt., I, 28th Massachusetts, age 34.	July 2, 4, '63.	Left. Surg. Z. E. Bliss, U. S. V. Bone removed; hæm. Disch'd March 22, 1865.
214	[1]*Faiver, A. J.*, Pt., 18th Miss., age 19.	Sept. 17, 18, '62.	Left; posterior flap.
215	Fallon, T., Pt., D, 11th Massachusetts.	May 3, 3, '63.	Right; flap. Disch'd September 21, 1863.
216	*Farmer, N.*, Pt., —, 13th North Carolina.	Aug. 16, 16, '64.	Right. Surg. — Bace, C. S. A. Retired Jan. 9, 1865.
217	Farmer, T. F., Serg't, G, 51st New York.	Sept. 30, 30, '64.	Left; flap. Confederate surgeon. Disch'd Jan. 5, 1865.
218	Farnsworth, E., jr., Lieut., C, 26th Massachusetts.	Oct. 19, 20, '64.	Left. Surgeon J. G. Bradt, 26th Mass. Disch'd Feb. 11, 1865.
219	Farrell, W., Pt., F, 158th New York, age 32.	Sept. 29, 29, '64.	Left; circ. Disch'd April 11, '65.
220	*Farthing, W. G. W.*, Pt., D, 5th Texas, age 26.	July 2, 3, '63.	Left. Paroled November 12, '63.
221	Faulkner, L., Pt., C, 2d Artillery.	April 13, 14, '63.	Right; flap. Disch'd October 10, 1863.
222	Fellers, J. A., Pt., I, 87th Pennsylvania, age 21.	Sept. 19, 20, '64.	Left; flap. Mar. 22, '65, re-amp. Disch'd May 20, '65. *Spec.* 4198.
223	Felman, J. R., Capt., I, 108th New York.	July 3, 3, '63.	Right. Surg. F. Wolf, 39th N. Y. Disch'd April 22, 1864.
224	Fenlin, W. H., Serg't, F, 88th Pennsylvania.	Dec. 13, 15, '62.	Right; flap. Disch'd June 14, 1864.
225	*Ferguson, J. W.*, Pt., I, 19th Alabama, age 24.	July 22, 23, '64.	Right; circ. Transferred Sept. 22, 1864.
226	*Ferriter, J.*, Pt., Letcher's Battery.	July 2, 2, '63.	Right. Retired February 9, 1865.
227	Fieldson, T., Serg't, F, 14th New York Heavy Artillery, age 21.	Mar. 25, 25, '65.	Right; flap. Surg. W. C. Shurlock, 51st Penn. Disch'd Nov. 6, 1865. *Spec.* 1145.
228	Fink, F., Pt., B, 5th New York, age 18.	June 2, 2, '64.	Right; flap. Confed. surgeon. Duty Oct. 19, 1864.
229	Fletcher, T., Pt., I, 82d New York, age 23.	July 2, 2, '63.	Right; flap. Disch'd July 4, '64.
230	Foote, D. W., Lieut., I, 3d Iowa, age 33.	Oct. 5, 5, '62.	Left. Surg. B. F. Keables, 3d Iowa. Resigned Aug. 21, 1863.
231	Foss, J. A., Serg't, C, 1st Maine, age 22.	April 2, 2, '65.	Left. Surg. F. M. Everleth, 7th Me. Disch'd July 2, '65. Bone removed in 1867.
232	Foster, M. F., Serg't, H, 59th Mass., age 26.	June 17, 18, '64.	Left; flap. Disch'd May 23, '65. Died Aug. 23, '76; tuberc. dis.
233	Foughty, G. W., Serg't, B, 57th Ohio.	Dec. 28, 28, '62.	Right; flap. Surg. E. O. F. Roler; 55th Ill. Disch'd Mar. 7, 1863.
234	Franklin, J. S., Serg't, A, 74th New York.	Aug. 29, 30, '62.	Right. Surg. J. T. Calhoun, 74th New York. Disch'd Oct. 29, '62.
235	Franklin, S., Pt., G, 54th Massachusetts, age 42.	Nov. 30, Dec 1, '64.	Left; circ. Disch'd July 2, 1865.
236	Frazier, W., Pt., I, 140th Pennsylvania.	April 6, 6, '65.	Right; flap. A. Surg. B. F. Hill, 140th Penn. Disch'd June 27, 1865.
237	Free, S. S., Pt., B, 170th New York, age 20.	May 18, 18, '64.	Right; flap. Surg. D. W. Maull, 1st Del. Disch'd Nov. 10, 1864.
238	Freidrich, J., Corp'l, K, 2d Michigan, age 28.	June 18, 18, '64.	Right; flap. Surg. W. B. Fox, 8th Mich. Disch'd July 4, 1865.
239	Frost, L. G., Pt., C, 3d Maine, age 23.	May 10, 10, '64.	Right; flap. Surg. T. Hildreth, 3d Me. Disch'd Nov. 19, 1864.
240	Frost, N. G., Pt., G, 32d Maine, age 34.	July 30, 30, '64.	Left; flap. Disch'd Feb. 8, 1865. May, 1865, amp. knee joint.
241	Fry, H. S., Corp'l, B, 12th Iowa, age 24.	Mar. 27, 27, '65.	Left; flap. Disch'd September 25, 1865.
242	Fryer, E., Pt., A, 1st Delaware, age 33.	June 3, 3, '64.	Left; flap. Surg. D. W. Maull, 1st Del. M. O. Nov. 19, 1864.
243	Fuller, C., Pt., K, 14th N. Y. H'vy Art., age 19.	June 18, 20, '64.	Right; flap. Disch'd July 7, '65.
244	Furney, M., Pt., G, 126th Ohio, age 26.	Sept. 22, 23, '64.	Left; flap. Disch'd March 27, 1865.
245	Fyans, A., Corp'l, F, 32d New York.	May 7, 8, '62.	Left. Surgeon F. H. Hamilton, U. S. V. Disch'd July 15, 1862.
246	Gallup, E. A., Pt., L, 1st Vt. H'vy Art., age 21.	June 1, 2, '64.	Left; double flap. Gangrene. Discharged Oct. 21, 1865.
247	Ganster, W. A., Pt., D, Independent Penn. Artillery, age 21.	Aug. 18, 18, '64.	Right; circ. Surg. E. Jackson, 30th Colored Troops. Disch'd Jan. 3, 1865.
248	*Garner, J.*, Pt., I, 5th N. Carolina.	Sept. 17, 17, '62.	Right. Union surgeon. Furloughed Dec. 19, 1862.
249	Garvin, M., Corp'l, C, 40th New York, age 33.	June 18, 18, '64.	Right. Surg. O. J. Evans, 40th N. Y. Disch'd March 4, 1865.
250	*Gaskins, J.*, Pt., D, 4th Virginia Battery.	July 1, 1, '62.	——. Recovery.
251	Gates, E. B., Capt., H, 4th Pennsylvania.	June 30, J'y 1, '62.	Left. Surg. M. S. Kittinger, 100th N. Y. Disch'd Oct. 31, 1862.
252	Gieseke, A., Pt., I, 12th Missouri.	July 17, 17, '63.	Left; flap. Surg. J. Spiegelhalter, 12th Mo. Disch'd April 14, '64.
253	*Gilbert, D. R.*, Pt., K, 23d South Carolina, age 35.	July 2, 3, '63.	Right. Exchanged Nov. 12, '63.
254	Gillen, J., Pt., A, 35th N. Jersey, age 23.	Dec. 9, 9, '64.	Left; double flap. Surg. A. B. Monahan, 63d Ohio. Trismus. Transferred April 14, 1865.
255	Gilkerson, J., Corp'l, G, 140th Pennsylvania.	April 6, 6, '65.	Right; circular. Mustered out.
256	Gillighan, H., Pt., K, 22d Mass., age 23.	May 11, 11, '64.	Left; ant. post. flap. Surg. I. H. Stearns, 22d Mass. Discharged October 17, 1864.
257	Gilmore, T., Pt., I, 107th New York, age 21.	May 25, 27, '64.	Left; circular. Discharged July 20, 1865.
258	Ginnings, E. K., Pt., K, 26th Illinois, age 19.	Mar. 22, 22, '65.	Right; lateral flaps. Surg. A. T. Hudson, 26th Iowa. Disch'd June 27, 1865.
259	Glatzel, P. P., Pt., E, 26th Wisconsin, age 28.	June 1, 1, '64.	Left; flap. Disch'd Sept. 21, '65.
260	Glynn, M., Pt., A, 107th New York, age 48.	Mar. 16, 16, '65.	Right; circ. Surg. P. H. Flood, 107th N. Y. Disch'd Feb. 20, '66.
261	Godchalke, A., Capt., H, 79th Pennsylvania.	Sept. 19, 19, '63.	Left; flap. Surg. W. M. Wright, 79th Penn. Nov. 21, '65, re-amp. 23d, hæm. M. O. June 30, 1866.
262	Goery, L., Serg't, B, 90th Pennsylvania.	Sept. 17, 17, '62.	Right. Disch'd Nov. 20, 1862.
263	Goodnow, A. H., Pt., C, 30th Iowa, age 22.	May 13, 13, '64.	Right; flap. Surg. A. T. Hudson, 26th Iowa. Disch'd June 16, '65.
264	*Goslon, L.*, Lieut., I, 33d N. Carolina, age 22.	April 2, 3, '65.	Right; circular. Released June 9, 1865.
265	Gosper, J. J., Lieut., C, 29th C. Troops, age 24.	Dec. 4, 4, '64.	Left. Surg. D. MacKay, 29th C. Troops. Disch'd May 15, 1865.
266	Graham, G. W., Serg't, E, 7th Minnesota, age 24.	Dec. 16, 17, '64.	Right; flap. Surg. V. B. Kennedy, 5th Minn. Disch'd April 4, 1865.
267	Graham, R., Pt., A, 98th Illinois, age 19.	April 17, 18, '64.	Right; flap. Ass't Surg. A. T. Barnes, 98th Ill. Disch'd July 23, 1864.
268	Grant, J., Pt., F, 12th Rhode Island.	Dec. 13, 14, '62.	Right. Ass't Surg. J. G. Wilbur, 18th Mass. Disch'd Mar. 13, '63.
269	*Graves, B. F.*, Pt., Crenshaw's Va. Battery.	June 27, 27, '62.	——. Surg. W. C. Warren, C. S. A. Retired Feb. 22, 1865.
270	Greely, P., Pt., A, 1st Wisconsin, age 22.	July 21, 21, '64.	Left; flap. Surg. L. J. Dixon, 1st Wis. M. O. March 1, 1865.
271	Green, D. M., Pt., A, 97th New York, age 26.	June 12, 13, '64.	Right; circ. Surg. W. B. Chambers, 97th N. Y. Disch'd June 13, 1865.
272	*Green, E.*, Pt., H, 5th N. Carolina Bat'y, age 23.	May 5, 6, '62.	——; flap. Discharged October 17, 1862.
273	*Greenison, S. W.*, Pt., E, 4th Georgia.	Aug. 21, 21, '64.	Right. Surg. W. P. Young, C. S. A. Exchanged.
274	*Greenwell, J. A.*, Pt., Baltimore Light Artillery.	Sept. 17, 17, '62.	Right. Surg. R. A. Lewis, C. S. A. Recovery.
275	Griffith, W. C. P., Pt., H, 80th Indiana, age 20.	May 14, 15, '64.	Right; ant. post. flap. Ass't Surg. W. P. Welborn, 80th Indiana. Disch'd May 18, 1865.
276	Grim, G. W., Corp'l, F, 6th Ohio Cav., age 30.	Feb. 5, 5, '65.	Right; ant. post. flap. Disch'd August 16, 1865.
277	Gross, W., Pt., C, 7th Penn. Res., age 27.	Dec. 13, 13, '62.	Right. Gangrene. Discharged May 2, 1863.
278	Grove, S., Pt., K, 3d Iowa.	July 12, 14, '63.	Left; flap. Discharged October 13, 1863.
279	Groves, C. H., Pt., K, 18th Massachusetts, age 23.	Nov. 7, 7, '63.	Left. Surg. W. Holbrook, 18th Mass. Disch'd March 28, 1864.
280	*Hackler, J. P.*, Serg't, K, 3d Mississippi, age 23.	Nov. 30, 30, '64.	Left; circ. To Provost Marshal March 7, 1865.
281	Hadlow, H., Pt., H, 81st New York, age 21.	May 31, J'e 1, '62.	Right. Confed. surgeon. Gang. Aug. 1, amp. thigh; 15, re-amp. thigh. Disch'd May 2, 1863.
282	Hahn, M., Serg't, C, 26th Wisconsin, age 32.	Mar. 19, 19, '65.	Left; circular. Disch'd Nov. 23, 1865.
283	Haight, O., Pt., L, 2d N. Y. H. Art'y, age 26.	April 7, 8, '65.	Right; flap. Disch'd June 6, '65.

[1] Fisher (G. J.). *Report of Fifty-seven Cases of Amputations, in the Hospitals near Sharpsburg, Md., after the battle of Antietam, September* 17, 1862, in *American Journal Medical Sciences*, Volume XLV, page 48.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
284	*Hallam, H. C.*, Pt., Fredericksburg Artillery.	May 2, 2, '63.	Right. Ass't Surg. H. L. Hines, C. S. A. Recovery.
285	Hallett, D., Serg't, F, 67th Ohio, age 24.	April 2, 2, '65.	Right; ant. post. flap. Disch'd July 29, 1865.
286	Halsey, H., Pt., F, 48th Pennsylvania, age 26.	May 11, 11, '64.	Left; circular. Disch'd January 5, 1865.
287	*Hamil, T.*, Serg't, E, 12th Georgia.	Sept. 19, 19, '64.	Right; flap. Surg. — Lamar, C. S. A. To Fort McHenry Jan. 5, 1865.
288	*Hamilton, T. P.*, Pt., K, 13th Georgia.	April 29, —, '63.	Left. Surg. J. Ebersole, 19th Ind. Prison June 25, '63. *Spec.* 4819.
289	Hamilton, W. J., Serg't, I, 11th Pennsylvania Reserves, age 23.	May 23, 23, '64.	Left; circ. Surg. C. Bower, 6th Penn. Reserves. Mustered out June 13, 1864.
290	Hammer, G., Serg't, E, 52d New York, age 37.	June 14, 15, '64.	Left; circ. Surg. J. W. Wishart, 140th Penn. Disch'd May 22, '65.
291	Hanlon, W., Pt., E, 27th New York.	July 21, 23, '61.	Right; flap. Surg. — Smith, C. S. A. Must. out May 31, 1863.
292	*Hannah, G.*, Pt., G, 3d Florida, age 24.	July 22, 22, '64.	Left; circ. To Provost Marshal Dec. 1, 1864.
293	Hardin, J., Lieut., G, 101st Illinois, age 39.	May 25, 26, '64.	Left; flap. Disch'd Oct. 13, '64. Oct., 1865, re-amputation.
294	*Harding, W. R.*, Pt., C, 15th North Carolina.	Sept. 17, 17, '62.	Right. Furloughed.
295	*Harper, F. M.*, Pt., C, 6th Mississippi.	April 10, 11, '63.	——. Confederate surgeon. Recovery.
296	*Harrell, H. D.*, Pt., G, 31st N. Carolina, age 22.	Sept. 30, 30, '64.	Left. To prison January 23, '65.
297	Harrigan, J. M., Corp'l, A, 26th Ohio, age 22.	Dec. 4, 4, '64.	Right; circular. Disch'd May 15, 1865.
298	Harriger, J., Serg't, B, 105th Penn., age 19.	July 2, 2, '63.	Right; flap. Surg. — Patterson, C. S. A. Disch'd Sept. 8, 1864.
299	Harrington, G. W., Pt., K, 38th Ohio, age 22.	Aug. 5, 5, '64.	Left; flap. Surg. J. Haller, 38th Ohio. Gangrene. Discharged May 27, 1865.
300	*Harris, J. M.*, Pt., D, 37th Virginia.	July 3, 3, '63.	Right. Surg. — Butler, C. S. A. Exchanged March 3, 1864.
301	Harris, L., Corp'l, G, 143d Pennsylvania.	May 5, 7, '64.	Left; flap. Disch'd Jan. 23, '65.
302	*Harris, L. S.*, Corp'l, C, Jeff. Davis Legion.	June 14, 14, '64.	——. Surg. — Metcalfe, C. S. A. Recovery.
303	[1] *Harwood, E. F.*, Pt., 18th Mississippi, age 30.	Sept. 17, 17, '62.	Right; post. flap. Doing well.
304	Hasenour, G., Pt., I, 49th Indiana.	May 16, 16, '63.	Left; flap. Surg. J. A. Ritter, 49th Indiana. Disch'd Feb. 8, 1864.
305	Haycus, J. S., Pt., H, 33d New York.	Dec. 13, 13, '62.	Right. Discharged.
306	Hawkins, W. W., Serg't, I, 93d N. York, age 21.	May 5, 6, '64.	Right. Ass't Surg. A. B. Haines, 20th Ind. May 16, amp. thigh. Disch'd July 12, '65. *Spec.* 4497.
307	Haynes, C. H., Serg't, E, 20th Maine, age 28.	May 5, 7, '64.	Left; flap. Confederate surgeon. Disch'd April 10, 1865.
308	Heist, E., Pt., E, 27th Pennsylvania.	June 8, 10, '62.	Left; flap. Discharged September 16, 1862.
309	Heist, J. A., Pt., G, 6th Michigan Cavalry.	July 6, 6, '63.	Left; flap. Confederate surgeon. July 27, re-amp. Discharged May 21, 1864.
310	Hemingway, N. M., Pt., H, 32d Mass., age 17.	Dec. 13, 13, '62.	Right; circular. Disch'd June 18, 1863.
311	Hemminway, A., Pt., K, 49th New York, age 25.	May 6, 6, '64.	Right; circ. flap. Discharged March 30, 1865.
312	*Henderson, S. R.*, Pt., F, 36th Virginia.	June 5, 5, '64.	——. Surgs. Bell and Cross, C. S. A. Retired Dec., 1864.
313	Hendricks, M., Pt., K, 79th Indiana.	Jan. 2, 2, '63.	Left. Discharged February 28, 1863.
314	Hendrickson, J., Lieut. Col., 83d New York.	Dec. 13, 13, '62.	Right. Mustered out June 30, 1866.
315	Hessler, P., Pt., K, 82d New York, age 23.	May 18, 18, '64.	Right; circ. Surg. S. H. Plumb, 82d New York. Disch'd June 9, 1865.
316	Hibbs, T., Pt., G, 2d N. Y. H'vy Art., age 47.	June 1, 1, '64.	Left; circ. Surg. G. L. Potter, 145th Penn. Gangrene. Disch'd Nov. 4, 1865. Re-amp. 1866.
317	Hickey, P., Pt., E, 3d N. Y. Artillery, age 31.	May 14, 14, '64.	Right. Discharged December 7, 1864.
318	Hicks, J., Pt., B, 6th Tennessee.	May 14, 14, '64.	Left; circular. Discharged November 21, 1865.
319	*Higginbotham, E. B.*, Pt.,	May 12,	Both. Surgeon W. J. Arrington,
320	F, 38th Georgia.	13, '64.	P. A. C. S. Recovery.
321	Higgins, V. N., Pt., H, 2d Maine, age 24.	May 4, 5, '63.	Left. Discharged June 9, 1863.
322	Hiller, J. A., Corp'l, D, 9th New York Cavalry, age 26.	Sept. 26, 26, '64.	Left; post. flap. Surgeon A. P. Clark, 6th N. Y. Cav. Disch'd June 29, 1865.
323	Hines, G. W., Pt., C, 98th Ohio, age 19.	Dec. 17, 17, '64.	Right; circular; gang. Disch'd May 26, 1865.
324	*Hinson, J. L.*, Lieut., I, 6th Alabama, age 29.	Sept. 19, 19, '64.	R't; circ. Surg. — Weatherby, C. S. A. To prison Dec. 9, '64.
325	Hinson, J. W., Pt., C, 33d Indiana, age 22.	June 29, 29, '64.	Right; flap. Surg. J. Bennett, 19th Mich. Disch'd July 21, '65.
326	Hobbs, J., Pt., B, 39th Indiana.	Sept. 19, 19, '63.	Right; flap. Disch'd January 9, 1864.
327	Hochstetler, C., Pt., D, 54th Penn., age 19.	June 18, 18, '64.	Right; ant. posterior double flap. Disch'd April 1, 1865.
328	Hoffses, R. W., Corp'l, E, 20th Maine, age 29.	May 5, 6, '64.	Right; circular. Disch'd December 12, 1864.
329	Hogue, W., Pt., G, 83d Pennsylvania, age 24.	July 1, 1, '62.	Right. Discharged May 30, 1863.
330	Holladay, J. F., Pt., C, 48th Ohio, age 22.	Mar. 12, 13, '63.	Right; flap. Disch'd July 23, 1863.
331	Hood, J. E., Serg't, F, 35th Mass., age 23.	July 30, 30, '64.	Left; circ. Surg. G. W. Snow, 35th Mass. Disch'd April 12, '65.
332	*Hooks, B. A.*, Pt., B, 59th Georgia, age 27.	Aug. 14, 14, '64.	Right. To prison October 15, 1864.
333	Hope, J., Pt., H, 2d Virginia, age 30.	Nov. 6, 8, '63.	Left; flap. Surg. W. Wynne, 14th Penn. Cav. Disch'd June 29, '64.
334	Horton, B. J., Lieut., I, 24th Ohio.	De. 31, '62, Jan. 1, '63.	Left. Resigned June 10, 1863.
335	Hough, W., Pt., A, 58th Illinois.	July 14, 14, '64.	Right; flap. Mustered out May 3, 1865.
336	Howard, W. F., Pt., I, 14th N. Hamp., age 24.	Sept. 18, 19, '64.	Right; flap. Surg. W. H. Thayer, 14th N. H. Disch'd Jan. 9, '65.
337	*Howie, J. N.*, Pt., B, 53d North Carolina, age 31.	Sept. 5, 6, '64.	Right; flap. Surg. L. Hill, 53d N. C. Recovery Jan. 8, 1865.
338	*Hubbard, J. M.*, Serg't, H, 2d Miss., age 26.	Sept. 17, 17, '62.	Left; flap. Transferred December 14, 1862.
339	Hudson, J., Pt., H, 31st Indiana, age 25.	May 12, 12, '63.	Left; circ. A. Surg. A. C. Mills, 125th Ill. Disch'd Oct. 16, 1863.
340	Huffman, C., Pt., K, 7th Illinois, age 17.	Feb. 15, 15, '62.	Right; double flap; re-amput'n. Discharged May 1, 1862.
341	*Huggins, A. C.*, Serg't Maj., 24th N. Carolina.	April 20, 20, '64.	——. Surg. W. R. Wilson, 24th N. C. Retired Feb. 24, 1865.
342	Hunn, W. R., Corp'l, A, 122d N. Y., age 35.	Oct. 19, 20, '64.	Right; flap. Surg. G. T. Stevens, 77th N. Y. Disch'd May 31, '65.
343	Idner, G. W., Pt., I, 23d Indiana.	May 12, 12, '63.	Right; circ. Surg. M. Brucker, 23d Ind. Disch'd Aug. 7, 1863.
344	*Ingraham, H.*, Pt., H, 43d North Carolina, age 49.	May 30, June 1, 1864.	Right; circ. A. Surg. J. T. Duffield, 7th Indiana. To prison Dec. 30, 1864.
345	Inman, S., Pt., F, 16th Maine, age 31.	April 1, 2, '65.	Right; flap. Discharged August 23, 1865.
346	Irvin, J., Lieut., E, 45th Penn., age 36.	May 18, 18, '64.	Right; circ. Surg. H. E. Smith, 27th Mich. Disch'd Jan. 18, 1865. Died April 17, 1871.
347	Irving, W., Major, 38th Ohio, age 30.	Aug. 5, 5, '64.	Left; flap. Surg. J. Haller, 38th Ohio. Must. out July 12, 1865.
348	Isham, F. W., Corp'l, D, 7th Wisconsin, age 32.	Mar. 31, 31, '65.	Left; circ. Surg. D. C. Ayers, 7th Wis. Disch'd June 13, 1865.
349	Jackson, J., Serg't, F, 12th Mo. Cav., age 22.	Dec. 17, 18, '64.	Right; circular. Disch'd July 2, 1865.
350	James, J., Pt., B, 57th Illinois, age 18.	Oct. 5, 5, '64.	Right; ant. post. flap. Surg. J. R. Zearing, 57th Ill. Discharged July 22, 1865.
351	Jecko, P., Serg't, D, 15th Missouri, age 29.	Nov. 29, 29, '64.	R't; flap. A. Surg. W. L. Graves, 6th Ark., C. S. A. Disch'd July 31, 1865. Also amp. forearm.
352	Jedowin, T., Pt., C, 1st Vt. H'vy Art., age 17.	Mar. 25, 25, '65.	Left; flap. Surg. J. J. Meigs, 3d Vermont. Disch'd Sept. 14, '65.
353	Jellison, N. F., Pt., 11th Ohio Battery.	Sept. 19, 20, '62.	Left. Disch'd April 4, 1863.
354	Jenne, R. C., Corp'l, I, 17th Vermont, age 20.	April 2, 2, '65.	Right; flap. Surg. L. W. Bliss, 51st N. Y. Disch'd Oct. 13, '65.
355	Jerman, D., Pt., F, 190th Penn., age 23.	July 11, 11, '64.	Right; flap. Surg. L. W. Read, U. S. V. Disch'd Aug. 7, 1865. Died May 9, '80; ulcera. stump.
356	Johnson, A., Pt., K, 1st N. J. Cavalry, age 19.	July 7, 8, '64.	Left; circular. Discharged.
357	Johnson, G., Pt., A, 43d Colored Troops, age 38.	Oct. 27, 27, '64.	Right; circ. Surg. E. Jackson, 30th C. T. Disch'd Sept. 14, '65.
358	*Johnson, J.*, Pt., G, 17th Virginia, age 18.	Nov. 11, 12, '64.	Right; circular. To prison Feb. 10, 1865.
359	Johnson, J. M., Pt., C, 3d Delaware, age 31.	June 3, 3, '64.	Right. Surg. D. E. Wolf, 3d Del. (Also amp. at left ankle joint.) Discharged June 8, 1865.
360	Johnson, W. T., Pt., I, 113th Ohio, age 21. (Alias T. F. Ricker.)	Aug. 6, 6, '64.	Left; flap. Surg. T. B. Williams, 121st Ohio. Disch'd May 23, 1865. Died May 11, 1874.
361	Johnstone, R., Pt., G, 121st Penn., age 31.	April 1, 2, '65.	Right; circular. Disch'd Sept. 30, 1865.
362	Joline, W. H., Pt., E, 12th Penn. Reserves, age 20.	May 10, 10, '64.	Left; circ. flap. Surg. B. Rohrer, 10th Penn. Reserves. Disch'd March 24, 1865.
363	Jones, W., Corp'l, H, 8th New York H'vy Art., age 25.	June 22, 23, '64.	Left; ant. post. flap. Surg. G. Chaddock, 7th Mich. Disch'd December 5, 1864.
364	*Jones, W. M.*, Serg't, K, 50th Georgia, age 22.	July 2, 4, '63.	Right. Exchanged March 17, 1864.
365	Jones, W. P., Pt., F, 12th Wisconsin, age 24.	July 21, 21, '64.	Left; flap. Surg. E. M. Rogers, 12th Wis. Disch'd June 1, 1865.
366	*Jones, W. S.*, Lieut., I, 2d Arkansas, age 21.	Jan. 2, 3, '63.	Left; flap. Disch'd November 7, 1864.
367	*Jones, Z.*, Pt., B, 24th N. Carolina, age 25.	April 2, 2, '65.	Left. Released July 22, 1865.
368	*Jordon, J. P.*, Lieut., B, 7th Virginia Cavalry.	May 29, 29, '64.	——. Surg. — Price, 7th Virginia. Furloughed.

[1] FISHER (G. J.). *Report of Fifty-seven Cases of Amputations, in the Hospitals near Sharpsburg, Md., after the battle of Antietam, September* 17, 1862. in *American Journal Medical Sciences*, Volume XLV, page 48.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
369	*Jowers, W.*, Pt., F, 17th Miss., age 39.	July 2, 3. '63.	Right; flap. Re-amput'n. Exchanged March 17, 1864.
370	Kapp, J., Pt., I, 17th Missouri.	Jan. 11, 11, '63.	Right; ant. post. flap. Surg. E. C. Franklin, U. S. V. Disch'd Jan. 22, 1864.
371	Kaufman, W., Serg't, E, 3d Missouri.	Jan. 11, 11, '63.	Right; flap. Discharged May 29, 1863.
372	*Kean, R. M.*, Pt., F, 50th Georgia.	July 2, 4. '63.	——. Surg. J. L. Harris, C.S. A. Paroled Nov. 12, 1863.
373	Keffer, H., Pt., B, 55th Pennsylvania, age 23.	June 3, 3, '64.	Left; flap. Discharged March 2, 1865.
374	*Keister, J. W.*, Serg't, 6th Alabama.	May 5, 6, '64.	——. Surg. G. Whitfield, 12th Alabama. Recovery.
375	Keller, I. N., Corp'l, B, 21st Ohio, age 22.	Sept. 1, 1, '64.	Left; flap. Surg. D. S. Young, 21st Ohio. Disch'd Feb. 21, '65.
376	Kelly, E., Pt., A, 29th Massachusetts.	Sept. 17, 18, '62.	R't; flap. Surg. G. B. Coggswell, 29th Mass. Disch'd Mar. 3, '63.
377	Kelly, L. C., Corp'l, K, 52d Ohio, age 21.	Jan. 27, 28, 64.	Right; flap. Surg. M. M. Hooton, 86th Ill. Disch'd Jan. 26, 1865.
378	Keltner, S., Pt., I, 66th Ohio, age 18.	Dec. 19, 19, '64.	Right; ant. post. flap. Disch'd June 30, 1865.
379	Kendall, T. C., Capt., B, 21st N. J., age 35.	May 4, 6, '63.	Right; circ. Surg. E. G. Greenleaf, 54th N. C. Mustered out June 19, 1863.
380	Kenfield, C. B., Pt., K, 35th Massachusetts.	Sept. 17, 19, '62.	Right; flap. Surg. G. W. Snow, 35th Mass. Disch'd Mar. 4, '63.
381	Kennedy, J., Pt., 5th Ohio Battery.	June 5, 5, '63.	Left. Surg. C. Carle, 41st Ill. Gangrene. Disch'd Sept. 8, '64.
382	*Kent, L. S.*, Pt., G, 4th Louisiana.	Aug. 31, 31, '64.	Left. Recovered.
383	Kenworthy, L., Pt., B, 22d Indiana, age 23.	Mar. 16, 16, '65.	Left; flap. Surg. J. A. Stillwell, 22d Ind. Disch'd June 12, 1865.
384	*Kerr, J. H.*, Lieut., H, 57th N. C., age 20.	July 20, —, '64.	Left. Confederate surgeon. To prison February 16, 1865.
385	*Keziah, P. C.*, Pt., F, 35th North Carolina.	May 19, 20, '64.	——. Surg. C. J. O'Hagan, 35th N. C. Recovery.
386	[1]*Kidd, W. J.*, Pt., 49th Virginia, age 26.	Sept. 17, 17, '62.	Left; post. flap. Transferred.
387	*Killebrew, W. H.*, Pt., C, 12th Georgia, age 22.	July 2, 2, '63.	Left. Surg. — Etheridge, C.S.A. Exchanged Nov. 12, 1863.
388	*Kissinger, H.*, Pt., F, 34th Virginia.	Sept. —, 29, '64.	Right. Doing well October 25, 1864.
389	Knight, C. E., Pt., F, 19th Iowa.	Dec. 7, 8, '62.	Right; flap. Surg. M. B. Cochrau, 1st Iowa Cavalry. Disch'd April 25, 1863.
390	Knight, F. W., Pt., E. 1st Vt. H'vy Art., age 21.	Sept. 19, 20, '64.	Right; flap of skin, circ. of mus. Feb. 15, reamputat'n. Disch'd Aug. 17, 1865. *Spec.* 4330.
391	Knowles, J., Corp'l, K, 114th Illinois.	July 15, 15, '64.	Left; flap. Discharged October 9, 1864.
392	Koch, D., Pt., A, 54th New York.	Aug. 29, 29, '62.	Right. Surg. C. W. Hagen, 54th N. Y. Sept. 3, re-amp. up. third. Disch'd April 14, '64. *Spec.* 6707.
393	Koch, H., Serg't, F, 82d Illinois, age 26.	May 25, 26, '64.	Left; circular. Discharged Aug. 31, 1865.
394	Koehler, A., Pt., D, 4th New York.	Dec. 13, 13, '62.	Right. Discharged August 28, 1863.
395	Kopp, E., Pt., K, 12th New Jersey, age 32.	Mar. 25, 27, '65.	Left; flap. Surg. A. Satterthwaite, 12th N. J., and A. Staff Surg. W. J. Burr, U.S.A. (Also amp. right leg, low. third.) April 2, slough. Discharged Oct. 3, 1865.
396	[2]Kosack, O., Pt., K, 2d Maryland, age 26.	Dec. 13, 13, '62.	Left; gangrene. Disch'd June 15, 1864. *Spec.* 6706.
397	Kriner, J., Pt., B, 48th Pennsylvania, age 26.	Oct. 29, 29, '64.	Right; circ. Surg. W. O'Meagher, 69th N. Y. Disch'd June 6, '65.
398	*Lacy, J. F.*, Capt., B, 44th Virginia.	May 3, 3, '63.	Right. Surg. P. F. Whitehead, C. S. A. Recovery.
399	Laird, P. P., Pt., D, 49th New York, age 19.	Aug. 21, 21, '64.	Right; flap. Surg. G. T. Stevens, 77th N. Y. Disch'd July 18, '65.
400	Langfit, J. W., Pt., A, 100th Penn., age 21.	May 5, 7, '64.	Left; flap. Surg. W. V. White, 57th Mass. Dis. July 18, 1865.
401	Larivicre, A., Pt., D, 5th Mich. Cavalry, age 35.	July 10, 10, '63.	Left; flap. A. Surg. A. R. Stone, 5th Michigan Cavalry. Disch'd December 7, 1863.
402	Larkins, W., Pt., G, 91st New York, age 19.	Mar. 31, 31, '65.	Left; ant. post. flap. Surg. R. Morris, 91st N. Y. Discharged July 21, 1865.
403	Lathrop, W., Pt., F, 67th Ohio, age 18.	April 2, 2, '65.	Left; circ. Surg. J. Westfall, 67th Ohio. Disch'd Aug. 12, 1865.
404	*Latimer, J. T.*, Pt., L, 3d Alabama, age 21.	May 2, 3, '63.	——; flap. Transferred June 9, 1863.
405	*Latta, W. T.*, Pt., A, 53d Georgia, age 22.	July 10, 10, '63.	Right. Surg. E. M. Waters, P. A. C. S. Exch'd March 17, 1864.
406	Law, A. H., Pt., C, 33d Indiana, age 24.	July 20, 20, '64.	Left; flap. Gangrene. Disch'd July 21, 1865.
407	Lawrence, C. P., Pt., B, 32d Mass., age 21.	July 2, 3, '63.	Left; circ. Surg. Z. B. Adams, 32d Mass. Disch'd July 27, '64.
408	[3]*Lawrence, J. R.*, Lieut., I, 1st Louisiana, age 33.	Sept. 17, 17, '62.	Right; post. flap. Transferred November 28, 1862.
409	Lee, A. W., Pt., K, 2d N. Y. H'vy Art., age 22.	Aug. 16, 17, '64.	Right; circ. Disch'd June 27, '65. Died Sept. 25, '68; consumption.
410	Lemmon, E., Pt., E, 16th Ohio.	Dec. 29, 30, '62.	Left; flap. Surg. J. Pomerene, 42d Ohio. Disch'd April 3, '63.
411	Lentz, D., Pt., L, 5th Penn. H'vy Artillery, age 40.	Oct. 6, 6, '64.	Left; circ. A. Surg. J. McCann, 5th Penn. Heavy Artil'y. Discharged June 8, 1865.
412	Leonard, A. G., Pt., B, 1st W. Va. Cav., age 23.	Sept. 26, 28, '64.	Right; flap. Discharged March 27, 1865.
413	Lewis, J. W., Pt., K, 13th Kentucky, age 21.	Nov. 16, 17, '63.	Left; flap. Discharged May 17, 1864.
414	Light, O. H., Pt., F, 12th Rhode Island.	Dec. 13, 13, '62.	Right; circ. Discharged April 6, 1863.
415	Little, A., Pt., F, 106th Penn., age 22.	June 1, 1, '64.	Right; flap. Surgeon M. Rizer, 73d Penn. Disch'd April 15, '65.
416	*Locke, W. S.*, Pt., K, 41st Mississippi.	Sept. 20, 20, '63.	Right. Surg. J. S. Cain, C. S. A. Recovery.
417	*Lockett, E. F.*, Pt., C, 23d Virginia.	May 3, 3, '63.	Left. Ass't Surg. — Dennis, 23d Virginia. Recovery.
418	*Lockett, W. F.*, Pt., E, 36th Virginia, age 20.	Oct. 19, 19, '64.	Right; circ. Surg. J. Watkins, 36th Va. To Provost Marshal February 11, 1865.
419	Loetech, C., Serg't, B, 2d Penn. Art'ry, age 36.	June 18, —, '64.	Left; flap. Surg. E. Griswold, 2d Penn. Disch'd Oct. 19, 1865.
420	Long, J. C., Pt., A, 3d Indiana Cav., age 22.	Oct. 11, 11, '63.	Right. Surg. E. W. H. Beck, 3d Ind. Cav. Disch'd April 6, '64.
421	Long, J. D., Pt., C, 15th Indiana.	De. 31, '62, Jan. 1, '63.	Left. Discharged March 6, 1863.
422	Lord, T. W., Lieut., K, 17th Maine.	May 3, 3, '63.	Left; flap. Surg. C. S. Wood, 66th N. Y. Disch'd Sept. 10, 1863. Re-amp. November, 1864.
423	*Lovell, B. L.*, Pt., B, 17th Virginia Cavalry.	Aug. 7, 7, '64.	——. Surg. R. Fleming, C. S. A. Recovery.
424	Lucore, L., Pt., C, 1st Penn. Rifles.	Dec. 13, 13, '62.	Right; flap. Discharged September 28, 1863.
425	Luzader, T., Pt., C, 33d Ohio, age 21.	Sept. 27, 27, '62.	Left. Discharged October 29, 1862.
426	*Lyons, W.*, Pt., E, 1st Tennessee Cavalry.	Oct. 12, 12, '63.	——. Ass't Surg. M. P. Shelton, C. S. A. Recovery.
427	*Mabers, H. S.*, Pt., H, 11th Alabama, age 24.	July 2, 3, '63.	Left. Surg. L. L. Saunders, P. A. C. S. 8th, re-amputation. Exchanged Nov. 12, 1863.
428	*Mainor, J. M.*, Pt., B, 37th Georgia, age 22.	De. 31, '62, Jan. 1, '63.	Right. Surg. — Gardner, C.S.A. Recovery.
429	Male, G. W., Seaman, Baron DeKalb, U. S. N.	Mar. 13, 13, '63.	Left; flap. Surg. J. Wise, U.S.N. Disch'd Oct. 22, 1863.
430	Maley, J., Pt., H, 7th Conn., age 26.	May 14, 14, '64.	Left; flap. Surg. G. C. Jarvis, 7th Conn. March 2, '65, re-amp. Discharged Sept. 13, 1865.
431	*Malloy, P.*, Pt., A, 10th Tennessee, age 38.	Sept. 19, 21, '63.	Right; flap. Surg. — Pitts, 2d Miss. To Provost Marshal June 14, 1864.
432	Malters, B., Pt., A, 108th New York, age 17.	July 3, 3, '63.	Right; ant. post. flap. Surg. O. Munson, 108th N. Y. Hæm.; lig. ant. tibial artery; necrosed. Disch'd Nov. 3, '64. *Spec.* 4323.
433	*Manahard, W. E.*, Pt., G, 2d Mississippi.	May 31, 31, '62.	——. Surgeon H. H. Hubbard, P. A. C. S. Recovery.
434	Mangan, R., Lieut., D, 75th Illinois.	June 24, 24, '64.	Left. Surg. S. H. Kersey, 36th Indiana. Disch'd Dec. 2, 1864.
435	*Manson, H. W.*, Serg't, H, 7th Tenn., age 22.	April 2, 2, '65.	Right; circular. Released June 14, 1865.
436	*Mapes, W. W.*, Pt., F, 5th N. Y. Cav., age 42.	Oct. 19, 20, '64.	Right; ant. post. flap. Surg. N. D. Ferguson, 8th N. Y. Cavalry. Disch'd May 3, 1865.
437	Martin, F. S., Pt., F, 2d Vermont, age 21.	Oct. 19, 20, '64.	Left; ant. post. flap. Surg. M. J. Hyde, 2d Vt. Oct. 31, bone removed. Disch'd Aug. 25, 1865. Accidentally killed Oct. 11, '65.
438	Martin, J., Pt., L, 2d N. Y. H'vy Art., age 21.	June 16, 16, '64.	Right; circ. Amp. toes, left foot. Disch'd Nov. 11, 1864. May 11, 1865, re-amputation.
439	Martin, W., Pt., D, 7th Maine, age 16.	May 18, 18, '64.	Right; flap. Confederate surgeon. Recovery.
440	Mason, D. L., Pt., B, 38th Wisconsin, age 15.	July 30, 30, '64.	Right; ant. post. flap. Surg. W. B. Fox, 8th Michigan. Disch'd July 11, 1865.
441	Mason, E. F., Pt., C, 29th Ohio, age 19.	July 3, 3, '63.	Left; flap. Surg. A. K. Fifield, 29th Ohio. Discharged November 20, 1863.
442	Masterson, P., Pt., A, 59th New York, age 51.	Aug. 25, 27, '64.	Left; double flap. Discharged July 24, 1865.
443	*Maury, J.*, Pt., E, 31st Georgia, age 38.	June 2, 3, '64.	——. Retired January 31, 1865.
444	May, E. A., Pt., A, 27th Michigan, age 21.	Nov. 16, 17, '63.	Right; flap. Discharged June 3, 1864.

[1] Fisher (G. J.), *Report of Fifty-seven Cases of Amputations, in the Hospitals near Sharpsburg, Md., after the Battle of Antietam, September* 17, 1862, in *American Journal Medical Sciences*, Vol. XLV, p. 48.

[2] Thomson (William), *Report of Cases of Hospital Gangrene treated in Douglas Hospital, Washington, D. C.*, in *American Journal Medical Sciences*, Vol. XLVII, p. 380.

[3] Fisher (G. J.), *Report of Fifty-seven Cases of Amputations, in the Hospitals near Sharpsburg, Md., after the Battle of Antietam, September* 17, 1862, in *American Journal Medical Sciences*, Vol. XLV, p. 48.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
445	May, J. H., Pt., D, 22d Col'd Troops, age 37.	Sept. 21, 21, '64.	Right; circ. Discharged May 22, 1865.
446	May, P. J., Pt., C, 1st R. Island Art'ry, age 20.	May 3, 4, '63.	Right; ant. post. flap; nec. bone removed. Disch'd Aug. 9, 1864.
447	McCandless, G., Pt., K, 118th Penn., age 48.	Nov. 7, 7, '63.	Right. Disch'd May 3, 1864. Perished Nov. 20, 1868, in a severe snow storm.
448	McCloy, R., Pt., A, 10th New York, age 18.	April 6, 7, '65.	Left; ant. post. flap.; sloughed; exfol. Disch'd Oct. 21, 1865.
449	McClure, S., Pt., H, 83d Indiana, age 28.	May 19, 20, '63.	Left; circ. Surg. E. C. Franklin, U. S. V. Gangrene. Disch'd February 23, 1864.
450	McComas, D. H., Serg't, E, 8th Mich., age 21.	Sept. 30, 30, '64.	Right. Surg. W. C. Shurlock, 51st Penn. Disch'd June 11, 1865.
451	McCoy, J., Pt., A, 64th Ohio, age 20.	May 9, 10, '64.	Right; circ. Confed. surgeon. Disch'd April 27, 1865.
452	*McCoy, W.*, Pt., G, 5th Tenn. Cav., age 19.	Aug. 5, 5, '64.	Right; lateral flap. To Provost Marshal Nov. 23, 1864.
453	*McDonald, J. H.*, Pt., A, 23d Miss., age 19.	July 20, 21, '64.	Left; circular. To Provost Marshal December 1, 1864.
454	McFarland, G. F., Lieut. Col., 151st Penn.	July 2, 2, '63.	Right. Mustered out July 27, 1863.
455	*McFarland, J. H.*, Capt., G, 1st Missouri.	May 16, 17, '63.	Right. Surg. — Node, C. S. A. Recovery.
456	McGiveney, J., Corp'l, D, 155th N. Y., age 26.	May 18, 18, '64.	Right; circular. Disch'd March 17, 1865.
457	McGowan, J., Pt., C, 6th Vermont, age 26.	May 5, 5, '64.	Right; circular. Disch'd Aug. 2, 1865.
458	McGrath, M., Pt., K, 27th Mass., age 26.	Mar. 14, 14, '62.	Left; circ. Surg. G. Derby, 23d Mass. Disch'd Sept. 21, 1862.
459	McGuire, J., Pt., A, 12th Massachusetts, age 27.	Dec. 13, 14, '62.	Left; circ. Surg. A. W. Whitney, 13th Mass. Disch'd Apr. 30, '63.
460	McGuire, T., Pt., A, 105th New York.	Dec. 13, 14, '62.	Left. Discharged, 1863.
461	McMullen, W., Pt., H, 66th Ohio.	Aug. 9, 11, '62.	Right; flap. Discharged January 15, 1863.
462	McNaughton, C., Serg't, I, 5th Michigan.	May 2, 2, '63.	Left; circ. Ass't Surgeon R. A. Everett, 5th Mich. Discharged Dec. 11, 1863.
463	*Mears, T.*, Pt., H, 61st Virginia.	June 23, 23, '64.	—. Recovery.
464	Meinhardt, J., Corp'l, D, 12th Missouri.	Mar. 8, 8, '62.	Left; flap. Surg. C. Cook, 12th Missouri. Discharged.
465	Meissner, G. H., Pt., F, 3d Wisconsin, age 26.	Aug. 3, 3, '64.	Right. Surg. J. Chapman, 123d N. Y. Disch'd May 27, 1865.
466	Merry, E. W., Serg't-Maj., 21st Ohio, age 21.	July 20, 20, '64.	Left; flap. Surg. D. S. Young, 21st Ohio. Mustered out May 31, 1865.
467	Metz, L., Lieut., E, 78th New York, age 28.	June 15, 16, '64.	Left; flap. Discharged July 12, 1864.
468	Miller, I. D., Pt., C, 11th Infantry, age 24.	May 12, 13, '64.	Right; flap. Discharged March 27, 1865.
469	Miller, J., Pt., C, 19th Wisconsin, age 27.	Oct. 27, 29, '64.	Left; ant. post. flap. Discharged May 22, 1865.
470	Miller, J. H., Pt., A, 54th Ohio, age 35.	July 22, 23, '64.	Right; flap. Ass't Surg. C. B. Richards, 30th Ohio. Disch'd May 20, 1865.
471	*Miller, J. T.*, Lieut., E, 38th Virginia, age 24.	July 1, 1, '63.	R't. Surg. J. McAlpine, C. S. A. Exch'd and furloughed, 1864.
472	Miller, W., Pt., A, 4th Artillery, age 28.	July 3, 4, '63.	Left; post. flap. Surg. H. M. McAbee, 4th Ohio. Headquarters March 26, 1864.
473	Milliken, G. A., Corp'l, I, 1st Minnesota, age 21.	July 2, 3, '63.	Left; flap. Surg. J. B. LeBlond, 1st Minn. Disch'd Dec. 15, '63.
474	Mills, H. L., Serg't, H, 7th Minn., age 31.	Dec. 16, 16, '64.	Right; flap. Disch'd October 5, 1865.
475	Milner, S., Serg't, G, 10th Ohio.	Oct. 8, 10, '62.	Left. Surg. C. S. Muscroft, 10th Ohio. Disch'd Dec. 14, 1862.
476	Mitchelfelder, E., Pt., B, 163d New York.	Dec. 13, 14, '62.	Left; double flap. To Veteran Reserve Corps Feb. 29, 1864.
477	Monaghan, T., Pt., A, 63d New York, age 50.	Dec. 13, 14, '62.	Right. Surg. L. Reynolds, 63d N. Y. Disch'd Aug. 31, 1863. Died December 25, 1874.
478	Monroe, J. M., Pt., G, 42d Ohio.	Dec. 28, 28, '62.	Left; flap. Discharged April 2, 1863.
479	Moon, J. B., Pt., E, 71st Indiana.	Aug. 30, 31, '62.	Right; flap. Discharged October 1, 1862.
480	Moore, S. H., Pt., A, 30th Iowa, age 31.	Nov. 27, 27, '63.	Right; flap. Surg. A. T. Hudson, 20th Iowa. Disch'd Jan. 1, '65.
481	*Moore, T.*, Pt., B, Austin's Louisiana Bat'ry.	May 25, 25, '64.	—. Surg. W. A. Holt, C. S. A. Retired March 21, 1865.
482	Morse, B. F., Corp'l, A, 5th New Hampshire.	Sept. 17, 17, '62.	Left. Discharged December 6, 1862.
483	Morse, W. B., Pt., H, 1st Mass. Artillery, age 23.	June 18, 19, '64.	Left; flap. Discharged July 8, 1865.
484	Mortanto, L., Pt., G, 57th New York, age 59.	Aug. 25, 27, '64.	Right; dou. flap. Surg. — Taylor, C.S.A. Disch'd June 16, '65.
485	*Mosely, W. D.*, Pt., G, 25th Va. Cav., age 27.	Sept. 20, 20, '64.	Right; circ. Surg. J. W. Lawson, P. A. C. S. To prison Jan. 5, '65.
486	*Muller, W.*, Pt., H, 20th Louisiana.	Jan. 2, 2, '63.	Right. Surg. W. A. Holt, C. S. A. Recovery.
487	Munger, L. L., Pt., E, 105th New York.	Sept. 17, 17, '62.	Left; circular. Discharged.
488	*Murphey, J. F.*, Pt., B, 28th North Carolina.	Sept. 16, 16, '64.	—. Surg. — Trescott, C. S. A. Retired January 30, 1865.
489	Myers, P., Pt., M, 1st Wis. Cav., age 22.	Sept. 5, 5, '64.	Left; circ. Surg. W. H. Thorne, U. S. V. Disch'd Aug. 30, 1865.
490	Nance, R. G., Capt., B, 40th Illinois, age 42.	July 28, 28, '64.	Right; flap. Surg. A. Goslin, 48th Ill. Aug. 2, re-amputat'n. Discharged Jan. 7, 1865.
491	*Neeley, J. T.*, Pt., F, 21st Mississippi, age 19.	July 4, 6, '63.	Left. Exchanged March 17, '64.
492	*Neighbors, W. R.*, Lieut., G, 4th Tenn.	Sept. 20, 20, '63.	—. Surg. — Berton, C. S. A. Recovery.
493	Nelson, E., Pt., H, 7th Kentucky.	May 22, 22, '63.	Right; flap. Surg. W. Berry, 7th Kentucky. Disch'd Aug. 8, '63.
494	Nelson, S., Pt., B, 22d Wisconsin, age 20.	July 20, 20, '64.	Left; flap. A. Surg. C. S. Blanchard, 22d Wis. Disch'd July 4, 1865. Died Feb. 25, 1867.
495	[1]Neveling, W., Pt., N, 71st Penn., age 26.	June 30, 30, '62.	Right; double flap. Sept. 1, 1863, amp. knee joint. Disch'd Mar. 3, 1864. *Specs.* 668, 2458, 2778.
496	Newton, J. B., Lieut., K, 28th Illinois.	Oct. 5, 6, '62.	Right. Discharged June 10, 1863.
497	Noyes, C. H., Serg't, H, 169th N. York, age 21.	Jan. 16, 16, '65.	Left; ant. post. flap. Discharged Nov. 3, 1865. *Spec.* 3512.
498	Nutter, L. S., Pt., A, 5th New Hamp., age 16.	July 1, 1, '62.	Left; flap. Surg. G. B. Coggswell, 29th Mass. Jan. 3, '63, re-amp. Disch'd Sept. 25, 1863.
499	Nutter, W. S., Pt., A, 42d Missouri, age 22.	May 18, —, '65.	Right; flap. Surg. S. Hart, U. S. V. Disch'd June 28, 1865.
500	O'Brian, T., Corp'l, D, 69th New York.	Sept. 17, 19, '62.	Right; flap. Surg. L. Reynolds, 63d N. Y. Disch'd Mar. 4, 1863.
501	O'Brien, J., Pt., E, 188th Pennsylvania, age 26.	May 16, 16, '64.	Right; flap. Disch'd Dec. 23, '64. Insane Asylum 1870.
502	[2]*O'Connor, D.*, Pt., C, Cobb's Legion, age 28.	Sept. 21, 21, '63.	Left; circ. April 14, '64, re-amp. To prison Oct. 4, '64. *Spec.* 2212.
503	O'Keefe, R., Pt., A, 1st Artillery, age 21.	Oct. 7, 7, '64.	Right; flap. Discharged Aug. 28, 1865.
504	*Oliver, D. S.*, Pt., E, 6th Kentucky, age 24.	July 22, 23, '64.	Right; ant. post. flap. To Provost Marshal Dec. 8, 1864.
505	Oliver, J. B., Corp'l, 6th N. Y. Battery, age 21.	May 28, 28, '64.	Left; circ. Surg. A. Wood, 1st Mass. Cav. Disch'd Aug. 18, '64.
506	Orkney, J. A., Corp'l, A, 4th Ohio, age 25.	Aug. 25, 27, '64.	Right; ant. post. flap. Disch'd December 21, 1864.
507	O'Rourke, M., Pt., M, 6th N.Y. H'vy Art., age 23.	May 9, 10, '64.	Left; flap. Disch'd March 16, 1865.
508	Ostrander, C. W., Lieut., C, 122d N. Y., age 31.	May 6, 7, '64.	Right; ant. post. flap. Confed. surgeon. Disch'd March 10, '65.
509	Ostrander, M., Pt., F, 15th N.Y. Cav., age 19.	Nov. 30, 30, '64.	Right; lat. double flap. A. Staff Surg. N. F. Graham. Disch'd August 18, 1865.
510	*Otts, F. M.*, Serg't, B, 31st Miss., age 23.	July 20, 21, '64.	Left; circ. To Provost Marshal April 2, 1865.
511	*Parker, J.*, Lieut., B, 14th Louisiana.	May 19, 20, '64.	Left. Surg. — Dickson, C. S. A. Recovery.
512	Patterson, G. G., Pt., B, 44th Illinois.	Dec. 31, 31, '62.	Left; flap. Discharged March 31, 1863.
513	*Patterson, J. M.*, Pt., K, 50th Alabama, age 34.	July 20, 20, '64.	Left; circular. Furloughed Oct. 18, 1864.
514	Patterson, J. W., Pt., E, 42d Indiana.	Oct. 8, 9, '62.	Right; flap. Surg. J. A. Stillwell, 22d Ind. Disch'd Dec. 17, 1862.
515	*Patterson, T. B.*, Serg't, H, 51st Ala., age 30.	Sept. 19, 19, '64.	Left; flap. Surg. W. S. Love, C.S.A. To prison Jan. 5, 1865.
516	*Patton, J. F.*, Pt., K, 6th Georgia.	Sept. 30, 30, '64.	Right; double flap. Transferred October 8, 1864.
517	Paul, D., Pt., I, 103d Illinois, age 23.	Nov. 25, 25, '63.	Right; flap. Surg. R. Morris, 103d Illinois. Disch'd June 6, 1864. Died June 12, 1870.
518	Payne, M., Corp'l, A, 14th N. Y. H'vy Art'y, age 26.	June 26, 26, '64.	Left; ant. post. flap. Surg. I. V. Mullen, 14th N. Y. H'vy Art'y. Disch'd Dec. 29, 1864.
519	[3]*Peebles, D. P.*, Pt., D, 18th Miss., age 22.	Sept. 17, 19, '62.	Right; post. flap. Discharged November 10, 1862.
520	Penet, J. D., Capt., A, 144th N. York, age 25.	Oct. 30, 30, '64.	Left; circ. A. A. Surg. H. R. Durant. Must. out June 25, '65.
521	Perry, E. J., Corp'l, C, 61st Mass., age 21.	April 2, 3, '65.	Left; flap. Surg. J. H. Kimball, 32d Me. Disch'd July 27, 1865.
522	Peters, J., Pt., K, 1st Kansas.	Sept. 14, 15, '63.	Right; flap. Surg. B. F. Stevenson, 14th Ill. Mustered out June 17, 1864.
523	Peterson, D. M., Pt., M, 2d Mass. Artillery.	Oct. 18, 18, '64.	Left circ. A. A. Surg. J. L. Wade. Disch'd March 30, 1865.
524	Pfeiffer, O., Pt., B, 47th Pennsylvania, age 19.	Aug. 18, 19, '64.	Left; flap. Discharged March 15, 1865.
525	Phelps, H., Pt., K, 11th Vermont, age 20.	Oct. 19, 20, '64.	Right; post. flap. Discharged September 11, 1865.
526	Phelps, M., Pt., F, 10th Illinois, age 35.	Mar. 21, 21, '65.	Left; bilateral flap. Surg. A. B. Monohan, 63d Ohio. Disch'd June 30, 1865.
527	*Pickett, H.*, Pt., G, 27th North Carolina.	Oct. 14, 15, '63.	Right; flap. Confed. surgeon. Recovery.

[1] Brinton (J. H.), *On Amputation at the Knee Joint and at the Knee*, in *American Journal Medical Sciences*, 1868, Vol. LV, p. 319.

[2] Lidell (J. A.), *On the Secondary Traumatic Lesions of Bone, etc.*, in *U. S. Sanitary Commission Memoirs*, Surgical Volume I, p. 459.

[3] Fisher (G. J.), *Report of Fifty-seven Cases of Amputations in the Hospitals near Sharpsburg, Md., etc.*, in *American Journal Medical Sciences*, 1863, Vol. XLV, p. 48.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
528	Pierce, A. J., Corp'l, E, 104th N. York, age 21.	July 1, 2, '63.	Right; flap. Surg. E. G. Chase, 104th N.Y. Disch'd Aug. 9, '64.
529	Pinckney, J., Pt., E, 5th Col'd Troops, age 20.	Mar. 20, 21, '65.	Left; flap. Surg. L. Barnes, 6th C. Troops. Disch'd Oct. 18, '65.
530	*Pleasants, G. S.*, Pt., Page's Virginia Bat'ry, age 19.	July 1, 3, '63.	Right. Exchanged March 17, 1864.
531	Pool, J. D., Pt., I, 148th New York, age 19.	June 18, 18, '64.	Right; circ.; gangrene. Disch'd July 27, 1865.
532	Porus, J., Pt., F, 25th Connecticut.	May 28, 28, '63.	Left. Surg. C. Robertson, 159th N. Y. Disch'd Aug. 26, 1863.
533	Potts, J. G., Pt., B, 14th N. Y. S. M., age 32.	July 1, 2, '63.	Right; flap. Surg. J. M. Farley, 84th N. Y. Disch'd Nov. 28, '63.
534	Pousch, J., Pt., B, 47th Illinois, age 22.	Mar. 31, 31, '65.	Right; flap. Surg. V. B. Kennedy, 5th Minn. Disch'd Feb. 16, 1866.
535	*Powell, K. H.*, Serg't, C, 6th Georgia.	Sept. 7, 9, '64.	——. Surg. — Swann, C. S. A. Recovery.
536	Powers, L. J., Pt., F, 2d Massachusetts.	June 9, 9, '63.	Right. Surg. A. Hard, 8th Ill. Cavalry. Disch'd January 25, 1864. *Spec.* 1219.
537	Presan, H., Pt., I, 1st Maryland Cavalry.	Aug. 16, 16, '64.	Left; flap. Discharged January 15, 1865.
538	Prettyman, J. J., Pt., I, 11th West Va., age 25.	Oct. 19, 20, '64.	Right; ant. post. flap. Mustered out June 17, 1865.
539	*Price, J. T.*, Pt., C, 5th North Carolina, age 26.	Sept. 19, 19, '64.	Left; circ. Surg. I. F. Pearson, 5th N. C. To prison Feb. 25, '65.
540	Priest, A. M., Pt., M, 1st D. C. Cavalry, age 20.	Aug. 25, 25, '64.	Right; flap. Discharged July 21, 1865.
541	Priest, J. T., Pt., B, 36th Massachusetts.	June 3, 3, '64.	Left; flap. Discharged June 17, 1865.
542	Prueller, F., Pt., H, 39th Illinois, age 46.	Oct. 13, 13, '64.	Right. Confed. surgeon. Discharged October 17, 1865.
543	Purman, J. J., Lieut., A, 140th Penn., age 22.	July 2, 3, '63.	Left; flap. Discharged May 23, 1864.
544	*Quinlan, M.*, Pt., E, 14th Louisiana.	July 1, 2, '63.	——. Surg. — White, C. S. A. Recovery.
545	Quinn, J., Pt., D, 12th Infantry, age 19.	May 12, 13, '64.	Right; circular. To regiment June 27, 1864.
546	Quinn, J., Pt., C, 73d Pennsylvania, age 34.	Dec. 16, 16, '64.	Right; ant. post. flap. Disch'd June 28, 1865.
547	Race, J., Pt., B, 194th New York, age 42.	Mar. 22, 22, '65.	Left; circ. A. A. Surg. J. F. Cleveland. Disch'd July 19, 1865.
548	Rackmyer, P. N., Pt., I, 115th N. York, age 21.	Sept. 29, Oct. 1, '64.	Right; ant. post. flap. Confed. surgeon. Disch'd April 6, 1865.
549	Ramaley, L., Pt., F, 139th Pennsylvania, age 20.	Sept. 19, 19, '64.	Right; lat. flap. A. Surg. S. B. Sturdevant, 139th Penn. Disc'd February 10, 1865.
550	Rand, M., Serg't, C, 16th Massachusetts.	July 3, 4, '63.	Left; flap. Surg. C. C. Jewett, 16th Mass. Disc'd April 12, '64.
551	Ranger, G., Pt., I, 122d New York, age 42.	Mar. 25, 25, '65.	Left; ant. post. flap. Discharged July 6, 1865.
552	*Rankin, J. S.*, Pt., Orr's S. C. Rifles.	July 28, 28, '64.	Left; double flap. Surg. ——, Orr's S. C. Rifles.
553	Ranzow, H., Pt., H, 16th Illinois, age 34.	Dec. 13, 13, '64.	Left; flap. Surg. E. Batwell, 14th Mich. Disch'd July 6, 1865.
554	*Ratcliffe, J. R.*, Corp'l, H, 18th La., age 28.	April 13, 13, '63.	Right. Discharged August 22, 1863.
555	Raymond, J. R., Serg't, A, 111th Penn., age 22.	July 20, 20, '64.	Left; flap; gangrene. Disch'd May 22, 1865.
556	Reed, G. R., Pt., I, 18th Massachusetts, age 29.	Dec. 13, 15, '62.	Right. Discharged April 21, '63.
557	Reeve, J. H., Capt., K, 3d New York, age 24.	Jan. 12, 12, '65.	Right; ant. post. flap. Surg. G. C. Jarvis, 7th Conn. Disch'd June 26, 1865. *Spec.* 6934.
558	Resa, F., Pt., B, 3d Iowa, age 29.	Oct. 5, 6, '62.	Right; flap. Discharged April 7, 1863.
559	Reynold, J., Corp'l, D, 12th Conn., age 24.	Sept. 19, 19, '64.	Right; lat. oval flap. Surg. N. S. Snow, 153d N. Y. Discharged March 10, 1865.
560	Reynolds, J., Pt., A, 6th Connecticut, age 24.	May 9, 10, '64.	Left; ant. post. flap. Discharged November 4, 1865.
561	Reynolds, S. H., Serg't, A, 1st Mass. Battery.	Dec. 13, 13, '62.	Right. Discharged June 5, 1863.
562	Rice, C., Pt., D, 87th Indiana, age 33.	Sept. 19, 20, '63.	Left. Discharged April 17, 1864.
563	*Richardson, J. M.*, Capt. and A. A. General.	Sept. 19, 19, '64.	——. Surg. W. T. Sutton, C. S. A. Recovery.
564	Rider, J., Pt., B, 49th New York, age 40.	Aug. 21, 21, '64.	Right; flap. Surg. G. T. Stevens, 77th N. Y. Discharged Dec. 19, 1864. *Spec.* 2460.
565	Riggins, J., Pt., H, 99th Pennsylvania, age 29.	May 12, 12, '64.	Left; flap. Disch'd Sept. 24, '64. Died Aug. 15, '68; consumpt'n.
566	*Roache, F. T.*, Pt., A, 32d Virginia.	Sept. 24, 24, '64.	R't; circ. Surg. W. V. Harrison, C. S. A. Trans. Oct. 26, 1864.
567	Robb, L. A., Corp'l, L, 28th Pennsylvania.	Sept. 17, 17, '62.	Left; circ. Surg. H. E. Goodman, 28th Penn. Dis. Nov. 27, 1862.
568	Roberts, H., Serg't, K, 47th Illinois, age 38.	May 22, 22, '63.	Left; flap. Discharged May 30, 1864.
569	*Robertson, J. F. M.*, Corporal, H, 13th Tenn.	July 1, 2, '63.	——. Surg. — McAden, C. S. A. Recovery.
570	Robinson, B., Serg't, D, 5th Vermont.	June 29, 30, '62.	Right; circ. Surg. W. P. Russell, 5th Vt. Disch'd Oct. 22, 1862.
571	Rode, C., Pt., G, 123d Ohio.	June 13, 14, '63.	Left. Discharged Aug. 26, 1863.
572	Roe, D. W., Pt., E, 69th New York.	Mar. 25, 26, '65.	Right; circ. Discharged Aug. 14, 1865.
573	Rogers, J. H., Pt., D, 125th N. Y., age 35.	May 10, 10, '64.	Left; ant. post. flap. Surg. W. S. Cooper, 125th N. Y. Disch'd June 24, 1865.
574	*Rollston, G. W.*, Capt., H, 9th Ark., age 33.	Dec. 16, 16, '64.	Right; circ. Surg. — Mitchell, 4th Ark. To Provost Marshal March 7, 1865.
575	Ropp, S., Pt., I, 42d Illinois, age 42.	Dec. 16, 16, '64.	Right; ant. post. flap. Disch'd July 6, 1865.
576	Ross, L., Corp'l, C, 39th Ohio, age 30.	July 22, —, '64.	Left. Furloughed Nov. 10, 1864.
577	Ross, L. T., Serg't, A, 81st Illinois.	May 22, 22, '63.	Left; flap. Discharged August 5, 1863.
578	Rowley, R., Pt., G, 29th Wisconsin.	May 1, 2, '63.	Left; flap. Discharged July 16, 1863.
579	Rucker, A., Pt., B, 10th West Virginia, age 35.	Oct. 19, 20, '64.	Left; circular. Discharged May 14, 1865.
580	Rudiger, J., Corp'l, A, 66th N. York, age 24.	July 2, 3, '63.	Right; circ. Surg. C. S. Wood, 66th N. Y. Disch'd Dec. 8, '63.
581	Ryan, S. W., Corp'l, B, 191st Penn., age 20.	May 9, 10, '64.	Left; flap. Surg. B. Rohrer, 10th Penn. Reserves. Disch'd Feb. 16, 1865.
582	Sanborn, J. O., Pt., E, 10th Maine.	Sept. 17, 19, '62.	Right; circular. Disch'd March 23, 1863.
583	*Sanders, C. H.*, Pt., H, 38th Georgia, age 25.	July 1, 2, '63.	Left. Recovered and paroled.
584	Sans Souci, L., Corp'l, E, 5th Minn., age 45.	Dec. 16, 17, '64.	Left; flap. Surg. V. B. Kennedy, 5th Minn. Disch'd April 25, '65.
585	Sargent, C. A., Pt., B, 4th Vermont, age 24.	Dec. 13, 13, '62.	Left. Feb. 7, '63, hæm.; lig. ant. tibial. Disch'd August 25, '63.
586	Sargent, L. N., Pt., G, 9th N. Hamp., age 28.	May 31, 31, '64.	Right. Discharged July 18, '65. *Spec.* 3072.
587	*Sarver, W. J.*, Pt., D, Virginia Artillery.	Aug. 16, 16, '64.	Left; circular.
588	Sawyer, O., Pt., E, 29th Maine, age 33.	Oct. 19, 19, '64.	Left; circ. Surg. J. F. Day, jr., 29th Me. Disch'd May 30, '65.
589	Sayles, H., Serg't, E, 8th Wisconsin.	May 22, 22, '63.	Left; flap. Surg. J. E. Murtha. 8th Wis. Disch'd June 3, 1864.
590	Schaniski, L., Saddler, G, 1st Louisiana Cavalry, age 43.	Nov. 3, 3, '63.	Left; circ. Confederate surgeon. Pieces of necros'd bone remov'd. (Also left little finger shot off.) Disch'd Feb. 1, '64. Died Sept. 20, '70; erysipelas and pyæmia. *Spec.* 4310.
591	Schweitzer, J., Pt., H, 47th N. York, age 35.	Aug. 16, 17, '64.	Right; double flap. Confed. surgeon. Disch'd June 24, 1865.
592	*Scott, J. T.*, Serg't, A, Philips's Georgia Legion, age 21.	July 2, 3, '63.	Right; circular. Retired February 7, 1865.
593	*Seagle, P.*, Serg't, B, 23d N. C., age 27.	Sept. 19, 20, '64.	Left; flap. Surgeon — Atkins, C. S. A. To prison Feb. 16, '65.
594	Seaton, J. A., Pt., B, 13th Iowa.	May 12, 12, '63.	Left; circular. Disch'd October 5, 1863.
595	Secor, E. C., Serg't, H, 61st New York, age 20.	July 3, 4, '63.	Left; flap. Discharged August 24, 1864.
596	Seibert, J., Pt., E, 100th New York.	Aug. 30, 30, '63.	Left; circ. Surg. M. S. Kittenger, 100th N.Y. Disch'd Sept. 22, '64.
597	Seng, T., Pt., A, 41st New Jersey.	July 2, 4, '63.	Left; circular. Discharged May 17, 1864.
598	Shafer, J., Sergeant, K, 198th Penn., age 44.	April 1, 1, '65.	Right; circular. Disch'd June 21, 1865.
599	*Sharp, J. H.*, Pt., F, Cobb's Ga. Legion.	———	Right; circ. Furloughed October 17, 1864.
600	Sharpe, G., Pt., C, 38th Massachusetts, age 27.	Oct. 19, 19, '64.	Right; ant. post. flap. Disch'd March 30, 1865.
601	Shaud, J., Pt., K, 93d Pennsylvania, age 26.	May 31, J'e 2, '62.	Right; ant. post. flap. Disch'd March 9, 1864. *Spec.* 4305.
602	Shears, C. R., Serg't, C, 26th Michigan, age 31.	May 11, 13, '64.	Right; circ. A. A. Surg. D. O. Farrand. Disch'd May 2, 1865.
603	Sherwood, D., Pt., E, 131st New York.	May 27, 27, '63.	Left; flap. Surg. C. Robertson, 159th N. Y. Discharged October 20, 1863.
604	Siemers, H., Pt., B, 39th New York, age 26.	July 3, 4, '63.	Right; flap. Mustered out June 29, 1864. Died Dec. 10, 1867.
605	Skeen, Wm., Pt., G, 87th Pennsylvania, age 21.	April 2, 2, '65.	Left; ant. post. flap. Discharged September 25, 1865.
606	Skinner, J., Pt., E, 5th Connecticut, age 20.	June 22, 23, '64.	Left; circ. Confederate surgeon. Gangrene. Disch'd Aug. 22, '65.
607	Slater, E., Pt., D, 10th Ohio Cavalry, age 31.	Nov. 19, 19, '64.	Right; flap. Surg. M. Hawes, 10th Ohio Cavalry. Disch'd June 18, 1865.
608	*Slaver, H. P.*, Corp'l, E, 36th Virginia.	Aug. 17, 19, '64.	——. Surg. W. S. Love, C. S. A. Retired Feb. 14, 1865.
609	Sloan, W. A., Pt., H, 10th Vermont, age 26.	Sept. 19, 19, '64.	Right; flap. Surg. W. A. Barry, 98th Penn. Disch'd Sept. 11, '65.
610	Small, T., Pt., H, 60th New York, age 19.	Nov. 27, 27, '63.	Left; circ. Vet. Reserve Corps Nov. 19, 1864. Died July 6, 1870; consumption.
611	*Smith, A.*, Pt., G, 18th Georgia.	Aug. 29, 31, '62.	Left. Surg. A. J. Semmes, C. S. A. Recovery.
612	Smith, D. F., Pt., B, 12th New Hamp., age 20.	July 2, 2, '63.	Left; flap. Surg. J. M. Merron, 2d N. H. Discharged March 17, 1864.
613	Smith, E., Pt., G, 45th Pennsylvania, age 26.	June 3, 3, '64.	Left; circ. Surg. T. Christ, 45th Penn. Disch'd July 4, 1865.
614	Smith, G. H., Pt., F, 7th Wisconsin, age 21.	July 1, 2, '63.	Left; flap. Discharged December 22, 1863.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
615	Smith, H., Pt., H, 13th Connecticut, age 34.	April 9, 10, '64.	Right; circ. Disch'd Jan. 30, 1865. Died June 28, 1869.
616	Smith, H. D., Pt., C, 2d Delaware, age 31.	May 3, 3, '63.	Right; flap. Discharged Aug. 10, 1864.
617	[1]*Smith, L.*, Serg't, H. 10th Georgia, age 31.	Sept. 17, 18, '62.	Left; circular; gang. Disch'd March 6, 1863.
618	Smith, T. A., Corp'l, A, 5th Conn., age 21.	Aug. 9, 11, '62.	Right; flap. Surg. W. C. Bennett, 5th Conn. Gangrene. Disch'd July 30, 1863.
619	Smithson, C., Pt., C, 116th Col'd Troops.	Oct. 1, 1, '64.	Left; flap. Surg. D. Mecker, U. S. V. Disch'd May 31, 1865.
620	*Snelling, E. A.*, Pt., Nottaway's Artillery.	June 22, 22, '64.	Left (also right, low. third). Confederate surgeon. Recovery.
621	Snow, E. N., Pt., C, 97th New York.	Sept. 17, —, '62.	Left. Discharged November 30, 1862.
622	Snyder, G., Pt., K, 200th Pennsylvania.	Mar. 25, 25, '65.	Right; flap. Discharged July 4, 1865.
623	Speer, A. C., Lieut., A, 14th Mich., age 30.	July 5, 5, '64.	Right; flap. Surg. E. Batwell, 14th Mich. Disch'd Nov. 1, '64.
624	*Speer, A. C.*, Pt., K, 4th Georgia, age 37.	Mar. 25, 25, '65.	Right; circular. Released June 28, 1865.
625	Spellman, T., Pt., F, 37th Massachusetts, age 21.	Sept. 19, 20, '64.	Left; circ. A. Surg. J. G. Thompson, 77th N. Y. Disch'd Jan. 17, 1866. July 8, '68, re-amputat'n.
626	Spiker, J., Pt., K, 100th Pennsylvania, age 21.	July 11, 11, '64.	Left; flap. Surg. W. C. Shurlock, 51st Penn. Disch'd June 1, '65.
627	*Spivey, A. A.*, Pt., D, 54th North Carolina, age 21.	Aug. 21, 21, '64.	Left; circular. To Provost Marshal October 25, 1864.
628	Sprague, F. E., Pt., A, 26th Mass., age 20.	Sept. 19, 20, '64.	Left; circ. Surg. J. G. Bradt, 26th Mass. Disch'd Nov. 7, 1864.
629	*Springer, F.*, Pt., G, Cobb's Ga. Legion.	Sept. 14, 15, '62.	Left; circular. Furloughed Dec. 19, 1862.
630	Springsteen, W. E., Pt., G, 14th Mich., age 24.	Sept. 1, 1, '64.	Left; flap. Surg. E. Batwell, 14th Mich. Disch'd Aug. 11, 1865.
631	*Stampen, W. H.*, Pt., D, 43d N. Carolina, age 22.	Aug. 21, 21, '64.	Right. Exchanged October 27, 1864.
632	Starr, R. H., Serg't, K, 36th Illinois, age 24.	May 17, 18, '64.	Right; circ. Surg. W. P. Peirce, 88th Ill. Disch'd Jan. 6, 1865.
633	Steece, J., Pt., G, 4th Ohio Cavalry.	Oct. —, —, '62.	Left. Discharged March 12, '63.
634	Steel, S. G., Pt., H, 149th Pennsylvania, age 33.	May 8, 8, '64.	Left; flap. Discharged July 4, 1865.
635	Stever, O., Serg't, A, 96th New York, age 28.	Sept. 29, 29, '64.	Right; long post. flap. A. Surg. H. C. Merryweather, 5th Col'd Troops. Discharged.
636	Stewart, C. W., Pt., D, 4th Maryland, age 18.	May 5, 5, '64.	Left; flap. Discharged May 6, 1865.
637	Stiles, J., Corp'l, D, 27th Kentucky, age 22.	Dec. 14, 14, '63.	Right; flap. Surg. A. Nash, 9th Mich. Cav. Disch'd May 17, '64.
638	Stinebaugh, G. B., Pt., H, 38th Ohio, age 24.	Sept. 1, 1, '64.	Left; flap. Surg. C. N. Fowler, 105th Ohio. Discharged July 14, 1865.
639	*St. Julien, J.*, Pt., C, 8th Louisiana.	May 4, 5, '63.	Right. Surg. — Mammir, C.S.A. Recovery.
640	Stonehouse, S., Pt., H, 27th Michigan, age 31.	June 18, 20, '64.	Left; flap. Surg. H. E. Smith, 27th Mich. Bone rem'd. Disch'd June 8, 1865. *Spec.* 2263.
641	Stratton, J. P., Serg't, D, 31st Indiana, age 22.	Dec. 16, 16, '64.	Left; ant. post. flap. A. A. Surg. T. C. Eakin. Erysipelas. Discharged April 11, 1865.
642	*Strode, C. E.*, Pt., H, 5th Texas Cavalry, age 19.	June 28, 28, '63.	Right; circ. A. Surg. A. Matherson, U. S. N. Bone removed. To prison April 28, 1864.
643	Stubbs, R., Pt., F, 4th Rhode Island, age 25.	Sept. 17, 18, '62.	Left; post. flap. Ass't Surg. C. L. Duffell, 51st Penn. Disch'd Nov. 7, 1863. Re-amputation Sept. 19, 1865.
644	*Sullin, R. C.*, Pt., A, 4th Mississippi.	July 6, 6, '63.	——. Surg. — Redruff, C. S. A. Recovery.
645	Switzer, J. C., Pt., A, 22d Iowa.	Sept. 19, 21, '64.	Right; circ. Ass't Surg. W. G. Bryant, 122d Ohio. Disch'd October 4, 1865.
646	*Sykes, A.*, Pt., B, 6th Alabama.	June 2, 2, '64.	——. Ass't Surg. — Weatherly, P. A. C. S. Recovery.
647	Tait, G. F., Captain, B, 10th New York.	May 6, 6, '64.	Left; circ. Surg. B. Gesner, 10th N. Y. Disch'd Aug. 16, 1864.
648	Taylor, M. A., Corp'l, D, 13th New Hampshire, age 40.	Dec. 13, 14, '62.	Right; ant. post. flap. Surg. C. Gray, 7th N. Y. Disch'd June 8, 1864. *Spec.* 6700.
649	Taylor, T., Pt., G, 155th Pennsylvania, age 22.	Sept. 30, 30, '64.	Right; ant. post. flap. Surg. J. A. E. Reed, 155th Penn. Discharged June 8, 1865.
650	*Terrell, J. J.*, Lieut., I. 1st North Carolina.	July 1, 1, '62.	——. Surg. — Manson, C. S. A. Recovery.
651	Thomas, A., Seaman, U. S. Gunboat Choctaw, age 26.	Aug. 20, 20, '64.	Left. Recovery March 7, 1865.
652	Thomas, F., Pt., I, 7th Ohio Cavalry, age 40.	Dec. 15, 16, '64.	Left; circular. A. A. Surg. J. H. McIntyre. Disch'd May 17, '65.
653	*Thomas, H.*, Pt., K, 13th Georgia, age 18.	April 29, 29, '63.	Left. Surg. J. Ebersole, 19th Indiana. Exch'd June 25, 1863.
654	Thompson, C. H., Pt., C, 18th Massachusetts.	Dec. 13, 14, '62.	Left; circular. Discharged September 18, 1863.
655	Thurber, F. N., Pt., H, 3d New Hampshire.	June 16, 16, '62.	Left. Discharged September 9, 1862.
656	Tilbe, R., Corp'l, E, 17th Connecticut, age 24.	Aug. 21, 21, '63.	Right; ant. post. flap. A. Surg. C. Mudge, 1st N. York Engineers. Disch'd July 2, 1864.
657	Tillson, W. F., Lieut., G, 4th Vermont, age 22.	April 2, 2, '65.	Right; necrosed bone removed. Mustered out Sept. 28, 1865.
658	*Todd, J.*, Pt., C, 43d N. Carolina, age 38.	Aug. 21, 21, '64.	Right; circ. Surg. W. T. Brewer, 43d N. C. Trans. Jan. 8, 1865.
659	Traurnicht, H., Pt., E, 2d Missouri.	Oct. 8, 8, '62.	Left; circ. Surg. C. Spinzig, 2d Mo. Disch'd Dec. 17, 1864.
660	Trindle, J., Pt., K, 56th Massachusetts, age 22.	July 21, 21, '64.	Left; flap. Discharged August 23, 1865.
661	Tripp, E., Corp'l, I, 140th New York, age 28.	June 18, 18, '64.	Right; flap. Surg. T. M. Flandrean, 146th N. Y. Hæmorrhage. Disch'd June 24, 1865.
662	Trisket, A. J., Pt., E, 1st Michigan, age 30.	June 12, 12, '64.	Right; flap. Surgeon — Wier, C. S. A. Disch'd Sept. 8, 1865.
663	Troy, B. F., Pt., G, 10th Iowa.	May 16, 16, '63.	Left (amp. right, upper third). Discharged Sept. 3, 1863.
664	[2]*Tucker, W.*, Pt., K, 13th Mississippi, age 21.	Sept. 17, 17, '62.	Left; flap. Surg. J. T. Gilmore, C. S. A. Retired Jan. 31, 1865.
665	*Tyson, J. H.*, Pt., H, 51st North Carolina, age 22.	Sept. 30, 30, '64.	Left. Released July 26, 1865.
666	Urieh, C., Pt., E, 45th New York, age 20.	July 1, 2, '63.	Left; post. flap. Disch'd April 2, 1864. Died June 12, 1870. *Spec.* 4307.
667	Utz, C. E., Pt., 5th Ohio Battery.	July 12, 12, '63.	Left. Surg. W. S. Edgar, 32d Illinois. Discharged.
668	Valentine, L. W., Pt., H, 6th Maine.	May 3, 5, '63.	Left; double flap. Surg. F. S. Holmes, 6th Me. Hæmorrhage. Disch'd October 27, 1863.
669	Van Doozer, B. S., Pt., B, 58th Illinois, age 19.	April 9, 9, '65.	Right; circ. Discharged July 6, 1865.
670	Van Kirk, J., Pt., C, 1st Penn. Cavalry, age 23.	May 28, 28, '64.	Left; ant. post. flap. A. A. Surg. W. H. True. M. O. Sept. 9, '64.
671	*Vann, L.*, Pt., A, 11th Florida.	Sept. 17, 18, '64.	——. Surg. — Bacon, C. S. A. Recovery.
672	Van Ness, J., Pt., C, 43d New York, age 20.	Oct. 19, 19, '64.	Left; double flap. Surg. G. T. Stevens, 77th N. Y. Gangrene. Disch'd May 16, 1865.
673	Verner, W., Landsman, U.S.S. Hartford, age 20.	Aug. 5, 5, '64.	Right. Surg. J. C. Palmer, U. S. Navy. Disch'd May 5, 1865.
674	*Vick, E. C.*, Pt., E, 7th North Carolina.	Nov. 14, 14, '62.	——. Retired February 11, 1865.
675	Waber, W., Pt., C, 44th Illinois.	Dec. 31, '62, Jan. 1, '63.	Left; flap. Discharged May 19, 1863.
676	Wade, G. B., Pt., G, 13th Missouri.	April 6, 6, '62.	Right; flap. Discharged Aug. 21, 1862.
677	Wagner, G., Pt., D, Independent Battalion New York Vols.	Sept. 9, 9, '63.	Right; lat. flap. Surg. S. W. Gross, U. S. V. Disch'd June 23, 1864.
678	Walcott, W. H., Lieut., B, 17th Infantry.	July 3, 3, '63.	Left. Ass't Surg. J. S. Billings, U. S. A. Re-amputation. Retired January 7, 1865.
679	Walker, F., Pt., F, 24th Michigan, age 24.	Oct. 7, 7, '64.	Right. Duty Feb. 10, 1865.
680	Walker, J., Pt., B, 8th New York Heavy Artillery, age 19.	June 3, 4, '64.	Left; long post., short ant. flap. Surg. C. H. Pegg, 8th N. York, H. A. Disch'd Sept. 14, 1865.
681	Wallingford, G., Pt., G, 17th Maine, age 46.	May 6, 7, '64.	Right; ant. post. flap. Confed. surgeon. Disch'd Nov. 29, 1864.
682	Walsh, J., Pt., A, 64th New York, age 42.	May 12, 13, '64.	Right; lat. flap. Surg. C. T. Kelsey, 64th N. Y. Disch'd July 30, 1865.
683	Walsh, J., Corp'l, K, 37th Massachusetts, age 24.	April 2, 2, '65.	Right; circ. Surg. E. M. White, 37th Mass. Disch'd Sept. 12, '65.
684	Wandrey, A., Serg't, K, 2d Wisconsin, age 25.	July 1, 3, '63.	Right; circ. Ass't Surg. P. S. Arndt, 2d Wis. Dis. April 1, '64.
685	Ward, J., Pt., C, 88th Pennsylvania, age 25.	Aug. 29, 30, '62.	Left; ant. post. flap. Surg. J. S. Jemison, 86th N. Y. Disch'd September 29, 1863.
686	Warden, W. H., Serg't, F, 76th Illinois, age 22.	April 9, 9, '65.	Left; double lateral flap. Discharged June 24, 1865.
687	Warford, S. J., Pt., B, 8th Kentucky, age 24.	Jan. 2, 2, '63.	Left; flap. Discharged November 16, 1863.
688	Warner, J. T., Corp'l, K, 118th N. York, age 22.	Sept. 30, 30, '64.	Left; ant. post. flap. Discharged September 12, 1865.
689	Warwick, N., Pt., B, 13th Infantry.	May 18, 20, '63.	Left; flap. Discharged.
690	Watson, W., Pt., M, 2d Artillery, age 27.	June 11, 11, '64.	Left; circular. Disch'd March 18, 1865.
691	Weatherlow, S., Serg't, I, 126th N. Y., age 25.	July 4, 4, '63.	Right. Discharged December 25, 1864.
692	*Weaver, T.*, Pt., H, 66th Georgia, age 25.	Nov. 30, Dec. 1, '64.	Right; circ. To Provost Marshal March 7, 1865.
693	Weber, W., Pt., K, 2d New York Heavy Artillery, age 22.	June 10, 11, '64.	Right; circ. Surg. J. W. Wishart, 140th Penn. Discharged December 9, 1864.
694	Wells, H. W., Serg't, H, 16th Maine, age 26.	Dec. 13, 14, '62.	Right. Discharged May 3, 1864.
695	Welsh, M., Pt., E, 162d New York.	July 27, 27, '64.	Right; lat. flap. Disch'd Oct. 21, 1865. Re-amputation.

[1] Fisher (G. J.), *Report of Fifty-seven Cases of Amputations, in the Hospitals near Sharpsburg, Md., after the battle of Antietam*, in *American Journal Medical Sciences*, 1863, Vol. XLV, p. 48.

[2] Fisher (G. J.), *loc. cit.*, p. 48.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
696	Welsh, M., Pt., H, 49th Pennsylvania, age 20.	May 10, 11, '64.	Right; circular. Disch'd January 22, 1865.
697	Welsh, P., Pt., C, 34th Ohio, age 27.	June 18, 18, '64.	Right; flap. Discharged April 1, 1865.
698	West, G. F., Pt., I, 5th Wisconsin, age 18.	April 2, 2, '65.	Left; circ. Discharged July 12, 1865.
699	Westbrook, J., Pt., A, 104th New York.	Sept. 17, 17, '62.	Right; ant. post. flap. Disch'd December 26, 1862.
700	*Wester, A. H.*, Pt.,I, 30th North Carolina, age 24.	July 3, 3, '63.	Right. Surg. G. W. Briggs, 30th N. C. Paroled Nov. 25, 1863.
701	Wheeler, C., Pt., I, 4th Colored Troops.	Feb. 11, 11, '65.	Right; circular. Disch'd July 25, 1865.
702	Wheeler, E. H., Pt., G, 17th Maine, age 22.	May 3, 3, '63.	Left. Surg. N. A. Hursam, 17th Maine. Disch'd Dec. 16, 1863.
703	Wheeler, H.,Pt.,D,125th New York, age 22.	July 2, 3, '63.	Right; flap. Surg.W. S. Cooper, 125th N. Y. Dis. June 20, 1864.
704	Whitcomb, W. W.,Corp., C, 11th Mass., age 21.	July 2, 4, '63.	Right; circ. Surg. H. B. Fowler, 12th N. H. Disch'd Nov. 21, '63.
705	*Whitlock, O. J.*, Pt., B, 44th Virginia.	May 3, 4, '63.	——. Surg. P. F. Whitehead, P. A. C. S. Retired Dec. 28, '64.
706	Whitman, F. M., Pt., G, 35th Mass., age 25.	May 18, —, '64.	Right; ant. post. flap. Surg. T. F. Oakes, 56th Mass. Disch'd Dec. 15, 1864. Re-amputation.
707	Wicks, W., Pt., H, 8th New Jersey, age 23.	Oct. 27, 29, '64.	Right; circular. Disch'd Sept. 23, 1865.
708	Wierman, J. H., Pt., A, 69th Indiana, age 24.	April 9, 9, '65.	Left; circ. Surg.W. A. Babcock, 76th Ill. Disch'd June 5, 1865.
709	Wilburn, J. M., Pt., D, 63d Indiana, age 23.	May 14, 15, 64.	Left; flap. Surgs. B. G. Pierce, 96th Ill., and H. E. Hasse, 24th Wis. Disch'd Nov. 21, 1864.
710	Wiley, W. C., Pt., E, 70th New York.	July 3, 3, '63.	Left; flap. Surg. J. Ash, 70th N. Y. Discharged.
711	*Wilkinson, J. A.*, Serg't, F, 23d Virginia.	Aug. 25, 25, '64.	——. Surg. C. C. Henkel, C. S. A. Retired December 30, 1864.
712	Williams, J., Pt., B, 5th Penn. Reserves, age 24.	May 8, 8, '64.	Right; circ. Surg. B. Rohrer, 10th Penn. Res. Disch'd June 8, 1865. *Spec.* 2969.
713	*Williams, J. H.*, Pt., I, 2d Kentucky.	Aug. 5, 5, '62.	Left. Surg. — Patton, C. S. A. Recovery.
714	Williams, R. W., Serg't, I, 57th Mass., age 22.	Mar. 25, 25, '65.	Right; circ. A. Surg. S. Adams, U. S. A. Disch'd Oct. 30, 1865. *Spec.* 4028.
715	Williams, T., Serg't, K, 5th Illinois Cavalry.	June 4, 5, '63.	Right; flap. Surg. J. B. Ensey, 5th Ill. Cav. Dis. Aug. 11, '63.
716	Williams, T., Pt., E, 17th Col'd Troops, age 25.	Dec. 14, 15, '64.	Right; flap. Surg. P. H. Clemons, 17th Col'd Troops. Mustered out May 31, 1865.
717	*Williams, T. G.*, Pt., I, 23d North Carolina.	July 2, 3, '63.	Left. Paroled September 25, '63.
718	Willis, F. J., Serg't, A, 51st New York, age 24.	July 30, 30, '64.	Right; circ. Surg. L. W. Bliss, 51st N. Y. Disch'd Mar. 1, '65.
719	Willis, N. J., Pt., D, 15th N.Y. Hv'y Art., age 19.	May 20, 20, '64.	Left; circular. Discharged December 30, 1864.
720	*Wilson, W. L.*, Lieut., H, 15th Alabama.	Nov. 25, 26, '63.	Left. Surg. — Gunnal, C. S. A. Recovery.
721	Wilson, W. P., Serg't, F, 19th Indiana, age 35.	July 1, 2, '63.	Left; flap. A. Surg. P. S. Arndt, 2d Wis. Disch'd Dec. 13, 1863.
722	Wilson, W. W., Serg't, G, 66th Ohio.	June 9, 10, '62.	Right; flap. Confed. surgeon. Disch'd Jan. 6, 1863.
723	Winus, T., Pt., A, 4th N. Y. H'vy Art., age 20.	Aug. 23, 24, '64.	Left; flap. Surg. G. L. Potter. 145th Penn. Dis. June 16, '65.
721	Wood, E. R., Pt., B, 18th Connecticut.	June 17, 18, '64.	Right. Surg. L. Holbrook, 18th Conn. July 29, amput'n thigh. Discharged May 4, 1865.
725	Wood, G., Pt., D, 33d Ohio, age 25.	Mar. 19, 20, '65.	Left; circ. Confederate surgeon. Discharged July 31, 1865.
726	Wood, M., Serg't, C, 11th Vermont, age 19.	Sept. 19, 19, '64.	Left; double flap. Surg. C. B. Park, jr., 11th Vermont. Disc'd July 6, 1865.
727	Woodruff, S. B., Serg't, F, 20th Ky., age 21.	Aug. 10, 10, '64.	Left; circ. Surg. J. C. Welch, 20th Ky. Disch'd Mar. 10, '65.
728	Woodward, W., Pt., B, 116th New York.	Oct. 19, 20, '64.	Left; circular. Discharged June 6, 1865.
729	Workman, H., Pt., E, 83d Ohio, age 18.	Jan. 11, 11, '63.	Left; circ. Surg. J. Pomerene, 42d Ohio. Disch'd Dec. 17, '64.
730	Wright, E. C., Corp'l, H, 21st N. Jersey, age 19.	May 3, 3, '63.	Right; posterior flap. Surg. D. McNeill, 21st N. J. Disch'd June 13, 1863. Amp. knee joint.
731	Wunderlin, J. E., Pt., C, 33d New York, age 27.	May 3, 5, '63.	Left; flap. Mustered out April 1, 1864.
732	Yaeger, W., Pt., B, 26th Wisconsin, age 24.	May 14, 14, '64.	Left; flap. Surg. I. W. Hastings, 33d Mass. Bone rem. Disch'd.
733	Yoder, N. W., Lieut., A, 51st Ohio.	Jan. 2, —, '63.	Left. Discharged July 30, 1863. Drowned March 9, 1877.
734	York, J. C., Pt., C, 94th New York, age 28.	Aug. 19, 20, '64.	Right; circ. Discharged March 17, 1865.
735	Zibble, A. H., Pt., L, 7th Mich. Cavalry, age 18.	July 10, 10, '64.	Right; circ. Confed. surgeon. Discharged May 19, 1865.
736	Zwicker, E., Pt., B, 7th Ohio.	Aug. 9, 11, '62.	Right; double flap. Discharged October 27, 1862.
737	Alcock, A. O., Pt., C, 16th New York, age 41.	May 10, 10, '64.	Left. Died June 16, 1864.
738	Aldrich, J., Corp'l, F, 188th N. York, age 43.	Feb. 6, 6, '65.	Left; double flap. Died March 2, 1865; pyæmia.
739	Anderson, D., Corp'l, H, 7th Maryland, age 41.	Aug. 21, 21, '64.	Right (also amp. left leg, lower third). Died Oct. 1, 1864.
740	Armstrong, J. G., Pt., G, 8th Michigan.	Nov. 29, 29, '63.	Right. Surg. J. P. Prince, 36th Mass. Died Dec. 27, 1863.
741	Austin, E. B., Pt., A, 111th Ohio.	May 14, 14, '64.	Right. Died June 30, 1864; pyæmia.
742	Axtelle, F. H., Pt., B, 34th Massachusetts.	June 5, 6, '64.	——; circular. Died July 21, 1864; pyæmia.
743	Bailey, S. G., Lieut., H, 5th Maine, age 29.	May 3, 3, '63.	Right. Died May 30, 1863; pyæmia.
744	Bailey, S. W., Serg't, I, 2d Vermont, age 31.	Sept. 19, 20, '64.	Right; flap. Surg. G. T. Stevens, 77th N. Y. Died October 21, 1864; diphtheria.
745	Ballard, J., Pt., G, 143d Pennsylvania.	May 5, 5, '64.	Right. Surg. H. F. Lyster, 5th Michigan. Died May 16, 1864.
746	*Bammond, C.*, Pt., Carter's 1st Virginia Battery, age 38.	May 14, 14, '64.	Right. Surg. H. F. Lyster, 5th Michigan. Died May 26, 1864.
747	*Barnes, B. J.*, Pt., E, 10th South Carolina.	July 22, —, '64.	Left. Surg. M. W. Robbins, 4th Iowa. Died July 30, 1864.
748	Binger, L., Pt., E, 5th Kentucky.	Nov. 25, 26, '63.	Right; circular; gangrene. Died December 17, 1863.
749	Bohrer, C., Pt., G, 107th Ohio.	July 1, —, '63.	Right. Died July 16, 1863.
750	Bradley, J., Pt., K, 1st Mass. H'vy Art., age 33.	May 19, 19, '64.	Left. Died June 22, 1864.
751	Brongher, S. H., Serg't, C, 142d Penn., age 20.	May 5, 5, '64.	Right; ant. post. flap. Surg. L. Holt, C. S. A. Died April 4, 1865; pleurisy.
752	Bruce, L. H. C., Corp'l, K, 14th Iowa.	May 18, 18, '64.	Right; circ. Surg. C. Powers, 160th N. Y. (Also wound of thigh.) Died June 14, 1864.
753	Brugart, C., Lieut., I, 26th Wisconsin.	July 1, —, '63.	Right. Died July 16, 1863.
754	Burdett, C., Corp'l, H, 2d Massachusetts.	July 3, 4, '63.	Left; circular. Died July 26, 1863.
755	Burns, F., Pt., H, 88th New York.	June 19, —, '64.	Left. Surg. P. E. Hubon, 28th Mass. Died June 26, 1864; typhoid fever.
756	Carter, C., Pt., G, 61st Col'd Troops, age 40.	July 15, 15, '64.	Right; circ.; erysipelas; gang. Died Aug. 5, 1864; gangrene.
757	Cassidy, L., Pt., H, 16th Kentucky.	June 17, 17, '64.	Right. Surg. J. T. Kimbly, 11th Kentucky. Died June 17, 1864.
758	*Chapel, G.*, Pt., B, 6th Virginia, age 19.	———	Left; ant. post. flap. Died May 27, 1864; prostration.
759	Clevantine, J., Serg't, F, 150th Pennsylvania.	June 3, 3, '64.	——. Died June 12, 1864.
760	Colcord, C. E., Serg't, C, 4th N. Hamp., age 26.	May 16, 16, '64.	Left. Died June 27, '64; tetanus.
761 762	*Cooksey, A. J.*, Pt., D, 3d Miss., age 35.	Dec. 15, 16, '64.	Both; circ. Died Jan. 2, 1865; exhaustion from sloughing.
763	Cork, I., Serg't, C, 4th Col'd Troops, age 25.	Sept. 29, 29, '64.	Left; flap. Died October 1, 1864.
764	Craig, J. S., Pt., H, 14th Indiana.	Dec. 13, 13, '62.	Right. Died January 6, 1863.
765	Crumley, H. W., Corp'l, D, 110th Ohio, age 20.	July 18, 18, '64.	Left. Died July 28, '64; tetanus.
766	Curran, G., Pt., I, 124th New York, age 33.	July 29, 29, '64.	Left; ant. post. flap; gangrene. Died Aug. 26, 1864; exhaust'n.
767	*Curry, D.*, Pt., K, 6th Louisiana.	July 9, 11, '64.	Right; circ. Surg. C. H. Todd, C. S. A. Died July 16, 1864.
768	Curtis, J., Pt., C, 28th Massachusetts, age 26.	May 10, 11, '64.	Left; flap. Surg. P. E. Hubon, 28th Mass. Died May 17, 1864.
769	Day, J. E., Lieut., K, 3d West Virginia.	Aug. 28, 28, '62.	Left. Surg. R. W. Hazlett, 5th West Virginia Cavalry. Died Sept. 27, 1862; pyæmia.
770	Deneza, C., Pt., L, 5th Mo. Mil. Cav., age 30.	Oct. 23, 23, '64.	Left. Died Nov. 10, 1864; gangrene.
771	*Drain, J. F.*, Pt., A, 53d Virginia, age 26.	July 2, 4, '63.	Left. Oct. 1, hæm.: 9th, amp. thigh. Died Nov. 5, 1863; exhaustion. *Specs.* 1963, 1975.
772	Durkin, J. W., Pt., F, 120th N. York, age 35.	Mar. 31, 31, '65.	Left; gangrene. Died April 25, 1865.
773	*Edwards, R. T.*, Serg't, E, 19th S. Carolina.	——, '64, Primary.	Right. Died.
774	Elmer, A., Pt., F, 1st New York Cavalry.	Mar. 31, 31, '65.	——. Died May 14, 1865.
775	Emerson, C. A., Pt., H, 97th Ohio.	June 27, 27, '64.	Right. Died July 18, 1864.
776	Farman, D., Corp'l, H, 155th Penn., age 23.	Aug. 16, 16, '64.	Right. Died October 16, 1864; exhaustion.
777	Fisher, G., Pt., D, 24th N. Y. Cavalry, age 44.	May 18, 19, '64.	Right. Died July 14, 1864; exhaustion.
778	Folkarts, J., Pt., K, 5th Michigan, age 50.	July 2, 3, '63.	Right. Died September 5, 1863; exhaustion.
779	French, D. H., Serg't, E, 34th Mass., age 24.	Oct. 13, 14, '64.	Right; ant. post. flap. Died Nov. 13, 1864; exhaustion.
780	Gibson, C. O., Pt., H, 4th Vermont, age 31.	Oct. 19, 19, '64.	Right. Died November 26, 1864; diphtheria.
781	Ginnicker, C. B., Lieut., D, 9th Mass., age 27.	May 5, —, '64.	Right. Died June 9, 1864.
782	Givens, S., Pt., A, 9th Col'd Troops, age 28.	Sept. 29, 29, '64.	Left. Died October 21, 1864; exhaustion.
783	Goodrich, M. B., Lieut., H, 93d Penn., age 25.	May 5, 5, '64.	Left; flap. Died June 14, 1864; pyæmia.
784	Goudy, C. W. C., Pt., D, 1st Mass. H. A., age 22.	May 19, 19, '64.	Right; gangrenous. Died May 24, 1864.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
785	*Gray, J. C.*, Pt., B, 10th Texas, age 20.	July 22, 24, '64.	Right; ant. posterior flap. Died March 13, 1865.
786	Green, M., Pt., B, 2d Michigan, age 20.	June 17, 17, '64.	Right. Surg. S. S. French, 20th Mich. Died July 2, 1864; irritative fever.
787	Greene, W. P., Lieut., A, 14th West Virginia.	Sept. 22, 23, '64.	Left; circ. Died Oct. 31, 1864; irritative fever.
788	Hatch, A., Serg't, A, 7th Connecticut, age 22.	Aug. 16, 16, '64.	R't. Surg. G. C. Jarvis, 7th Conn. Died Sept. 9, 1864; exhaust'n.
789	Hatch, T., Pt., D, 1st Me. Heavy Art'y, age 45.	June 19, 19, '64.	Right; flap; pyæmia. Died July 13, 1864; exhaustion.
790	Haynes, H., Pt., C, 14th Infantry, age 19.	May 24, 25, '64.	Left; circular. Died August 20, 1864.
791	Hayward, J. W., Pt., A, 9th C. Troops, age 25.	Sept. 29, 30, '64.	Right. Died October 31, 1864; tetanus.
792	Hella, C., Pt., B, 121st Pennsylvania.	Dec. 13, 13, '62.	Left. Died March 5, 1863; gangrene.
793	*Hewlett, J.*, Pt., E, 30th Virginia.	Mar. 25, 25, '65.	Right. Died April 25, 1865.
794	Hobart, C. J., Pt., I, 27th New York.	Sept. 14, 15, '62.	Right; circular; slough. Died October 28, 1862; pleur. eff'n.
795	Hollanbeck, S., Corp'l, D, 52d N. Y., age 28.	Aug. 15, 16, '64.	Left; flap. Died September 7, 1864.
796	Hopkins, S. M., Lieut., I. 12th Rhode Island.	Dec. 13, 13, '62.	Left; flap. Died December 26, 1862.
797	Irwin, D., Pt., G, 1st Md. Cavalry, age 21.	Aug. 16, 16, '64.	Left. Died September 1, 1864; mortification.
798	Irwin, T., Pt., C, 14th New Jersey, age 20.	May 10, 10, '64.	Right; circular. Died June 10, 1864; gangrene.
799	Jacobson, F., Pt., C, 11th Connecticut, age 18.	June 18, 18, '64.	Right; circ.; gangrene. Aug. 20, re-amp. thigh; gangrene; hæm. Died August 26, 1864.
800	Job, J., Pt., M, 2d New York Artillery.	June 16, 16, '64.	Right. Surg. J. W. Wishart, 140th Penn. Died July 11, 1864.
801	*Johnson, J. W.*, Pt., H, 19th Arkansas, age 25.	Nov. 30, Dec. 1, '64.	Right; circ. Surg. — Ruskin, C. S. A. Died May 27, 1865.
802	*Johnson, M. B.*, Pt., G, 16th Georgia.	Sept. 14, 16, '62.	——. Died October 7, 1862.
803	Jones, L., Pt., D, 58th Massachusetts, age 45.	June 3, 3, '64.	Right; flap. Died July 1, 1864.
804	Jullivett, N., Pt., D, 98th New York, age 19.	Sept. 29, 30, '64.	Right (also amp. arm). Surg. J. A. Bigelow, 8th Conn. Died October 9, 1864; exhaustion.
805	Kirk, A., Pt., K, 95th New York.	May 12, 12, '64.	Left; circular. Died May 31, 1864; exhaustion.
806	Klock, M., Pt., B, 9th Minnesota, age 51.	Dec. 16, 16, '64.	Right; ant. post. flap; sloughing. Died Dec. 29, '64; irrita. fever.
807	Korff, C., Corp'l, B, 6th Indiana.	Dec. 4. 4, '64.	Left; ant. post. flap. A. A. Surg. J. E. Patterson. Died December 11, 1864.
808	Kruppel, L., Corp'l, D, 40th New York, age 37.	June 17, 17, '64.	Left. Died June 24, '64; pyæmia.
809	Larabee, J., Pt., E, 75th Ohio, age 19.	July 1, 1, '63.	Left; hæm.; lig. femoral. Died August 20, 1863; pneumonia.
810	LaRose, C., Corp'l, H, 93d New York, age 27.	May 5. 6, '64.	Left. Died May 30, 1864.
811	Lee, T., Pt., E, 43d New York, age 45.	July 12, 12, '64.	Right; circ. A. A. Surg. M. F. Price. Died Nov. 14, 1864.
812	Levan, G. W., Pt., C, 131st Pennsylvania.	Dec. 13, —, '62.	Right. Died.
813	Lewis, N., Lieut., C, 114th New York.	Oct. 19, 19, '64.	Right; sloughing. Died Nov. 30, 1864; pyæmia.
814	Lewzader, W., Pt., B, 9th Indiana, age 24.	June 15, 15, '64.	Left; gangrene. Died July 4, 1864.
815	*Livingstone, L. A.*, Capt., F, 8th Alabama, age 23.	July 2, 3, '63.	Left; erysip. July 14, amp. thigh: hæm. Aug. 4, three ins. bone removed. Died Sept. 27, 1863; erysipelas; hæmorrhage.
816	Long, O., Pt., G, 49th Pennsylvania.	Sept. 19, 19, '64.	Left; flap. Died October 6, 1864; exhaustion.
817	Longe, J., Pt., L, 11th Vermont, age 18.	June 1, 2, '64.	Right. Died September 2, 1864.
818	Lozo, J., Corp'l, B, 21st Michigan, age 22.	Mar. 19, 19, '65.	Right. Died May 18, 1865; pyæmia.
819	Magner, E., Pt., I, 69th New York.	Sept. 17, —, '62.	——. Died October 29, 1862.
820	*Mann, B. H.*, Lieut., I. 59th Virginia, age 44.	May 20, 20, '64.	Right. Died May 24, 1864; exhaustion.
821	Manny, D., Pt., 7th New York Battery, age 24.	June 28, 28, '64.	Left; sloughed. Died July 24, 1864.
822	Marshall, B. F., Pt., A, 1st N. Hampshire H'vy Artillery.	Sept. 14, 14, '64.	Right; Teal's method. Surg. R. B. Bontecou, U. S. V. (Also wound of thigh, fract. left foot.) Hæmorrh. Died Sept. 14, 1864; exhaustion. *Spec.* 3245.
823	McCarthy, D., Corp'l, C, 26th Massachusetts.	Sept. 19, 19, '64.	Left; circular. Died October 7, 1864.
824	McClure, D., Pt., D, 28th Colored Troops.	July 30, 30, '64.	Right; flap. Surg. D. MacKay, 29th Col'd Troops. Died July 30, 1864.
825	*McCullough, L.*, Corp'l, H, 31st Miss., age 19.	July 20, 21, '64.	Left; circ. Died Feb. 26, 1865; chronic diarrhœa.
826	McDermott, E., Pt., H, 7th N. Y. H. Art., age 48.	June 20, 20, '64.	Left; circular. Died June 27, 1864; exhaustion.
827	McEntyre, D., Pt., B, 100th N. Y., age 22.	May 15, 15, '64.	Right; single post. flap. Gang. Died July 20, 1864.
828	McLane, W., Pt., D, 69th Pennsylvania.	May 12, 12, '64.	Right. Died May 26, 1864; pyæmia.
829	Mecham, J. E., Corp'l, H, 114th Ill., age 20.	Dec. 15, 15, '64.	Right; flap. Died January 16, 1865.
830	*Mills, A.*, Pt., K, 6th Mississippi, age 24.	Nov. 30, Dec. 1, '64.	Right; ant. post. flap. Surg. — Wayles, C. S. A. Died May 13, 1865; exhaustion.
831	Modlin, J. H., Serg't, C. 36th Indiana, age 24.	May 30, 30, '64.	Right. Surg. S. H. Kersey, 36th Indiana. Died July 23, 1864; chronic diarrhœa.
832	Moore, A. J., Pt., D, 50th Pennsylvania.	May 10, 10, '64.	Left (also flesh wound right leg). Died May 13, 1864.
833	Morris, W. F., Pt., A, 116th Illinois.	July 22, 22, '64.	Right; circ. A. Surg. C. B. Richards. 30th Ohio. Erysipelas. Died August 5, 1864.
834	Munn, W., Pt., I, 27th Michigan, age 31.	May 10, 10, '64.	Right; circ.; gangrene. Sept. 20, amp. thigh. Died Oct. 4, 1864; exhaustion. *Spec.* 3330.
835	Nason, H., Pt., C, 1st Rhode Island Artil'ry, age 38.	Nov. 30, Dec. 2, '63.	Left; flap (also amp. right leg, lower third). Died December 21, 1863; pyæmia.
836	Neff, J., Pt., K, 10th Massachusetts, age 27.	May 10, 10, '64.	Left; flap. Died May 28, 1864.
837	Noe, A. W., Pt., E, 13th Illinois.	Nov. 27, 27, '63.	Left. Surg. S. C. Plummer, 13th Illinois. Died Dec. 19, 1863.
838	Nolan, R., Pt., B, 12th Col'd Troops, age 24.	Dec. 15, 17, '64.	Left. A. A. Surg. J. S. Giltner. Died Dec. 30, 1864; gangrene.
839	*Page, J. C.*, Serg't, H, 15th Miss., age 25.	Nov. 30, Dec. 2, '64.	Left; circular; gangrene. Died March 26, 1865; pneumonia.
840	Park, A. G., Pt., K, 11th West Virginia.	Sept. 19, 19, '64.	Left. Died October 23, 1864.
841	*Pierson, W. C.*, Pt., F, 14th Texas, age 25.	Dec. 16, 16, '64.	Right; circular. Died February 11, 1865; exhaustion.
842	[1]*Powell, W. H.*, Pt., I, 3d South Carolina, age 20.	Sept. 17, 18. '62.	Right; flap; slough.; necrosis. Nov. 30, amp. thigh. Died May 2, 1863; exhaust'n. *Specs.* 3962, 795, 3837.
843	Preston, J. A., Serg't, A, 1st Mich. Cav., age 32.	May 11, 11, '64.	Right; flap. Died August 20, 1864.
844	Pyles, W. H., Pt., H, 11th West Virginia, age 32.	Aug. 4, 5, '64.	Left; circ. sect. skin and muscles. A. A. Surg. W. B. Crain. Erysipelas. Died August 11, 1864.
845	Queen, G., Pt., E, 1st Col'd Troops, age 20.	Aug. 17, 17, '64.	Left. Died September 11, 1864; exhaustion.
846	*Quin, J.*, Pt., A, Austin's Sharpshooters, age 30.	Dec. 30, '62, Jan. 1, '63.	Left. Surg. E. Swift, U. S. A. Hæm. Died January 8, 1863.
847	Raymond, W. M., Capt., D, 52d Indiana.	Dec. 16, 16, '64.	Left; ant. post. flap. Jan. 12, '65, re-amputation. Died Jan. 13, 1865; irritative fever.
848	Remkwitz, G. A., Pt., G, 24th Illinois.	Oct. 8, 8, '62.	——; typhoid fever. Died Nov. 19, 1862.
849	Roberts, I., Pt., F, 100th Col'd Troops, age 22.	Dec. 15, 15, '64.	Left; flap. Died December 22, 1864; effects of amputation.
850	Robinson, G. H., Pt., D, 39th Illinois.	May 12, 12, '64.	Right. Died May 25, 1864.
851	Roehl, C., Corp'l, E, 21st Iowa.	May 1, 1, '63.	Left; double flap; slough. Died May 20, 1863.
852	Sapp, W. E., Musician, A, 11th N. J., age 20.	June 23, 23, '64.	Left. Died July 31, 1864.
853	Saunders, J., Pt., E, 95th New York, age 33.	Feb. 6, 6, '65.	Right; post. flap. Died March 19, 1865; tetanus.
854	Schweichardt, F., Pt., D, 16th Illinois, age 38.	June 26, 26, '64.	Left. Surg. C. S. Frink, U. S. V. Died July 7, 1864.
855	Seerwald, C., Pt., A, 8th Ohio.	July 3, —, '63.	Right. Died August 7, 1863.
856	Sergent, C. J., Lieut., F, 7th Iowa, age 31.	Aug. 11, 11, '64.	Left; ant. post. flap. Surg. W. R. Marsh, 2d Iowa. October, '64, necrosed bone removed. Died April 10, 1865.
857	Sharp, D. C., Pt., B, 23d Iowa, age 25.	Oct. 28, 29, '62.	Left. Nov. 10, erysipelas. Died Nov. 18, 1862; erysipelas and pyæmia. *Spec.* 470.
858	Sherman, R. T., Pt., F, 2d Pennsylvania Res., age 21.	May 12, 12, '64.	Right. Surgeon B. Rohrer, 10th Penn. Res. Died June 3, 1864; exhaustion. *Spec.* 4510.
859	*Sinkswiller, J.*, Pt., K, 52d Virginia, age 34.	May 30, 31, '64.	Right; circular. Bone removed. Died August 12, 1864.
860	Small, J. W. M., Corp'l, D, 17th Infantry, age 32.	July 2, 3, '63.	Left. Died July 14, 1863; pyæmia.
861	Smith, G. R., Pt., I, 59th New York.	Oct. 27, 27, '64.	Right. Died October 30, 1864.
862	Smith, L. C., Serg't, G, 4th Mich., age 26.	May 10, 11, '64.	Right; flap. Died May 27, 1864.
863	Spriggs, I. B., Pt., D, 118th Ohio, age 20.	May 14, 15, '64.	Right; circ. Surg. S. K. Crawford, 50th Ohio. Died Sept. 1, 1864; pyæmia.
864	Storm, J., Pt., A, 17th Wisconsin.	May 19, 19, '63.	Right. Died July 15, 1863.
865	Stout, C. R., Pt., K, 25th Massachusetts, age 20.	July 1, 1, '64.	Right. Died July 14, 1864; tetanus.
866	Sturtevant, L., Serg't, F, 1st Me. H. Art'y, age 22.	April 2, 2, '65.	Right; lateral flap. Died May 14, 1865; exhaustion.

[1] Fisher (G. J.), *Report of Fifty-seven Cases of Amputations, in the Hospitals near Sharpsburg, Md., after the battle of Antietam*, in *American Journal Medical Sciences*, 1863. Vol. XLV. p. 48.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
867	Taylor, A., Pt., I, 15th New York, age 46.	Oct. 19, 19, '64.	Right; flap. Died November 18, 1864; pyæmia.
868	Taylor, G. W., Brig. General U. S. V.	Aug. 27, 28, '62.	Left; double flap. Surg. J. H. Brinton, U. S. V. Died Sept. 1, 1862; exhaustion. *Spec.* 313.
869	Thiback, H., Pt., D, 5th Wisconsin, age 30.	May 10, 10, '64.	R't; circ. Surg. C. E. Crane, 5th Wis. Died June 5, '64; pyæmia.
870	*Thompson, J. T.*, Pt., H, 51st N. Carolina, age 19.	Sept. 30, 30, '64.	Left (also w'nd of pelvis). Died Oct. 10, 1864; exhaustion.
871	Thompson, T. N., Pt., D, 8th New York Heavy Artillery, age 17.	June 2, 3, '64.	Right (also w'd of thigh and fract. left leg). Surg. S. H. Plumb, 82d N. Y. Died June 24, 1864.
872	Tracy, G. B., Serg't, E, 9th N. Hamp., age 28.	May 12, 12, '64.	Left. Died June 6, '64; pyæmia.
873	Troope, S., Pt., B, 12th Col'd Troops, age 28.	Dec. 15, 16, '64.	Left; flap. A.A. Surg. J. S. Giltner. Died Dec. 30, '64; gang.
874	Twining, L. C., Serg't, B, 136th New York.	Mar. 19, 19, '65.	Right (also fracture left fibula). Died April 8, 1865; pyæmia.
875	Twining, P.E., Serg't, F, 36th Wisconsin, age 26.	June 1, 3, '64.	Left; circ. Surg. S. H. Plumb, 82d N. Y. Sept. 14, amp. thigh. Died October 16, 1864.
876	Vallcley, E. J., Pt., A, 3d R. I. Artillery, age 18.	April 9, 11, '63.	Right (also fract. ulna and femur). Died April 14, '63. *Spec.* 1165.
877	Vetter, J. C., Pt., G, 26th Wisconsin.	May 3, 3, '63.	Left. Died May 18, 1863.
878	Wait, B., Corp'l, C, 16th Michigan, age 30.	Aug. 19, 20, '64.	Right; flap. Died September 18, 1864; pyæmia.
879	[1]Waters, W., Pt., K, 123d New York.	May 15, 15, '64.	Right (also amp. left hip joint). Surg. J. W. Brock, 66th Ohio. Died May 15, 1864.
880	Watson, W., Pt., C, 4th Iowa.	May 13, 13, '64.	Left. Surg. J. Spiegelhalter, 12th Missouri. Died May 14, 1864.
881	*White, A.*, Pt., C, 2d Virginia Cavalry.	Oct. 19, 19, '64.	Right; circ. Died October 21, 1864; erysipelas.
882	Winslow, S., Pt., I, 37th Massachusetts.	April 2, 2, '65.	Left. Died April 24, 1865; pyæmia.
883	Word, W. F., Corp'l, G, 48th New York, age 22.	May 16, 16, '64.	Right; flap. Died September 23, 1864.
884	Wyman, A. R., Corp'l, B, 9th New York H'vy Artillery, age 27.	June 22, 22, '64.	Left; circ. Surg. W. A. Child, 10th Vermont. Died July 10, 1864; tetanus.
885	Yardley, W., Pt., —, 85th New York, age 19.	Mar. 10, 10, '65.	Right; circular. Died March 27, 1865; typhoid fever.
886	Young, H. E., Pt., B, 1st Miss. Marine Brigade, age 18.	April 26, 26, '63.	Right. Surg. J. Robarts, 1st M. Marine Brigade. May 15, re-amputat'n; hæmorrhage. Died May 31, 1863.
887	*Bradford, F. L.*, Pt., A, 10th Mississippi.	Sept. 1, 1, '64.	Left.
888	*Emfinger, E.*, Pt., E, 7th Mississippi.	Aug. 31, 31, '64.	—.
889	*Gambill, A. M.*, Pt., A, 6th Missouri.	May 1, —, '63.	Right.
890	[2]*O'Brien, J.*, Pt., 1st Va., age 30.	Sept. 17, 19, '62.	Left; post. flap; sloughing. Recovery doubtful.
891	*Oxford, E. J.*, Serg't, E, 2d Georgia.	Aug. 31, 31, '64.	Left.
892	*Weaver, T.*, Pt., H, 66th Georgia, age 25.	Nov. 30, Dec. 1, '64.	Right; circular.

Primary Amputations in the Lower Third of the Leg for Shot Injury.—There appear on the records of this Office nine hundred examples of primary amputation in the lower third of the leg. Six hundred and seventy-six terminated successfully, two hundred and fifteen fatally, and the results in nine instances are not recorded, a fatality of 24.1 per cent., exceeding the mortality of the primary amputations in the middle third 7.2 per cent.

Successful Primary Amputations in the Lower Third of the Bones of the Leg.—The six hundred and seventy-six operations of this group were performed on six hundred and seventy-three patients, three being amputations of both limbs. Five hundred and thirty-two were Union and one hundred and forty-one were Confederate soldiers. Of the former, five hundred and twenty-eight were pensioned or placed on the retired list; forty-three of these have died since the date of their discharge. In fifty-two instances re-amputation in the leg and in six amputation in the thigh was subsequently performed.

Case 740.—Lieutenant E. F. O'Brien, Co. A, 28th Massachusetts, aged 29 years, was wounded at Cold Harbor, June 3, 1864. Surgeon W. S. Cooper, 125th New York, reported his admission to the field hospital of the 1st division, Second Corps, with "shot fracture involving the left ankle; leg amputated at lower third by Surgeon P. E. Hubon, 28th Massachusetts." Five days after the reception of the injury the patient entered Armory Square Hospital, Washington, and one month later he proceeded to his home on leave of absence. He was discharged from service October 13, 1864, and afterwards entered the Veteran Reserve Corps, in which organization he served until April 17, 1867, when he was mustered out and pensioned. Subsequently he obtained employment as clerk in the Post Office and Interior Departments at Washington. In May, 1869, when visiting the Army Medical Museum, he was in excellent health, and stated that he had worn a "Salem" artificial leg with satisfaction for over five years. In his application for a new artificial limb, supplied in 1880, the pensioner reports the stump as continuing in "very good condition." His pension was paid September 4, 1880. The amputated bones of the leg, together with the astragalus (*Spec.* 4494, *Surg. Sect.*, A. M. M.), were contributed to the Museum by the operator, and are represented in the wood-cut (Fig. 290), showing the tibia to be shattered into the ankle and the fibula fractured transversely.

Fig. 290.—The lower portion of the bones of the left leg and the astragalus. The tibia is shattered into the ankle. *Spec.* 4494.

Case 741.—Lieutenant Robert Catlin, 5th U. S. Artillery, was wounded in an engagement on the Weldon Railroad, near Petersburg, August 21, 1864, by a twelve-pound round shot which crushed his left foot. Three hours after the reception of the injury the limb was amputated in the lower third, by circular incision, by Surgeon W. B. Fox, 8th Michigan. The wound healed rapidly, and Lieutenant Catlin was able to be about in a month. Dr. S. Weir Mitchell,[3] who had the patient under treatment for a period of three years on account of neuralgia of the leg stump, published an

[1] *Circular* No. 6, S. G. O., November 1, 1865. *Circular* No. 7, S. G. O., July 1, 1867, pp. 29, 58.

[2] Fisher (G. J.), *Report of Fifty-seven Cases of Amputations, in the Hospitals near Sharpsburg, Md., after the battle of Antietam, September* 17, 1862, in *American Journal Medical Sciences*, Volume XLV, page 48.

[3] Mitchell (S. W.), *The Relations of Pain to Weather, being a study of the natural history of a case of Traumatic Neuralgia*, in *American Journal of Medical Sciences*, 1877, Vol. LXXIII, p. 306.

elaborate account of the results of his observations. In July, 1866, Lieutenant Catlin was promoted Captain. Dr. John H. Brinton, in the spring of 1875, at the request of Dr. Mitchell, exsected one and a half inches of the peroneal nerves, but without material influence on the neuralgic pains. The patient was furnished with an artificial limb by A. A. Marks, of New York. He was placed on the retired list as captain December 15, 1870.

CASE 742.—Private J. Cavanaugh, Co. C, 7th Wisconsin, aged 27 years, was wounded before Petersburg, June 18, 1864, by a shell, which caused a fracture of the lower portion of the left leg, involving the ankle joint. Surgeon C. N. Chamberlain, U. S. V., reported that the injured leg was amputated at the field hospital of the 4th division, Fifth Corps. Surgeon B. B. Wilson, U. S. V., contributed the pathological specimen, No. 1526, *Surg. Sect.*, A. M. M., shown in the adjoining wood-cut (FIG. 291), and reported the following history of the case: "The patient was admitted to Stanton Hospital, Washington, from City Point, July 1st. He had suffered amputation of the leg at the lower third, by the circular method, the day after he was wounded, being, according to his statement, in a high fever at the time of the operation. He was treated with stimulants, and ice dressings locally. During the month of September the limb became much swollen and abscesses formed in the line of the middle third of the bone, which, after discharging, left fistulous openings, clearly indicating necrosis of the shaft of the tibia. His term of service having expired, the patient was discharged October 5, 1864, but being unable to leave, he was retained as a patient in the hospital. The shaft of the tibia being evidently extensively necrosed, I determined to perform another amputation above the diseased portion. This operation—though opposed by the medical staff of this hospital and by Surgeon A. N. Dougherty, U. S. V., as well as Surgeon T. F. Betton, 1st U. S. V. V., who saw the case—was preferred by me to that of exsecting the sequestrum for the reason that it involved no more danger and would give the patient a much better stump (though six inches shorter) for fitting an artificial limb. The operation was performed one inch below the tubercle of the tibia, by the circular method, on February 25, 1865, and the stump was treated with cold-water dressings. Traumatic erysipelas followed (an epidemic of erysipelas breaking out in the hospital the same week), and for a few days fears were apprehended as to the result. The patient, however, made a good recovery, and by March 15th the inflammation, which had extended to the abdomen, had subsided. Before he finally left the hospital the patient received an artificial limb, on which he walked with great ease and comfort. The specimen indicates clearly and in a marked degree the efforts of nature in throwing off dead bone and supplying its place by new growth. The adventitious process, thrown out to unite the amputated ends of the tibia and fibula and thus give the extremities of those two bones firmness and solidity, shows to how great an extent the reparative process can be carried. By what agency the want of bony matter at this point was perceived and its deposit determined at the proper place and in the proper form is beyond the scope of human knowledge at the present time. The fact, however, evidences the powers of nature to accommodate herself to circumstances and to repair in a limited degree the effects of losses which are irremediable." The specimen, consisting of the re-amputated stumps of the bones of the leg joined by osseous deposit at their lower extremities, shows a massive involucrum except on the anterior border, where a heavy sequestrum is visible. The patient became a pensioner after leaving the hospital. On September 2, 1874, he was examined by Dr. C. F. Falley, pension examiner at Lancaster, Wisconsin, who certified to the loss of the leg and reported: "The amputation has left rather an irritable stump, but, as his cork leg does not press on it, I do not think it any great injury in wearing an artificial limb. He can flex and extend the stump freely," etc. The pensioner was paid March 4, 1880. In his application for an artificial leg he reported that Surgeon D. C. Ayres, 7th Wisconsin, performed the first amputation.

FIG. 291.—Six ins. of the stump of the bones of the left leg, showing a massive involucrum. *Spec.* 1526.

CASE 743.—Private F. Grahame, Co. A, 6th Wisconsin, aged 26 years, was wounded at Spottsylvania, May 10, 1864. Surgeon C. N. Chamberlain, U. S. V., reported his admission to the field hospital of the 4th division, Fifth Corps, with "shot fracture of right ankle joint, followed by amputation of leg at lower third." The wounded man was conveyed to Armory Square Hospital, Washington, several days after the reception of the injury, and two months later he was transferred to Harvey Hospital at Madison, where, on September 7th, a second operation was performed by Surgeon H. Culbertson, U. S. V., who made the following report: "The stump of the tibia became necrosed from the lower end to its tuberosity. New bone formed, but the necrosed portion was not separating. There were several cloacæ, and the lower end of the tibia projected through the soft parts of the stump. The patient was in an anæmic condition and his system was failing from the constant discharge and reflex irritation from the diseased stump. Designing to resect the diseased tibia, I made an incision from the tuberosity of the bone down to its lower extremity, but on separating the soft parts I found the disease so extensive as to lead me to amputate by a short anterior and a long posterior flap at the tuberosity of the tibia. In notching the tibia the periosteum was pushed back, the notch sawed off, and the periosteum laid over the surface of the bone. The anterior and posterior tibial arteries were ligated. Simple dressings were applied after the operation, and quinine and iron was administered. The sutures were removed on the fifth day and the ligatures came away on the fourteenth day. The wound steadily healed." The re-amputated stump of the tibia and fibula (*Spec.* 3696, *Surg. Sect.*, A. M. M.), the latter being well rounded and united at its extremity with the former, were contributed to the Museum by the operator, and are represented in the wood-cut (FIG. 292). The specimen shows a sequestrum in the tibia six inches long; over the upper part of the anterior border the involucrum is wanting. The patient was discharged from service August 22, 1865, and pensioned, having been previously furnished with a "Bly" artificial leg. In his application for commutation he described the stump as continuing in "healthy condition." This pensioner was paid March 4, 1880.

FIG. 292.—Re-amputated portions of the right tibia and fibula. *Spec.* 3696.

In the following instance both legs were amputated in the lower thirds on the day of the injury. The patient survived the operation ten years:

CASE 744.—Private D. Lee, Co. G, 2d New York Artillery, aged 20 years, was wounded in both legs by a shell during the siege of Petersburg, June 16, 1864, and entered Harewood Hospital, Washington, six days afterwards. Surgeon R. B.

Bontecou, U. S. V., reported: "The patient had both legs amputated by Assistant Surgeon O. S. Paine, 2d New York Artillery, on the day he was wounded, the operation being performed by the circular method at the lower thirds. He stated that he was in good health at the time of the operation. At the time of his admission he was suffering from diarrhœa, and there were symptoms of gangrene in the stump of the right leg, the tibia and fibula protruding; granulations of stump of left leg not very good. The treatment was supporting, and included opiates, astringents, and the external application of solution of chloride of lime to the gangrenous stump. By June 26th the patient was improving and the granulations had become healthy." He was subsequently transferred to the General Hospital at Rochester, discharged May 31, 1865, and pensioned, having been previously furnished with artificial legs of the "Bly" pattern. In his application for artificial limbs, dated 1870, the pensioner described the stumps as being in a "sound condition." He died September 25, 1874. Though the immediate cause of his death was not ascertained, the pensioner's health had been reported as having become very much impaired.

Fatal Primary Amputations in the Lower Third of the Leg.—Two of the two hundred and fifteen operations of this group were double amputations; the operations were therefore performed on two hundred and thirteen patients,—one hundred and ninety-one Union and twenty-two Confederate soldiers. Re-amputation in the leg was performed in seven and amputation in the thigh in two instances.

CASE 745.—Private *W. J. Holmes*, Co. G, 33d Mississippi, aged 18 years, was wounded in the left leg, at the engagement of Peachtree Creek, near Atlanta, July 20, 1864, and suffered amputation two days afterwards. About four months after losing his limb he was taken prisoner at Franklin, Tenn., whence he was conveyed to Nashville and subsequently to Louisville. Surgeon R. R. Taylor, U. S. V., who contributed two post-mortem specimens from the stump, reported the result of the case as follows: "The patient was admitted to Crittenden Hospital on December 9th. He was suffering from chronic diarrhœa, of which he died December 23, 1864. His left leg had been amputated by the circular method, at the lower third, in consequence of gunshot fracture of the lower portion of the tibia and fibula. In October a portion of the fibula came away, after which the stump healed rapidly. At the time of his death the stump was entirely well. The accompanying specimens are intended simply to illustrate the changes in the cut ends of the bones and nerves. The latter, consisting of the extremities of the posterior and anterior tibial and of the musculo-cutaneous nerves, are bulbous." The nerve portions constitute specimen 4244 of the Surgical Section of the Museum. A representation of the specimen of the bones of the stump (*Spec.* 4243, *Surg. Sect.*, A. M. M.) appears in the wood-cut (FIG. 293). In the history of the specimen on page 400 of the *Catalogue of The Surgical Section of the U. S. A. Medical Museum*, Washington, 1866, it is remarked that "though the stump is said to have been entirely healed, * * the specimen shows the extremity and posterior surface of the tibia necrosed." In a letter dated December 18, 1867, Dr. H. M. Lilly, late Acting Assistant Surgeon, states that he prepared this specimen, and adds: "I can corroborate Surgeon R. R. Taylor's statement that the stump was entirely healed. In explanation of the necrosed appearance of the end and posterior portion of the tibia, I offer the following history of the preparation of the specimen as possibly giving it the appearance of necrosis. Owing to the inconvenient arrangements of the hospital (the hospital not being finished at that date), I macerated the specimen in a tin can in my private room. Under such circumstances it was of course desirable to destroy completely all effluvium. To this end I supplied the water in the can *liberally* with the solution of permanganate salts furnished by the Medical Purveyor. May it not be that the chemical action of these salts has slightly damaged the specimen, giving it a partially necrosed appearance?"

FIG. 293.—Bony stump of left leg, five months after amputation. *Spec.* 4243.

CASE 746.—Private B. Spriggle, Co. I, 17th Pennsylvania Cavalry, aged 28 years, was wounded in the engagement near Funkstown, July 10, 1863, and entered the General Hospital at Frederick ten days afterwards. Assistant Surgeon R. F. Weir, U. S. A., reported: "He was wounded by a minié ball, which entered the outer side of the left foot just below the external malleolus, passing directly through, involving the bones of the ankle joint and emerging three-fourths of an inch below the internal malleolus. The leg was amputated at its lower third by flap operation the same day he received the injury. At the time of admission the stump looked well and there was healthy suppuration; patient doing well constitutionally, suffering none and having good appetite. He was allowed a generous diet, and in addition one-half pint of port wine daily, and the stump was dressed with adhesive plaster straps and cold-water applications. On August 4th, the flaps having firmly adhered, the straps were taken off the stump and simple cerate dressing was applied. Two days afterwards the patient was able to sit up for a few hours in a chair, and on the next day an abscess was opened which had formed near the end of the stump. The patient's appetite now had become a little depraved and he had some irritation of the stomach. During the evening of August 7th he had a severe chill, followed by some fever the next morning. Quinine and fever mixture was then prescribed and the wine continued. August 9th, pulse 106 and rather feeble; appetite not improving; some discharge still coming from the superficial abscess. On August 10th, the patient had improved a little, but the granulations were not looking very healthy and the stump was ordered to be dressed with Hay's lotion. On the following day there was another chill; pulse 130; no improvement. On August 12th, the chills continued, the tongue looking pale, and the pulse being accelerated; but the patient was apparently much better. A bandage was applied to prevent the burrowing of pus towards the knee joint. August 13th, pulse 134 and very irregular; tongue dry; patient complaining of a great deal of thirst, having some cough, and gradually sinking. Milk punch was now substituted for the wine. The next day the patient was very delirious, the pulse accelerated and threadlike; great deal of tenderness in the knee; joint doubtless involved; fluctuations detected. August 15th, patient sinking and still very delirious; pulse 156; a good deal of subsultus; very little diarrhœa; tongue red and dry; knee joint seemingly enlarging. Patient taking no nourishment but beef tea, having no relish for other food; stimulants and opiates administered in large doses. Death occurred at 11.55

A. M. on August 16, 1863. On dissecting up the integuments and opening the chest during the post-mortem examination, the lungs were found to be healthy and weighing eighteen ounces; heart normal and weighing eight ounces; liver healthy and weighing three pounds and fifteen ounces; weight of spleen seven ounces, and weight of kidneys nine ounces. On removing both bones of the leg from the point of the operation to the knee joint, a circumscribed abscess, containing about an ounce of pus, was found in the belly of the gastrocnemius muscle. The knee joint contained between three and four ounces of pus. The capsule was broken down and the pus extended up the outer side of the thigh about six inches above the joint; cartilage quite soft and commencing to erode around its edges." The bones of the stump, exhibiting a minute sequestrum, nearly separated on the carious extremity of the tibia, were contributed to the Museum by Acting Assistant Surgeon J. C. Shimer, and constitute specimen 3878 of the Surgical Section.

CASE 747.—Private A. C. Paine, Co. F, 42d New York, aged 30 years, was wounded in both lower extremities, at the battle of Gettysburg, July 3, 1863. He was admitted to the field hospital of the 3d division, Second Corps, where Surgeon I. Scott, 7th West Virginia, recorded the injury as "fracture of both feet, caused by a solid shot," necessitating "primary amputation of both legs at the lower third, which operation was performed by Surgeon H. M. McAbee, 4th Ohio." Surgeon H. Janes, U. S. V., recorded that the patient died at the Seminary Hospital, Gettysburg, July 23, 1863, from the effects of his injuries.

TABLE LXX.

Summary of Nine Hundred Cases of Primary Amputations in the Lower Third of the Leg for Shot Injuries.

[Recoveries, 1—676; Deaths, 677—891; Results unknown, 892—900.]

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1	Abbey, C. F., Serg't, C, 107th New York.	Mar. 16, 16, '65.	Left; circ. Surg. P. H. Flood, 107th N. Y. Disc'd Aug. 23, '65.
2	Abbott, H. S., Pt., D, 32d Wisconsin, age 20.	Aug. 14, 14, '64.	Right; lateral flap. Surg. J. C. Denise. 27th Ohio. Discharged July 17, 1865.
3	Allen, C., Lieut., H, 11th Wisconsin.	May 22, 23, '63.	Right. Surg. H. P. Strong, 11th Wis. Resigned Jan. 11, 1864.
4	Almany, J., Pt., B, 9th Kentucky, age 39.	Sept. 19, 20, '63.	Left; flap. Discharged January 28, 1864.
5	Amelunxen, M., Lieut., H, 68th New York.	Aug. 29, 29, '62.	Right. Surg. L. Schultz, 68th N. Y. Mar. 29, 1863, re-amp. mid. third. Disch'd Aug. 3, '63.
6	*Andrew, J. J.*, Pt., E, 26th North Carolina.	Oct. 22, 24, '64.	——. Confederate surgeon. Recovered.
7	Annand, A., Adj't, 28th Massachusetts, age 30.	May 18, 19, '64.	Left. Nov. 20, removal of necrosed bone. Disch'd May 6, '65.
8	Antis, T. S., Pt., L, 2d N. Y. M. R., age 22.	July 2, 3, '64.	Left; circ. Surg. R. T. Paine, 2d N. Y. M. R. Discharged Feb. 25, 1865.
9	Armstrong, A. H., Corp'l, A, 106th N. Y., age 22.	Sept. 19, 19, '64.	Left; flap. Surg. J. N. Freeman, 106th N. Y. Discharged.
10	Armstrong, S. J., Pt., C, 1st Michigan Cavalry.	July 14, 16, '63.	Left. Discharged December 26, 1863.
11	Augustine, A., Pt., B, 50th Pennsylvania.	Sept. 17, 17, '62.	Left; circ. Discharged Dec. 13, 1862. Died Aug. 20, 1869.
12	Auman, P., Pt., H, 211th Pennsylvania.	April 2, 2, '65.	Left; flap. Surg. W. G. Hunter, 211th Penn. Disch'd July 20, '65.
13	*Ayres, H.*, Pt., B, 27th North Carolina.	Aug. 25, 26, '64.	Left. Surg. E. L. Howard, 27th N. C. Furloughed.
14	Babb, J. A., Corp'l, K, 10th Indiana, age 24.	Aug. 3, 3, '64.	Left; circ. Discharged July 18, 1865. Died Feb. 17, 1866.
15	Babcock, E. A., Pt., G, 146th N. Y., age 18.	June 18, 18, '64.	Left; circ. Surg. T. M. Flandrau, 146th N. Y. Discharged May 18, 1865.
16	Babe, R., Pt., D, 97th Pennsylvania, age 22.	May 20, 20, '64.	Right; circ. Surg. J. R. Everhart, 97th Penn. Discharged August 20, 1864.
17	*Badger, S.*, Pt., F, 26th North Carolina, age 17.	July 1, 1, '63.	Right. Gangrene. Transferred for exchange March 3, 1864.
18	Baker, L. A., Capt., A, 39th Illinois, age 29.	Aug. 16, 16, '64.	Left. Surg. C. M. Clark, 39th Ill. Discharged Dec. 17, 1864.
19	*Baldwin, R. F.*, Lieut., F, 1st Arkansas, age 25.	Nov. 30, Dec. 1, '64.	Left; ant. post. flap. Surg. — Mitchell, 1st Ark. Transferred to Pro. Mar. Feb. 6, 1865.
20	Bales, A., Pt., A, 4th Indiana Cav., age 19.	June 1, 1, '64.	Left; circ. Asst. Surg. H. D. Garrison, 4th Ind. Cav. Discharged Nov. 1, 1864.
21	*Banton, S. A.*, Pt., K, 26th N. C., age 19.	July 2, 2, '63.	Left. Paroled Sept. 22, 1863.
22	Barber, C., Pt., F, 6th Iowa, age 28.	May 13, 13, '64.	Right; ant. post. flap. Surg. W. Lomax, 12th Ind. Discharged July 10, 1865.
23	*Barfield, T.*, Serg't, L, 8th South Carolina.	Sept. 20, 21, '63.	——. Surg. — Walker, C. S. A. Recovered.
24	*Barge, A. L.*, Corp'l, B, 28th Georgia.	Aug. 24, 24, '64.	——. Surg. — Mathis, C. S. A. Recovered.
25	Barnes, I. M., Pt., F, 83d Illinois.	Jan. 29, 29, '63.	Right; flap. Asst. Surg. J. P. McClanahan, 83d Ill. Disch'd April 10, 1864.
26	Barnes, M. J., Pt., E, 65th Illinois.	July 6, 6, '62.	Left. Surg. G. H. Parks, 65th Ill. Discharged Aug. 19, 1862.
27	Barnes, W. H., Pt., B, 3d Ohio.	Jan. 3, 4, '63.	Left; circ. Surg. W. L. Peck, 3d Ohio. Discharged.
28	Bartholomew, C. F., Pt., D, 3d Iowa.	July 12, 12, '63.	Left. Surg. J. B. Hinkle, C. S. A. Discharged Dec. 29, 1863.
29	[1]*Barwick, J. H.*, Pt., —, 6th S. C., age 20.	Sept. 17, 17, '62.	Right; circular. Doing well.
30	Bass, G., Pt., B, 34th Massachusetts, age 21.	June 5, 5, '64.	Right; circular. Discharged Oct. 17, 1864.
31	*Bass, J. C.*, Pt., I, 5th Virginia Cavalry.	Oct. 19, 19, '64.	——. Recovered.
32	Bassett, O. J., Pt., F, 70th Indiana, age 18.	June 15, 15, '64.	Right; circ. Discharged Feb. 27, 1865. Died June 10, 1872.
33	Bates, C. A., Pt., D, 57th Massachusetts, age 18.	Aug. 19, 20, '64.	Right; flap. Surg. W. V. White, 57th Mass. Disch'd Mar. 10, '65.
34	Bauvais, D., Pt., H, 97th New York, age 25.	Feb. 6, 7, '65.	Right; lateral flap. Discharged Aug. 17, 1865.
35	*Bay, M. S.*, Lieut., K, 38th N. C., age 36.	July 3, 3, '63.	——. Exchanged September 15, 1863.
36	Bayless, B. J., Pt., F, 137th N. Y., age 20.	July 20, 20, '64.	Right. Surg. E. Hutchinson, 137th N. Y. Aug. 8, '64, re-amp. at up. third. Disch'd June 16, '65.
37	Beath, R. B., Capt., G, 6th C. Troops, age 25.	Sept 29, Oct. 1, '64.	Right; circ. flap. Surg. D. G. Rush, 101st Penn. Discharged Sept. 20, 1865.
38	*Bedford, P. B.*, Corp'l, B, 50th Ga., age 36.	July 3, 4, '63.	Right. Transferred to prison December 5, 1863.
39	Beers, C. E., Serg't, G, 81st New York, age 25.	June 30, 30, '64.	Left; flap. Surg. W. H. Rice, 81st N. Y. Disch'd Dec. 29, '64.
40	Beers, E. J., Corp'l, C, 113th Ohio, age 27.	June 27, 27, '64.	Right. Surg. T. B. Williams, 121st Ohio. Re-amput'n. Discharged May 16, 1865.
41	Bell, F., Capt., I, 1st Pennsylvania Rifles.	July 3, 3, '63.	Right. Surgeon C. Bower, 6th Penn. Res. Disch'd Oct. 19, 63.
42	*Bell, J.*, Pt., G, 12th Ga. Battalion, age 26.	Sept. 19, 20, '64.	R't. Surg. S. V. D. Hill, P. A. C. S. Trans. to Pro. Mar. Apr. 1, '65.
43	Bell, J. H., Lieut., D, 61st Ohio, age 52.	July 20, 20, '64.	Left; flap. Surg. H. K. Spooner, 61st Ohio. Disch'd Dec. 15, '64. Oct. 27, '70, amp. thigh at mid. third for neuralgic aff. of stump.
44	Bencler, P., Pt., B, 74th New York, age 35.	July 2, 3, '63.	Right; circular. Discharged July 25, 1864.
45	Bennett, E. F., Pt., B, 76th Pennsylvania.	July 11, 13, '63.	Left. Confed. Surg. Necrosis. Oct. 6, amp. at mid. third. Discharged July 21, '64. *Spec.* 4308.
46	Bennett, F. H., Corp'l, G, 48th New York, age 23.	May 16, 17, '64.	Right; ant. post. flap. Surg. J. L. Mulford, 48th N. Y. Discharged May 24, 1865.
47	Bennett, G. B., Serg't, I, 3d Wisconsin, age 36.	Mar. 16, 16, '65.	Left; circ. Surg. P. H. Flood, 107th N. Y. Disch'd June 14, '65.
48	*Benton, E.*, Pt., Hart's Battery.	Oct. 14, 15, '63.	Left. Surg. — Green, C. S. A. Recovered.
49	Bergeron, J., Pt., H, 39th Massachusetts, age 20.	May 9, 9, '64.	Right; flap. Discharged April 7, 1865.
50	*Beto, R. W.*, Lieut., H, 56th N. C., age 20.	May 13, 14, '64.	Right (also flesh wound left arm); gangrene. Exch'd Aug. 18, '64.
51	Betterley, C. M., Pt., H, 198th Penn., age 27.	Mar. 29, 29, '65.	Right; flap. Discharged July 6, 1865.
52	Beverly, D., Serg't, D, 97th New York.	Sept. 17, 18, '62.	Left. Discharged Dec. 6, 1862.
53	*Birns, W. G.*, Pt., D, 50th Virginia.	July 3, 3, '63.	Right. Surg. — Baxter, C. S. A. Recoverd.

[1] FISHER (G. J.), *Report of Fifty-seven Cases of Amputations, in the Hospitals near Sharpsburg, Md., after the Battle of Antietam, September 17, 1862*, in *American Journal Medical Sciences*, 1863, Vol. XLV, page 48.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
54	Black, G., Serg't, C, 4th Maryland, age 23.	May 8, 8, '64.	Left; circ. Surg. — Mitchell, C. S. A. Disch'd Nov. 11, 1864.
55	*Blair, J. E.*, Pt., A, 10th Alabama.	Sept. 17, 18, '62.	Left; Surg. R.Y. Royston, C.S.A. Recovered.
56	Blanchard, C., Pt., H, 96th N. Y., age 29.	Sept. 29, 29, '64.	Right; flap. A. Surg. M. Hines, 96th N.Y. Disch'd Apr. 17, '65. Re-amp. at mid.th'd June 15, '65.
57	Bloom, C., Pt., D, 2d N. H., age 22.	June 3, 4, '64.	Left; circular. Discharged Jan. 8, 1865.
58	Bœhme, C. F., Pt., A, 52d New York, age 25.	April 2, 4, '65.	Left; circ. April 10, hæm. from ant. and post. tib. arteries; necro. bone removed. Disch'd Nov. 14, 1865. Died Aug. 18, 1874.
59	Bonbomme, E., Pt., E, 73d C. Troops, age 27.	April 10, 10, '65.	Left; ant. post. flap; slough. Apr. 24, '65, re-amp. low. third thigh. Discharged June 17, '65. Died June 3, 1867; marasmus.
60	*Bonner, R.*, Pt., D, 1st Mississippi, age 21.	Nov. 30, Dec. 1, '64.	Right; circular. Provost Marshal March 2, 1865.
61	*Boyle, P.*, Pt., G, 24th Mississippi, age 48.	Oct. 8, 8, '62.	Left. Feb. 9, 1863, re-amp. mid. third, circ. lat. flaps. Transferred Oct. 8, 1863.
62	Brackett, E. J., Pt., D, 35th Mass., age 22.	Sept. 30, 30, '64.	Left; flap. Surg. S. Cooper, 6th N. H. Discharged Jan. 18, '65.
63	Brady, F., Pt., K, 46th Pennsylvania, age 22.	July 20, 21, '64.	Right; circ. Discharged Aug. 25, 1865.
64	Brazell, M., Pt., F, 61st Illinois, age 38.	July 20, 21, '64.	Right; flap. Disch'd Apr. 26, '65. Re-amp. mid. third July 17, '65.
65	Bickford, C., Corp'l, G, 14th Maine, age 21.	Oct. 19, 20, '64.	Left; circ. Disch'd Mar. 30, '65. Died Jan. 27, '69; consumption.
66	Brian, W., Capt., K, 3d Pennsylvania Res.	Dec. 13, 13, '62.	Left. Confed. Surg. Discharged Sept. 15, 1863.
67	Brockway, J. W., Capt., C, 29th C. T., age 29.	July 30, Au. 1, '64.	Left; circ. Surg. J. P. Prince, 36th Mass. Disch'd Mar. 9, '65.
68	Brooks, F. C., Pt., D, 3d East Tenn., age 20.	July 1, 1, '64.	Left; circ. Surg. C. W. McMillan, 1st East Tenn. Gangrene. Discharged Feb. 26, 1865.
69	*Brothers, C. P.*, Serg't, H, 11th South Carolina.	Aug. 21, 21, '64.	——. Surg. — Loben, C. S. A. Recovered.
70	Brown, T., Pt., K, 15th Massachusetts, age 21.	July 3, 4, '63.	Left; ant. post. flap. Discharged Jan. 29, 1864.
71	Brown, W. F., Serg't, G, 24th New Jersey.	Dec. 13, 13, '62.	Left; circular. Discharged June 29, 1863.
72	Brubaker, D., Pt., C, 127th Pennsylvania.	Dec. 13, 15, '62.	Left; flap. Mustered out May 29, 1863.
73	Bryan, W. A., Pt., C, 11th Penn. Reserves.	Dec. 13, 15, '62.	Right. Discharged Feb. 11, 1863.
74	*Burditt, I. J.*, Pt., Hampton Legion.	May 31, J'e 1, '62.	——. Surg. — Darby, C. S. A. Recovered.
75	Burk, C. J., Serg't, A, 140th Penn., age 44.	Nov. 27, 28, '63.	Right; circ. Surg. J. W. Wishart, 140th Penn. Discharged March 16, 1865.
76	Burke, M., Pt., D, 20th Mass, age 22.	May 10, 10, '64.	Right. Surg. N. Hayward, 20th Mass. Discharged Oct. 12, 1864. *Spec.* 517.
77	Burkett, J., Pt., M, 5th Cavalry.	April 9, 9, '65.	Right; flap. Surg. A. K. St. Clair, 1st Michigan Cavalry. Discharged August 10, 1865.
78	Burr, C. M., Pt., E, 2d Conn. H. A., age 21.	Oct. 19, 20, '64.	Right; circ. Surg. H. Plumb, 2d Conn. H. A. Disch'd June 9, '65.
79	*Burt, A. W.*, Lieut., A, 7th S. C., age 22.	July 2; 3, '63.	Left. Paroled Nov. 14, 1863.
80	Burtner, J., Corp'l, E, 103d Penn., age 19.	April 19, 20, '64.	Left; ant. post. flap. Surg. — Gott, 21st Ga. Discharged Apr. 19, 1865.
81	Bushey, F. P., Pt., C, 56th Mass., age 22.	May 18, 18, '64.	Left; flap. Surg. W. V. White, 57th Mass. Necrosis. Dec. 25, lateral flap amp., middle third. Disch'd Apr. 3, '65. *Spec.* 4336.
82	Butler, J. H., Lieut., G, 2d Artillery.	Nov. 8, 8, '63.	Left. Surg. E. W. H. Beck, 3d Ind. Cav. Aug. 5, 1864, rem. 6 ins. tibia from stump. Retired Feb. 7, 1865.
83	Byington, A., Corp'l, I, 6th N. Y. Cav., age 25.	June 2, 2, '64.	Right; circ. Surg. A. P. Clark, 6th N. Y. Cav. Discharged Sept. 20, 1864.
84	Caldwell, J. P., Pt., A, 115th N. Y., age 39.	July 30, 30, '64.	Left; flap. Discharged May 23, 1865.
85	Call, C. K., Pt., K, 35th Massachusetts, age 24.	Dec. 13, 14, '62.	Left; flap; bone removed. Discharged Mar. 5, 1863.
86	Cann, C., Pt., D, 30th New York.	July 30, Au. 1, '64.	Left; circ. Surg. D. MacKay, 27th C. T. Disch'd Dec. 20, '64.
87	Carey, J. H., Pt., D, 27th Michigan, age 26.	June 3, 3, '64.	Right; circ. Surg. A. F. Whelan, 1st Michigan S. S. Discharged October 28, 1864.
88	Carney, P., Pt., A, 2d Maine.	Dec. 13, 13, '62.	Right. Discharged April 7, 1863.
89	Carpenter, S. B., Pt., F, 11th Vermont, age 20.	June 10, 10, '64.	Left; flap. Surg. C. B. Park, 11th Vt. Discharged Dec. 24, 1864.
90	Carr, H. C., Pt., B, 22d Indiana.	Oct. 8, 9, '62.	Left; flap. Discharged Feb. 10, 1863.
91	Carshaw, W. E., Pt., E, 14th N.Y. State Militia.	July 1, 1, '63.	Left; circ. A. Surg. P. S. Arndt, 2d Wis. Disch'd Nov. 20, 1863.
92	Carter, C. A., Pt., B, 11th Maine, age 21.	June 17, 17, '64.	Left; circ. Disch'd June 28, '65. Re-amp. below knee. Died Oct. 31, 1869, from chronic diarrhœa.
93	Carter, W. A., Pt., D, 148th Penn., age 26.	May 12, 13, '64.	Right; flap. Discharged July 28, 1865.
94	*Carter, W. F.*, Pt., G, 45th N. C., age 21.	Sept. 22, 22, '64.	Left. Transferred to Provost Marshal June 1, 1865.
95	Case, C. P., Pt., D, 8th Penn. Cavalry, age 18.	May 2, 3, '63.	Left. Discharged May 24, 1864.
96	Case, S., Pt., C, 11th Wisconsin.	May 22, 23, '63.	Left; flap. Discharged Aug. 20, 1863.
97	*Castello, P.*, Pt., F, 3d Alabama.	Sept. 17, 18, '62.	Left. Surg. — Mitchell, C. S. A. Recovered.
98	*Casto, A. H.*, Serg't, G, 17th Virginia.	June 10, 10, '63.	——. Surg. — Bee, C. S. A. Recovered.
99	[1] Catlin, R., Lieut., D, 5th U. S. Artillery.	Aug. 21, 21, '64.	Left; circ. Surg. W. B. Fox, 8th Mich. Retired Dec. 15, '70. Ex-section of 1½ in. peroneal nerve by Dr. J. H. Brinton, 1875.
100	Cavanaugh, J., Pt., C, 7th Wisconsin, age 21.	June 18, 19, '64.	Left; circ. Surg. D. C. Ayres, 7th Wis. Disch'd Oct. 5, '64. *Spec.* 1526. Feb. 25, '65, re-amp. 1 inch below tubercle of tibia.
101	Cavender, L., Pt., H, 3d Michigan, age 22.	May 5, 5, '64.	Left; flap. Discharged Feb. 10, 1865.
102	Chalfant, G. W., Pt., E, 52d Ohio, age 21.	July 19, 19, '64.	Left. Surg. H. M. Duff, 52d Ohio, Two subsequent amputations. Discharged Oct. 17, 1865.
103	Chartier, N. A., Pt., A, 37th Wisconsin, age 20.	June 18, 18, '64.	Right. Surg. W. C. Shurlock, 51st Penn. Disch'd June 26, '65.
104	Chase, G. W., Corp'l, G, 56th Mass., age 25.	May 12, 12, '64.	Right; circ. Surg. T. F. Oakes, 56th Mass. Disch'd Dec. 15, '64.
105	Christ, W., Pt., I, 57th Pennsylvania, age 23.	June 16, 17, '64.	Left; flap. Surg. J. W. Lyman, 57th Penn. Disch'd Sept. 5, '65.
106	*Christian, G. L.*, Serg't, 2d Richm'd Howitzers.	May 12, 12, '64.	——. Surg. — Roscoe, C. S. A. Retired Oct. 12, 1864.
107	*Church, J. P.*, Capt., K, 48th Tennessee, age 33.	Dec. 16, 17, '64.	Right; ant. post. flap. Surg. W. F. Westmoreland, 53d Tennessee. Trans. to Pro. Mar. March 7, '65.
108	Clark, A., Lieut., F, 11th Maine, age 25.	May 18, 19, '64.	Left; flap. Surg. N. F. Blunt, 11th Me. Disch'd July 10, '65.
109	[2] Clark, H. W., Pt., H, 100th N. York, age 30.	May 13, 13, '64.	Left; lat. flap.; and right foot, Chopart's op. Surg. M. S. Kittinger, 100th N. Y. Discharged Dec. 13, 1864. *Spec.* 2857.
110	Clark, J., Pt., E, 89th Illinois, age 29.	July 27, 28, '64.	Left; ant. post. flap. Discharged Dec. 1, 1864.
111	Clark, P., Pt., D, 140th New York, age 28.	July 2, 3, '63.	Right; hæm.; lig. of post. tibial artery. Recovered.
112	Clay, W. C., Pt., D, 2d U. S. S. S., age 35.	May 31, 31, '64.	Left; circ. Surg. W. B. Reynolds, 2d U.S.S.S. Disch'd Mar. 22, '65.
113	Clayton, G., Pt., I, 4th N. Hampshire, age 37.	May 16, 16, '64.	Right; flap. Discharged Sept. 27, 1864.
114	Clayton, H., Pt., A, 74th Indiana, age 44.	June 15, 15, '64.	Right; circ. Discharged March 17, 1865.
115	Clearwater, R., Pt., G, 125th Illinois, age 33.	Sept. 20, 21, '63.	Right; flap. Surg. J. Y. Finley, 2d Kentucky Cav. Discharged Feb. 18, 1864.
116	Clemens, H., Pt., H, 12th New York.	July 18, 18, '61.	Right; flap. Surg. R. W. Pease, 12th N. Y. Duty Sept. 9, 1861.
117	*Cochran, S. H.*, Pt., A, 2d S. C. Rifles, age 20.	Oct. 28, 29, '63.	Left; circ. Surg. — Skinner, 44th Ala. Furloughed Mar. 14, '65.
118	Colburn, A. T., Pt., A, 34th Mass., age 23.	Oct. 13, 14, '64.	Left; circ. Nov. 23, removal of two inches tibula and fibula. Disch'd May 11, 1865.
119	Colby, A. T. G., Pt., B, 28th New York.	Dec. 13, 14, '62.	Right. Re-amp. 6 inches below knee. Disch'd Jan. 21, 1863.
120	Collins, A., Pt., D, 2d Pennsylvania, age 19.	Aug. 16, 17, '64.	Left. Discharged May 15, 1865.
121	Collins, J., Pt., C, 82d New York, age 20.	June 3, 3, '64.	Right; ant. post. flap. Surg. S. H. Plumb, 82d N. Y. Disch'd June 30, 1865. *Spec.* 1524.
122	Colomy, M. G., Pt., K, 31st Maine, age 42.	Sept. 30, Oct. 1, '64.	Right; circ. Discharged Aug. 24, 1865.
123	Comerford, J., Pt., B, 10th New York, age 21.	Feb. 6, 6, '64.	Left; flap. Surg. B. Gesner, 10th N. Y. Disch'd July 10, 1864. *Spec.* 4302.
124	Compton, T., Pt., D, 29th New Jersey.	May 2, 2, '63.	Left. A. Surg. J. T. Brown, 94th N. Y. May 20, re-amp. at middle third. Disch'd June 30, '63.
125	Conaway, J., Pt., H, 13th Penn. Cav., age 37.	Aug. 14, 14, '64.	Right. Surg. G. T. Stevens, 77th N. Y. Discharged June 21, '65.
126	Condon, E., Pt., F, 1st Maine.	Oct. 19, 19, '64.	Right; flap. Discharged July 20, 1865.
127	Connelly, J. F., Pt., G, 7th Maine, age 30.	Oct. 19, 19, '64.	Right; ant. post. flap. A. Surg. D. H. Armstrong. 160th N. Y. Disch'd Mar. 8, 1865. June 3, 1869, re-amp. at junc. mid. and lower thirds. *Spec.* 524.

[1] Mitchell (S. W.), *The Relations of Pain to Weather, being a study of the natural history of a case of Traumatic Neuralgia*, in *American Journal of Medical Sciences*, 1877, Vol. LXXIII, page 306.

[2] Smith (Stephen), *Analysis of 439 recorded amputations in the Continuity of the Lower Extremity*, in *United States Sanitary Commission Memoirs*, Surgical Volume II, New York, 1871, pages 110, 140.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
128	Conner, H., Pt., D, 20th Massachusetts, age 35.	May 24, 24, '64.	Left; ant. post. flap. Discharged April 17, 1865.
129	Conover, J., Pt., C, 33d New Jersey, age 45.	May 25, 25, '64.	Left: ant. post. flap. Surg. J. Reily, 33d N. J. Discharged March 16, 1865.
130	Cooley, S. I., Pt., K, 97th New York, age 23.	June 18, 18, '64.	Right; circ. Surg. W. B. Chambers, 97th N. Y. Discharged Oct. 27, 1864.
131	Cook, S. A., Pt., A, 2d Wisconsin.	Sept. 17, 17, '62.	Left; flap. Surg. A. J. Ward, 2d Wis. Discharged Dec. 6, 1862.
132	Cornell, M. E., Pt., E, 36th Illinois, age 21.	May 14, 15, '64.	Right; flap. Surg. W. P. Pierce, 88th Ill. Disch'd Oct. 29, 1864.
133	Cornish, J., Serg't, B, 39th Colored Troops.	July 30, Au. 1, '64.	Right; circ. Surg. F. M. Weld, 27th Colored Troops. Disch'd Dec. 21, 1864.
134	Cornish, J., Pt., F, 8th Colored Troops, age 35.	Aug. 15, 16, '64.	Right; circ. Discharged Feb. 11, 1865.
135	Corson, G. F., Serg't, B. 7th N. H., age 27.	Oct. 1, 1, '64.	Left; circ. Surg. C. M. Clark, 39th Ill. Re-amp. mid. third. Discharged May 7, 1865.
136	Cotton, G. E., Pt., M, 4th N. Y. H. A., age 25.	Aug. 25, 26, '64.	Right; circ. Surg. J. W. Wishart, 140th Penn. Disch'd July 6, '65.
137	Couse, F. H., Pt., B, 83d Pennsylvania.	Dec. 13, 14, '62.	Left; circ. Discharged August 27, 1863.
138	*Cox, E.*, Pt., I, 13th Louisiana.	Sept. 20, 22, '62.	Right. Surg. L. Holt, C. S. A. Recovered.
139	Cox, L. C., Corp'l, D, 6th Tenn., age 29.	Dec. 15, 16, '64.	Right; ant. post. flap. A. Asst. Surg. J. K. Simmons. Disch'd.
140	Coy, S., Pt., K, 2d Michigan, age 33.	June 17, 18, '64.	Left; flap. Disch'd Apr. 15, '65. Died Nov. 20, 1868, of phthisis pulmonalis.
141	Crain, L. G., Serg't, C, 39th Ohio, age 23.	July 22, 24, '64.	Right; flap. Surg. A. B. Monahan, 63d Ohio. Discharged August 9, 1865.
142	[1]*Crawford, R. D.*, Pt., 6th S. Carolina, age 27.	Sept. 17, 18, '62.	Right; circular. Recovered.
143	Cregar, H., Pt., F, 35th Ohio, age 20.	July 21, 21, '64.	Left; circ. Surg. C. N. Fowler, 105th Ohio. Disch'd June 26, '65. Died November 29, 1866.
144	Crew, J., Pt., K, 31st Illinois, age 30.	May 27, 27, '63.	Left; circ. Disch'd Dec. 3, 1863. Died Dec. 23, 1869.
145	Crilley, O., Serg't, E, 81st Pennsylvania, age 21.	June 21, 21, '64.	Left; ant. post. flap. Surg. J. W. Wishart, 140th Penn. Discharged January 6, 1865.
146	Croft, A. C., Pt., D, 7th Wisconsin.	Sept. 14, 16, '62.	Left; circular. Discharged July 23, 1863.
147	Cross, H., Pt., A, 16th Infantry, age 19.	Sept. 1, 1, '64.	Left; circular; gangrene. Discharged May 20, 1865.
148	Cunningham, R., Pt., E, 8th Iowa Cav., age 18.	May 7, 7, '64.	Right; flap; erysipelas. Discharged.
149	Cunningham, W., Pt., H, 1st W. Virginia, age 23.	Aug. 29, 29, '62.	Left: circ. Surg. D. Baguly, 1st W. Va. Disch'd Mar. 16, 1863.
150	Daniels, D. B., Pt., K, 7th Illinois.	Feb. 15, 17, '62.	Right; circ. Discharged May 1, 1862.
151	Daniels, V., Pt., E, 76th New York, age 39.	April 1, 1, '64.	Right. Discharged July 7, 1864. *Spec.* 2211.
152	Daniels, W. H., Pt., B, 1st Mass. H'vy Art'y.	May 20, 20, '64.	Left; circular. Discharged Mar. 11, 1865.
153	Danley, S. B., Serg't, B, 15th N. J., age 27.	May 12, 12, '64.	Left; ant. post. flap. Surg. R. Sharpe, 15th N. J. Discharged May 23, 1865.
154	*Danver, J. H.*, Pt., H, 1st Virginia.	July 3, 3, '63.	Right. Paroled Sept. 25, 1863.
155	*Davidson, A. J.*, Pt., B, 17th Virginia.	Aug. 7, 7, '64.	——. Surg. — Fleming, C. S. A. Recovered.
156	Davis, E., Pt., D, 76th Col'd Troops, age 37.	April 12, 12, '65.	Left; ant. post. skin flap and circ. section of muscles. Discharged June 17, 1865.
157	Davis, G., Pt., F, 2d Michigan, aged 23.	Nov. 16, 16, '63.	Left; flap. Discharged May 31, 1864.
158	Davis, J., Pt., A, 28th Pennsylvania.	Sept. 17, 17, '62.	Right; flap. Discharged Sept. 25, 1863.
159	Davis, J. A., Pt., F, 5th Iowa Cavalry, age 23.	Dec. 15, 17, '64.	Right; circ. A. A. Surg. J. H. McIntyre. Disch'd June 29, '65.
160	*Davis, R. I.*, Pt., B, Purcell Battery.	June 26, 26, '62.	Right. Surg. — Capot, C. S. A. Discharged Oct. 28, 1864.
161	*Dean, S. H.*, Pt., F, 6th Georgia Cavalry.	Feb. 12, 12, '62.	Right. Surg. C. J. Towles, C. S. A. Recovered.
162	Dearolf, E., Pt., H, 127th Illinois, age 31.	May 19, 19, '63.	Right; flap. Surg. J. R. Gore, 127th Ill. Disch'd Aug. 27, '64.
163	Deforest, M. J., Capt., B, 81st N. Y., age 25.	June 3, 3, '64.	Left: flap. Discharged October 27, 1864.
164	Deighton, J., Pt., I, 6th Colored Troops.	Sept. 29, 29, '64.	Right; flap. Discharged April 19, 1865.
165	*De Langhter, A.*, Lieut., D, 5th Florida.	Aug. 21, 21, '64.	——. Surg. G. S. West, C. S. A. Recovered.
166	Dennis, A. W., Pt., D, 1st N. Y. Artillery, age 18.	May 5, 6, '62.	Left: circular. Discharged Jan. 13, 1863.
167	Derr, J., Pt., K, 148th Pennsylvania, age 26.	May 10, 10, '64.	Right; flap. Discharged Feb. 10, 1865.
168	De Tar, T., Capt., D, 32d Iowa, age 37.	Dec. 16, 17, '64.	Right; flap. Surg. V. B. Kennedy, 5th Minn. Disch'd May 15, '65.
169	Dewey, D. A., Serg't, B, 121st N. Y., age 23.	May 6, 7, '64.	Right; flap. Surg. — Moffatt, C. S. A. Disch'd June 29, 1865.
170	*Diamond, R.*, Pt., K, 3d Alabama, age 25.	Sept. 19, 19, '64.	Left; circ. Surg. A. Bowie, 3d Ala. To prison Jan. 5, 1865.
171	Dietrich, C., Pt., E, 91st New York.	April 13, 13, '63.	Left. Discharged April 10, 1864.
172	Dillon, J., Pt., K, 20th Massachusetts.	Dec. 13, 13, '62.	Left. Surg. N. Hayward, 20th Mass. Disch'd Aug. 12, 1863.
173	*Divers, P. D.*, Pt., K, 1st Virginia.	May 5, 5, '64.	Left. Surg. — Graham, C. S. A. Recovered.
174	Douglas, J. H., Pt., G, 91st Penn., age 33.	July 3, 3, '63.	Right; circ. Asst. Surg. E. T. Whittingham, C. S. A. Disch'd Feb. 8, '65. Died June 30, '77.
175	Dowd, J., Farrier, M, 10th Missouri Cavalry, age 24.	April 18, 19, '63.	Right. Surg. P. N. Woods, 39th Iowa. Disch'd. Jan. 25, 1864, amp. thigh; necro. Nov., '67, re-amp. Died Nov. 15, 1867.
176	Downing, H., Pt., C, 4th Rhode Island Artil'ry.	July 1, 1, '62.	Left. Discharged Aug. 30, 1862.
177	Dowus, S. N., Pt., H, 19th Maine, age 25.	June 18, 18, '64.	Right; flap. Surg. S. H. Plumb, 82d N. Y. Disch'd Mar. 16, '65.
178	Dreibilbis, A., Pt., G, 96th Penn., age 21.	June 1, 3, '64.	Right; circ. Surg. D. W. Bland, 96th Penn. Disch'd Apr. 6, '65.
179	Drost, M., Pt., K, 1st Maryland, age 29.	June 3, 4, '64.	Right; flap. Discharged June 3, 1865.
180	Drury, J. T., Lieut., I, 17th Indiana, age 25.	Sept. 19, 19, '63.	Left; circ. Surg. A. Ewing, 13th Mich. Disch'd June 1, 1864.
181	*Dunkin, J. H.*, Pt., E, 6th Virginia.	May 12, 13, '64.	Left; circ. Surg. T. B. Ward, 6th Virginia. Recovered.
182	Dunn, J. R., Pt., H, 96th New York, age 35.	May 15, 15, '64.	Left: flap. Discharged January 25, 1865.
183	*Durall, A.*, Pt., A, 1st Virginia Art'y, age 18.	July 14, 14, '64.	Right. To prison March 22, '65.
184	Dyer, C. F., Pt., A, 12th Mass., age 24.	Dec. 13, 14, '62.	Left; ant. post. flap. Oct. 8, '63, re-amp. middle third. Disch'd March 17, 1864.
185	Eaton, G. W., Pt., A, 6th Maine, age 21.	June 3, 3, '64.	Left; flap. Discharged December 3, 1864.
186	Edmunds, J., Pt., I, 32d Col'd Troops, age 27.	Feb. 11, 11, '65.	Right; circ. Discharged October 28, 1865.
187	Edwards, J. A., Pt., G, 10th Mich., age 24.	Sept. 1, 2, '64.	Right: flap. Surg. C. H. Mills, 125th Ill. Disch'd July 1, '65.
188	Eisenhart, S. A., Corp., M, 8th Penn. Cav., age 26.	June 24, 25, '64.	Right; circular. Discharged October 19, 1864.
189	Eldridge, N., Pt., D, 77th New York, age 27.	Mar. 25, 25, '65.	Left; circ. Surg. E. Phillips, 6th Vermont. Disch'd Aug. 12, '65.
190	Elligott, T., Pt., I, 105th New York.	Dec. 13, 14, '62.	Left; long post. flap. Discharged Nov. 6, 1863. *Spec.* 2714.
191	Elliott, J., Lieut., 2d Artillery.	Aug. 21, 21, '64.	Left; circ. Surg. A. F. Whelan, 1st Mich. S. S. Retired Feb. 1, 1865. Died April 18, 1871.
192	Elliott, W., Pt., A, 7th New Hamp., age 22.	Oct. 23, 23, '64.	Right; flap. Surg. G. C. Jarvis, 7th Conn. Disch'd June 13, '65.
193	Ellis, L., Pt., 6th Maine Battery, age 23.	June 3, 3, '64.	Left; flap. Disch'd December 29, 1864.
194	Eagle, G. W., Pt., E, 11th Ohio Cav., age 19.	Aug. 28, 29, '62.	R't; don. flap. Surg. J. E. Summers, U.S.A. Disc'd Mar. 14, '63. Died Jan. 18, 1871. *Spec.* 314.
195	Erskine, W. M., Pt., B, 1st Maine Heavy Artillery, age 20.	May 31, 31, '64.	Left. Surg. C. H. Pegg, 8th N. Y. Art. July 6, re amp. at up. th'd. Disch'd Oct. 28, '64. *Spec.* 3173.
196	Evertson, J., Lieut., G, 82d New York, age 27.	July 3, 4, '63.	Left. Surg. G. Chaddock, 7th Mich. Disch'd June 12, 1864.
197	*Fairy, P. W.*, Serg't, G, 4th S. C. Cav., age 29.	May 28, 29, '64.	Left; ant. post. flap. Recovered.
198	Farrell, T., Pt., E, 111th New York.	Mar. 31, 31, '65.	Right; flap. Surg. W. Vosburg, 111th N. Y. Disch'd July 25, '65.
199	Favour, C. L., Corp'l, H, 16th Maine, age 21.	July 1, 2, '63.	Left: flap. Discharged November 28, 1863.
200	Fayent, F., Pt., D, 7th Wisconsin, age 23.	May 5, 7, '64.	Right; circ. Disch'd Oct. 3, '64. Stump never healed permanently. Died Oct. 8, 1870.
201	Fennee, J., Pt., E, 6th Missouri.	May 22, 22, '63.	Right; flap; gangrene. Disch'd October 18, 1863.
202	Ferguson, A., Pt., G, 88th Pennsylvania, age 21.	May 8, 9, '64.	Right; circ. Surg. J. W. Rawlins, 88th Penn. Disch'd July 4, '65.
203	Ferris, J. A., Pt., A, 2d Conn. H. Art., age 29.	June 1, 1, '64.	Right; circ. Surg. H. Plumb, 2d Conn. Art. Gangrene. Disch'd August 4, 1865.
204	Fezer, H., Pt., K, 7th Ohio, age 21.	Nov. 27, 27, '63.	Left; circ. Surg. C. J. Bellows, 7th Ohio. Disch'd June 24, '64.
205	Fink, R. P., Pt., F, 16th Penn. Cavalry, age 21.	April 21, 22, '64.	Right; circ. Disch'd September 28, 1864.
206	Finkbeiner, C., Pt., L, 3d Ohio Cavalry, age 18.	Oct. 25, 25, '64.	Right; flap. Disch'd March 17, 1865.
207	Fisher, J., Pt., E, 8th Indiana Cav., age 18.	Mar. 9, 9, '64.	Left. Discharged June 25, 1864.
208	Fisher, J., Pt., D, 76th Pennsylvania, age 21.	July 30, 31, '64.	Left; circ. Surg. D. Merritt, 55th Penn. Re-amputation. Disch'd January 27, 1865.
209	Fisk, J., Corp'l, D, 19th Iowa, age 24.	Mar. 27, 27, '65.	Left. Surg. L. M. Sloanaker, 19th Iowa. Disch'd June 5, 1865.
210	*Fitch, E.*, Corp'l, D, 23d Virginia.	Sept. 19, 20, '64.	Left; circ. Surg. J. M. McGuire, C. S. A. To prison Jan. 5, 1865.
211	Flemmer, C., Pt., H, 4th Col'd Troops, age 20.	June 15, 15, '64.	Left; circular. Discharged Feb. 10, 1865.

[1] Fisher (G. J.), *Report of Fifty-seven Cases of Amputations, in the Hospitals near Sharpsburg, Md., after the Battle of Antietam September* 17, 1862, in *American Journal Medical Sciences*, 1863, Vol. XLV, p. 48.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
212	Flesh, J., Pt, B, 73d Ohio, age 23.	May 14, 14, '64.	Right; flap. Surg. I. N. Hines, 73d Ohio. Disch'd Sept. 24,'64. Died Dec. 3, 1868; consumption.
213	Flower, E. W., Pt., E, 8th Michigan, age 22.	May 24, 24, '64.	Right; circ. Surg. W. C. Shurlock, 51st Penn. Discharged February 1, 1865.
214	Fluetsch, J. L., Pt., K, 15th Missouri, age 30.	May 14, 14, '64.	Left; circ. Surg. W. P. Pierce, 88th Ill. Disch'd Mar. 20, '65.
215	Flynn, Patrick, Pt., C, 12th Infantry, age 31.	May 5, 5, '64.	Left; flap. Surg. G. T. Stevens, 77th N. Y. Disch'd Feb. 28,'65. Died April 13, 1872.
216	Foley, J., Serg't, E, 35th Iowa, age 25.	July 14, 14, '64.	Left; circ. Surg. G. L. Lucas, 47th Ill. Disch'd Oct. 17, 1865.
217	Folk, N., Pt., K, 93d Pennsylvania, age 31.	Sept. 22, 22, '64.	Left; flap. Surg. E. R. Umberger, 93d Penn. Re-amp. at junc. mid. and lower thirds. Discharged October 2, 1865.
218	Folsom, H. W., Pt., E, 31st Maine, age 26.	April 6, 6, '65.	Left; flap. Discharged July 7, 1865.
219	Ford, T., Pt., C, 69th Indiana.	April 9, 9, '65.	Left; flap. Surg. W. A. Babcock, 76th Ill. Mustered out, 1865.
220	*Foster, T. F.*, Lieut., H, 55th Alabama, age 24.	July 20, 21, '64.	Right; ant. post. flap. Provost Marshal Dec. 8, 1864.
221	Foy, P., Pt., H, 8th Pennsylvania.	May 1, 1, '63.	Right; circ. Discharged February 16, 1864.
222	Friel, J., Pt., H, 63d Pennsylvania.	Aug. 29, 29, '62.	Right. Discharged January 5, 1863.
223	Fry, J. J., Pt., D, 78th Illinois, age 20.	Sept. 1, 1, '64.	Left; double flap. Surg. S. C. Moss, 78th Ill. Gangrene. Discharged July 6, 1865.
224	Fulkineer, J. M., Pt., E, 3d W. Va. Cav., age 19.	July 24, 24, '64.	Left; flap. A. Surg. T. Morton, 3d West Virginia Cavalry. Discharged July 18, 1865.
225	Gallup, S. H., Corp'l, G, 18th Conn., age 43.	June 5, 5, '64.	L't; post. flap. Surg. L. Holbrook, 18th Conn. Disch'd May 4, 1865.
226	Ganthrop, H., Lieut., F, 4th Delaware, age 24.	April 1, 1, '65.	Right. Surg. D. E. Wolfe. 3d Delaware. Recovered.
227	Garrity, T., Pt., D, 24th Massachusetts.	June 1, 1, '63.	Right; circ. Surg. S. A. Green, 24th Mass. Disch'd Sept. 21,'63. Nov. 30, '67, re-amp. mid. third.
228	Gatchell, C. H., Serg't, E, 1st Maine Heavy Artillery, age 24.	May 18, 19, '64.	Left; double flap. Surg. H. F. Lyster, 5th Mich. Disch'd June 24, 1865.
229	Gault, T. J., Pt., F, 3d Tennessee, age 22.	May 14, 14, '64.	Right; flap. Discharged.
230	Gavin, S., Pt., L, 15th Connecticut.	Mar. 8, 10, '65.	Left; flap. Confederate surgeon. Disch'd June 29, 1865.
231	Geiger, J., Pt., D, 46th Pennsylvania, age 27.	June 20, 20, '64.	Right; circular. Disch'd May 29, 1865.
232	Geissler, E., Corp'l, K, 3d N. J. Cav., age 36.	Aug. 17, 19, '64.	Left; dou. flap. Surg. H. Fearn, 175th N. Y. Disch'd Sept. 23,'65.
233	Gibson, H., Corp'l, F, 21st Michigan, age 30.	Mar. 19, 20, '65.	Left; flap. Confederate surgeon. Discharged.
234	Gilmore, G., Pt., G, 33d Illinois, age 19.	Mar. 31, 31, '65.	Right; circ. Surg. A. T. Bartlett, 33d Mo. April 22, rem. of half inch of bone. Disc'd Oct. 15,'65.
235	*Gladson, W. D.*, Serg't, D, 44th N. Carolina.	Aug. 21, 21, '64.	——. Surg. W. R. Wilson, C. S. A. Retired Feb. 17, 1865.
236	Glascoe, W., Pt., G, 29th Connecticut.	Oct. 27, 27, '64.	Left; circ. Surg. G. C. Jarvis, 7th Conn. Disch'd Aug. 7, '65.
237	Glaser, J., Serg't, C, 15th N. Y. H'vy Art., age 37.	July 8, 9, '64.	Right; circular. Disch'd April 13, 1865.
238	Glassie, J., Pt., B, 63d New York, age 22.	June 3, 3, '64.	Left; oval flap. Surg. P. E. Hubon, 28th Mass. June 25, amp. lower third thigh. Mar. 19, '65, seq. rem. Disch'd Aug. 15, '65. Died Nov. 12, '67. *Spec.* 3100.
239	Gonderman, C., Pt., C, 98th Penn., age 19.	June 8, 8, '64.	Left; circular. Discharged May 30, 1865.
240	Goodwin, A., Corp'l, B, 30th Ohio, age 20.	June 27, 27, '64.	Left; circ. A. Surg. C. B. Richards, 30th Ohio. Disch'd Feb. 17,'65.
241	Goodspeed, H. M., S'g't, C, 30th Indiana, age 25.	July 4, 4, '64.	Right; circ. Surg. S. H. Kersey, 36th Ind. Duty Sept. 21, 1864.
242	*Gordon, C. H.*, Pt., B, 33d Miss., age 24.	Nov. 30, 30, '64.	Right; circ. To Provost Marshal March 7, 1865.
243 } 244 }	Gordon, J., Teamster U. S. service, age 38.	Aug. 30, Sep. 1, '62.	Both. A. A. Surg. M. J. Davis. Recovered.
245	Gordon, W., Pt., C, 2d Iowa Cavalry.	May 9, 9, '62.	Right. A. Surg. G. H. Noyes, 2d Iowa Cav. Disch'd Aug. 11,'62.
246	Grahame, F., Corp'l, A, 6th Wis., age 26.	May 10, 10, '64.	Right. Sept. 7, re-amp. at tubercle of tibia. Disch'd August 22, 1865. *Spec.* 3696.
247	Grant, A. A., Pt., A, 2d Vermont, age 27.	May 5, 6, '64.	Left; flap. December 2, bone removed. Disch'd May 29, '65.
248	*Grant, A. D.*, Pt., C, 8th South Carolina, age 19.	July 2, 2, '63.	Right. Exchanged Nov. 12, '63.
249	Grant, E. L., Pt., F, 145th Pennsylvania, age 20.	June 8, 8, '64.	Right; circ. Surg. G. L. Potter, 145th Penn. Disch'd May 15,'65.
250	*Grant, T.*, Pt., D, 21st South Carolina, age 19.	June 18, 19, '64.	Right. Surg. G. T. Stevens, 77th N. Y. To prison Sept. 23, 1864.
251	Green, P., Pt., A, 66th Illinois, age 23.	Mar. 21, 22, '65.	Right; flap. Surg. J. Pogue, 66th Illinois. Disch'd July 7, 1865.
252	*Green, W. J.*, Pt., F, 42d Georgia, age 20.	May 15, 16, '64.	Right; ant. post. flap. Provost Marshal Dec. 1, 1864.
253	Greene, J. R., Pt., A, 7th Rhode Island.	Dec. 13, 13, '62.	Right; ant. post. flap. Disch'd February 6, 1863.
254	Greenfield, C. S., Pt., B, 19th Illinois.	Sept. 14, 14, '61.	Left; flap. Discharged November 19, 1861.
255	Greer, D., Pt., F, 90th Pennsylvania, age 45.	July 1, 2, '63.	Left; circ. Disch'd May 9, 1864. Died March 1, 1865.
256	*Gregory, A. H.*, Pt., K, 13th North Carolina.	Sept. 17, 17, '62.	——. Surg. J. H. McAden, 13th N. C. Recovered.
257	Griffin, G. W., Pt., G, 1st N. Y. Art'y, age 23.	Oct. 27, 28, '64.	Right; flap. Discharged August 2, 1865.
258	*Griffin, T. H.*, Lieut., C, 18th Miss., age 25.	July 2, 3, '63.	Right. Surg. J. T. Gilmore, C. S. A. Exchanged Oct. 20, 1863.
259	Gullisath, B., Capt., F, 5th Penn. Cav., age 27.	Dec. 10, 11, '64.	Right. Discharged May 15, '65.
260	Gulmire, N., Serg't, H, 8th Michigan, age 20.	Nov. 22, 23, '63.	Left; flap. Surg. J. P. Prince, 36th Mass. Disch'd May 4, '64.
261	Gutman, C., Pt., B, 19th Wisconsin, age 27.	Oct. 27, 29, '64.	Right; circ. Surg. J. Harrison, C. S. A. Disch'd May 23, 1865.
262	Haight, L., Pt., F, 6th Michigan, age 23.	July 24, 24, '64.	Right. Surgeon E. Powell, 72d Ill. Gang. Disch'd Jan. 3, '65.
263	*Halford, J. H.*, Pt., G, 12th Louisiana, age 26.	July 28, 28, '64.	Left; flap; gang. Recovered.
264	*Hallewanger, J.*, Serg't, H, 3d S. C., age 24.	July 3, 4, '63.	Left. Exchanged November 12, 1863.
265	Hammond, G. M., Lieut., A, 86th New York.	July 2, 2, '63.	Left; circular. Discharged September 22, 1863.
266	Hammond, J. A., Corp'l, C, 11th Maine, age 22.	Aug. 14, 14, '64.	Left; circ. Discharged April 17, 1865.
267	*Hamrick, M.*, Pt., D, 19th Virginia Cavalry.	Oct. 13, 13, '63.	——. Surg. — Gramnon, C. S. A. Recovered.
268	Handley, J. R., Pt., K, 11th Conn., age 23.	June 18, 18, '64.	Left; circ. Surg. G. T. Stevens, 77th N. Y. Disch'd May 7, '65.
269	Hanlin, T., Pt., E, 10th West Virginia.	Sept. 19, 20, '64.	Right; flap. Discharged July 20, 1865.
270	*Hargrove, B. F.*, Lieut., L, 12th La., age 31.	Nov. 30, 30, '64.	Right; circ. Provost Marshal March 7, 1865.
271	Harmon, S., Pt., I, 105th Pennsylvania, age 27.	April 9, 9, '65.	Right; flap. Mustered out July 1, 1865.
272	*Harney, W. A.*, Pt., B, 27th North Carolina.	May 5, 5, '64.	Left. Surg. E. L. Howard, 27th N. C. Furloughed Jan. 23, '65.
273	Harris, A., Pt., A, 57th Ohio.	April 6, 7, '62.	Right. Discharged June 13, '62.
274	*Harrison, T. J.*, Pt., B, 15th Georgia.	Nov. 18, 18, '64.	Left; circular. Surgeon ——, 15th Georgia. Recovered.
275	Hart, C., Pt., D, 148th Pennsylvania.	May 3, 3, '63.	Right. Surg. G. L. Potter, 145th Penn. Disch'd Sept. 19, 1863.
276	Hart, G. W., Pt., C, 30th Indiana.	Sept. 19, 21, '63.	Left; circular. Discharged May 12, 1864.
277	Hastings, J. R., Pt., H, 62d Penn., age 24.	July 2, 3, '63.	Right. Surg. J. Kerr, 62d Penn. July 13, re-amp. middle third. Disch'd Sept. 20, 1864.
278	Hays, G., Pt., C, 6th N. Y. H'vy Art'y, age 34.	Oct. 19, 20, '64.	Right; post. flap. Discharged September 12, 1865.
279	Hazelbaker, A. J., Pt., G, 181st Ohio, age 27.	Dec. 7, 7, '64.	Right; circ. Surg. C. H. Hood, U. S. V. Discharged.
280	Heffler, J., Pt., K, 6th Maryland, age 37.	July 23, 23, '63.	Right. Discharged June 15, 1864.
281	*Helsabeck, G. J.*, Pt., C, 33d N. C., age 20.	July 28, 28, '64.	Right; flap. Surg. D. W. Maull, 1st Del. To prison Dec. 14, '64.
282	*Henson, J. P.*, Pt., M, 7th South Carolina, age 19.	July 1, 2, '63.	Left. Exchanged Sept. 25, 1863.
283	Herrick, M. S., Lieut., E, 8th Massachusetts.	April 26, 26, '61.	Right. Surg. N. Smith, 6th Mass. Disch'd May 21, 1861.
284	Hess, G., Pt., I, 28th Penn., age 18.	June 24, 24, '64.	Left; flap. Surg. H. E. Goodman, U. S. V. Disch'd May 29, 1865.
285	Hibbs, S. T., Pt., H, 107th Illinois, age 19.	June 1, 1, '64.	Left; flap (also flesh wound right leg). Disch'd May 27, 1865.
286	Hibner, C., Pt., K, 5th Michigan, age 30.	May 6, 6, '64.	Right; ant. post. flap. Confed. surgeon. Caries. Discharged Jan. 21, 1865. March 13, 1865, re-amp. upper third: circular.
287	Hickie, J., Pt., A, 10th Vermont, age 18.	June 3, 3, '64.	Right; flap. Surg. W. A. Child. 10th Vt. Disch'd June 27, 1865.
288	Higgins, D., Pt., G, 11th Vermont, age 30.	June 2, 2, '64.	Left; ant. post. flap. Surg. C. B. Park, 11th Vermont. Gangrene. Disch'd August 11, 1865.
289	Hill, S., Pt., D, 198th Penn., age 36.	Mar. 31, 31, '65.	Left; flap. Disch'd August 7, 1865.
290	Hinchey, F., Pt., D, 8th N. Y. Heavy Artillery, age 21.	June 16, 16, '64.	Left; circ. Surg. M. F. Regan, 164th New York. Disch'd July 27, 1865.
291	*Hinson, J. D.*, Pt., A, 57th North Carolina.	Dec. 10, 12, '64.	Left. Surg. R. S. Peebles, P. A. C. S. Furloughed Jan. 26, 1865.
292	*Hobbs, J.*, Pt., H, 15th Tennessee, age 25.	Nov. 30, 30, '64.	Left; flap. To Provost Marshal March 7, 1865.
293	Holland, T. F., Pt., E, 2d Rhode Island.	May 6, 8, '64.	Right; flap. Surg. A. Holt, C. S. Discharged.
294	Holman, J. G., Serg't, F, 52d Illinois, age 22.	May 27, 27, '64.	Right; circ. Surg. E. Guelich, 9th Illinois. Disch'd July 6,'65.
295	Holmes, W. L., Pt., I, 1st Me. H'vy Art'y, age 33.	May 19, 20, '64.	Right; circ. Surg. H. F. Lyster, 5th Mich. Disch'd Jan. 20, '65.
296	Holton, C., Pt., G, 4th Tenn. Cav., age 21.	Sept. 27, 27, '64.	Right; ant. post. flap. Disch'd June 20, 1865.
297	Hoon, S., Pt., D, 63d Ohio, age 21.	July 22, 22, '64.	Left; flap. Surg. N. Gay, U. S. V. Disch'd March 12, 1865. Died Oct. 11, 1867; consumption.
298	Hoover, J. W., Pt., K, 20th Indiana, age 24.	May 9, 9, '64.	Left; circular. Disch'd September 12, 1864.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
299	Hostetter, C., Corp'l, L, 1st Penn. Cav., age 19.	April 5, 5, '65.	Right; circular. Disch'd July 7, 1865.
300	Hotchkiss, L. P., Lieut., B, 189th N. Y., age 23.	Mar. 31, 31, '65.	Right. Mustered out May 30, 1865.
301	*Hough, P.*, Pt., I, 7th Louisiana.	May 23, 23, '62.	——. Surg. — Triplett, C. S. A. Retired Feb. 21, 1864.
302	Hoyt, S., Pt., B, 16th Michigan, age 24.	June 27, 29, '62.	Left. A. A. Surg. J. Swinburne. Jan. 6, '63, re-amp. middle third. Discharged August 24, 1864.
303	Hubbs, A. H., Corp'l, B, 122d N. York, age 21.	May 6, 7, '64.	Right; ant. post. flap. Confed. surgeon. Disch'd June 14, '65.
304	*Huddleston, S. H.*, Pt., G, 44th Va., age 25.	Mar. 25, 25, '65.	Left; circular. Released June 14, 1865.
305	Hughes, H. H., Pt., C, 4th Indiana, age 28.	April 8, 8, '64.	Left; flap. Discharged June 10, 1864.
306	Hughs, P., Pt., I, 17th Ohio.	Sept. 20, 22, '63.	Right; flap. Confed. surgeon. Disch'd January 21, 1864.
307	Hulbert, E. D., Serg't, K, 83d Pennsylvania.	May 27, 28, '62.	Right; flap. Discharged August 14, 1862. Died June 13, 1868; consumption.
308	Huntley, O. P., Pt., A, 5th Mich., age 42.	May 7, 7, '64.	Right; ant. posterior double flap. Surg. W. O. Hudson, 4th Ala. Disch'd May 5, 1865.
309	Hurley, M., Pt., C, 101st Illinois, age 39.	Mar. 15, 15, '65.	R't; flap. Surg. J. M. Chapman, 123d N. Y. Disch'd June 15, '65.
310	Hyde, A. J., Pt., H, 21st Wisconsin, age 27.	May 14, 14, '64.	Right; flap. Surg. J. T. Reeve, 21st Wis. Disch'd May 22, '65.
311	Iago, H., Pt., C, 51st Pennsylvania, age 21.	May 6, 7, '64.	Right; flap. Surg. W. C. Shurlock, 51st Penn. Disch'd June 16, 1865.
312	Jackson, J. A., Corp'l, D, 49th Penn., age 32.	Sept. 19, 19, '64.	Left; circ. Surg. C. F. Crehore, 37th Mass. Disch'd Sept. 8, '65.
313	Jameson, A. W., Pt., G, 4th Ohio.	Dec. 13, 13, '62.	Left (also w'nd of arm and face). June 24, '63, re-amp. mid. third. Disch'd. Dec. 25, 1863.
314	Jellison, C. W., Pt., C, 1st Me. H. Art., age 22.	May 19, 19, '64.	Right; circular. Disch'd December 3, 1864.
315	Johnson, C., Serg't, K, 56th N. Y., age 22.	Nov. 30, 30, '64.	Left; ant. post. flap. Discharged July 9, 1865.
316	Johnson, F. M., Pt., A, 38th Indiana.	Oct. 8, 8, '62.	Right. Discharged Feb. 21, 1863.
317	Johnson, H. C., Serg't, C, 28th Ky., age 25.	Feb. 24, 25, '64.	Left; circ. Surg. F. Salter, U. S. V. Feb. 26, post. tibial artery lig. July 11, re-amp. mid. third. Disch'd June 24, 1865. Died June, 1877; effects of fall on ice.
318	Johnson, J., Pt., H, 1st Ohio Cavalry, age 25.	June 15, 15, '64.	Left; flap. Surg. R. B. McNary, 3d Ky. Cav. Disc. May 30, '65.
319	Johnson, N., Pt., H, 14th N. Y. H. Art., age 24.	July 30, Aug. 1, '64.	Left; flap. Surg. W. V. White, 57th Mass. Disch'd Oct. 21, '65.
320	Johnson, W., Serg't, F, 27th Mich., age 32.	June 19, 19, '64.	Right; flap. Surg. H. E. Smith, 27th Mich. Disch'd Sept. 19, '65.
321	Johnston, L. A., Capt., H, 11th Penn. Res.	Dec. 13, 15, '62.	Right; flap. Confed. surgeon. Discharged Oct. 5, 1863.
322	Jones, A. J., Pt., L, 1st Ohio Battery.	Oct. 19, 20, '64.	Left. Discharged May 12, 1865.
323	Jones, T., Pt., M, 2d N. York Artillery.	Aug. 14, 14, '64.	Right; ant. post. flap. Disch'd May 31, 1865.
324	Jones, W., Pt., A, 20th Maine, age 27.	Mar. 31, 31, '65.	Left; flap. Discharged June 19, 1865.
325	Jordan, G. P., Corp'l, F, 17th Maine, age 31.	May 3, 3, '63.	Right; flap. Disch'd September 16, 1863.
326	*Joye, T. E.*, Pt., E, 6th South Carolina.	May 6, 6, '64.	——. Surg. R. H. Jordan, 6th S. C. Recovered.
327	[1]Judge, B., Pt., D, 90th Illinois, age 23.	Mar. 31, Ap. 1, '63.	Left; circ. A. A. Surg. T. T. Smiley. Disch'd Feb. 20, '64. Aug. 3, '64, re-amp., flap, mid. third.
328	Jung, H., Pt., I, 46th N. York.	Aug. 30, 30, '62.	Right. Surgeon O. Shenk, 46th N. Y. Disch'd Dec. 30, 1862.
329	Justice, T. J., Pt., F, 67th Ohio.	Oct. 27, 28, '64.	Right; circ. Surg. M. S. Kittinger, 100th N. Y. Discharged.
330	Kanyon, E. H., Corp'l, F, 3d Iowa.	July 12, 12, '63.	Right; flap. Surg. B. F. Keables, 3d Iowa. Disch'd May 20, '64.
331	Kasmire, C. P., Serg't. A, 3d Me. Cav., age 28.	Sept. 19, 19, '64.	Right; circular. Disch'd March 16, 1865.
332	Kelly, F. A., Pt., H, 18th Infantry, age 23.	May 30, 30, '64.	Left; flap. Discharged September 20, 1864.
333	Kelly, G., Pt., C, 122d Illinois.	Dec. 31, 31, '62.	Left; flap. Discharged April 7, 1863.
334	Kelly, J., Pt., H, 107th Pennsylvania, age 23.	June 19, 20, '64.	Left; ant. post. flap. Surg. J. F. Hutchinson, 107th Penn. Disc'd May 28, 1865. *Spec.* 4141.
335	Kelly, J., Pt., G, 38th Wisconsin, age 24.	Feb. 16, 16, '65.	Right; flap. Surg. W. C. Shurlock, 51st Penn. Dis. Oct. 11, '65.
336	Kelly, T., Pt., I, 11th Maine, age 39.	May 18, 18, '64.	Right; flap. Surg. N. F. Blunt, 11th Me. Must. out Nov. 18, '64.
337	Kelly, W., Pt., G, 26th Iowa, age 48.	Nov. 6, 6, '62.	Left; flap. Discharged December 26, 1862.
338	Kennedy, J. M., Corp'l, G, 20th Me., age 25.	July 10, 10, '64.	Left; ant. post. flap. Surg. J. Thomas, 118th Penn. Disch'd April 18, 1865.
339	Kenner, L. C., Pt., H, 71st New York, age 21.	July 2, 3, '63.	Left. Discharged.
340	Kenney, C., Pt., B, 31st Maine, age 39.	May 24, 24, '64.	Left; ant. post. flap. Discharged February 11, 1865.
341	Kidder, N. P., Pt., M, 1st N. H. Cavalry, age 20.	Nov. 12, 12, '64.	Left; flap. Surg. J. W. Smith, 2d Ohio Cav. Disc. June 2, '65.
342	Kierman, M., Pt., H, 2d Louisiana.	May 27, 28, '63.	Left; flap. Disch'd April 18, '64.
343	Kimball, L. N., Pt., H, 22d Mass., age 19.	May 10, 10, '64.	July 2, 1864, re-amputation. Right; ant. post. flap; small art. ligated. Disch'd Oct. 17, 1864. Jan., '67, amp. thigh, low. third.
344	Kimberly, C. A., Lieut., B, 112th N. Y., age 22.	Sept. 29, 29, '64.	Left; circular. Disch'd March 23, 1865.
345	Kinnard, H., Pt., H, 39th Colored Troops.	July 30, 31, '64.	L't; circ. Surg. D. MacKay, 29th C. Troops. Disch'd Dec. 20, '64.
346	Kinner, G. W., Corp'l, G, 139th N. Y., age 31.	July 10, 10, '64.	Right. Disch'd June 10, 1865.
347	Kirkpatrick, W., Pt., C, 2d Iowa, age 18.	Aug. 18, 18, '64.	Left; flap. Surg. W. C. Jacobs, 81st Ohio. Disch'd Mar. 23, '65.
348	Kirwin, P., Pt., A, 155th New York, age 20.	May 18, 18, '64.	Left; circ. Disch'd Mar. 27, '65. Died April 3, '68; consumption.
349	Knecht, A., Lieut., A, 52d Ohio, age 27.	Aug. 7, 7, '64.	Right; flap. . Surg. H. M. Duff, 52d Ohio. Disch. March 18, '65.
350	*Knight, J. J.*, Pt., I, 31st Georgia, age 25.	Sept. 19, 21, '64.	Right; circ. A. Surg. — Dorsey, 1st Md. Cav., C. S. A. To Provost Marshal April 1, 1865.
351	Knott, D., Pt., K, 4th N. Jersey, age 40.	June 1, 1, '64.	Right; circular. Disch'd May 3, 1865.
352	Knowlton, H. L., Corp'l, H, 11th Vt., age 22.	June 1, 1, '64.	Left; flap. Surg. D. M. Goodwin, 3d Vt. Disch'd June 2, 1865.
353	Kopp, E., Pt., K, 12th N. Jersey, age 32.	Mar. 25, 26, '65.	Right; flap. March 27, left mid. third, flap. Surg. A. Satterthwaite, 12th N. J., and Acting Staff Surg. W. J. Burr. Discharged Oct. 3, 1865.
354	Kriminger, C., Corp'l, C, 2d Kentucky.	May 21, 21, '62.	Right. Surg. D. J. Griffith, 2d Ky. Disch'd Jan. 19, 1863.
355	Kunz, L., Pt., E, 126th Ohio, age 46.	May 6, 6, '64.	Right; flap. Discharged March 7, 1865.
356	*Ladford, S. E.*, Pt., H, 2d N. C. Battery, age 20.	July 3, 3, '63.	Right. Exchanged November 12, 1863.
357	La Fleur, A. B., Serg't, H, 4th Mich., age 22.	May 10, 10, '64.	Right; flap. June 20, 2 ins. of stump removed. Dis. June 5, '65.
358	*Lambeth, A. M.*, Pt., B, 23d North Carolina.	May 9, 9, '64.	——. Surg. R. J. Hicks, 23d N. C. Recovered.
359	Lampman, A., Pt., K, 36th Wis., age 36.	June 22, 23, '64.	Left. Surg. W. J. Burr, 42d New York. Disch'd Aug. 24, 1864.
360	Lampman, J. M., Corp'l, H, 17th Mich., age 26.	Nov. 16, 17, '63.	Left; flap. Confederate surgeon. Discharged May 17, 1864.
361	Lancaster, T. W., Pt., K, 42d New York, age 44.	May 12, 13, '64.	Left; ant. post. flap. Surg. W. J. Burr, 42d N. Y. Recovered. Transferred July 18, '64. Died March 8, 1865.
362	*Langston, W.*, Pt., F, 1st Texas, age 37.	Sept. 17, 18, '62.	Right. Discharged November 12, 1862.
363	Lapp, C., Pt., F, 5th Ohio, age 22.	May 25, 26, '64.	Left; flap. Surg. W. Altman, 28th Penn. Disch'd Feb. 24, '65.
364	Larabee, C., Pt., A, 142d New York, age 46.	Oct. 27, 27, '64.	Left; circ. Surg. A. C. Barlow, 62d Ohio. Necrosis. June 15, 1865, re-amp. mid. third. Discharged Oct. 13, '65. *Spec.* 4338.
365	Latney, T., Pt., D, 36th Col'd Troops, age 21.	April 6, 7, '65.	Right. Discharged January 31, 1866.
366	Law, H., Pt., D, 34th Illinois.	De. 31, '62, Jan. 2, '63.	Right; flap. Confed. surg. Jan. 27, re-amputation. Discharged.
367	Lauf, J., Pt., F, 91st N. York, age 22.	Mar. 31, 31, '65.	Left; ant. post. flap. Discharged July 27, 1865.
368	Lee, D., Pt., G, 2d N. Y.	June 16,	Both; circ. A. Surg. O. S. Paine,
369	H'vy Artillery, age 20.	16, '64.	2d N. Y. H'vy Art'y. Disch'd May 31, '65. Died Sept. 25, '74.
370	Lehr, G. M., Corp'l, G, 11th Missouri.	May 22, 24, '63.	Right; flap. Ass't Surg. H. M. Sprague, U. S. A. Discharged.
371	*Lemons, J.*, Pt., K, 38th Virginia.	Aug. 30, 30, '62.	Left. Surg. — McAlbine, C. S. A. Recovered.
372	Le Roy, J. D., Pt., C, 4th N. Y. Art., age 44.	May 19, 20, '64.	Left; circ. Surg. W. S. Thompson, U. S. V. Disch'd March 7, '65.
373	*Lewis, J. A.*, Pt., F, 17th Florida, age 22.	July 28, 28, '64.	Right; circular. Sept. 8, re-amp. in up. third. Trans. Sept. 22, '64.
374	Linn, E. D., Pt., C, 178th Ohio, age 36.	Dec. 14, 14, '64.	Right; ant. post. flap. Surg. J. Campbell, 178th Ohio. Disch'd June 29, 1865.
375	Little, F., Pt., B, 53d Penn., age 18.	June 3, 3, '64.	Right; circ. Surg. J. W. Wishart, 140th Penn. Oct. 15, excision of 1 inch tibia and fibula. Disch'd December 8, 1864.
376	Little, J. S., Lieut., A, 93d New York, age 29.	May 23, 23, '64.	R't; flap. A. Surg. J. D. Stewart, 74th N. Y. Disch'd Sept. 26, '64.
377	Littlefield, L., Pt., K, 31st Maine, age 26.	July 30, 30, '64.	Left; circular. Disch'd December 23, 1864.
378	Livingston, H. B., Pt., A, 48th New York, age 30.	May 16, 16, '64.	Right; flap. Surg. J. L. Mulford, 48th N. Y. Disch'd Oct. 19, '64.
379	Lockwood, J., Pt., G, 5th West Virginia, age 29.	Aug. 29, 29, '62.	Right; ant. post. flap. Surg. P. R. Randall, 5th W. Va. Discharged March 24, 1863.
380	Loveland, W., Pt., E, 20th Conn., age 35.	July 20, 20, '64.	Right; circular. Surg. J. W. Terry, 20th Conn. Discharged January 21, 1865.
381	Lucius, W. M., Colored serv't, 2d Mich., age 12.	June 8, 8, '64.	Right. Transferred June 17, '64.

[1] SMILEY (T. T.), *Gunshot Wounds, from Arkansas Post*, in the *Boston Medical and Surgical Journal*, 1863, Vol. LXIX, p. 157.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
382	Lynch, D., Pt., A, 33d Wisconsin, age 29.	Mar. 30, 30, '65.	Left; circular. Disch'd July 17, 1865.
383	Lynch, M. J., Pt., B, 3d N. Y. Light Artillery, age 20.	Oct. 22, 22, '64.	Right; circ. Disch'd March 10, '65. March 12, '65, rem. 4 ins. necro. fibula. *Spec.* 1406.
384	Lyons, J., Pt., H, 20th Mass., age 27.	July 28, 28, '64.	Right; flap. Confed. surgeon. Disch'd Dec. 28, 1864.
385	Mab, E., Pt., H, 24th Indiana.	May 16, 17, '63.	Right; flap. Surg. R. B. Jessup, 24th Ind. Disch'd July 31, '63.
386	Mace, J., Pt., B, 4th N. Y. Cav., age 22.	June 12, 12, '64.	Left; circ. Surg. B. G. Streeter, 4th N. Y. Cav. Discharged.
387	Mahan, J., Pt., G, 18th Penn. Cav., age 19.	Oct. 19, 21, '64.	Right; circular. Disch'd July 17, 1865.
388	Major, W. T., Corp'l, E, 48th N. Y., age 29.	July 30, 30, '64.	Left; long post. flap. Surg. J. L. Mulford, 48th N. Y. Disch'd July 14, 1865.
389	*Malock, A. F.*, Pt., B, 23d N. C., age 29.	July 1, 2, '63.	Left. Retired from service Dec. 21, 1864.
390	*Malone, M.*, Pt., K, 6th N. C., age 26.	July 1, 2, '63.	Right; circ. Transferred for exchange September 10, 1863.
391	*Malony, M.*, Pt., G, 25th Virginia.	July 3, 3, '63.	——. Surg. G. L. Miller, C. S. A. Recovered.
392	Mance, G., Serg't, C, 14th N. Y. S. Militia, age 24.	May 8, 8, '64.	Right; flap. Discharged Sept. 27, 1864.
393	[1]Mansur, N., Pt., A, 5th N. Hampshire, age 42.	July 27, 27, '64.	Right; bi-lat. flap. Surg. J. H. Buckman, 5th N. H. Disch'd June 18, 1865.
394	Marple, T. J., Corp'l, K, 91st Penn., age 34.	June 18, 18, '64.	Left; circular. Discharged Oct. 21, 1864.
395	Marsh, E. C., Pt., H, 8th Michigan, age 17.	June 3, 3, '64.	Right; flap. Surg. W. B. Fox, 8th Michigan. Discharged.
396	Martin, A. P., Pt., I, 5th Tenn., age 21.	June 2, 2, '64.	Left; circular. June 7, re-amp. mid. third. Disch'd Mar. 31, '65.
397	Martin, F., Pt., K, 17th New York, age 25.	Mar. 19, 19, '65.	Left; circular. Discharged June 9, 1865.
398	*Martin, J. L.*, Serg't, B, 41st Tenn., age 23.	April 2, 2, '65.	Left; circular. Released July 5, 1865.
399	Martin, L., Pt., E, 29th Colored Troops.	July 30, 30, '64.	Left; circ. (also right arm at up. third). Surg. D. MacKay, 29th Col'd Troops. Also w'd of face. Discharged Dec. 6, 1865.
400	Martins, W. F., Capt., I, 1st Mass. H. A., age 47.	May 19, 19, '64.	Left; flap (also w'd right elbow). Disch'd Oct. 5, '64. *Spec.* 4498.
401	Mathews, H. C., Pt., H, 116th Ohio, age 21.	April 2, 2, '65.	Left; circ. June 23, '65, re-amp. in middle third. Disch'd Sept. 8, 1865. *Spec.* 4334.
402	McAnalty, H., Corp'l, A, 69th New York.	Aug. 25, 27, '64.	Left. Ass't Surg. H. S. Bradley, C. S. A. Disch'd March 27, '65.
403	McCarty, P., Pt., F, 16th Infantry, age 19.	May 28, 28, '64.	Left; ant. post. flap. August 20, re-amp. Disch'd March 22, '65. Died Nov. 4, 1879.
404	McClaughry, W., Pt., A, 155th N. Y., age 34.	June 3, 3, '64.	Left; lateral flap. Surg. J. A. Spencer, 182d N. Y. Disch'd April 13, '65. Oct. 3, '68, re-amp. at middle third.
405	[2]McCollom, J., Corp'l, B, 1st D. C. Cav., age 23.	Sept. 29, 29, '64.	Left; ant. post. flap. Disc'd June 23, 1865. Oct. 12, '65, re-amp.
406	McCommon, J. S., Capt., K, 73d Ohio, age 26.	June 27, 27, '64.	Left; flap. Surg. J. W. Hastings, 33d Mass. Disch'd Nov. 2, '64.
407	McCoy, J., Pt., F, 64th New York, age 23.	May 18, 18, '64.	Left. Surg. G. L. Potter, 145th Penn. Disch'd Jan. 20, 1866. Died May 29, 1868.
408	*McCracken, J. D.*, Lieut., K, 7th Texas, age 37.	Nov. 30, Dec. 1, '64.	——; ant. post. flap. Surg. — Richardson, 7th Texas. Provost Marshal March 7, 1865.
409	McCurley, F., Serg't, I, 6th Maryland, age 30.	June 1, 1, '64.	Left; flap. Surg. C. T. Simpers, 6th Md. Disch'd Nov. 10, 1864.
410	McDonald, B., Pt., B, 16th N. Y. H. A., age 35.	Oct. 7, 7, '64.	Right; circ. Disch'd August 11, 1865.
411	McDonald, J., Pt., K, 11th Penn. Cav., age 24.	Oct. 3, 3, '64.	Right; bi-lat. flap. Discharged Sept. 19, '65. Died September 26, 1866; chronic diarrhœa.
412	McElroy, C., Pt., E, 36th Wisconsin, age 31.	June 1, 1, '64.	Right; ant. post. flap. Surg. H. A. Martin, U. S. V. Discharged May 6, 1865.
413	McGee, J. H., Pt., L, 1st Ohio L. Art., age 24.	Oct. 19, 19, '64.	Right; circ. Disch'd May 17, 1865.
414	McGlaflin, C., Pt., K, 3d Vermont, age 20.	Sept. 19, 19, '64.	Right; flap. Surg. W. A. Barry, 98th Penn. Discharged October 3, 1865.
415	McGuire, H., Pt., G, 120th New York, age 34.	Oct. 27, 28, '64.	Left; circ. Disch'd June 16, '65.
416	McHenry, J. H., Pt., H, 48th Illinois, age 21.	July 7, 7, '63.	Left; flap. Surg. A. Goslin, 48th Ill. Discharged Nov. 12, 1864. Died April 5, 1868.
417	McIntire, H. M., Lieut. Col., 1st Penn. Res.	June 30, 30, '62.	Left. Disch'd January 7, 1863. Died June 12, 1863.
418	McInturf, S., Pt., I, 2d East Tenn., age 29.	Oct. 10, 10, '63.	Left; ant. post. flap. Surg. J. T. Smith, 2d Ohio Cav. Disch'd.
419	McLain, E., Pt., D, 125th Ohio, age 20.	May 14, 16, '64.	Left; circ. Discharged June 21, 1865.
420	McLean, J., Lieut., A, 40th Illinois.	April 6, 6, '62.	Left. Resigned September 23, 1862
421	[3]McQuaid, F., Pt., C, 95th New York, age 22.	June 18, 18, '64.	Right; ant. post. flap; gangrene. Disch'd Nov. 29, 1864. Nov. 28, 1865, sequestra removed.
422	Meader, G. P., Pt., G, 29th Maine, age 25.	Oct. 19, 20, '64.	Left. Disch'd August 12, 1865.
423	*Merrett, J.*, Serg't, D, 8th Arkansas, age 29.	Nov. 30, Dec. 1, '64.	Left; circular. Provost Marshal March 7, 1865.
424	Mershon, J. N., Pt., 6th N. Y. Battery, age 19.	May 30, 31, '64.	Left; circular. Discharged September 24, 1864.
425	Metz, J., Pt., G, 142d Penn., age 20.	May 22, 22, '64.	Left; circular; gangrene; bone removed. Disch'd July 4, 1865.
426	Miller, C., Pt., H, 2d Penn. Art'y, age 44.	Sept. 29, 30, '64.	Right; double flap. Confederate surgeon. Disch'd July 12, '65.
427	Miller, H. H., Corp'l, K, 117th N. Y., age 24.	Aug. 29, 29, '64.	Left; flap. Surg. H. W. Carpenter, 117th N. Y. Discharged May 31, 1865.
428	Miller, P. D., Corp'l, I, 87th Penn., age 25.	June 1, 1, '64.	Right; circ.; gangrene. Disch'd October 13, 1864.
429	*Miller, R. M.*, Pt., G, 14th North Carolina.	May 3, 3, '63.	Right. A. Surg. J. E. Logan, 14th N. C. Recovered.
430	Miller, W. S., Pt., H, 116th Penn., age 19.	May 18, 18, '64.	Left; circ. Surg. J. W. Wishart, 140th Penn. Disch'd July 10, '65. Feb., 1871, re-amp. in up. third.
431	Mills, H., Pt., A, 14th N. Y. Art'y, age 22.	July 10, 10, '64.	Right; flap. Surg. G. W. Snow, 35th Mass. Disch'd June 19, 1865; subsequent operation.
432	Miser, J. W. K., Pt., G, 30th Ohio, age 20.	July 3, 3, '64.	L't; circ. A. Surg. C. B. Richards, 30th Ohio. Disch'd June 15, '65. Nov. 24, '66, re-amp. upper third.
433	Mitchell, C. L., Serg't, F, 55th Mass., age 35.	Nov. 30, Dec. 1, '64.	Right; flap. Disch'd Aug. 29, 1865.
434	Molter, J., Pt., D, 39th New York, age 25.	Dec. 1, 3, '63.	Left; circ. Confederate surgeon. Disch'd August 31, 1864.
435	*Moore, J. B.*, Pt., D, 12th Tennessee.	July 20, 20, '64.	Right; circular. Recovered.
436	Moore, W. H., Comm'y Serg't, 8th New York Cavalry, age 24.	Mar. 2, 2, '65.	Right; ant. post. flap. Surg. P. E. Siekler, 8th N. Y. Cavalry. Disch'd June 19, 1865.
437	Morris, T., Pt., F, 4th R. Island, age 22.	July 30, 31, '64.	Right; ant. post. flap (also w'd of left leg). Disch'd Mar. 11, '65.
438	Morrison, T. W., Pt., I, 83d Indiana, age 30.	July 28, 29, '64.	Right; flap. A. Surg. C. B. Richards, 30th Ohio. Discharged November 29, 1864.
439	Morrison, W. H., Pt., F, 90th New York.	June 14, 14, '63.	Left; lat. flap. Surg. E. S. Hoffman, 90th N. Y. Disch'd Sept. 29, 1864. Died July 8, 1869; consumption.
440	[4]Morrissey, P., Pt., K, 20th Mass., age 39.	Dec. 11, 12, '62.	Left. Surg. N. Hayward, 20th Mass. Disch'd June 18, 1864. July 25, '64, re-amp., flap. Died October 26, 1870.
441	Morrow, B. M., Major, 205th Penn., age 30.	April 2, 2, '65.	Right; circ. Surg. W. G. Hunter, 211th Penn. Disch'd June 3, '65. Died March 7, '67; consumpt'n.
442	Mullen, E., Pt., G, 161st New York.	Feb. 16, 16, '63.	Left; circ. A. Surg. J. S. Dolson, 161st N. Y. Disch'd May 31, '63.
443	*Mulvay, M.*, Pt., G, 25th Virginia.	July 3, 3, '63.	Left. Surg. G. L. Miller, C. S. A. Retired January 4, 1865.
444	Murdock, J., Pt., I, 7th Maine, age 41.	Oct. 19, 21, '64.	Right; ant. post. flap. Surg. G. T. Stevens, 77th N. Y. Disch'd June 22, 1865.
445	*Murphy, J. I.*, Pt., D, 14th Virginia, age 21.	July 2, 4, '63.	Left; circ. Transferred for exchange Nov. 12, 1863.
446	Murphy, W. H., 1st S'g't, B, 31st Mo., age 20.	Nov. 16, 16, '64.	Left; ant. post. flap. Surg. B. N. Boud, 27th Mo. Disch'd April 24, 1865.
447	Musselman, A. L., Corp'l, D, 71st Ohio, age 22.	Dec. 16, 16, '64.	Right; flap. Disch'd June 2, '65.
448	*Myear, F.*, Pt., B, 2d Va. Reserves.	July 9, 9, '64.	Right. Surg. — Carter, C. S. A. Recovered.
449	Nellis, E., Serg't, B, 6th Connecticut.	Aug. 28, 28, '64.	Left; circ. Surg. G. C. Jarvis, 7th Conn. Disch'd Aug. 14, 1865.
450	*Neville, W., jr.*, Pt., A, 3d Alabama.	May 3, 3, '63.	Left. Surgeon G. A. Nott, P. A. C. S. Recovered.
451	Newman, J., Pt., F, 84th New York, age 31.	May 8, 9, '64.	Right; circ. Surg. O. Smith, 14th N. Y. State Militia. Oct. 5, seq. removed. Disch'd June 6, '65. *Spec.* 3278.
452	Newman, P., Pt., C, 182d New York, age 37.	Aug. 25, 27, '64.	Left; flap. Surg. L. G. Hunt, 27th N. C. Also four other wounds. Disch'd Sept. 13, 1865.

[1]O'MEAGHER (W.), *Surgical Cases from Field Hospitals*, in the *Medical and Surgical Reporter*, 1865, Vol. XII, p. 253.

[2]MORGAN (C. R.), *Re-amputation for Intense Neuralgia in a Stump. Anæsthesia induced by Nitrous-Oxide Gas. Surgical Clinic by* Dr. T. G. MORTON, in *Medical and Surgical Reporter*, 1865, Vol. XIII, p. 365.

[3]LIDELL (J. A.), *Chronic Osteo-myelitis of Tibia following Primary Amputation and Sloughing of Stump, etc.*, in *U. S. Sanitary Commission Memoirs*, New York, 1870, Surgical Volume I, p. 297.

[4]THOMSON (WM.), *Report of Cases of Hospital Gangrene treated in Douglas Hospital, Washington, D. C.*, in *American Journal Medical Science*, 1864, N. S., Vol. XLVII, p. 384.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
453	Newman, W., Pt., D, 149th N. York, age 26.	May 25, 26, '64.	Right; flap. Surg. J.V. Kendall, 149th N.Y. Disch'd Oct. 5, '65.
454	Nichols, J. B., Pt., A, 8th Michigan, age 35.	Nov. 4, 4, '64.	Left; circular. Discharged May 25, 1865.
455	*Norman, W. H. H.*, Pt., H. 50th Ga., age 22.	July 2, 3, '63.	Left; flap. Surgeon — Davids, C. S. A. Also w'nd right thigh. Exchanged Nov. 12, 1863.
456	Northrop. A., Corp'l. G, 107th Pennsylvania.	June 20, 20, '64.	Left; flap. Discharged April 20, 1865.
457	[1]O'Beirne, W., Pt., D, 28th Mass., age 23.	July 27, 27, '64.	Left; circ. Surg. P. E. Hubon, 28th Mass. Disch'd Oct. 9, '64. Nov. 15, '67, re-amp. mid. third.
458	O'Brien. E. F., Lieut., A, 28th Mass., age 29.	June 3, 3, '64.	Left; circ. Surg. P. E. Hubon, 28th Mass. Disch'd Oct. 13, '64. Subs. V. R. C. *Spec.* 4494.
459	O'Brien, H., Pt., C, 170th New York, age 35.	June 16, 18, '64.	Left; flap. Surg. F. Douglas, 170th N. Y. Disch'd Oct. 16, '65. Mar. 1, 1867, bi-lateral flap amputation at middle third.
460	O'Brien, J., Pt., G, 66th New York, age 50.	June 22, 23, '64.	Right; lat. flap. Confed. surgeon. Disch'd Oct. 21, 1865.
461	O'Dougherty, B., Serg't, H, 33d N. J., age 29.	June 22, 22, '64.	Right; circ. Surg. J. Reily, 33d N. J. Disch'd April 3, 1865.
462	O'Driscoll, B. J., Lieut., C, 188th New York.	June 16, 16, '64.	R't; flap. Surg. W. O'Meagher, 69th N. Y. Disch'd Jan. 17, '65.
463	*O'Keer, J. M.*, Pt., D, 1st Texas, age 27.	Nov. 7, 7, '64.	Left. Transferred to prison May 30, 1865.
464	Osborne, E. J., Pt., B, 18th Ohio, age 21.	Dec. 15, 17, '64.	Right; flap. A. A. Surg. F. G. Albright. Disch'd April 6, '65.
465	Ostrander, P. V. L., Pt., B, 100th N. Y., age 28.	May 13, 13, '64.	Right; circ. Ass't Surg. W. D. Murray, 100th New York. Discharged January 13, 1865.
466	*Overstrut, W. J.*, Pt., K, 43d Miss., age 20.	Nov. 30, 30, '64.	Right; ant. post. flap. To Provost Marshal March 1, 1865.
467	Page, F., Pt., K, 3d Michigan.	April 16, 16, '62.	Both; circ. Discharged August 16, 1862.
468			
469	Palmer, J., Corp'l, F, 62d Ohio, age 22.	Oct. 13, 13, '64.	Left; circular. Surg. A. C. Barlow, 62d Ohio. Discharged.
470	Parker, D., Pt, F, 61st New York, age 29.	July 2, 4, '63.	Left; circular; gangrene. Discharged Dec. 8, 1864.
471	*Partain, J.*, Pt., D, Philip's Legion, Georgia.	May 6, 6, '64.	Right (also amputation middle third right arm). Recovered.
472	Patten, G. W., Corp'l, F, 1st Maine, age 18.	Mar. 25, 25, '65.	Left; circular. Discharged September 11, 1865.
473	Paul, P., Pt., F, 3d Infantry, age 27.	May 1, 1, '63.	Left; circular, Discharged February 11, 1864.
474	*Percy, J.*, Serg't, B, 5th Alabama.	Sept. 17, 17, '62.	Right. Confederate surgeon. Recovered.
475	Perkins, P., Pt., G, 7th Kentucky, age 20.	Sept. 18, 19, '64.	Left; circular. A. A. Surg. M. H. Head. Disch'd Oct. 5, 1864.
476	*Perry, L.*, Corp'l, G, 3d Arkansas, age 25.	July 2, 2, '63.	Left. Transferred for exchange November 12, 1863.
477	Peters, W., Pt., C, 139th Penn., age 22.	Sept. 19, 19, '64.	Right; flap. Discharged May 6, 1865.
478	Pettet, J. A., Pt., B, 8th Wisconsin.	Mar. 23, 23, '65.	Left; flap. Discharged May 22, 1865.
479	Pheiffer, P., Pt., A, 11th Penn. Cav., age 35.	Aug. 22, 22, '64.	Right; sloughing. Dec. 8, flap re-amp. middle third. Disch'd.
480	Piekering, B., Pt., A, 11th Michigan, age 22.	Nov. 25, 25, '63.	Right. Discharged August 22, 1864.
481	Pierce, F. O., Serg't, B, 14th N. H., age 28.	Oct. 19, 20, '64.	Right; ant. post. flap. Surg. E.F. Ward, 38th Mass. Discharged September 11, 1865.
482	*Pleasants, J. W.*, Pt., B, Richmond Howitzer Battery, age 22.	Sept. 19, 19, '64.	Left; circ. Surg. G. W. Semple, P. A. C. S. To Provost Marshal April. 1, 1865.
483	Plumstead, M. F., Serg't, H, 131st N. Y., age 21.	June 3. 3, '63.	Right; circ. Disch'd Mar. 30, '64. Died Jan. 11, 1867; typh. fever.
484	Pohner, M., Pt., D, 23d Kentucky, age 21.	July 27, 27, '64.	Right; circ. Surg. A.M. Morrison, 23d Ky. Disch'd April 28, '65.
485	Polly, M. H., Corp'l, A, 10th N.Y. H.A., age 23.	July 3, 3, '64.	Right; circ. Surg. O. S. Copeland, 10th N.Y. Art. Dis. May 31, '65.
486	*Poole, W. D.*, Serg't, I, 5th S. C., age 33.	Nov. 16, 16, '63.	Right; circ. To Provost Marshal December 1, 1864.
487	Porter, J., Pt., E, 16th Penn. Cav., age 20.	Aug. 16, 16, '64.	Right; lat. flap. A. Surg. A. F. Herman, 16th Penn. Cavalry. Hæm. Disch'd April 6, 1865.
488	Porter, W., Pt., B, 60th Ohio, age 22.	April 2, 2, '65.	Left; ant. post. flap. A. Surg. W. Carroll, U. S. V. Discharged July 17, 1865. *Spec.* 4140. Died June 22, 1868.
489	*Powell, J. E.*, Pt., H, 7th S. C. Battery, age 26.	May 14, 14, '64.	Right; circ. Confed. surgeon. Furloughed July 23, 1864.
490	*Prizer, W. J.*, Serg't, A, 9th Arkansas, age 24.	Nov. 30, Dec. 1, '64.	Right; lateral flap. To Provost Marshal March 7, 1865.
491	Quinn, J. A., Pt., K, 109th New York, age 20.	July 30, 30, '64.	Right. Surg. W. C. Shurlock, 51st Penn. Disch'd Jan. 30, '65.
492	Quinn, P., Pt., D, 5th N. Y. H'vy Art'y, age 27.	July 18, 19, '64.	Left; flap. Discharged October 17, 1865. Died May 17, 1874.
493	Rafford, O., Pt., H, 20th Maine, age 28.	Sept. 30, Oct. 1, '64.	Right; circ. Discharged February 21, 1865.
494	Rank, B. H., Pt., K, 51st Penn., age 27.	June 3. 3, '64.	Left; flap. Discharged July 18, 1865.
495	Rathburn, W., Pt., H, 7th Rhode Island.	Dec. 13, 13, '62.	Right; circ. Discharged March 6, 1863.
496	*Ray, N.*, Capt., D, 6th North Carolina.	May 30, 30, '64.	Left. Surg. J. G. Hardy, C. S. A. Recovered.
497	Rea, W. M., Pt., K, 140th Pennsylvania.	May 8, 8, '64.	Right; circ. Surg. J.W. Wishart, 140th Penn. Disch'd May 29, '65.
498	Reed, J. M., Pt., B, 10th Iowa.	May 22, 23, '63.	Right; circ. Discharged September 28, 1863.
499	Reen, C., Lieut. Col., 98th Penn., age 35.	April 2, 2, '65.	Left. Discharged June 29, 1865.
500	Regan, D., Pt., A, 59th Mass., age 25.	July 7, 7, '64.	Left; flap. Surg. T. F. Oakes, 56th Mass. Disch'd June 2, '65. Died April 22, 1869. *Spec.* 6533.
501	Reifert, L., Serg't, D, 29th New York.	Oct. 3, 4, '61.	Left. A. Surg. J. W. S. Gouley, U. S. A. Disch'd Dec. 13, 1861.
502	Reisinger, C. S., Serg't, H. 150th Penn., age 25.	June 19, 19, '64.	Left; flap. Surg. W. F. Humphrey, 149th Penn. Discharged.
503	Relyea, W., Pt., H. 77th New York.	May 3, 3, '63.	Left; flap. Discharged November 3, 1863.
504	Rennoe, D. M., Pt., H, 29th Indiana.	Jan. 2, 2, '63.	Right; flap. Discharged March 23, 1863.
505	Reynolds, M., Pt., I, 114th New York, age 27.	Oct. 19, 20, '64.	Right; lateral flap. Discharged June 12, 1865.
506	Rice, C. H., Pt., F, 129th Pennsylvania.	Dec. 13, 14, '62.	Right; flap. Discharged May 25, 1863.
507	Rice, M. G., Pt., I, 27th Mass., age 31.	June 18, 18, '64.	Left; circ. Surg. G. T. Stevens, 77th N. Y. Disch'd Oct. 3, '65.
508	Rich, W. H., Corp'l, F, 4th N. H., age 20.	Sept. 8, 8, '63.	Left; ant. post. flap. Surg. S.W. Gross, U. S.V. Disch'd June 1, 1864. *Spec.* 4315.
509	Ridenour, C., Corp'l, I, 7th Maryland, age 32.	May 5, 5, '64.	Right; flap. Discharged December 12, 1864.
510	Rifenverrick, W. M., Corporal, H, 149th Penn., age 30.	May 12, 12, '64.	Left; flap. Surg. W. F. Humphrey, 149th Penn. Discharged January 26, 1865.
511	Riley, S., Pt., K, 10th Indiana, age 23.	Aug. 3, 3, '64.	Left; circular. Discharged February 21, 1865.
512	*Rister, T. W.*, Pt., H, 13th S. C., age 19.	May 3, 4, '63.	——; circular. Recovered.
513	*Rittenhouse, J. H.*, Pt., E, 51st Georgia.	Sept. 26, 26, '64.	——. Surg. — Hoyt, C. S. A. Retired February 16, 1865.
514	Robar, A., Pt., I, 6th Vermont, age 16.	May 10, 11, '64.	Left. Discharged August 25, '64.
515	*Robertson, W. T.*, Pt., D, 11th Mississippi.	May 31, J'e 2, '62.	Left. Union surgeon. Recovered.
516	Robinson, S. C., Pt., C, 12th New Hampshire.	July 2, 3, '63.	Right; circ. Recovered. Discharged.
517	Robinson, T. B., Corp'l, B, 72d Penn., age 32.	May 12, 12, '64.	Left; flap. Surg. M. Rizer, 72d Penn. Disch'd Feb. 15, 1865.
518	Robnault, J., Pt., B, 11th Pennsylvania, age 27.	Dec. 13, 14, '62.	Right; flap. Discharged December 10, 1863.
519	*Roe, E.*, Pt., Texas Battery, age 20.	Dec. 15, 16, '64.	Left; circular. To Provost Marshal March 7, 1865.
520	Rogers, J., Pt., B, 29th Conn., age 38.	Oct. 27, 27, '64.	Right; circ. A. Surg. H. Grange, 7th Col'd Troops. Discharged April 11, 1865.
521	Rosevelt, G. W., Serg't, K, 26th Penn.	July 2, 4, '63.	Left; flap. Surg. St. J. W. Mintzer, 26th Penn. Disch'd Mar. 14, '64.
522	Runeiman, F., Pt., H, 27th Mich., age 30.	Nov. 22, 22, '63.	Left; circ. Surg. J. P. Prince, 36th Mass. Disch'd Jan. 26, '65.
523	Runyon. S. C., Pt., H, 2d Penn. Art'y, age 46.	July 6, 6, '64.	Right; posterior flap. Disch'd July 18, 1865.
524	Ryerson, J., Pt., E, 13th Ohio Cavalry.	July 30, 30, '64.	Left; circ. Surg. W. B. Fox, 8th Michigan. Discharged.
525	Rynearson, L., Pt., B, 110th Ohio, age 20.	May 5, 6, '64.	Left; circular. Discharged Nov. 2, 1864.
526	Sanders. J. H., Pt., D, 34th Mass., age 31.	Sept. 19, 19, '64.	Right; circ. Discharged June 8, 1865.
527	Savage, H. F., Pt., A, 1st Maine Art'y, age 18.	Aug. 26, 26, '64.	Left; flap. Disch'd Dec. 29, '64. Re-amp. at middle third.
528	Scofield, R., Pt., A, 9th Colored Troops.	Sept. 29, 29, '64.	Right; circular. Discharged September 7, 1865.
529	Scott, H., Pt., C, 2d Delaware.	May 2, 4, '63.	Right; circ. Discharged August 20, 1863.
530	Scott, J. G., Pt., D, 77th New York, age 23.	May 6, 6, '64.	Right; circ.; flap (also left at up. third). Surg. L. B. P. Kelly, 97th Penn. Discharged Nov. 3, 1864. *Spec.* 513.
531	*Scroggins, T. G.*, Serg't, A, 31st Ga., age 22.	July 9, 9, '64.	Left. Exchanged September 21, 1864.
532	Scullion, J., Pt., E, 155th New York, age 20.	June 16, 17, '64.	Right; circ. Discharged June 1, 1865.
533	Secor, L., Pt., D, 28th Mass., age 23.	June 3, 3, '64.	Left; circ. Surg. P. E. Hubon, 28th Mass. Disch'd Feb. 6, '65.
534	Seibert, J., Pt., H, 53d Penn., age 21.	Nov. 27, 27, '63.	Left; ant. post. flap. Surg. J. W. Wishart, 140th Penn. Disch'd March 28, 1865. Killed Dec. 22, 1879; railroad accident.
535	Seitzmeyer, J. L., Pt., E, 5th Penn. Cav., age 21.	Sept. 29, 29, '64.	Left; circular. Discharged July 18, 1865.
536	*Sessions, G. W.*, Pt., K, 5th Alabama, age 22.	July 1, 1, '63.	Right; ant. Surg. T. C. Hill, 5th Ala. Exchanged Nov. 1, '63.
537	Setley, S., Pt., F, 58th Penn., age 19.	April 17, 17, '63.	Left; circ. Surg. L. P. Morong, 2d Md. Disch'd Oct. 7, 1864.
538	Shaff, P., Pt., F, 11th Mich. Cav., age 38.	Oct. 2, 2, '64.	Left; circ. Surg. L. C. Woodman, 11th Michigan Cavalry. Discharged July 1, 1865.

[1] O'MEAGHER (W.), *Surgical Cases from Field Hospitals. Amputation of Left Leg, Lower Third, Stump healed in three weeks*, in *Medical and Surgical Reporter*, Philadelphia, 1865, Vol. XII, p. 253.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
539	*Sharp, J. W.*, Pt., G, 5th Georgia, age 26.	Oct. 19, 19, '64.	Left; circ. Surg. R. Watts, 133d N. Y. To Pro. Mar. April 8, '65.
540	Shay, M., Pt., K, 94th New York, age 21.	June 18, 19, '64.	L't; circ. Surg. D. A. Chamberlain, 94th N. Y. Disch'd Mar. 2, '65.
541	*Sheets, J. S.*, Pt., E, 52d Virginia, age 22.	Oct. 19, 19, '64.	Left; flap. Surg. C. B. Gibson, C. S. A. Trans. for exchange February 10, 1865.
542	Sheibly, F. J., Pt., B, 1st Penn. Rifles, age 19.	May 8, 9, '64.	Left; circ. Surg. J. J. Comfort, 1st Penn. Rifles. Disch'd Nov. 18, 1864.
543	Shell, J., Pt., H, 13th Tenn. Cavalry.	Nov. 11, 12, '64.	Right; flap. Surg. W. H. Matlock, 13th Tenn. Cav. Disch'd July 21, 1865.
544	[1]*Shell, W. T.*, Serg't, 18th Mississippi, age 24.	Sept. 17, 18, '62.	Right; circular. Doing well.
545	Simons, C. H., Pt., K, 59th Mass., age 35.	June 17, 17, '64.	Left; ant. post. flap. Discharged May 11, 1865.
546	Simmons, C., Pt., L, 6th Mich. Cav., age 21.	Sept. 19, 19, '64.	Right; flap. A. Surg. G. R. Richards, 1st Mich. Cavalry. Discharged May 3, 1865.
547	*Simmons, R.*, Pt., I, 20th Miss., age 22.	July 20, 20, '64.	Left; circular. Transferred September 22, 1864.
548	*Simmons, W. J.*, Pt., F, 57th Georgia, age 22.	Nov. 30, Dec. 1, '64.	Right; circular. To Provost Marshal March 7, 1865.
549	Simpson, E. A., Serg't, B, 30th Mass., age 34.	Oct. 19, 21, '64.	Left; ant. post. flap. A. Surg. B. Fordyce, 160th N. Y. Gang. Oct. 26, re-amput'n thigh, low. third. Disch'd Oct. 16, 1865.
550	*Simpson, J. N.*, Pt., I, 7th S. C., age 29.	Sept. 3, 4, '64.	Left. Surg. J. Evans, 3d S. C. To Provost Marshal for exch'ge February 11, 1865.
551	*Sinclair, F. C.*, Lieut., C, 13th Mississippi.	Nov. 8, 8, '63.	Right; ant. Surg. S. V. D. Hill, C. S. A. Recov'd; exchanged.
552	*Slade, S. G.*, Pt., A, 13th Georgia, age 24.	July 9, 9, '64.	Left. Exchanged.
553	Smedberg, W. R., Capt., F, 14th Infantry.	May 5, 5, '64.	Right. A. Surg. J. S. Smith, U. S. A. June, 1864, re-amputat'n mid. third. Retired Dec. 15, '70.
554	*Smith, A. R.*, Pt., F, 16th South Carolina, age 24.	Nov. 30, 30, '64.	Left; circular. To Provost Marshal March 29, 1865.
555	Smith, C., Pt., K, 1st Maryland, age 42.	April 1, 2, '65.	Right; flap; gangrene. Disch'd October 11, 1865.
556	Smith, C. G., Pt., F, 4th Infantry, age 26.	Sept. 17, 17, '62.	Left; circ. A. Surg. J. R. Gibson, U. S. A. Disch'd Aug. 22, '64.
557	Smith, C. G., Pt., H, 102d Illinois, age 18.	May 15, 16, '64.	Right; circ. Surg. W. Hamilton, 102d Ill. Disch'd May 18, 1865.
558	Smith, D., Pt., G, 21st Penn. Cav., age 24.	Aug. 21, 21, '64.	Left; ant. post. flap; gang. Discharged August 2, 1865.
559	*Smith, F.*, Serg't, G, 7th Louisiana, age 28.	Mar. 25, 25, '65.	Right; ant. circular. Surg. H. N. Young, C. S. A. Released June 14, 1865.
560	Smith, H. C., Pt., G, 30th Iowa, age 32.	Nov. 24, 25, '63.	Right; flap. Surg. A. T. Hudson. 20th Iowa. Disch'd Feb. 1, '65.
561	Smith, J. C., Pt., I, 24th Iowa, age 20.	May 16, 16, '63	Left; flap. Discharged September 18, 1863.
562	*Smith, J. L.*, Pt., C, 12th North Carolina.	May 3, 3, '63.	Left; gang. Transferred June 9, 1863.
563	*Smith, J. M.*, Pt., I, 23d Georgia.	July 6, 7, '64.	Right. Surg. — Morgan, C. S. A. Retired February, 1865.
564	Smith, J. M., Pt., K, 155th New York, age 53.	Oct. 27, 28, '64.	Right; flap. Surgeon F. Wylie, 155th N. Y. Disch'd May 27, '65.
565	Smith, N., Pt., H, 2d Iowa Cav., age 26.	May 9, 9, '62.	Right. Surg. G. Reeder, 2d Iowa Cavalry. Disch'd Aug. 12, '62.
566	*Smith, S.*, Pt., K, 4th Georgia, age 17.	Mar. 25, 25, '65.	Left; circular. Released June 14, 1865.
567	*Snelling, E. A.*, Pt., Nottaway's Artillery.	June 22, 22, '64.	Right (also left leg at mid. third). Confed. surgeon. Recovery.
568	*Snuggs, W.*, Pt., H, 14th North Carolina, age 18.	May 12, 12, '64.	Right; flap. To prison October 17, 1864.
569	Snyder, J. D., Pt., G, 11th Penn., age 19.	May 10, 11, '61.	Left; flap (also amp. right leg, up. third). Disch'd July 21, 1865.
570	Soper, L., Serg't, A, 11th Vermont, age 32.	April 2, 2, '65.	Left; flap. Surg. C. B. Park, 11th Vermont. Disch'd Sept. 14, '65.
571	Spraker, W., Serg't, I, 64th N. Y., age 24.	July 2, 4, '63.	Left; circular. Disch'd May 3, 1864. *Spec.* 4534.
572	Spratt, J. R., Lieut., E, 33d Indiana, age 27.	May 25, 25, '64.	Right. Surg. W. C. Bennett, U. S. V. Discharged Feb. 3, 1865.
573	*Stargill, M. M.*, Pt., B, 59th Tenn.	Sept. 16, 16, '63.	Left. Surg. — McFarland, C. S. A. Recovered.
574	*Stonewell, B. L.*, Pt., A, 12th Alabama, age 22.	Sept. 19, 21, '61.	Right; circ. Surg. — Weatherby, 6th Alabama. To prison January 5, 1865.
575	Starin, F. D., Pt., H, 43d Wisconsin, age 19.	Nov. 5, 5, '64.	Left; flap (also amp. right leg, up. third). Disch'd July 2, 1865.
576	Stark, H. M., Pt., G, 18th Infantry, age 19.	May 31, 31, '64.	Left; circ. Surg. S. Marks, 10th Wis. (Also wound right foot.) Disch'd Dec. 22, 1864.
577	Starr, A. D., Pt., H, 4th Iowa, age 20.	May 27, 27, '64.	Left; circ. Surg. B. N. Bond, 27th Mo. Disch'd May 23, 1865.
578	Steel, E. B., Pt., I, 35th New York.	Dec. 13, 13, '62.	Left. Surg. W. A. Madill, 23d New York. Disch'd June 6, '63.
579	Steger, J., Pt., G, 52d New York.	June 1, 1, '62.	Left. Discharged September 14, 1862.
580	Stein, F., Pt., H, 10th Infantry.	July 3, 3, '63.	Right. Discharged December 23, 1863. *Spec.* 1454.
581	Stetler, J. A., Pt., A, 143d Penn., age 19.	June 18, 18, '64.	Right; flap. Surg. F. C. Reamer, 143d Penn. Disch'd June 1, '65. Re-amp. at mid. third Jan., 1867.
582	Stevens, J., Pt., C, 79th Ohio, age 45.	July 20, 21, '64.	Left; circular. Discharged.
583	Stewart, J., Pt., K, 1st Maryland, age 24.	Aug. 19, 20, '64.	Right; circ. Surg. A. A. White, 8th Md. Disch'd Aug. 1, 1865.
584	Stewart, R. F., Capt., B, 179th N. York, age 24.	June 17, 17, '64.	Left; circ. A. A. Surg. W. H. Randolph. Disch'd Jan. 6, 1865. Died August 30, 1870.
585	Stewart, T. G., Pt., D, 36th Illinois, age 41.	Dec. 16, 16, '64.	Left; circular. Discharged July 12, 1865. Died July 1, 1870.
586	Stills, J., Pt., D, 90th Indiana, age 20.	Sept. 4, 4, '63.	Left; flap. Surg. A. C. Fosdick. 90th Ind. April 22, '64, re-amp. at mid. third. Disc. Nov. 11, '64.
587	*Stokes, C.*, Serg't, C, 7th Florida, age 35.	Dec. 7, 7, '64.	——; circular. To Provost Marshal March 7, 1865.
588	*Stone, J. F.*, Pt., E, 29th Mississippi, age 23.	Nov. 30, Dec. 1, '64.	Left; circ. Surg. — Lynch, C. S. A. To Pro. Mar. May 6, '65.
589	Street, T. G., Pt., C, 7th Maryland, age 19.	May 6, 7, '64.	Right; circ. Discharged March 24, 1865.
590	Striep, M., Corp'l, B, 6th N. Y. Cavalry, age 25.	Aug. 29, 29, '64.	Right; flap. Discharged.
591	Strohuber, G., Pt., A, 188th N. Y., age 20.	Oct. 27, 27, '64.	Left; circular. Discharged May 26, 1865.
592	Strong, L. M., Pt., K, 3d Vermont, age 21.	April 2, 2, '65.	Left; ant. post. flap. Surg. J. J. Meigs, 3d Vermont. Disch'd.
593	*Stroup, C. W.*, Pt., H, 52d N. C., age 29.	July 3, 3, '63.	Right. July 11, reamp. Transferred for exch. Nov. 12, 1863.
594	*Suidon, J. K.*, Lieut., F, 24th Virginia, age 22.	July 2, 3, '63.	Right; circ. Recovered. Exchanged.
595	*Suratt, J. G.*, Pt., F, 7th North Carolina.	July 3, 3, '63.	Right. Paroled September 5, 1863.
596	*Talesfero, W. M.*, Corp'l, E, 2d Va. Cavalry.	Oct. 11, 11, '63.	——. Surg. — Lee. C. S. A. Recovered.
597	Taylor, J. W., Pt., C, 5th N. Y. Cavalry, age 44.	April 27, 27, '64.	Left; flap. A. Surg. O. H. Armstrong, 5th N. Y. Cav. Disch'd Oct. 6, 1864. *Spec.* 2244.
598	Taylor, J., Pt., B, 5th Colored Troops.	Feb. 19, 20, '65.	Left; ant. circ. Ass't Surg. G. V. R. Merrill, 6th Colored Troops. Discharged Nov. 10, 1865.
599	*Taylor, W. T.*, Serg't Maj., 56th N.C., age 24.	Mar. 25, 25, '65.	Right; circular. Released June 19, 1865.
600	Teel, H., Corp'l, H, 122d Ohio, age 22.	Sept. 19, 19, '64.	Left; ant. post. flap. Ass't Surg. J. G. Thompson, 77th N. York. Discharged August 14, 1865.
601	*Temple, R.*, Serg't, E, 21st Virginia.	July 2, 2, '63.	——. Recovered. Transferred July 15, 1863.
602	*Thayer, W. S.*, Lieut., H, 11th Virginia.	April 18, 18, '64.	Left. Surg. J. R. Ward, C. S. A. Recovered.
603	*Thomas, H. H.*, Serg't, B, 26th N. C., age 23.	July 3, 3, '63.	Right. Paroled October 24, 1863.
604	Thomas, H. S., Major, 1st Penn. Cav., age 26.	April 5, 5, '65.	Right; flap. Discharged August 17, 1865.
605	Thomas, J., Pt., I, 30th Col'd Troops, age 22.	July 30, 30, '64.	Right; flap. Surg. G. R. Potts, 23d Col'd Troops. Discharged August 23, 1865.
606	*Thomas, S. B.*, Pt., H, 37th Virginia, age 40.	Mar. 25, 26, '65.	Right; circ. Surg. E. P. Roche. Released June 14, 1865.
607	*Thomas, W. B.*, Corp'l, E, 7th Georgia.	May 6, 7, '64.	——. Surg. G. S. West, C. S. A. Retired February 11, 1865.
608	*Thornton, M. L.*, Pt., E, 31st Georgia, age 22.	Oct. 19, 19, '64.	Right; circ. (also amp. right arm at mid. third). Surg. G. G. Button, 31st Georgia. To Provost Marshal April 8, 1865.
609	*Thornton, R. B.*, Pt., F, 12th N. C., age 21.	July 1, 2, '63.	Left. Transferred for exchange September 25, 1864.
610	Thurlkil, J., Pt., G, 31st Col'd Troops, age 29.	Oct. 27, 28, '64.	Left; circular. Discharged Aug. 23, 1865.
611	*Torreyson, T. N.*, Corp'l, C, 35th Va. Battery.	May 8, 8, '64.	——. Surg. W. J. Allen, C. S. A. Recovered.
612	Torry, A., Pt., H, 99th Penn., age 30.	Sept. 16, 16, '64.	Left; circular flap. Surg. D. S. Hays, 110th Penn. Discharged June 1, 1865. *Spec.* 4113.
613	Travis, C., Pt., E, 23d Missouri, age 30.	July 29, 29, '64.	Left; flap. Discharged January 20, 1865.
614	Tribou, D. W., Corp'l, C, 29th Mass.	Sept. 17, 17, '62.	R't. Surg. G. B. Coggswell, 29th Mass. Disch'd Jan. 13, 1863.
615	[2]*Trimble, J. E.*, Major General, C. S. A.	July 3, 3, '63.	——. Surg. H. McGuire, C. S. A. Transferred August 18, 1863.
616	*Tullis, J. W.*, Lieutenant, Hardaway's Alabama Battery, age 24.	July 2, 2, '63.	Left. Surg. J. McC. Greene, C. S. A. Recovered. Trans. for exchange March 17, 1864.
617	Turner, G., Pt., E, 1st Mich. Cav., age 34.	May 31, 31, '64.	Right; flap. Discharged September 24, 1864.
618	Tuttle, R. S., Corp'l, F, 27th Michigan.	July 11, 11, '63.	Right; circ. Surg. J. P. Prince, 36th Mass. Discharged Sept. 16, 1863.
619	Tyrrell, J. C., Serg't, I, 28th New Jersey.	Dec. 13, 13, '62.	Right; flap. Surg. W. D. Newell, 28th N. J. Disbarged July 6, 1863.

[1] Fisher (G. J.), *Report of Fifty-seven Cases of Amputations in the Hospitals near Sharpsburg, Md., etc.*, in *American Journal Medical Sciences*, 1863, Vol. XLV, N. S., p. 48.

[2] McGuire (H.), *Clinical Remarks on Gunshot Wounds of Joints, etc.*, in *Richmond Medical Journal*, 1866, Vol. I, p. 150.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
620	Underwood, L. A., Corporal, F, 4th Vermont, age 21.	April 2, 2, '65.	Left; flap. Disch'd Aug. 10, '65. (Also wounds of right shoulder and left hand.)
621	Van Kirk, A. J., Pt., D, 140th Penn., age 21.	May 12, 12, '64.	Right; circular. Surg. J. W. Wishart, 140th Penn. Disch'd April 16, 1865.
622	Van Kuren, J., Corp'l, B, 1st Mich., age 25.	May 8, 8, '64.	Left; flap. Confederate surgeon. Discharged May 11, 1865.
623	Vanocker, L., Pt., F, 104th New York.	Aug. 30, 30, '62.	Left. Discharged October 29, 1862.
624	Vanpelt, P. P., Pt., I, 14th N. J., age 24.	June 1, 1, '64.	Left; circular. Discharged February 3, 1865.
625	Van Scheffelin, A., Pt., E, 76th N. Y., age 30.	Nov. 18, 19, '63.	Right. A. Surg. N. R. Barnes, 76th N. Y. Disch'd July 22, '64.
626	Vincent, H. G., Pt., H, 15th Iowa, age 21.	April 6, 7, '62.	Right. Discharged June 18, '62.
627	*Voaglin, F.*, Pt., G, 44th Alabama.	Sept. 17, 17, '62.	Left. Dec. 16, resec. of acc. tibia. Furloughed March 2, 1863.
628	Wallace, G. H., Pt., I, 9th C. Troops, age 22.	July 9, 9, '64.	Right; flap. Discharged March 21, 1865.
629	[1] Warner, G., Lieut., K, 27th Mass., age 26.	Mar. 14, 14, '62.	Right; circ. Surg. G. A. Otis, 27th Mass. Recov., prom., and transferred to Vet. Res. Corps.
630	Waterhouse, B. W., Pt., G, 23d Ohio, age 27.	July 24, 24, '61.	Right; ant. post. flap. Surg. — Duffy, C. S. A. Disch'd May 18, 1865.
631	Watrous, R. S., Pt., A, 2d Artillery, age 20.	July 1, 1, '63.	Left. Trans. to Headquarters January 17, 1864.
632	*Watson, W. H.*, Pt., A, 33d Alabama, age 24.	Aug. 18, 18, '64.	Right; circular. Recovered.
633	Weaver, J., Pt., E, 126th Ohio, age 20.	Sept. 19, 19, '64.	Right; circular (also wound left leg). Discharged June 2, 1865.
634	Webb, J., Pt., C, 155th Penn., age 26.	May 8, 8, '64.	Left; ant. post. flap. Discharged April 6, 1865.
635	*Webber, W. A.*, Capt., A, 23d Virginia.	May 10, 10, '64.	——. Surg. C. C. Henkle, C. S. A. Recovered.
636	Weber, T., Pt., 5th Ohio Battery, age 20.	July 12, 12, '63.	Left; ant. post. flap. Surg. C. Carle, 41st Ill. Gang. Oct. 7, re-amp. by Luke's flap method. Discharged Sept. 13, 1864.
637	*Weeks, J.*, Pt., K, 4th Florida, age 20.	Dec. 7, 7, '64.	Left; circular. To Provost Marshal March 21, 1865.
638	Welch, J. M., Pt., B, 9th Iowa, age 19.	Oct. 29, 29, '63.	Left; flaps. Surg. D. B. Allen, 30th Iowa. Disch'd Aug. 26, '64.
639	Weschke, C., Pt., D, 67th New York, age 30.	May 12, 12, '64.	Right; ant. post. flap. Surg. R. Sharp, 15th N. Jersey. Disch'd May 11, 1865.
640	West, J. M., Pt., C, 97th Ohio, age 30.	May 26, 26, '64.	Left; circ. Surg. E. B. Glick, 40th Ind. Disch'd Nov. 12, '64. *Spec.* 3395.
641	Wetherbee, J. M., S'g't, B, 151st N. Y., age 25.	Nov. 27, 27, '63.	Left. April 4, 1864, re-amp. in upper third. Discharged July 6, 1865.
642	*Whartam, J.*, Pt., K, 10th Louisiana.	May 2, 2, '63.	Right. Recovered.
643	Wheeler, J. R., Pt., C, 2d Vermont, age 25.	Dec. 13, 13, '62.	Left. Re-amp. in upper third in 1863. Disch'd April 22, 1864. *Spec.* 1358.
644	White, A., Pt., E, 52d Penn., age 23.	Sept. 5, 5, '63.	Right; flap. Disch'd Sept. 20, '64. Re-amputation May, '65. Died May 8, 1865.
645	White, B. E., Pt., E, 16th Vermont.	July 3, 4, '63.	Left. Discharged October 29, 1863.
646	White, J. E., Serg't, F, 160th N. York, age 34.	Oct. 19, 21, '64.	Left; lat. flap. A. Surg. D. H. Armstrong, 160th New York. Discharged April 28, 1865.
647	Whitesell, D. A., Serg't, C, 5th Art'y, age 20.	July 2, 3, '63.	Left; flap. A. Surg. H. K. Spooner, 55th Ohio. Disch'd Oct. 12, '63.
648	*Whitlow, J. H.*, Pt., A, 57th Virginia.	July 2, 3, '63.	Right. Retired February 2, 1865.
649	Wilcox, B. F., Pt., E, 149th N. York, age 22.	July 20, 20, '64.	Right flap; gangrene. Disch'd August 8, 1865.
650	Wilder, W. W., Pt., K, 3d Mich., age 27.	Aug. 29, 30, '62.	Right; double flap. Discharged July 30, 1863.
651	Williams, H., Pt., K, 98th Pennsylvania, age 23.	April 9, 9, '65.	Left; circ. (amp. right foot, Hey's method). Disch'd Oct. 6, 1865.
652	Williams, J. B., Pt., H, 2d Penn. Art., age 27.	July 19, 19, '64.	Left; flap. Discharged July 4, 1865.
653	Williams, S. W., Serg't, C, 27th Mo., age 29.	Oct. 26, 26, '63.	Right; circ. Discharged Feb. 4, 1864. Died Dec. 19, 1871.
654	Williams, W. P., Pt., B, 188th Penn., age 18.	Sept. 29, 29, '64.	Left; circular. Disch'd March 26, 1865.
655	Willis, W., Pt., I, 8th Maine.	Mar. 26, 27, '63.	Right; lateral flap. Surg. J. D. Mitchell, 8th Maine. Disch'd December 24, 1863.
656	Willison, S. D., Pt., C, 2d Mich., age 28.	June 3, 3, '64.	Right. Discharged February 4, 1865.
657	Wilson, R., Pt., A, 73d Ohio, age 29.	Oct. 29, 29, '63.	Right. Discharged February 24, 1864. Died in 1865.
658	*Wilson, R. E.*, Major, 37th Georgia, age 33.	Nov. 30, Dec. 1, '64.	Left; circular. To Provost Marshal March 18, 1865.
659	Wilson, S. L., Lieut., F, 114th Ohio.	Dec. 29, 29, '62.	Left. Discharged August 14, '63.
660	*Wise, W. M.*, Lieutenant.	May 15, 15, '64.	Right. Surg. F. A. Walker. Recovered. Furloughed.
661	Woerts, C., Pt., I, 108th Ohio, age 26.	Aug. 14, 14, '64.	Left; circ. Surg. C. Spinzig, 2d Mo. Disch'd June 16, 1865.
662	Wolcott, H. P., Lieut., K, 41st Ohio.	Dec. 31, 31, '62.	Left; flap. Surg. A. G. Hart, 41st Ohio. Disch'd May 27, 1863.
663	Wolf, M., Pt., A, 160th New York, age 21.	Oct. 19, 20, '64.	Right; circ. Discharged July 10, 1865.
664	Wood, W. H., Pt., I, 126th N. Y., age 23.	July 3, 5, '63.	Right; circ. Discharged July 24, 1865.
665	Woodruff, J., Pt., K, 57th Mass., age 26.	July 4, 4, '64.	Left. Dec. 18, re-amp. at junc. of mid. and up. thirds. Dec. 22, hæm. Disch'd June 27, 1865.
666	Woodward, J., Pt., C, 14th N. Y. S. M.	July 1, 1, '63.	Right; ant. post. flap. Surg. J. M. Farley, 14th N. Y. S. M. Disch'd Feb. 26, 1864. *Spec.* 4309.
667	*Worley, C. L. F.*, Pt., A, 5th Ala., age 22.	July 1, 1, '63.	Right. Retired October 14, 1864.
668	Wrieth, H., Pt., B, 20th Mass., age 26.	July 28, 29, '64.	Left; flap. Confederate surgeon. Discharged August 13, 1865.
669	Wright, P., Pt., H, 39th Col'd Troops, age 29.	Feb. 11, 11, '65.	Left; flap. A. Surg. F. B. Kimball, 3d New Hamp. Disch'd October 19, 1865.
670	Wybourn, W. A., Serg't, I, 147th N. Y., age 23.	Feb. 6, 6, '65.	Right; circ. Surg. A. S. Coe, 147th N. Y. Duty April 3, 1865. Prom. Lieut. Dis. June 7, 1865.
671	*Yates, S.*, Corp'l, H, 33d Virginia, age 38.	Mar. 25, 26, '65.	Left; circular. Released June 14, 1865.
672	Yerkes, W. H., Pt., C, 128th Pennsylvania.	Sept. 17, 17, '62.	Right. Discharged May 11, 1863.
673	Young, F. V., Pt., I, 111th New York, age 18.	May 6, 6, '64.	Right; flap. Confed. surgeon. Discharged June 16, 1865.
674	Young, G. A., Pt., F, 5th Artillery, age 23.	Nov. 7, 7, '63.	Left. Discharged August 19, '64.
675	Young, J. B., Pt., K, 11th Indiana, age 21.	May 16, 17, '63.	Left; flap. Surg. R. B. Jessup, 24th Ind. Discharged August 31, 1864.
676	Ziegler, S. R., Pt., A, 49th Penn., age 23.	May 5, 6, '64.	Left; flap. Discharged November 10, 1864.
677	Abbott, J. I., Pt., C, 2d Conn. H. A., age 26.	June 27, 27, '64.	Right; circular. Died August 20, 1864; typhoid fever.
678	Adams, N., Pt., D, 36th Wisconsin, age 34.	June 17, 17, '64.	Left. Died June 29, 1864; gangrene.
679	Anderson, D., Corp'l, H, 7th Maryland, age 41.	Aug. 21, 21, '64.	Left (also amp. right leg at middle). Died Oct. 1, 1864.
680	Angell, G. W., Pt., K, 18th Ohio.	Dec. 31, —, '62.	——; erysipelas. Re-amputat'n. Died March 18, '63; exhaustion.
681	Arahood, J., Pt., C, 17th Ohio.	Sept. 19, —, '63.	Left. Died October 17, 1863; pneumonia.
682	Arte, Ph., Saddler, H, 17th Penn. Cav., age 24.	Aug. 11, 11, '64.	Left; flap. Died November 17, 1864.
683	Austin, J., Pt., G, 11th Michigan.	Dec. 31, '62, Jan. 1, '63.	Right. Died January 20, 1863.
684	Austin, S. J., Pt., A, 33d Massachusetts.	June 1, 1, '64.	Right. Died July 18, 1864.
685	Baker, S., Pt., B, 8th W. Virginia.	Aug. 23, —, '63.	Left. Died September 20, 1863.
686	Bakehouse, H., Pt., B, 82d Penn., age 36.	June 3, 3, '64.	Left; circular. Died April 9, 1865.
687	Banks, S., Pt., C, 43d Colored Troops.	July 30, 30, '64.	Left (also amputat'n right thigh). Surg. D. MacKay, 29th Colored Troops. Died July 31, 1864.
688	Barstow, T. A., Serg't, B, 15th New Hamp.	May 27, 27, '63.	Right. Died May 27, 1863.
689	*Barnett, D. J.*, Pt., B, 42d Alabama.	May 15, —, '64.	Left. Surg. E. Hutchinson, 137th N. Y. Died May 25, 1864.
690	Bassett, G. L., Pt., G, 19th Michigan.	May 15, 15, '64.	Left. Died May 20, 1864.
691	Bates, E. C., Pt., C, 9th Maine, age 17.	June 30, 30, '64.	Right. Died August 12, 1864; exhaustion.
692	Baysman, T., Pt., D, 14th Col'd H. Art'y, age 22.	Mar. 30, —, '65.	Right (also w'd left leg and hand); slonghing. Died May 16, '65.
693	Billings, D., Serg't, A, 149th New York.	July 20, 20, '64.	Right. Died October 9, 1864.
694	Bird, E., Pt., H, 8th Michigan, age 19.	Sept. 30, Oct. 1, '64.	Left. Died October 24, 1864; exhaustion.
695	Black, A., Pt., A, 3d N. Jersey, age 43.	July 30, 30, '64.	Left; circular; slonghing. Died August 28, 1864; pyæmia.
696	Boling, R. E., Corp'l, D, 6th Kentucky Cavalry.	June 24, 24, '64.	Left. Died July 25, 1864.
697	Borosky, J., Pt., A, 199th Pennsylvania.	April 9, 9, '65.	Right. Surg. C. M. Clark, 39th Illinois. Died May 8, 1865.
698	*Bounds, O. J.*, Pt., H, 39th Alabama, age 18.	Dec. 16, 16, '64.	Right; circular. A. A. Surg. R. L. McClure. Died Feb. 2, 1865; chronic diarrhœa.
699	*Bowen, S.*, Pt., E, 32d Alabama.	May 15, —, '64.	——. Died May 23, 1864.
700	Bowman, D., Pt., B, 15th Infantry, age 24.	June 3, 3, '64.	Left. Died July 18, 1864.
701	*Boyd, W. J.*, Pt., D, 21st North Carolina, age 28.	Oct. 19, 19, '64.	Right; circular. Died November 10, 1864; pyæmia.
702	Briggs, E. C., Pt., B, 125th Ohio.	Sept. 19, 19, '63.	——. Died October 21, 1863.
703	Brown, A., Pt., A, 5th N. Y. Cavalry, age 47.	July 7, 9, '64.	Left. Died July 24, 1864.
704	Bryan, M. W., Pt., G, 11th Michigan.	Aug. 7, 7, '64.	Right (amputation arm). Died September 6, 1864.

[1] Otis (G. A.), *Army Medical Intelligence*, in *Boston Medical and Surgical Journal*, 1862, Vol. LXVI, p. 239.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
705	Bryant, J., Pt., G, 23d Michigan.	May 14, 14, '64.	Right. Died July 14, 1864.
706	Bunn, J. K., Pt., 6th N. York Battery, age 19.	May 28, 28, '64.	Left; circular. Died June 22, 1864; pyæmia.
707	Burge, W., Pt., K, 103d Illinois.	Nov. 25, 25, '63.	Left. Surg. J. Hutchison, 15th Michigan. Died Dec. 16, 1863.
708	Burr, G., Pt., K, 25th Mass., age 39.	June 30, 30, '64.	Left; sloughing, Died July 12, 1864; exhaustion.
709	Campbell, S., Pt., A, 63d New York.	June 3, 3, '64.	——. Surg. J. W. Wishart, 140th Penn. Died June 8, 1864.
710	Carknard, J. E., Pt., E, 7th N. Y. Heavy Artillery, age 21.	June 16, 17, '64.	Left; circ. Surg. J. E. Pomfret, 7th N. Y. H'vy Artillery. Died July 28, 1864.
711	*Carney, A. B.*, Pt., E, 55th N. Carolina.	Mar. 25, 25, '65.	Right. Died April 19, 1865.
712	Carrington, W. H., Serg't, E, 51st New York.	Mar. 14, 14, '62.	Left. Died May 9, 1862.
713	Chedister, J. A., Pt., I, 15th West Va., age 30.	Sept. 3, 4, '64.	Left. A. A. Surg. J. R. Uhler. Died October 3, 1864.
714	*Childers, M.*, Pt., G, 15th Virginia, age 42.	April 6, 8, '65.	Left. Died May 5, 1865; gangrene.
715	Christy, D. L., Serg't, C, 102d Penn., age 24.	May 5, 6, '64.	Left; circular. Died June 18, 1864; exhaustion.
716	Cobleigh, J. W., Serg't, A, 1st Vt. H. A., age 24.	Mar. 25, 25, '65.	Right; flap. Died March 28, '65; exhaustion.
717	Cogan, W. H., Pt., B, 69th Ohio, age 25.	Aug. 16, 16, '64.	Left. Died September 16, 1864; irritative fever.
718	[1]*Cox, J. F.*, Capt., D, 29th Mississippi, age 31.	Aug. 31, 31, '64.	Left; gangrene; erysip. Died October 31, 1864.
719	Crowley, J., Pt., K, 88th New York.	May 1, 1, '63.	Right (also amp. left great toe); hæm. Died May 26, 1863.
720	Culler, M., Pt., H, 73d Illinois, age 22.	Nov. 30, Dec. 1, '64.	Left. Died December 28, 1864.
721	Daugherty, J., Pt., C, 1st Delaware.	July 1, 1, '63.	Left (also w'd of leg). Surg. G. W. New, 7th Ind. Died July 3, '63.
722	*Davis, A. W.*, Corp'l, F, 14th N. C., age 24.	July 12, 12, '64.	Right. Confed. surgeon. Aug. 4, re-amp. upper third. Died Aug. 10, 1864. *Spec.* 2923.
723	Davis, W., Pt., H, 48th Pennsylvania, age 28.	June 3, 3, '64.	Right; circular. Died September 5, 1864; diarrhœa.
724	Davis, W., Pt., A, 31st Maine, age 19.	July 30, 31, '64.	Left; ant. post. flap. Died Sept. 6, 1864; pyæmia.
725	DeBarr, G., Pt., B, 169th New York, age 35.	July 14, 14, '64.	Left; pyæmia. Died September 25, 1864.
726	Detchon, W. F., Pt., 9th Co., 60th Ohio, age 19.	July 30, 30, '64.	Left; circular; sloughing. Died August 13, 1864; exhaustion.
727	Devereux, C., Corp'l, F, 11th Vermont, age 33.	Oct. 19, 19, '61.	Right; ant. post. flap. Died Nov. 17, 1864; exhaustion.
728	*Dangan, C.*, Pt., H, 32d Alabama, age 28.	Nov. 25, —, '63.	Left. Died March 2, 1864; inflammation lungs.
729	Easterbrook, S., Pt., F, R. Island Art., age 48.	May 12, 12, '64.	Right. Died May 24, 1864; erysipelas.
730	Edson, H., Pt., C, 23d Massachusetts, age 35.	May 10, 11, '64.	Left; ant. post. flap. Surg. I. H. Steans, 23d Mass. Sloughing. Died June 30, 1864; exhaustion.
731	Elder, W., Pt., F, 63d Pennsylvania, age 21.	May 5, 6, '64.	Right (also fract. cranium); circ. Died May 30, 1864.
732	Fisher, D. E., Pt., B, 6th Pennsylvania, age 31.	July 20, 20, '64.	R't. Surg. A. M. Wilder, U. S. V. Died Nov. 12, '64; exhaustion.
733	Flore, C., Pt., G, 10th Minnesota, age 23.	April 5, 5, '65.	Left; circ. A. Surg. F. H. Milligan, 10th Minn. April 20, re-amputation. Died May 11, '65.
734	Fogle, M. P., Corp'l, A, 133d New York, age 31.	June 14, 14, '63.	Right. Surg. R. Watts, jr., 133d N. Y. Hæm.; lig. post. tibial. Died Nov. 17, 1863.
735	Forbes, J. K., Pt., A, 5th Iowa.	Sept. 19, 19, '62.	Left. Died September 23, 1862.
736	*Foster, C. B.*, Pt., D, 27th South Carolina, age 29.	Aug. 21, 22, '64.	Right; circular; pyæmia. Died September 17, 1864.
737	Fox, J. M., Pt., C, 61st Ohio.	July 22, 22, '64.	Left. Died August 27, 1864.
738	Francis, C., Pt., H, 83d Pennsylvania.	June 27, 28, '62.	Left. Aug. 6, re-amput'n. Died August 9, 1862; pyæmia.
739	Frost, A. C., Pt., C, 15th Massachusetts.	July 2, —, '63.	Left. Sept. 12, amp. thigh. Died Sept. 16, 1863; gangrene.
740	Fry, W. H., Pt., H, 56th Pennsylvania, age 21.	May 12, 13, '64.	Left. Died June 14, 1864.
741	Gallagher, T., Pt., D, 4th Delaware.	June 3, 3, '64.	Left. Died June 11, 1864.
742	Gerhart, J., Pt., B, 49th Pennsylvania, age 32.	May 10, 10, '64.	Left. Died June 1, '64; pyæmia.
743	Gibbs, M., Pt., C, 139th Pennsylvania, age 32.	April 2, 2, '65.	Left; ant. post. flap. Died May 10, 1865; exhaustion.
744	*Gillam, J. H.*, Pt., K, 15th North Carolina.	Sept. 14, 16, '62.	——; sloughing. Died October 12, 1862.
745	Goodsell, C. H., Pt., C, 124th New York.	May 3, 3, '63.	Left. Died August 3, 1863.
746	Goodwin, T., Pt., H, 22d Wisconsin.	May 15, 15, '64.	Left; circ. Surg. W. C. Bennett, U. S. V. Died July 12, 1864.
747	Graff, S., Pt., B, 83d Pennsylvania.	May 3, 3, '63.	Right. Died July 3, 1863.
748	Grant, P., Pt., B, 67th Ohio.	May 12, 12, '64.	Left. Died May 24, 1864.
749	Green, J. L. W., Pt., F, 26th New York.	Dec. 13, 13, 62.	Right; circular. Died January 2, 1863.
750	Green, R. B., Pt., G, 7th Rhode Island.	Dec. 13, —, '62.	Left. Died January 2, 1863.
751	Griffith, J., Pt., H, 4th Delaware, age 39.	June 2, 4, '64.	Right; circular; sloughing. Died July 1, 1864.
752	Hall, H., Pt., K, 50th Ohio, age 20.	July 22, 22, '64.	Right. Surg. J. C. Welch, 20th Kentucky. Gangrene. Died September 8, 1864.
753	Hall, J. F., Pt., B, 68th Pennsylvania.	July 3, —, '63.	Right. Died August 1, 1863.
754	Hanson, J., Pt., K, 3d Wisconsin.	July 4, —, '64.	Left. Died July 9, 1864.
755	Harrigan, W., Pt., M, 24th N. York Cav., age 21.	June 16, 16, '64.	Right. Died July 13, 1864.
756	Harris, R., Pt., G, 132d New York, age 26.	Feb. 1, 2, '64.	Left; circ. A. Surg. J. W. Gray, 98th N. Y. Died May 20, 1864, under infl. chlo. during operat'n.
757	Hart, J., Pt., G, 74th Indiana, age 29.	July 22, 22, '64.	Right. Died August 14, 1864.
758	Hartman, T. R., Serg't, K, 88th Penn., age 21.	Mar. 30, 31, '65.	Right; lateral flap. Died June 7, 1865.
759	Henry, P., Pt., C, 78th Pennsylvania.	May 31, 31, '64.	Left. Died July 15, 1864.
760	Higgins, A., Pt., E, 104th New York, age 23.	Aug. 19, 19, '64.	Left; ant. post. flap. Surg. E. G. Chase, 104th N. Y. Died Sept. 23, 1864; erysipelas.
761	Hilsondegen, J., Pt., F, 16th Michigan.	Sept. 30, 30, '64.	Left. Died November 6, 1864; pyæmia.
762	Hinkle, J. H., Pt., I, 70th Indiana.	May 15, 15, '64.	Left. Died June 1, 1864.
763	*Hobson, J. E.*, Pt., Brook's 1st Va. Art'y, age 23.	May 2, 4, '63.	——; flap; typhoid fever; hæm. Died May 29, 1863.
764	*Holmes, W. J.*, Pt., G, 33d Mississippi, age 18.	July 20, 22, '64.	Left; circ. Died Dec. 24, 1864; chr. diarrh. *Specs.* 4243, 4244.
765	Honestea, L., Pt., B, 10th Infantry, age 18.	May 5, 5, '64.	Right. Died November 2, 1864; variola.
766	Howell, J. H., Pt., C, 23d Michigan.	May 14, 14, '64.	Left. Surg. D. L. Heath, 23d Mich. Died July 6, 1864.
767	[2]Hoyt, H. H., Pt., D, 6th Connecticut.	Oct. 22, 24, '62.	Right; post. flap. A. A. Surg. T. T. Smiley. Died Oct. 30, 1862; gangrene. *Spec.* 733.
768	Hubbard, J., Pt., I, 10th Connecticut, age 38.	Dec. 14, 14, '62.	Left; circ. Surg. G. A. Otis, 27th Mass. Hæm. Died Dec. 16, '62.
769	Hukill, W. T., Pt., E, 66th Illinois.	May 16, 16, '64.	Right. Surg. J. Pogue, 66th Ill. Died July 9, 1864; pyæmia.
770	Hyatt, C., Capt., E, 6th Wisconsin.	Aug. 21, 21, '64.	Left. Died September 22, 1864.
771	Ingraham, G. M., Pt., M, 4th N. Y. H. A., age 19.	June 24, 24, '64.	Left; circular. Died August 10, 1864.
772	Johnson, J. M., Pt., E, 43d Col'd Troops.	July 30, 30, '64.	Left; circ. Surg. F. M. Weld, 27th C. T. Died Aug. 5, 1864.
773	*Johnson, T. B.*, Pt., H, 19th Arkansas, age 35.	Nov. 30, 30, '64.	Left; circular. Died May 27, 1865.
774	Johnson, Z., Pt., I, 8th Wisconsin.	May 9, —, '62.	Left. Died June 6, 1862.
775	Jones, P., Pt., I, 9th Col'd Troops, age 23.	Sept. 29, 29, '64.	Right. Died October 12, 1864.
776	Kendall, Z., Pt., G, 11th Vermont.	June 1, 1, '64.	Left. Surg. H. Plumb, 2d Conn. H. A. Died Oct. 31, 1864.
777	Kent, H. O., Pt., E, 4th Vermont.	Dec. 13, 13, '62.	Right. Died December 19, 1862; tetanus.
778	Kipp, G. J., Pt., I, 1st New Jersey, age 21.	May 5, 5, '64.	Left. Died June 20, 1864.
779	Krappman, A., Pt., A, 40th N. York, age 29.	July 2, 4, '63.	Left. July 16, hæmorrhage, 24 ounces; fatal.
780	Lamphere, L. O., Pt., E, 21st Conn., age 19.	June 30, 30, '64.	Right (also amput'n left thigh); sloughing. Died July 22, '64; tetanus.
781	Larkins, J., Pt., E, 37th Wisconsin.	July 30, 30, '64.	Right; circ. Surg. G. W. Snow, 35th Mass. Died July 30, 1864.
782	Laughlin, E. W., Pt., E, 77th Illinois, age 19.	Jan. 11, 11, '63.	Left. Feb. 9, re-amput'n. Died February 19, 1863; pyæmia.
783	Layton, J., Pt., F, 4th N. Y. Heavy Artillery.	June 19, 20, '64.	Right. Surg. W. Watson, 105th Pennsylvania. Died June 28, 1864. *Spec.* 2649.
784	Leesholts, W., Pt., G, 147th Pennsylvania.	May 25, 25, '64.	Right. Surg. H. B. Whiton, 60th N. Y. Died June 4, 1864.
785	Leight, E. P., Serg't Maj., 1st Mass. Cav., age 24.	May 4, 4, '64.	Right; circular. Died July 12, 1864.
786	Lieber, J., Corp'l, B, 1st Ohio.	Nov. 24, 24, '63.	Left. Died December 27, 1863.
787	Littlefield, L. P., Pt., K, 1st Mass. H'vy Art'y.	May 19, 19, '64.	Right; flap; erysipelas; gang. Died May 24, 1864.
788	Livingston, J., Pt., A, 1st Mich. S. S., age 18.	May 9, 10, '64.	Right; lateral flap. Surg. S. S. French, 20th Michigan. Died June 21, 1864; pyæmia.
789	Lockland, B., Pt., C, 3d Artillery, age 25.	Sept. 23, 23, '63.	Left. Died October 11, 1863.
790	Long, M. B., Pt., B, 12th Wisconsin, age 24.	Aug. 30, 30, '64.	Left. Surg. E. M. Rogers, 12th Wis. Died Nov. 23, 1864.
791	[3]Looney, M., Pt., B, 1st Mass. Cav., age 23.	May 31, J'e 1, '64.	Left; circular. Died June 8, '64; pyæmia.

[1] JONES (J.), *Investigations upon the Nature, Causes, and Treatment of Hospital Gangrene, etc.*, in *U. S. San. Com. Mem.*, Surg. Vol. II, p. 260.

[2] SMILEY (T. T.), *Twenty Cases of Gunshot Wounds*, in *Boston Medical and Surgical Journal*, 1863, Vol. 68, p. 419.

[3] LIDELL (J. A.), *On the Secondary Traumatic Lesions of Bone, etc.*, in *U. S. Sanitary Commission Memoirs*, Surgical Volume I, N. Y., 1870, p. 283.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
792	Loper, R., Pt., F, 25th Michigan.	May 14, 14, '64.	Left. Died July 29, 1864.
793	Lottridge, D. P., Pt., M, 2d New York Cavalry.	Dec. 6, 6, '64.	Left: circular. Died December 20, 1864; exhaustion.
794	Lovilett, P.C., Pt., H, 1st Mass. H. Art'y, age 23.	May 19, 19, '64.	Right; flap. Died June 7, 1864.
795	*Luther, F.*, Corp'l, E, 53d North Carolina.	July 3, —, '63.	Right. Surg. C. S. Wood, 66th N. Y. Died Sept. 14, 1863.
796	Magnus, N., Pt., A, 11th Colored Troops.	Aug. 25, 26, '64.	Left; Teal's method. Surg. C. E. Swasey, U. S. V. Died March 12, 1865.
797	Marks, P., Corp'l, A, 1st Minnesota.	July 2, 2, '63.	Right. Surg. C. S. Wood, 66th N. Y. Died July 24, 1863.
798	Marquis, W. H., Pt., E, 83d Penn., age 20.	Aug. 27, 27, '63.	Left (amp. right shoulder joint); lig. brachial. Died Sept. 12, '63.
799	Marsh, W. W., Pt., I, 14th New York Heavy Artillery, age 29.	July 26, 26, '64.	Left; flap. Surg. W. V. White, 57th Mass. Died Jan. 23, 1865; phthisis pulmonalis.
800	Martin, F., Pt., K, 9th Maine, age 20.	July 24, 24, '64.	Left; flap. Died Aug. 7, 1864; exhaustion.
801	McAfoot, G. W., Pt., A, 8th Penn. Res., age 26.	Dec. 13, 15, '62.	Left; erysipelas. Died April 11, 1863; pyæmia.
802	McCahan, J. D., Pt., H, 46th Pennsylvania.	July 20, 20, '64.	Left. Died July 25, 1864.
803	McCardle, J., Pt., E, 2d Pennsylvania, age 23.	July 2, 2, '64.	Right (also amp. left upper third). Died July 3, 1864.
804	McCool, A., Pt., E, 188th Pennsylvania, age 21.	June 1, 1, '64.	Right (also flesh w'd right thigh); circular. Died July 21, 1864.
805	McCool, J. G., Pt., I, 44th Illinois.	Sept. 19, 19, '63.	Left. Died October 13, 1863.
806	McGraw, F., Pt., K, 42d New York.	July 3, 3, '63.	Right. Died August 14, 1863.
807	McGuire, J., Corp'l, D, 40th New York, age 21.	May 5, 5, '64.	Left. Died May 14, 1864; hæmorrhage and exhaustion.
808	McMillan, T., Col'd servant, 50th Pennsylvania.	Nov. 25, 25, '63.	Left. Surg. A. M. Wilder, U. S. V. Died December 3, 1863.
809	Meekins, J., Pt., F, 2d Penn. Art'y, age 45.	July 18, 18, '64.	Right; flap. Died August 11, 1864.
810	Mitchell, C. B., Lieut., E, 14th Ohio.	Sept. 1, —, '64.	Left. Died September 20, 1864.
811	Mitchell, W. J., Pt., F, 56th Mass., age 40.	June 17, 18, '64.	Right. Died July 21, 1864.
812	*Mizzelle, R.*, Pt., D, 17th North Carolina, age 18.	May 21, 21, '64.	Left; circular. Died August 1, 1864.
813	Monson, J., Pt., H, 2d Conn. H. Art., age 27.	June 1, 3, '64.	Left; circular. Died August 30, 1864.
814	Moore, A., Pt., A, 61st Pennsylvania, age 25.	July 12, 12, '64.	Left; gangrene. Died August 7, 1864.
815	Morelock, W., Pt., I, 19th Michigan.	May 15, 15, '64.	Left. A. Surg. D. L. Jewett, 20th Conn. Died June 24, 1864.
816	Murray, J., Pt., D, 51st New York.	May 6, —, '64.	Right. Died May 20, 1864.
817	Myres, G., Corp'l, B, 14th Infantry, age 23.	Aug. 18, 18, '64.	Right; circular. Died September 11, 1864.
818	*Nash, J. C.*, Serg't, K, 40th Miss., age 17.	July 20, 20, '64.	Right. Sept. 20, re-amputation. Died October 4, 1864.
819	Nason, H., Pt., C, 1st R. Island Art'y, age 38.	Nov. 30, Dec. 2, '63.	Right (also amp. left, mid. third); circular; gangrene. Died Dec. 21, 1863; pyæmia.
820	*Nock, P.*, Pt., E, 1st Louisiana.	May 27, 27, '63.	Both. Died May 27, 1863.
821			
822	O'Neil, E., Pt., K, 124th Ohio.	May 31, 31, '64.	Right. Died June 21, 1864.
823	Paine, A. C., Pt., F, 42d New York.	July 2, 3, '63.	Both. Surg. H. M. McAbee, 4th Ohio. Died July 23, 1863.
824			
825	Palm, J., Pt., F, 22d Penn. Cavalry, age 19.	Aug. 21, 22, '64.	Left; circular. A. Surg. C. W. Stinson, 23d Ill. Died Sept. 2, '64.
826	Parker, M. F., Pt., E, 19th Michigan.	May 15, 15, '64.	Left. A. Surg. G. M. Trowbridge, 19th Mich. Died May 25, 1864.
827	Patterson, J., Pt., G, 2d Penn. H. Art'y, age 29.	June 16, 16, '64.	Right. Died June 22, 1864.
828	Perry, A., Pt., E, 6th New Hampshire.	Dec. 13, 13, '62.	Right. Died January 27, 1863.
829	Perry, O., Pt., F, 41st Illinois.	July 12, 12, '63.	Right; gangrene; amp. thigh. Died September 12, 1863.
830	*Phillips, W. A.*, Pt., B, 14th Georgia, age 25.	July 12, 13, '64.	Left; circ. Surg. W. P. Young, 4th Georgia. Died July 24, '64.
831	Pickle, A. H., Pt., G, 68th Pennsylvania, age 25.	July 2, —, '63.	Left. July 10, hæmorrhage, 24 oz. Died July 12, 1863.
832	Potter, H. W., Pt., G, 14th Infantry.	July 2, 4, '63.	Right. Died August 18, 1863.
833	Price, R. S., Pt., B, 1st N. J. Artillery, age 25.	July 3, 4, '63.	Right (also amp. forearm); colliq. diarr. Died Aug. 22, '63; exh'n.
834	Quinn, J., Sergeant, A, 170th New York, age 45.	Aug. 25, 25, '64.	Right; double flap. Surg. N. Hayward, 20th Mass. Necrosed; removal of 6 ins. tibia. Died Nov. 5, 1864. *Spec.* 3320.
835	Ransom, J. D., Capt., C, 142d N. Y., age 29.	Sept. 29, Oct. 1, '64.	Right. Surg. D. G. Rush, 101st Penn. Died Nov. 10, '64; pyæm.
836	Reed, J. M., Adj't, 10th Vermont.	April 2, 2, '65.	Right. Died April 6, 1865.
837	Reither, J. G., Pt., F, 142d N. Y., age 26.	Oct. 27, 27, '64.	Left. Surg. A. M. Clark, U. S. V. Died Nov. 28, 1864; pyæmia.
838	Riley, J., Pt., B, 9th Vermont, age 21.	Sept. 28, —, '64.	Left. Died October 31, 1864; exhaustion.
839	Roach, W., Pt., F, 27th Massachusetts, age 44.	June 18, 18, '64.	Left. Surg. G. T. Stevens, 77th New York. Died July 6, 1864; exhaustion.
840	Rogers, J. F., Pt., G, 24th Iowa.	April 8, 8, '64.	Right. Died May 17, 1864.
841	Rosser, J., Pt., B, 110th Ohio.	Oct. 19, 19, '64.	Left. Died October 24, 1864.
842	Ryan, T., Pt., E, 8th Maryland, age 23.	Aug. 21, 21, '64.	Right; circ. Surg. A. A. White, 8th Md. Hæm., 32 oz. Died Sept. 16, 1864; hæmorrhage.
843	Sabine, C. D., Corp'l, H, 100th New York.	April 9, 11, '63.	Left; circ. (also w'nd clavicle); slough.; pneum. Died April 30, 1863; pyæmia. *Spec.* 1188.
844	Sackhimer, G. F., Serg't. H, 81st Penn., age 27.	June 22, 24, '64.	Left; circular. Died June 29, 1864; gangrene.
845	Sancerman, G., Corp'l, G, 105th Penn., age 31.	May 5, 5, '64.	Left; circular. Died May 30, 1864; exhaustion.
846	Sanford, L., Bugler, C, 73d Ohio.	July 3, —, '63.	Left. Died July 12, 1863.
847	Schappie, N., Pt., K, 7th New York, age 36.	April 7, 8, '65.	Left; flap: gangrene; anæmia; diarrhœa. Died May 12, 1865.
848	Schmehl, M., Pt., D, 198th Penn., age 19.	Mar. 31, 31, '65.	Left. April 24, re-amput'n. Died April 25, 1865; tetanus.
849	Seville, J., Pt., H, 123d Pennsylvania.	Dec. 13, —, '62.	Left. Died December 26, 1862; tetanus.
850	Shannon, E., Pt., I, 38th Massachusetts.	April 13, 13, '63.	Left. Died May 5, 1863.
851	Shea, D., Pt., F, 13th New Hampshire.	June 3, 3, '64.	Left. Died June 25, 1864.
852	Simmington, J. S., S'g't, B, 10th Illinois Cav.	Sept. 10, 10, '63.	Right. Surg. E. A. Clarke, 8th Mo. Cav. Died Oct. 9, 1863.
853	*Smiley, W. J.*, Pt., F, 9th Alabama Cavalry.	June 24, —, '64.	Right. Died September 22, 1864.
854	Smith, G. M., Pt., B, 6th Ohio Cavalry, age 38.	June 20, 21, '63.	Right. Died July 18, 1863; pyæmia.
855	Smith, J. S., Pt., F, 2d N. Y. H'vy Art., age 17.	June 2, 2, '64.	Left; flap. Dr. A. Garcelon, of Maine. Died July 29, 1864.
856	Smith, W. H., Pt., H, 23d Penn., age 22.	June 1, 1, '64.	Left. Died June 28, 1864.
857	Southworth, W. B., Pt., F, 42d Illinois, age 25.	Nov. 25, 25, '63.	Left. Died April 2, 1864, of typhoid fever.
858	Spriggle, B., Pt., I, 17th Penn. Cavalry, age 28.	July 10, 10, '63.	Left; flap. Died August 16, '63. *Spec.* 3878.
859	Stahli, U., Pt., B, 187th Penn., age 17.	Aug. 19, 20, '64.	Left; circular. Died September 7, 1864; pyæmia.
860	Stiers, W., Pt., A, 97th Ohio.	June 22, 22, '64.	Right. Died July 27, 1864.
861	Stiteler, C., Pt., D, 16th Infantry.	Sept. 19, 19, '63.	Right. Died September 29, '63; tetanus.
862	Stover, J. H., Pt., 188th Pennsylvania, age 21.	June 1, 1, '64.	Left; ant. post. skin flap. Died June 30, 1864; gangrene.
863	Suttin, M., Pt., H, 8th N. Y. H'vy Art'y, age 28.	June 3, 3, '64.	Left. Died August 13, 1864.
864	Swinger, J., Pt., K, 130th Indiana, age 18.	Aug. 3, 3, '64.	Right. Surgeon J. W. Lawton, U. S. V. Died Sept. 1, 1864.
865	Sykes, W. E., Corp'l, G, 1st N. Y. Art'y, age 47.	May 19, 19, '64.	Left; flap. Died June 1, 1864.
866	*Taylor, W. W.*, Pt., G, 25th S. C., age 25.	Aug. 20, 21, '64.	Right; circular. Died September 12, 1864; pyæmia.
867	Taylor, W., Pt., H, 65th Ohio.	Sept. 19, 19, '63.	Left. Died October 13, 1863.
868	*Thilks, M. J.*, Pt., A, 19th Virginia.	July 2, —, '63.	Right. Died August 6, 1863.
869	Thomas, F., Corp'l, 10th Michigan.	July 14, —, '64.	——. Died July 17, 1864.
870	Tibbetts, S., Corp'l, D, 1st Me. H. A., age 29.	June 18, 20, '64.	Left; circular. A. A. Surg. O. W. Peck. Died July 30, 1864.
871	Ulmer, F., Pt., F, 189th New York.	Mar. 30, 31, '65.	Left; gangrene. Died April 28, 1865; exhaustion.
872	Van Buren, J. H., Pt., G, 2d Conn. H'vy Art'y.	Sept. 19, 19, '64.	Left; circular. Died October 7, 1864; exhaustion.
873	Vandruff, H. C., Corp'l, A, 97th Ohio.	Dec. 16, 16, '64.	Left. A. A. Surg. J. C. Thorpe. Died January 9, 1865.
874	Wakefield, W., Pt., E, 2d Ohio Cavalry, age 26.	Mar. 31, Ap. 1, '65.	Left. Surg. S. H. Plumb, 82d N. York. Died June 4, 1865.
875	Ward, T., Capt., F, 67th Ohio, age 31.	Oct. 13, 13, '64.	Left. Died October 21, 1864.
876	Wassenberg, J., Pt., I, 27th Penn., age 23.	Nov. 25, 25, '63.	Left. Surg. J. Reily, 33d N. J. Died April 19, 1864.
877	Webster, G. W., Pt., I, 7th Maryland.	May 6, 6, '64.	Left. Died May 27, 1864.
878	Welch, J. B., Pt., G, 35th Iowa.	July 14, 14, '64.	Left. Died July 19, 1864.
879	Wells, W. W., Lieut., F, 58th Penn., age 30.	May 26, 26, '64.	Left; circ. Surg. C. A. Cowgill, U. S. V. June 6, re-amputation. Died June 11, '64; exhaustion.
880	Weyman, J. B., Pt., A, 6th Kentucky, age 22.	July 20, 21, '64.	Left; circular. Died September 27, 1864; chronic diarrhœa.
881	Wheatly, J., Pt., C, 61st Ohio.	May 3, 3, '63.	Right. Died May 21, 1863.
882	Whittier, F. M., Pt., K, 14th Kentucky.	June 27, 27, '64.	Right. Died July 18, 1864.
883	Wilson, A. N., Pt., I, 5th New York.	Aug. 30, 30, '62.	Right. Died October 10, 1862.
884	Wilson, W. C., Pt., B, 4th Vermont.	Dec. 13, 13, '62.	Left. Died January 13, 1863.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.	No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
885	Wilts, B. F., Pt., A, 21st Illinois.	Dec. 31, 31, '62.	Left. Died January 7, 1863.	893	Ball, P., Pt., F, 3d Infantry.	May 3, 3, '63.	——. Ass't Surg. J. S. Billings, U. S. A.
886	Wimpfler, S., Pt., C, 9th Ohio.	Nov. 25, 25, '63.	Left (also amp. elbow joint). Died December 9, 1863.	894	*Blackwell, W.*, Pt., B, 1st S. C. Artillery.	Mar. 19, 19, '65.	Right.
887	Winget, C. B., Pt., B, 1st Michigan, age 45.	June 3, 3, '64.	Left; circ. Surg. A. F. Whelan, 1st Mich. S. S. Died July 5, 1864; exhaustion.	895	*Culp, T. H.*, Lieut., H, 9th Georgia.	Oct. 7, —, '64.	Left.
888	*Woodrum, J.*, Sergeant, French's Virginia Artillery.	Aug. 16, —, '64.	Right; circ. Surg. W. F. Richardson, P. A. C. S. Died September 3, 1864; pyæmia.	896	*Page, L. L.*, Pt., E, 24th Georgia.	May 18, —, '64.	Right.
889	Woods, I., Pt., F, 199th Penn., age 57.	April 9, 9, '65.	Right. Died May 29, 1865.	897	*Reed, J. W.*, Pt., K, 2d Louisiana.	May 6, —, '64.	Right.
890	Wright, A. M., Capt., F, 57th N. York, age 22.	June 16, 16, '64.	Left. Died July 2, 1864.	898	*Simms, D. L.*, Pt., C, 1st Battery Va. Artillery.	Oct. 1, 1, '64.	Left; circular (also severing tibial artery).
891	Wright, D., Pt., G, 92d Ohio, age 24.	June 27, 27, '64.	Left. Died July 17, 1864; pyæmia.	899	*Speck, A.*, Pt., A, 17th Tennessee.	Oct. 21, —, '61.	
892	Bailey, N., Pt., B, 14th Infantry.	May 12, —, '64.	Left.	900	*Thrift, W. H.*, Pt., A, 1st S. C. Rifles.	———	——; circular.

In thirty-eight of the nine hundred cases of primary amputations in the lower third of the leg, the side was not reported; four hundred and sixty-nine operations involved the left, and three hundred and ninety-three the right limb. Specimens of forty cases belonging to this group are preserved in the Army Medical Museum.

Primary Amputations in the Leg for Shot Injury in which the seat of Operation was not indicated.—In five hundred and seventy-one of the three thousand three hundred and ninety-two primary amputations in the continuity of the bones of the leg the seat of the operation was not specified. The results in twenty-nine cases were not ascertained. One hundred and twenty-four operations proved successful, and four hundred and eighteen fatal, a mortality of 77.1 per cent.

Examples of Recoveries after Primary Amputations in the Continuity of the Bones of the Leg, seat of operation not specified.—The one hundred and twenty-four operations of this group were performed on one hundred and twenty-three patients, in one instance both limbs having been removed. One hundred and seventeen were Confederate and six Union soldiers:

Case 748.—Private *J. B. Barron*, Co. I, Cobb's Georgia Legion, was wounded in the leg, and captured at South Mountain, September 14, 1862. Assistant Surgeon H. A. Du Bois, U. S. A., described the injury as a "gunshot compound comminuted fracture of both bones. The man was admitted to the field hospital at Burkettsville, where amputation by the circular method was performed forty-eight hours after the reception of the wound. The patient recovered." After his recovery he was paroled and sent south. The Confederate hospital records show that he was admitted, on December 4th following, to the general hospital at Petersburg, whence he was furloughed two weeks later and proceeded to his home.

In the following instance both legs were successfully amputated by a Confederate surgeon on the day of the injury:

Case 749.—Corporal *J. W. Alexander*, Co. K, 13th Mississippi, was wounded at the battle of Fredericksburg, December 11, 1862. His injury appears recorded on a Confederate hospital register as "gunshot fracture of both legs, followed by amputation of both legs the same day by Surgeon J. T. Gilmore, C. S. A." The man recovered, and was subsequently furnished with artificial limbs by the Confederate Association for the relief of maimed soldiers.

Of the six Union soldiers one, an officer, remained in the service and was afterwards killed in battle; three were pensioned, and two do not seem to have applied for pensions; one of the pensioners died six years after the operation.

Case 750.—Lieutenant-Colonel George H. Ward, 15th Massachusetts, was wounded in the action at Ball's Bluff, October 21, 1861. Surgeon A. B. Crosby, U. S. V., states: "The wound was inflicted by a bullet; primary amputation was performed, the ankle being shattered and the circulation cut off." Lieutenant-Colonel Ward recovered, was promoted to the Colonelcy of his regiment, which he rejoined in February, 1863, and was killed at the battle of Gettysburg, July 2, 1863.

Case 751.—Private M. Higman, Co. B, 46th Pennsylvania, aged 29 years, was wounded by a shell in the right leg, at Cedar Mountain, August 9, 1862. He fell into the hands of the enemy and suffered primary amputation. Two weeks afterwards he was conveyed to the Hotel Hospital, at Piedmont, where he remained until exchanged during the following month. Surgeon R. B. McCay, U. S. V., recorded that the patient, after being paroled by the enemy, was admitted to the Chesapeake

Hospital, Fort Monroe, and Surgeon A. E. Stocker, U. S. V., reported that he was discharged January 6, 1863, by reason of "loss of right leg." He was a pensioner until June 14, 1868, when he died. The cause of his death has not been ascertained.

Fatal Cases of Primary Amputations in the Leg, seat of Operation not indicated.—This group includes four hundred and eighteen amputations performed on four hundred and twelve patients; three hundred and forty-nine were Union and sixty-three Confederate soldiers. In three instances re-amputation in the thigh became necessary.

CASE 752.—Private J. Jameson, Co. A, 29th Illinois, aged 24 years, was wounded at the battle of Spanish Fort, March 29, 1865, by the explosion of a shell, which caused flesh wounds of the left shoulder and left hip and fracture of the tibia and fibula of the right leg. Assistant Surgeon W. E. Waters, U. S. A., reported that the wounded man was admitted to the Sixteenth Corps Field Hospital, where the injured "leg was amputated by Surgeon S. L. Cheaney, 29th Illinois." Surgeon J. B. G. Baxter, U. S. V., reported the following result: "The patient entered Barracks Hospital at New Orleans eight days after being wounded. He had undergone antero-posterior flap amputation of the leg on the field. The flesh wounds were granulating feebly. Secondary hæmorrhage took place from the anterior tibial on April 4th, amounting to thirty ounces, and being controlled by manual pressure on the groin for forty-eight hours. The patient was also troubled with some diarrhœa; he had a good constitution, however. Both bones protruded from the stump, and no union of the flaps took place up to April 12th, when one inch of the fibula was resected by Assistant Surgeon E. McClintock, U. S. V., who performed the operation without using anæsthetics. The patient died April 18, 1865."

CASE 753.—Private S. Watson, Co. C, 118th Pennsylvania, was wounded in the left leg during the engagement at the crossing of the Potomac, on September 20, 1862. Surgeon E. McDonnell, U. S. V., contributed the following description of the injury and its result: "The wounded man was conveyed to the German Reformed Church Hospital at Sharpsburg, where the leg was amputated below the knee on September 21st. The operation was performed for compound fracture of the leg. On September 28th the patient's condition was favorable, but during the following two days it was critical. On October 1st, the aspect of the stump was unhealthy, the entire flap threatening to slough; no union; discharge black, sanious, and unhealthy. During the next two days he mended somewhat, and on October 4th he was much improved. The difficulty in the case was a complete falling apart of the flaps, there being no union whatever. The posterior flap was large and heavy and composed of the thick muscles of the calf of the leg, making a bad wound to heal by granulations, the bone being exposed. October 11th, the patient's system has been sinking. He has some diarrhœa and tympanitis, and was restless and delirious during the night. He must die unless the whole stump is removed by an operation above the knee, and I have become sick of amputating thighs secondarily. October 13th, condition very low; pulse at times not perceptible; jaws and body rigid. Patient had a passage from the bowels during the night and passed water quite freely. Small doses of brandy and morphine were administered; no relief. October 14th, at 8 P. M., applied a large bread poultice to stump. Hæmorrhage from stump occurred during the following night. Death at 11.30 A. M. on October 15, 1862."

TABLE LXXI.

Summary of Five Hundred and Seventy-one Cases of Primary Amputations in the Leg for Shot Injury, the point of operation unspecified.

[Recoveries, 1—124; Deaths, 125—542; Results unknown, 543—571.]

NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.	NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	*Alexander, J. W.*, Corp'l, K, 13th Mississippi.	Dec. 11, 11, '62.	Both. Surg. J. T. Gilmore, C. S. A. Recovery.	16	*Byrd, L. S.*, Serg't, D, 10th Virginia.	May 3, 4, '63.	——. Surg. A. S. Flinn, C. S. A. Recovery.
2							
3	*Anderson, J. G.*, Pt., D, 4th Virginia.	Sept. 17, 17, '62.	——. Surg. — Black, C. S. A. Recovery.	17	*Calhoun, P. J.*, Pt., C, 1st Texas.	July 1, 3, '62.	Left. Surg. H. F. Campbell, P. A. C. S. Recovery.
4	*Atwell, C. I.*, Pt., L, 1st South Carolina.	Aug. 29, 29, '62.	Right. Surg. W. H. Prioleau, P. A. C. S. Recovery.	18	*Calvert, J. W.*, Pt., A, 2d South Carolina.	May 6, 6, '64.	——. Surg. — Brown, 2d S. C. Rifles. Recovery.
5	*Bailey, A. B.*, Serg't, K, 29th Tennessee.	Nov. 25, 25, '63.	Left. Surg. — Smith, C. S. A. Recovery.	19	*Carney, A.*, Pt., F, 3d South Carolina.	Dec. 12, 13, '62.	——. Surg. ———. 7th S. C. Recovery.
6	*Barnard, A. B.*, Pt., H, 8th N. C., age 26.	Sept. 30, 30, '64.	Left (right leg wounded). To prison February 22, 1865.	20	*Carroll, J.*, Serg't, C, 2d South Carolina.	Dec. 13, 14, '63.	——. Surg. D. A. Maxwell, P. A. C. S. Recovery.
7	Barney, J., Pt., I, 28th Illinois.	July 12, 12, '63.	Left. Discharged October 31, 1863.	21	*Carroll, S.*, Pt., A, 52d Virginia.	Aug. 28, 28, '62.	Right. Surg. — Leethe, C. S. A. Recovery.
8	*Barron, J. B.*, Pt., G, Cobb's Ga. Legion.	Sept. 14, 16, '62.	——; circular. Furloughed December 9, 1862.	22	*Claxton, A. J.*, Pt., E, 18th Tennessee.	May 14, —, '64.	Right. Transferred May 28, '64.
9	*Berry, J. H.*, Pt., G, 25th Virginia.	May 5, 6, '64.	——. Recovery.	23	*Clayburn, E.*, Pt., H, 55th Virginia.	May 2, 2, '63.	Left; flap. Furloughed September 24, 1863.
10	*Bickett, N. J.*, Pt., A, 48th North Carolina.	Oct. 14, 15, '63.	——. Ass't Surg. B. Chears, 48th North Carolina. Recovery.	24	*Clinton, T. L.*, Pt., H, 23d North Carolina.	May 2, 2, '63.	Right. Surg. R. J. Hicks, 23d North Carolina. Recovery.
11	*Bishop, H. D.*, Pt., K, 16th Virginia.	June 30, 30, '62.	——. Surg. — Capeheart, C. S. A. Recovery.	25	*Coffy, D.*, Pt., B, 32d Alabama.	July 22, 22, '64.	Left. Transferred.
12	*Blakemore, W. T.*, Captain.	May 20, 20, '64.	Right. Surg. R. D. Jackson, C. S. A. Recovery.	26	[1] *Collins, J.*, Pt., F, 10th South Carolina.	Sept. 19, 19, '63.	——; flap. Recovery.
13	*Boatwright, J. D. A.*, Pt., D, 2d Florida.	May 6, 6, '64.	——. Surg. M. S. Thomas, P. A. C. S. Recovery.	27	*Conrad, B. F.*, Lieut., A, 35th Virginia.	May 6, 7, '64.	——. Surg. — Horton, C. S. A. Recovery.
14	*Broksher, C. E.*, Serg't, K, 24th Ga., age 27.	July 2, 4, '63.	Right. Paroled September 25, 1863.	28	*Cooper, A. B.*, Pt., D, 18th Alabama.	May 14, —, '64.	Right. Transferred June 10, '64.
15	*Browne, S. B.*, Pt., B, 11th Alabama.	June 30, 30, '62.	——. Confederate surgeon. Recovery.	29	*Cormick, R. M.*, Pt., H, 4th Virginia Cavalry.	Oct. 11, 11, '63.	——. Surg. — Owens. Recovery.

[1] TERRY (C.), *Report of Wounded treated in Field Hospital of Hindman's Division after the battle of Chickamauga*, in *Confederate States Medical and Surgical Journal*, 1864, Vol. I, p. 76.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
30	*Crawford, E. D.*, Pt., A. 7th Georgia.	June 11, 11, '64.	——. Union surgeon. Recovery.
31	*Cross, J. W.*, Pt., C, Ga. Legion Cavalry.	Aug. 1, 2, '63.	Left. Surg. — Metcalf, C. S. A. Recovery.
32	*Dry, C. F.*, Pt., B, 2d Mississippi.	June 27, 27, '62.	Right. Surg. H. H. Hubbard, P. A. C. S. Recovery.
33	Echalaz, J. F., Corp'l, H, 65th New York.	May 31, 31, '62.	Left. Discharged December 12, 1862.
34	*Falkland, J. B.*, Pt., D, 8th N. C., age 22.	Sept. 30, 30, '64.	Left. To prison April 13, 1865.
35	*Fisher, C.*, Pt., G, 2d North Carolina.	July 3, 3, '63.	——.
36	*Flaherty, G. W.*, Pt., A, 31st Mississippi.	July 20, 20, '64.	Left. To prison November 10, 1864.
37	*Folkes, W. C.*, Pt., Shoemaker's Battery.	July 1, 2, '63.	——. Recovery.
38	*Ford, J. A.*, Pt., H, 23d North Carolina.	May 2, 2, '63.	——. Ass't Surg. B. Howard, U. S. A. Recovery.
39	[1] *Foxworth, C. B.*, Pt., I, 10th South Carolina.	Sept. 19, 19, '63.	——. Transferred October 9, '63. Recovery.
40	*Frazier, G. W.*, Pt., D, 37th Virginia.	May 8, 8, '62.	——. Surg. P. F. Whitehead, P. A. C. S. Recovery.
41	*Fuller, W.*, Serg't, G, 1st South Carolina.	July 21, 22, '63.	——. Surg. — Sloan, C. S. A. Recovery.
42	*Green, H. W.*, Pt., Beauregard's Artillery.	July 1, 1, '62.	——. Recovery.
43	*Gregory, J. T.*, Pt., E, 3d Arkansas.	May 6, 7, '64.	——. Surg. — Brown, 3d Ark. Retired March 20, 1865.
44	*Hanlin, P.*, Lieut., I, 16th Mississippi.	Sept. 17, 17, '62.	——. Ass't Surg. ———, 16th Mississippi. Recovery.
45	*Harrell, E. H.*, Pt., D, 48th Georgia.	May 4, 4, '63.	——. Ass't Surg. — Saunders. Recovery.
46	*Hart, R. A.*, Pt., D, 12th North Carolina.	May 2, 2, '63.	——. Surg. T. B. Wilkinson, P. A. C. S. Recovery.
47	*Harvey, J.*, Pt., E, 5th North Carolina.	May 5, 5, '62.	——. Transferred June 8, 1862.
48	*Hatfield, D.*, Pt., H, 5th Tennessee.	——— 1862.	Right. Furloughed February 20, 1863.
49	*Higgins, J.*, Pt., C, 63d Virginia.	June 22, 22, '64.	——. Surg. — Hunt, C. S. A. Recovery.
50	Higman, M., Pt., B, 46th Pennsylvania, age 30.	Aug. 9, 9, '62.	Right. Discharged Jan. 6, 1863. Died June 14, 1868.
51	*Howell, C.*, Pt., E, 5th Missouri.	Oct. 4, 4, '62.	——. Union surgeon. Feb. 6, '63, re-amputated. Recovery.
52	*Hubbard, J. A.*, Pt., A, 18th Virginia.	Mar. 31, Ap. 1, '65.	Right. Surg. M. C. Rowland, 61st N. Y. Released June 6, 1865.
53	*Hunter, J. H.*, Pt., I, 28th Virginia.	June 30, 30, '62.	——. Surg. H. W. Thompson, C. S. A. Recovery.
54	*James, D. H.*, Corp'l, G, 8th N. Carolina, age 23.	Sept 30, Oct. 1, '64.	Right. Released June 21, 1865.
55	*Johnson, C. L.*, Serg't, L, 7th South Carolina.	May 6, 6, '64.	——. Surg. J. E. Chancellor, C. S. A. Recovery.
56	*Jones, B. C.*, Capt., E, 56th Virginia.	June 27, 27, '62.	——. Surgeons Dunn and Lee, C. S. A. Recovery.
57	*Kirkland, J. G.*, Pt., D, 2d South Carolina.	May 25, 25, '61.	——. Surg. — Lamond, C. S. A. Recovery.
58	*Kirkley, D. C.*, Lieut., D, 15th S. Carolina.	Sept. 19, 19, '63.	——. Surg. — Johnson, C. S. A. Recovery.
59	*Lansing, J.*, Serg't, K, 5th Louisiana.	July 1, 3, '63.	Left. Surg. — Strickland, C.S.A. Discharged Dec. 8, 1864.
60	*Leach, B. F.*, Pt., H, 10th Arkansas.	May 27, 27, '63.	Left. To Provost Marshal Aug. 7, 1863.
61	*Lewis, T. N.*, Pt., A, 57th Georgia.	May 16, 16, '63.	Left. Recovery.
62	*Lewis, W. M.*, Pt., D, 1st Tennessee.	July 14. 14, '63.	Right. Recovery.
63	*Lietner, W. Z.*, Capt., E, 2d South Carolina.	July 2, 3, '63.	Right. Surg. — Lamond, C.S.A. Recovery.
64	*Lilly, E. J.*, Pt., C, 23d North Carolina.	May 3, 3, '62.	——. Surg. R. J. Hicks, 23d N. Carolina. Recovery.
65	*Logan, W. R.*, Capt., G, 4th Georgia Cavalry.	May 14, 15, '64.	Right. Surg. J. B. Edelin, C.S.A. Recovery.
66	*Love, W.*, Lieut., K, 46th Mississippi.	July 20, 20, '64.	Left. To prison November 10, 1864.
67	*Lowell, E. P.*, Pt., H, 26th N. Carolina.	May 5, 5, '64.	——. Surg. L. P. Warren, 26th North Carolina. Recovery.
68	*Mallard, W. W.*, Pt., E, 30th N. C., age 30.	May 3, —, '63.	——. Furloughed June 10, 1863.
69	*Marburg, E.*, Lieut., 7th Missouri Cavalry.	July 4, —, '63.	Left. To prison August 13, 1863.
70	*Mayer, C.*, Serg't, H, 6th Louisiana.	July 1, 1, '62.	——. Surg. W. A. Robertson, C. S. A. Retired Feb. 1, 1865.
71	*McClendon, W. M.*, Pt., D, 8th Georgia.	July 2, —, '63.	Right. To prison January 25, 1864.
72	*McCoy, E. C.*, Pt., B, 1st South Carolina.	Aug. 29, 29, '62.	——. Surg. W. A. Robertson, C. S. A. Recovery.
73	*McDoul, J.*, Pt., G, 21st Georgia, age 21.	May 2, 3, '63.	——; flap. Transferred May 26, 1863.
74	*McFoll, J. A.*, Pt., F, 18th Tennessee.	May 14, 14, '64.	Left. Transferred June 9, 1864.
75	*McLewis, A.*, Major, 2d Georgia.	Sept. 19, 19, '63.	——. Surg. — Headly, C. S. A. Recovery.
76	*McNeely, W. W.*, Serg't, B, 9th Louisiana.	May 2, 4, '63.	——. Recovery.
77	*McNiel, H. M.*, Pt., E, 56th N. C., age 26.	April 20, 20, '64.	Left; ant. skin, post. mus. skin flap. Surg. C. H. Ladd, C. S. A. Disch'd June 15, 1864.
78	*Michie, D.*, Pt., A, Jeff. Davis Legion.	July 9, 9, '63.	Left. Recovery.
79	[1] *Middleton, J.*, Pt., L, 10th South Carolina.	Sept. 19, 19, '63.	——; flap. Surg. T. P. Bailey, 10th S. C. Trans. Oct. 31, 1863.
80	*Miller, L.*, Pt., Purcell's Battery.	Aug. 29, 29, '62.	Left. Surg. — Haynes, C. S. A. Transferred Jan. 30, 1863.
81	*Miller, P.*, Pt., H, 33d Virginia.	July 21, 21, '61.	——. Surg. H. McGuire, C. S. A. Recovery.
82	*Mills, J. P.*, Lieut., G, 21st Mississippi.	May 3, —, '63.	Left. Transferred July 9, 1863.
83	*Mitchell, T. P. R.*, Pt., D, 1st Tennessee.	July 3, —, '63.	Left. Paroled September 5, '63.
84	*Moody, W. J.*, Pt., B, 5th North Carolina.	May 5, —, '62.	Left. Paroled August 31, 1862.
85	*Moore, A. E.*, Pt., K, 4th Virginia Cavalry.	Nov. 1, 1, '62.	Left. Ass't Surg. F. Gilliam, C. S. A. Recovery.
86	*Moore, G. W.*, Pt., C, 19th Alabama.	July 28, 28, '64.	Left. To prison February 18, 1865.
87	*Moyer, D.*, Pt., B, 19th South Carolina.	July 22. 22, '64.	Right. To prison November 10, 1864.
88	*Nash, P. W.*, Pt., E, 11th Mississippi.	Aug. 29, 30, '62.	——. Surg. — Ward, C. S. A. Recovery.
89	Nolen, F. J., Pt., A, 83d Pennsylvania.	June 27, 27, '62.	Right. Discharged January 20, 1863.
90	*Norton, W. C.*, Pt., B, 2d Mississippi.	July 1, 1, '63.	Left. Surg. H. H. Hubbard, P. A. C. S. Recovery.
91	*O'Niel, C.*, Pt., G, 5th North Carolina.	———	Right. Paroled August 31, 1862.
92	*Outlaw, J. E.*, Pt., A, 23d N. Carolina, age 26.	Oct. 19, 19, '64.	Left; post. flap. Surg. R. J. Hicks, 23d N. C. Trans. Jan. 8, 1865.
93	*Parker, J. C.*, Pt., A, 8th N. Carolina, age 26.	Sept. 30, 30, '64.	Right. To prison April 13, 1865.
94	*Peden, W. H.*, Corp'l, A, 17th Mississippi.	Nov. 29, 29, '63.	Left (also resection bones of right leg). Surg. J. P. Prince, 36th Mass. Exchanged.
95	*Proctor, S. A.*, Pt., F, 12th S. Carolina.	July 1, 3, '63.	——. Surg. T. P. Bailey, 12th S. Carolina. Recovery.
96	*Putnam, W. A.*, Pt., B, 49th North Carolina.	Aug. 21, 21, '64.	——. Ass't Surg. C. Duffy, 24th N. C. Retired Jan. 28, 1865.
97	*Raburn, J. M.*, Corp'l, F, 25th Tennessee.	Sept. 19, 19, '63.	——. Ass't Surg. F. R. Gregory, C. S. A. Recovery.
98	*Richardson, D.*, Pt., I, 61st N. Carolina.	Dec. 11, 11, '63.	——. Ass't Surg. R. R. Murphy, 16th N. C. Recovery.
99	*Roberts, J.*, Lieut., I, 48th Virginia.	May 3, 3, '63.	——. Surg. — Flemming, C.S.A. Recovery.
100	*Rodgers, T. M.*, Pt., C, 11th Tennessee.	Jan. 1, 1, '63.	Right. Surg. — Manney, C.S.A. Transferred August 3, 1863.
101	*Ruby, C. W.*, Pt., D, 42d Mississippi, age 29.	July 1, 2, '63.	——. Paroled August 22, 1863.
102	[1] *Russell, W.*, Corp'l, I, 28th Alabama.	Sept. 19, 19, '63.	Left. Transferred September 30, 1863.
103	*Russ, J. J.*, Pt., D, 18th N. Carolina, age 27.	May 2, 2, '63.	——; circular. Transferred June 5, 1863.
104	*Sadler, A. D.*, Serg't, G, 21st Mississippi.	Dec. 11, 11, '62.	Right (also amp. left foot). Surg. — Hill, C. S. A. Recovery.
105	*Saunders, G. L.*, Pt., G, 24th Virginia.	May 5, 5, '62.	——. Recovery.
106	*Scarborough, D. J.*, Pt., H, 14th S. Carolina.	Aug. 24, 24, '64.	Right. Surg. P. B. Henderson, P. A. C. S. Recovery.
107	*Sharrer, J.*, Pt., H, 48th Mississippi.	June 22, 22, '62.	——. Recovery.
108	*Shedd, W. H. H.*, Pt., C, 41st Mississippi.	Sept. 21, 21, '63.	Right. Surg. — Powell, 41st Mississippi. Recovery.
109	*Slusser, S. S.*, Pt., H, 12th Virginia.	May 6, 6, '64.	——. Surg. W. H. Burton, 7th Va. Cavalry. Recovery.
110	*Still, B.*, Pt., C, 9th Ga.	Oct. 14, 14, '64.	Left. Surg. G. F. Cooper. Recovery.
111	*Stinespring, W. H.*, Pt., E, 10th Virginia.	May 3, 3, '63.	——. Surg. — Campbell, C. S. A. Recovery.
112	*Stone, S.*, Pt., B, 37th Virginia.	May 3, 3, '63.	——. Surg. C. C. Henkle, C.S.A. Recovery.
113	*Talifero, J. M.*, Pt., H., 52d Virginia.	Sept. 16, 18, '62.	——. Surg. — Bland, C. S. A. Recovery.
114	Terry, R. L., Pt., C, 78th Illinois.	June 27, —, '64.	Left. Mustered out June 7, 1865.
115	*Thompson, J. W.*, Corp'l, H, 13th Mississippi.	Dec. 11, 11, '62.	Right. Surg. — Austin, C. S. A. Recovery.
116	[1] *Todd, W. F.*, Pt., —, 10th South Carolina.	Sept. 19, 19, '63.	——; erysipelas.
117	*Tracy, J. N.*, Corp'l, I, 5th Missouri.	May 1, 1, '63.	Left. Recovery.
118	*Triplett, H. F.*, Pt., Stuart Horse Artillery.	Oct. 15, 15, '63.	Right. Surg. J. H. Murray, P. A. C. S. Recovery.
119	*Vann, C.*, Pt., F, 12th Georgia, age 16.	Dec. 16, 16, '64.	Right. Exchanged January 16, 1865.
120	*Walker, H. C.*, Pt., B, 26th N. C., age 19.	July 1, 3, '63.	——. Paroled August 22, 1863.
121	*Walker, J.*, Pt., A, 23d Virginia.	June 27, 27, '62.	Right. Surgeon — Rievers, 28th Virginia. Recovery.
122	Ward, G. H., Lieut. Col., 15th Massachusetts.	Oct. 21, 21, '61.	Left. Recovery. Killed at Gettysburg.

[1] TERRY (C.), *Report of Wounded treated in Field Hospital of Hindman's Division after the battle of Chickamauga*, in *Confederate States Medical and Surgical Journal*, 1864, Vol. I, p. 76.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
123	*Wayland, W. R.*, Pt., K, 19th Virginia.	Oct. 15, 15, '61.	——. Surg. J. T. Gilmore, C.S.A. Discharged February 22, 1862.
124	*Webb, J. B.*, Serg't, C, 13th Virginia Cavalry.	Aug. 1, 1, '63.	——. Recovery.
125	Abbott, O., Pt., H, 7th New Hampshire.	July 11, —, '63.	Right. Died.
126	Ackerman, W., Pt., H, 8th New York.	June 8, 8, '62.	——; gangrene. Died June 15, 1862; tetanus.
127	Acres, G. C., Pt., D, 4th Iowa.	July 28, 28, '64.	Left. Surg. B. N. Bond, 27th Mo. Died August 5, 1864.
128	Adsit, J. E., Pt., F, 97th New York.	Sept. 17, 17, '62.	Right. Died October 17, 1862.
129	Anderson, A., Pt., G, 26th Missouri.	Sept. 19, 19, '62.	——. Died January 10, 1863.
130	Andrews, A. J., Lieut., C, 104th New York.	Dec. 13, 13, '62.	Right. Died January 26, 1863.
131	Andrews, T., Pt., C, 20th Michigan.	June 3, —, '64.	Right (also wound of shoulder). Died June 8, 1864.
132	Amick, W. M., Serg't, H, 55th Penn., age 22.	June 18, 18, '64.	Right. Died August 11, 1864.
133	Amidon, E. H., Pt., B, 36th Wisconsin.	June 19, 19, '64.	Left. Surg. C. Miller, 36th Wisconsin. Died July 9, 1864.
134	Allen, J. W., Pt., H, 1st Tennessee.	Oct. 8, 8, '62.	——. Died October 20, 1862.
135	Alverd, A. O., Pt., C, 100th New York.	May 31, —, '62.	Left. Died June 12, 1862.
136 137	Arkerson, A., Pt., D, 11th Infantry.	June 18, 18, '64.	Both. Died June 19, 1864.
138	Arnold, T., Pt., F, 7th Infantry.	Feb. 21, 22, '62.	——. Died February 26, 1862.
139	Athean, J., Serg't, H, 25th Iowa.	Jan. 11, —, '63.	Left. Died February 5, 1863.
140	Bailey, S. W., Pt., H, 6th Michigan.	May 27, 27, '63.	Left. Died May 28, 1863.
141	Baker, A., Pt., G, 3d Missouri.	Nov. 27, 27, '63.	Left (also amp. fingers). Died December 28, 1863; pyæmia.
142	Barrett, E., Pt., K, 14th Indiana.	Mar. 23, 23, '62.	Right. Died April 2, 1862.
143	Baxter, W., Pt., K, 3d Wisconsin.	May 15, —, '64.	Right. Died June 18, 1864.
144	Beckert, E., Pt., C, 25th Ohio.	Dec. 13, —, '61.	——. Ass't Surg. H. R. Wirtz, U. S. A. Died Jan. 28, 1862.
145	Beekstine, F., Lieut., I, 82d Illinois.	July 20, 20, '64.	Left. Died July 20, 1864.
146	Beeson, W. H., Serg't, G, 62d Pennsylvania.	July 2, 4, '62.	——. Died July 10, 1862.
147	Beers, C., Pt., K, 7th New Jersey.	July 3, 3, '63.	Right. Died July, 1863.
148	Bihl, A., Pt., E, 82d Illinois.	May 3, 3, '63.	Left. Died May 31, 1863.
149	*Bingham, W. H. M.*, Pt., B, 54th N. Carolina.	Sept. 19, 19, '64.	——. Died October 6, 1864.
150	Bitner, J., Pt., K, 102d Pennsylvania.	Oct. 19, 19, '64.	Left. Died October 20, 1864.
151	Blackwell, G., Pt., B, 7th Minnesota.	July 14, 14, '64.	——. Surg. A. T. Bartlett, 33d Mo. Died August 6, 1864.
152	Blakley, J. L., Pt., A, 52d New York, age 47.	June 16, 17, '64.	Left; post. flap. Died July 2, 1864; pyæmia.
153	Blanchard, J., Pt., C, 91st New York.	June 14, 14, '63.	Right. Surg. T. B. Reed, U.S.V. Died June 21, 1863.
154	Bloomestine, J., Pt., F, 4th New York.	Sept. 17, —, '62.	——. Died September 21, 1862.
155	Bower, J., Pt., A, 5th New Jersey.	May 4, —, '62.	—— (also wound of arm). Died May 17, 1862.
156	Bowman, J., Pt., I, 46th Pennsylvania.	July 20, 20, '64.	Right. Died September 7, 1864.
157	*Boyles, C.*, Pt., G, 55th Alabama.	July 20, —, '64.	Left. Died July 21, 1864.
158	Brady, P., Corp'l, H, 3d Ohio.	Oct. 8, 8, '62.	Left. Died November 7, 1862.
159	Branson, J., Serg't, F, 40th Illinois.	June 27, 27, '64.	Left. Surg. W. Graham, 40th Illinois. Died July 23, 1864.
160	Brierly, J., Pt., D, 97th Pennsylvania.	May 20, —, '64.	Left. Died May 22, 1864.
161	Brink, E., Seaman, Gunboat Maratanza.	Oct. 11, —, '62.	Right. Died June 28, 1864; exhaustion.
162 163	Brinkman, A., Pt., G, 79th Pennsylvania.	Aug. 11, 11, '64.	Both. Died August 12, 1864.
164	Bronsher, I., Pt., D, 81st Illinois, age 25.	May 22, 22, '63.	Left. Died June 14, 1863; pyæmia.
165	*Brown, A.*, Pt., I, 3d North Carolina.	Nov. 27, —, '63.	Right. Died December 14, 1863.
166	Brown, C., Lieut., E, 100th New York.	July 18, 20, '63.	Right. Died August 13, 1863; tetanus.
167	Brown, H. F., Corp'l, I, 14th New Hampshire.	Sept. 19, 19, '64.	Right. Died September 19, 1864.
168	*Brown, J. D.*, Pt., B, 3d North Carolina.	July —, —, '63.	——. Died July 18, 1863.
169	Brown, R., Pt., G, 49th Colored Troops.	June 7, —, '63.	Right. Died June 14, 1863.
170	*Brown, W. D.*, Pt., Anderson's Chesapeake Bat'y.	July 3, —, '63.	——. Died July 11, 1863.
171	Brown, W. M., Pt., G, 12th Illinois.	May 14, —, 64.	Right. Died June 1, 1864.
172	Bryant, W., Pt., D, 19th Ohio.	Jan. 2, —, '63.	Left. Died January 20, 1863.
173	Bucklin, G., Pt., K, 12th Rhode Island.	Dec. 13, 13, '62.	Right. Died January 9, 1863.
174	Bulley, J., Pt., E, 16th New York.	May 3, 3, '63.	——. Died May 20, 1863.
175	Bunker, C. L., Pt., I, 1st Me. Heavy Artillery.	June 16, —, '64.	Right. Died June 28, 1864.
176	Burke, P. E., Colonel, 66th Illinois.	May 16, 16, '64.	Left. Surg. W. R. Marsh, 2d Iowa. Died May 19, 1864.
177	Burnes, J. P., Pt., H, 13th West Virginia.	Oct. 19, 19, '64.	Left; flap. Died October 28, 1864; pyæmia.
178	Butler, M., Pt., D, 15th New York.	June 3, 3, '64.	Left (also wound buttock). Died June 19, 1864; pyæmia.
179	Buxton, A., Capt., H, 2d U. S. Sharpshooters.	May 5, 6, '64.	——. Died May 7, 1864.
180	*Bybee, J.*, Pt., F, 21st Kentucky.	June 20, 20, '64.	——. Surg. C. J. Walton, 21st Ky. Died June 20, 1864.
181	*Byers*, —, Pt., E, 5th Alabama.	July 3, —, '63.	Right. Died July 24, 1863.
182	Byrne, W. E., Pt., K, 42d New York.	July 2, —, '63.	——. Died July 24, 1863.
183	Cahill, D., Pt., E, 10th ——	Oct. 8, —, '62.	Left. Died October 15, 1862.
184	Cain, Wm., Pt., F, 7th N. Y. H'vy Art'y, age 23.	June 16, 16, '64.	Left. Surg. S. H. Plumb, 82d N. Y. Died July 25, 1864.
185	*Calloway, R. W.*, Capt., K, 22d Georgia.	July —, —, '63.	——. Died July 16, 1863.
186	*Campbell, J. B.*, Pt., F, 3d Tennessee.	May 15, —, '64.	Left. Confederate surgeon. Died May 24, 1864.
187	Campher, L., Serg't, D, 4th C. Troops, age 26.	Sept. 29, 30, '64.	Left. Died October 27, 1864; exhaustion.
188	Carr, W., Serg't, I, 12th Massachusetts.	July 3, —, '63.	Left. Died July 14, 1863.
189	Cathcart, B. F., Pt., G, 141st Pennsylvania.	July 3, —, '63.	Right. Died August 10, 1863.
190	*Chalker, W. H.*, Pt., A, 48th Georgia.	July 3, —, '63.	——. Died July 16, 1863.
191	Champlain, J., Pt., D, 12th Infantry.	July 3, —, '63.	Left. Died July 6, 1863; hæmorrhage.
192	Chandler, J. S., Pt., E, 111th Illinois.	May 14, 14, '64.	Left. A. Surg. J. F. Smith, 55th Illinois. Died May 16, 1864.
193	Chedister, J. O., Pt., I, 7th Iowa.	Nov. 7, 7, '61.	——. Died November 30, 1861.
194	Chism, R., Serg't, K, 91st Penn., age 21.	May 7, —, '64.	Left. Died June 1, 1864.
195	Church, R., Pt., C, 40th Ohio.	Nov. 24, 24, '63.	Right. Died December 4, 1863.
196	Clayton, J., Pt., F, 4th N. Y. H'vy Artillery.	June 18, 18, '64.	Right. Died June 28, 1864.
197	Cliff, J., Recruit, Col'd Troops.	1864.	Left. Died November 16, 1864.
198	Cleoman, P., Pt., K, 86th New York.	May 3, 3, '63.	Right. Died May 20, 1863.
199	*Clyde, C. C.*, Pt., Phillips's Legion, Georgia.	July 1, 3, '63.	Right. Died July 20, 1863.
200	Cole, J., Serg't, Kane's Penn. Rifles.	June 8, 8, '62.	Left. Died June 11, 1862.
201	Cole, M. R., Pt., A, 6th Indiana.	May 31, 31, '64.	——. Died May 31, 1864.
202	Cole, S. B., Pt., H, 18th New York.	Sept. 14, 16, '62.	——. Died October 21, 1862; exhaustion.
203	*Colsten, R.*, Lieut.-Col., 2d Virginia.	——	——. Died December 23, 1863.
204	*Colum, W.*, Corp'l, G, 21st Mississippi.	July 1, 1, '63.	——. Died July 6, 1863.
205	Conrad, C., Pt., G, 12th Missouri.	May 14, 14, '64.	Left; flap. Surg. J. Spiegehalter, 12th Mo. Died May 22, 1864.
206	Cooper, W., Pt., D, 2d Cavalry, age 22.	Aug. 28, 28, '64.	Right. Died October 24, 1864.
207	Crowell, S. W., Lieut., I, 1st Me. H'vy Artillery.	June 18, 18, '64.	Right. Died June 28, 1864.
208	Crowningshield, L. C., Pt., G, 142d N. Y.	Dec. 25, 25, '64.	Right (also amp. arm). Died January 11, 1865.
209	Cuppernell, L., Pt., E, 121st New York.	May 3, 3, '63.	——. Died May 15, 1863.
210	Curtain, P., Pt., E, 152d New York, age 32.	Nov. 6, 6, '64.	——. Surg. J. L. Brenton, 8th Ohio. Died Nov. 12, 1864.
211	*Davenport, C. O.*, Pt., G, 36th Virginia.	Sept. 19, —, '64.	——. Died September 25, 1864; exhaustion; shock.
212	*Davis, J.*, Pt., E, 8th Virginia.	July 2, —, '63.	——. Died July 11, 1863.
213	Dean, W. J., Pt., D, 10th Missouri.	Sept. 19, 19, '62.	——. Died September 30, 1862.
214	De Gouth, B., Pt., M, 5th Artillery.	May 6, 6, '64.	Right. Died May 13, 1864.
215	Demay, H., Pt., D, 20th Connecticut.	May 3, 3, '63.	Right. Died May 31, 1863.
216	Demby, W. H., Serg't, G, 4th Col'd Troops.	Feb. 11, 11, '65.	Left; circular. Died.
217	Dennison, C. E., Capt., B, 18th Infantry.	Dec. 31, 31, '62.	Right. Died January 15, 1863.
218	Dettmer, G., Pt., E, 82d Illinois.	July 20, 20, '64.	Right. Died August 8, 1864.
219	Dixon, J., Pt., —, 18th Infantry.	Aug. —, —, '64.	Left. Died August 10, 1864.
220	Dolph, I., Pt., C, 136th Pennsylvania.	Dec. 13, 13, '62.	Left. Died January 15, 1863; pyæmia.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
221	Donahay, T., Pt., A, 19th Michigan.	May 15, 15, '64.	Right. Surg. J. Bennett, 19th Mich. Died May 23, 1864.
222	Doster, J., Pt., C, 90th Ohio.	Dec. 31, —, '62.	Left. Died February 9, 1863.
223	Dougan, S. W., Corp'l, C, 8th Kansas.	Sept. 19, 19, '63.	Left (also wound of right wrist). Died September, 1863.
224	Duncan, J. B., Capt., H, 32d Illinois.	Oct. 5, 5, '62.	——. Died July 18, 1864; debility resulting from injury.
225	Dungan, J. W., Lieut., A, 113th Ohio.	June 27, 27, '64.	Left. Died July 4, 1864.
226	Eaton, I. V., Pt., D, 4th Maine.	July 2, 2, '63.	Right. Died August 18, 1863.
227	Eberly, C., Pt., C, 98th Pennsylvania.	May 12, 12, '64.	Left. Died May 20, 1864.
228	Efford, W., Pt., G, 53d Indiana.	Oct. 5, 5, '62.	——. Died.
229	Ellinwood, A. W., Pt., F, 25th Mass., age 21.	June 3, 3, '64.	Left. Died July 6, 1864.
230	Emmel, P., Pt., E, 163d New York.	Dec. 13, 13, '62.	Left. Died January 5, 1863.
231	Enos, J., Teamster, 39th Indiana.	Oct. 8, 8, '62.	Right. Died October 25, 1862.
232	Erisman, J., Pt., D, 57th Indiana.	Sept. 1, —, '64.	Left. Died September 20, 1864.
233	*E——, J. N. P.*	July 3, 3, '63.	——. Died July 3, 1863.
234	Esson, H. J., Pt., G, 17th Michigan.	May 12, 12, '64.	——. Died May 21, 1864.
235	Faber, W., Pt., H, 47th Ohio.	May 26, 26, '63.	Left. Died September 7, 1863.
236	Farrell, J., Pt., F, 2d R. Island, age 33.	May 5, 5, '64.	Right. Died June 6, 1864.
237	Farrington, P., Pt., G, 82d New York.	July 3, 3, '63.	Right. Died July 10, 1863.
238	Feller, J., Serg't, A, 21st Ohio.	Aug. 21, —, '64.	Left. Died October 2, 1864.
239	Fightmaster, G. W., Pt., F, 22d Kentucky.	May 22, —, '63.	Right. Died May 28, 1863; pyæmia.
240	*Fincheler, H. S.*, Pt., A, 40th Alabama.	July 28, 28, '64.	Right. Died August 11, 1864.
241	Follet, L. D., Pt., D, 92d New York, age 38.	June 1, 1, '64.	Left. Died June 14, 1864.
242	Ford, J. H., Pt., C, 9th Iowa.	May 22, —, '63.	Right; double flap. Surg. A. T. Hudson, 26th Iowa. Died June 24, 1863.
243	Foss, C. A., Lieut., C, 72d New York.	July 3, —, '63.	——. Died July 7, 1863.
244	Foss, J., Serg't, C, 59th New York.	Sept. 17, 17, '62.	—— (also amp. other thigh and w'd of arm). Died Sept. 21, '62.
245	Fowler, R. H., Serg't, A, 27th Connecticut.	Dec. 13, 13, '62.	——. Died December 17, 1862.
246	Frener, D. C., Pt., G, 141st Pennsylvania.	May 2, 3, '63.	Right. Died May 20, 1863.
247	*Friel, G.*, Pt., D, 2d Ky.	Sept. 19, 19, '63.	Left. Died December 1, 1863, while a prisoner.
248	Fritz, J., Pt., A, 124th Ohio.	May 15, —, '64.	Right. Died July 18, 1864.
249	Fulton, G., Lieut., C, 88th Pennsylvania.	Dec. 13, 13, '62.	—— (also wound of side). Died December 30, 1862.
250	Garrison, M., Pt., B, 126th New York.	July 2, 2, '63.	Right. Died July 18, 1863.
251	Geary, W. T., Pt., E, 10th Conn., age 19.	Sept. 27, 28, '63.	Left (also partial fract. right leg). Died October 7, 1863.
252	Gehring, J., Pt., G, 59th Illinois.	Oct. 8, 8, '62.	——. Died October, 1862.
253	*Gentry, L.*, Pt., B, 33d Mississippi.	July 20, —, '64.	Left. Died September 8, 1864.
254	Gilbert, P., Seaman, Gunboat Tyler.	Mar. 1, —, '62.	——. Died March 4, 1862.
255	Gilchrist, J. E., Pt., B, 78th Pennsylvania.	May 31, 31, '64.	Left. Died June 5, 1864.
256	Glenni, J., Pt., H, 81st Pennsylvania.	Dec. 13, 13, '62.	Right. Jan. 1, '63, re-amp. thigh. Died Jan. 2, '63; shock and exh'n.
257	Goodwin, A. N., Lieut., A, 9th Maine.	July 20, —, '63.	Left. Died July 27, 1863.
258	*Grant, W. D.*, Lieut., B, 18th Georgia.	April 5, 5, '65.	Right. Died April 16, 1865.
259	Green, J., Pt., D, 69th Pennsylvania.	May 5, 5, '62.	Left. Died May 5, 1862.
260	Gregory, O., Pt., H, 7th Ohio.	Mar. 23, 23, '62.	——. Died April 12, 1862.
261	Grey, A. R., Pt., G, 7th Wisconsin.	May 8, 8, '64.	Left. Died May 13, 1864.
262	Gridley, E., Pt., H, 57th Pennsylvania.	Dec. 13, 13, '62.	Right. Died December 17, 1862.
263	Gridley, W., Pt., A, 136th Pennsylvania.	Dec. 13, 13, '62.	Right. Died December 18, 1862.
264	Griffith, J. L., Pt., I, 22d Iowa.	May 22, 22, '63.	——. Died May 24, 1863.
265	Grogan, C. H., Serg't, I, 6th Connecticut.	July 11, —, '63.	——. Died July 23, 1863.
266	Grossman, W., Pt., C, 11th Penn. Res., age 23.	May 8, 9, '64.	Right. Surg. B. Rohrer, 10th Pa. Res. (Also amp. arm.) Died August 3, 1864.
267	Grotenhaus, J., Pt., D, 8th Michigan.	May 6, —, '64.	——. Died May 19, 1864.
268	Grover, C. D., Serg't, F, 25th Connecticut.	April 13, 13, '63.	——. Died April 16, 1863.
269	Groves, J., Pt., F, 7th Massachusetts.	May 3, 3, '63.	Left. Died June 11, 1863.
270	Guild, J., Pt., C, 153d New York.	Sept. 19, 19, '64.	Right. Died September 28, 1864.
271	Halfhill, G., Pt., I, 21st Iowa.	May 22, 22, '63.	—— (wound of both legs). Died June 9, 1863.
272	*Hall, J. F.*, Pt., B, 22d Virginia, age 25.	May 3, 4, '63.	——; flap. Died May 24, 1863; typhoid fever.
273	*Hanley, O.*, Pt., B, 31st Mississippi.	July 20, —, '64.	Left. Died August 27, 1864.
274	Harard, J. W., Pt., E, 3d Colored Troops.	Sept. 30, 30, '64.	Right. Died October 2, 1864.
275	*Hardy, H. F.*, Pt., F, 11th Mississippi.	July 2, 3, '63.	Left. Surg. H. M. McAbee, 4th Ohio. Died July 20, 1863.
276	Harriman, C., Pt., E, 19th Maine.	July 2, 2, '63.	Left (also fract. right leg). Died July 7, 1863; hæmorrhage.
277	*Harris, A. C.*, Pt., A, 43d Georgia.	May 14, —, '64.	Left. Died May 22, 1864.
278	Haskall, H. A., Pt., C, 4th New Hamp., age 24.	Sept. 29, Oct. 1, '64.	Left. Died October 9, 1864.
279	Haskinson, A., Pt., G, 84th Illinois.	Dec. 31, 31, '62.	Left. Died January 8, 1863.
280	*Hatley, —*, Pt., I, 52d North Carolina.	July 2, —, '63.	——. Died July 17, 1863.
281	Hawkins, A., Pt., K, 4th Maine.	May 6, 7, '64.	Right. Died May 13, 1864.
282	Heath, J., Serg't, K, 2d Colored Troops.	—— 1864.	Right. Died October 24, 1864.
283	Heighly, H. O., Pt., C, 1st U. S. Sharpshooters, age 25.	July 2, 3, '63.	Left. July 17, hæm., 24 oz., from post. tibial. Died July 18, 1863; hæmorrhage.
284	*Hess, T. W.*, Pt., K, 8th North Carolina.	Sept. 30, 30, '64.	Left. Died October 7, 1864; irritative fever.
285	*Hesterly, P.*, Pt., B, 12th Alabama.	Sept. 17, 17, '62.	Left. Died October 11, 1862.
286	Hevener, W. C., Serg't, E, 28th Illinois.	Oct. 5, 5, '62.	——. Died October 5, 1862.
287	Higgins, F. M., Pt., B, 5th New Hampshire.	Dec. 13, 13, '62.	Right. Died December 27, 1862.
288	Hill, W. S., Serg't, F, 62d Penn., age 24.	June 3, 3, '64.	Right (also w'nd of back). Died June 14, 1864.
289	Hinchman, J. B., Serg't, L, 54th Penn., age 23.	July 18, 18, '64.	Left. Died July 25, 1864.
290	Hogan, J., Pt., I, 56th Massachusetts.	May 6, —, '64.	Right. Died May 13, 1864.
291	*Holloway, R. H.*, Corp'l, D, 13th Georgia.	July 3, —, '63.	——. Died July 10, 1863; pyæmia.
292	Holmes, F., Corporal, Kane's Penn. Rifles.	June 8, 8, '62.	Left. Died June 14, 1862.
293	Hoover, F. M., Pt., B, 83d Penn., age 24.	May 6, 6, '64.	Left. Died May 27, 1864.
294	Horminger, G., Pt., H, 1st New Jersey.	May 3, 3, '63.	——. Died May 24, 1863.
295	Horne, G., Pt., A, 15th N. Y. H'vy Artillery.	June 19, 19, '64.	Right. Died June 26, 1864.
296	Horner, W., Pt., H, 155th Pennsylvania.	June 17, —, '64.	Left. Died June 24, 1864.
297	*Horton, D. F.*, Pt., D, 25th North Carolina.	May 14, 14, '64.	Right; circ. (also left leg). Died June 13, 1864.
298	Horton, H. R., Pt., F, 7th R. I. Battery, age 37.	June 24, —, '64.	Left. Died July 4, 1864; exhaustion.
299	Howard, H., Pt., D, 20th Massachusetts.	July 1, 1, '63.	Left. Surg. N. Hayward, 20th Mass. Died July 8, 1863.
300	Howe, D., Serg't, C, 1st New York.	May 12, 12, '64.	——. Died May 22, 1864.
301	Howe, G. W., Pt., E, 34th Massachusetts.	May 15, 15, '64.	Right. Died May 21, 1864.
302	Hubbard, E., Corp'l, B, 3d Kentucky.	Dec. 29, —, '62.	——. Died January 1, 1863; typhoid symptoms.
303	Hubbard, W. B., Pt., E, 2d Kentucky.	April 6, —, '62.	Right. Died April 18, 1862; pyæmia.
304	*Hughes, J. H.*, Pt., A, 28th Virginia.	July 3, —, '63.	Left. Died July 28, 1863.
305	Hughs, P. W., Pt., A, 5th New York.	June 1, —, '64.	Right (also wound of left leg). Died June 4, 1864.
306	Hunt, J., Pt., H, 7th Ohio.	Mar. 23, —, '62.	——. Died April 5, 1862.
307	Hyatt, J., Corp'l, F, 48th New York.	July 18, 18, '63.	Right. Died August 9, 1863; chronic diarrhœa.
308	Jackson, J., Pt., D, 1st Maine H'vy Artillery.	June 20, 20, '64.	——. Died June 25, 1864.
309	Jacobs, C., Pt., B, 19th Ohio.	Sept. 19, 19, '63.	Left. Died September —, 1863.
310	Jamison, J., Pt., A, 29th Illinois, age 24.	Mar. 29, 29, '65.	Right; ant. post. flap. Surg. S. L. Cheaney, 29th Illinois. April 4, hæm. Died April 18, 1865.
311	*Jesse, J. P.*, Pt., C, 37th Virginia.	July 2, 4, '63.	Left. Died July 4, 1863.
312	Johnson, C., Pt., G, 1st Wisconsin Cavalry.	April 26, 26, '63.	Left. Died April 26, 1863.
313	Jollife, J., Pt., F, 70th New York.	July 2, 2, '63.	Left. Died August 4, 1863.
314	*Jones, W. P.*, Pt., D, 2d Georgia.	July 2, —, '63.	——. Died July 20, 1863.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
315	Jones, W., Corp'l, 23d Wisconsin.	July —, —, '63.	Right. Died July 17, 1863.
316	Kahoe, M., Pt., I, 113th Ohio.	June 27, 27, '64.	Right. Died August 21, 1864.
317	Kalchback, J., Pt., —, 16th Infantry.	Sept. 5, —, '64.	Right. Died September 10, 1864.
318	Keely, B., Pt., F, 7th Illinois.	Oct. 4, 4, '62.	——. Died October 4, 1862.
319	Kellogg, T. A., Corp'l, A, 14th Infantry.	July 3, —, '63.	Left. Died July 24, 1863; gangrene.
320	Kiles, J. G., Pt., A, 124th New York.	May 5, —, '63.	Right. Died May 24, 1863.
321	King, G., Pt., K, 54th Massachusetts.	Aug. 30, 31, '62.	Right. Died August 31, 1862.
322	King, I., Pt., E, 126th Ohio, age 21.	May 21, 21, '64.	Right. Died May 29, 1864; pyæmia.
323	Krumelbein, W., Corp'l, E, 2d Missouri.	Nov. 24, 24, '63.	Right. Died February 12, 1864.
324	Kuster, J. W., Pt., F, 57th Pennsylvania.	1862.	Right. Died June 25, 1862.
325	Laib, F., Serg't, A, 7th New Jersey.	July 3, 3, '63.	——. Died July —, 1863.
326	Lambert, W. H., Pt., H, 160th N. Y., age 31.	April 9, 9, '64.	——. Died May 26, 1864.
327	Lamponi, D., Pt., H, 8th New Hampshire.	May 27, 27, '63.	Left. Died June 1, 1863.
328	Langdon, B., Pt., H, 93d New York, age 19.	May 23, 23, '64.	Left. Died June 8, '64; pyæmia.
329	Lawrence, J. B., Capt., H, 9th N. J., age 36.	May 16, 16, '64.	Left. Died May 30, 1864.
330	Lehman, J. J., Pt., C, 50th Pennsylvania.	May 12, 12, '64.	Right. Died May 25, 1864.
331	Lerch, J., Pt., B, 9th Penn. Reserves.	Sept. 14, —, '62.	Left. Died October 21, 1862.
332	Lewis, H. F., Lieut., D, 145th Pennsylvania.	July 1, —, '63.	Left. Died July 2, 1863.
333	Lewis, L., Pt., E, 55th Pennsylvania, age 18.	June 5, —, '64.	Left. Died August 2, 1864; exhaustion.
334	Lininger, W., Pt., B, 145th Pennsylvania.	July 2, 2, '63.	Right. Died July 18, 1863.
335	Lively, L., Pt., K, 12th Massachusetts, age 27.	Dec. 13, 13, '62.	——. Died December 15, 1862.
336	Livingstone, J., Pt., B, 60th Ohio.	Aug. 21, —, '64.	Left. Died *en route* to hospital.
337	Locke, P., Pt., F, 22d Indiana.	Oct. 8, —, '62.	Left. Died October 16, 1862.
338	*Logan, N. B.*, Pt., I, 4th Virginia.	April —, —, '65.	Right. Died April 6, 1865.
339	Lotz, C., Corp'l, K, 151st Pennsylvania.	July 2, 2, '63.	Left. Died July 9, 1863.
340	Lualien, J., Pt., D, 43th	Jan. 15, 15, '65.	Both. Surg. L. Barnes, 6th C. T., and Ass't Surg. H. C. Merryweather, 5th C. T. Died January 23, 1865.
341	Indiana.		
342	Lynch, M., Pt., E, 9th Massachusetts.	Dec. 13, —, '62.	Left. Died December 31, 1862.
343	Madden, M., Pt., A, 4th Kentucky.	Sept. 19, 19, '63.	Right. Died December 20, 1863.
344	*Mahorner, H.*, Pt., F, 11th Mississippi.	July 2, 3, '63.	Right. Surg. H. M. McAbee, 4th Ohio. Died July 27, 1863.
345	Manson, J. P., Pt., A,	Dec. 13,	Both; flap. Died December 25,
346	121st Pennsylvania.	13, '62.	1862.
347	Markteller, W., Pt., E, 5th Penn. Cavalry.	Dec. 10, —, '64.	Right. Died December 28, 1864.
348	*Marom, J.*, Pt., C, 55th Alabama.	July 20, —, '64.	——. Died July 29, 1864.
349	Martin, J., Pt., E, 8th Connecticut, age 19.	May 9, 9, '64.	Right. Died September 8, 1864; exhaustion.
350	Marx, A., Pt., C, 14th Indiana.	Mar. 23, 23, '62.	Left. Died April 8, 1862.
351	Marx, P., Pt., A, 1st Minnesota.	July 2, —, '63.	——. Died July 24, 1863.
352	*Mason, M.*, Pt., G, 5th North Carolina.	July 2, —, '63.	Right. Died July 9, 1863.
353	*Mathews, J.*, Corp'l, B, 47th Georgia.	May 14, 14, '64.	Right. Died June 12, 1864.
354	Mattoon, H., Pt., D, 2d Conn. H. Art., age 30.	June 10, 10, '64.	Left. Died June 14, 1864.
355	Maynard, G., Pt., 145th Pennsylvania.	May 12, 12, '64.	——. Died May 16, 1864.
356	Maywood, D., Pt., E, 74th New York.	July 2, 2, '63.	Right. Died July 15, 1863.
357	McCafferty, W., Serg't, C, 121st Penn.	July 1, 1, '63.	Left. Died July 12, 1863.
358	McCartney, O., Pt., E, 106th New York.	June 2, 2, '64.	Left (also wound left shoulder). Died June 3, 1864.
359	McCune, A., Capt., G, 74th New York.	June 6, 6, '64.	Left. Died June 9, 1864.
360	McDonald, E. P., Pt., H, 28th Kentucky.	Dec. 16, 16, '64.	Right. A. A. Surg. J. C. Thorpe. Died December 16, 1864.
361	McDowell, A., Corp'l, D, 72d Pennsylvania.	July 1, —, '63.	Left. Died July 3, 1863.
362	McGinniken, C. B., Lt., D, 9th Mass., age 25.	May 5, 5, '64.	Right. Died May 5, 1864.
363	McGraw, F., Pt., A, 40th Massachusetts, age 28.	May 16, 16, '64.	Left. Died May 22, 1864.
364	McIntyre, S., Pt., A, 30th Illinois.	July 22, 22, '64.	Right. Died August 18, 1864.
365	McKeney, J., Pt., K, 108th New York.	Sept. 17, 17, '62.	——. Died September 24, 1862.
366	McKenna, P., Pt., G, 10th Infantry.	July 3, —, '63.	Left. Died July 11, 1863.
367	McLaughlin, M., Pt., C, 46th Pennsylvania.	May 30, 30, '64.	Left. Died June 23, 1864.
368	McMurtrie, A. H., Lieut., D, 3d Iowa.	July 12, —, '63.	Right. Died July 25, 1863.
369	Medway, W., Pt., C, 75th Colored Troops.	May 27, —, '63.	Right. Died July 3, 1863; gangrene.
370	Merwin, C. N., Drummer, A, 13th Conn.	June 14, —, '63.	Left. Surg. E. A. Thompson, 12th Maine. Died July 6, 1863.
371	Middleton, J., Pt., H, 22d Iowa.	May 22, —, '63.	Left. Died May 28, 1863.
372	Miller, C., Pt., H, 26th Pennsylvania.	July 2, —, '63.	Right. Died July 10, 1863.
373	Miller, J. W., Pt., E, 21st Maine.	June 14, 14, '63.	——. Died June 17, 1863.
374	Miller, L., Pt., G, 96th Illinois.	May 14, —, '64.	Right. Died May 27, 1864.
375	Miller, W., Pt., C, 13th Ohio.	July —, —, '64.	Left. Surg. W. M. Wright, 79th Penn. Died August 18, 1864.
376	Miller, W., Pt., E, 153d Pennsylvania.	July 2, —, '63.	Left. Died July 9, 1863.
377	*Millsaps, G. W.*, Pt., A, 7th N. Carolina, age 18.	June 22, 23, '64.	Left; circular. Died September 1, 1864; exhaustion.
378	Mitchell, M. L., Pt., G, 74th Indiana.	Sept. 19, 19, '63.	Right. Died October 9, 1863.
379	*Mobley, H. M.*, Pt., A, 55th Alabama.	July 20, —, '64.	Left. Died July 30, 1864.
380	Montgomery, R. S., Pt., I, 105th Pennsylvania.	Dec. 13, 13, '62.	Left. Died December 23, 1862.
381	*Moore, C. H.*, Pt., F, 13th Mississippi.	July 3, —, '63.	Left. Died July 7, 1863.
382	Morrill, F. L., Lieut., D, 3d New Hamp., age 23.	June 30, 30, '64.	Left. Died July 13, '64; tetanus.
383	Moser, J., Pt., H, 15th New York Artillery.	Sept. 19, 19, '64.	Left. Died October 11, 1864.
384	Moss, J., Pt., H, 3d Ohio.	Oct. 8, —, '62.	——. Died October —, 1862.
385	Mounts, N., Pt., B, 121st Ohio.	June 27, 27, '64.	Right (also wound of shoulder). Died June 28, 1864.
386	Mowers, H., Pt., I, 117th New York, age 38.	May 14, 14, '64.	Right; gangrene. Died June 27, 1864; exhaustion.
387	*Muller, W.*, Corp'l, G, 1st Virginia.	July 3, —, '63.	——; tetanus. Died from exhaustion.
388	Mullins, C. P., Capt., A, 130th Illinois.	April 8, 8, '64.	Right. Died May 6, 1864.
389	Munsell, E., Pt., I, 22d Massachusetts.	May 7, 7, '64.	Right. Died May 7, 1864.
390	Munson, L. F., Pt., A, 10th Connecticut.	Dec. 14, 14, '62.	Left. Surg. F. G. Snelling, U.S.V. Died Dec. 29, 1862; exhaust'n.
391	Murphy, C., Pt., A, 63d New York.	Sept. 17, 17, '62.	——. Died September 18, 1862.
392	Murphy, J. C., Pt., G, 11th Massachusetts.	May 3, 3, '63.	Left (also wound of right leg). Died May 11, 1863.
393	*Nance, T. J.*, Pt., H, 30th Texas Cavalry.	April 4, 4, '64.	Right. Surg. C. E. Swasey, U.S.V. May 1, amp. thigh. Died May 8, 1864; pyæmia.
394	*Newton, T.*, Pt., A, 10th Louisiana.	1864.	——; gangrene. Died May 24, 1864.
395	Nichols, G., Serg't, E, 4th Colored Troops.	Sept. 24, 24, '64.	——. Died September 24, 1864.
396	Nicholson, G., Pt., H, 126th New York.	July 2, 3, '63.	Right. Surg. F. Wolf, 39th N. Y. Died July 15, 1863.
397	Nolan, P., Serg't, K, 19th Massachusetts.	June 19, 19, '64.	Left. Surg. W. J. Burr, 42d N. Y. Died June 21, 1864.
398	Nutter, H. F., Corp'l, L, 31st Maine.	April 2, 2, '65.	Left (also wound left arm). Surg. L. W. Bliss, 51st N. Y. Died April 3, 1865.
399	O'Neil, H., Corp'l, K, 79th Penn., age 28.	1865.	Left. Died February 9, 1865.
400	Osborn, W. D., Corp'l, I, 26th Connecticut.	June 14, 14, '63.	Right. Died June 24, 1863.
401	Owens, J., Pt., F, 8th Tennessee Cavalry.	Dec. 17, 17, '64.	Right. Died.
402	Paisley, W., Pt., H, 32d Illinois.	Oct. 5, 5, '62.	——. Died October 5, 1862.
403	*Parker, A. M.*, Lieut., B, 11th Georgia.	July 3, —, '63.	Right. Died July 21, 1863.
404	Parks, G., Pt., I, 3d Iowa.	Oct. 5, 5, '62.	Left. Died October 17, 1862.
405	Parr, W., Pt., D, 38th New York.	May 5, 5, '62.	——. Died May 11, 1862.
406	Patterson, J., Pt., G, 30th Missouri.	May 18, —, '63.	Left. Surg. S. C. Plummer, 13th Illinois. Died June 16, 1863.
407	Paul, E., Pt., I, 1st Minnesota.	July 2, 2, '63.	——. Died July 13, 1863.
408	*Pelley, R.*, Serg't, G, 53d North Carolina.	July 2, 2, '63.	——. Died July 4, 1863.
409	Perkins, D., Pt., F, 8th Maine.	July —, —, '64.	Left. Died July 5, 1864.
410	Perkins, D., Pt., H, 4th Penn. Reserves.	Sept. 17, 18, '62.	——. Died October 2, 1862; erysipelas.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
411	Phillips, P., Pt., B, 1st Rhode Island Artillery.	May 9, 9, '64.	——. Died May 9, 1864.
412	*Pickett, J. W.*, Pt., G, 13th Alabama.	July 3, —, '63.	Left. Died July 28, 1863.
413	Pierce, A., Pt., I, 7th Rhode Island.	June 8, 8, '64.	Right. Died June 20, 1864.
414	Pierce, L. D., Pt., K, 63d Ohio.	May 9, 9, '62.	Left. Died June 9, 1862.
415	Pike, W., Pt., B, 75th Illinois.	Oct. 8, 8, '62.	Left. Died October 15, 1862.
416	Pilgrim, M., Pt., C, 1st Louisiana.	June 14, 14, '63.	Right. Died.
417	Pine, J., Pt., I, 3d Infantry.	July 3, —, '63.	Right. Died July 25, 1863.
418	Pinney, A. N., Capt., H, 27th Colored Troops.	July 30, 30, '64.	Right (also amp. arm). Surg. G. J. Potts, 23d Colored Troops. Died August 8, 1864.
419	Plumer, A. E., Pt., C, 19th Maine, age 31.	May 10, 10, '64.	Left. Surg. W. J. Burr, 42d N. Y. Died June 4, '64; pyæmia.
420	*Pool, J.*, Pt., B, 16th Georgia.	July —, —, '63.	—— (also amp. arm). Died July 6, 1863.
421	*Poole, M. C.*, Pt., I, 13th Georgia, age 20.	May 12, 14, '64.	Left (also wound right). Died June 4, 1864; pyæmia.
422	*Potter, H. H.*, Pt., G, 14th Mississippi.	July —, —, '63.	Right. Died August 18, 1863.
423	Potter, W. A., Pt., B, 55th Illinois.	April 6, —, '62.	——. Died April 11, 1862.
424	Potts, J. C., Capt., F, 39th Indiana.	Sept. 19, 19, '63.	Right. Died October 4, 1863.
425	Powell, J., Serg't, I, 10th Iowa.	May 16, —, '63.	——. Died May 26, 1863.
426	Price, A., Pt., A, 58th Illinois.	April 8, 8, '64.	Left. Died April 9, 1864.
427	Proctor, I., Pt., E, 110th Ohio.	June 1, —, '64.	Right. Died June 2, 1864.
428	Prosens, E., Pt., E, 111th New York.	July 2, 3, '63.	Left. Surg. H. M. McAbee, 4th Ohio. Died July 10, 1863.
429	Prugine, J. L., Pt., F, 1st Penn. Artillery.	July 3, 5, '63.	Right. July 10, hæmorrhage. Died July 20, 1863; exhaustion.
430	Pullin, C. B., Corp'l, H, 35th New Jersey.	Dec. 14, 14, '62.	——. Died December 14, 1862.
431	Purdy, J. A., Pt., E, 72d Illinois, age 24.	May 22, 22, '63.	Right. Died June 3, 1863; pyæmia.
432	Putnam, S., Serg't, E, 145th Pennsylvania.	Dec. 13, 13, '62.	Left (wound of arm and breast). Died December 13, 1862.
433	Quinly, J., Pt., B, 5th W. Virginia, age 42.	Aug. 30, 30, '62.	——. Surg. P. R. Randall, 5th W. Va. Died Sept. —, 1862.
434 435	Randall, A., Pt., C, 35th New York.	Dec. 13, 13, '62.	Both. Died December 15, 1862.
436	*Raper, W.*, Pt., G, 5th North Carolina.	May 5, 5, '62.	Right (also w'd right arm; hæm.: lig. axillary). Died June 14, 1862; exhaustion.
437	*Ray, A. J.*, Pt., K, 34th North Carolina.	July 3, 3, '63.	Left. Died July 31, 1863.
438	Ray, S., Serg't, D, 84th Illinois.	Sept. 2, 2, '64.	—— (also amp. arm). Surg. T. M. Cook, 101st Ohio. Died September 6, 1864.
439	*Reed, C. H.*, Serg't, F, 7th North Carolina.	July 3, 3, '63.	Left. Died August 13, 1863.
440	Reeder, C., Pt., F, 134th New York.	Oct. 19, 19, '64.	Right. Died October 19, 1864.
441	*Reeves, L. A.*, Pt., D, 15th Georgia.	July 3, 3, '63.	——. Died July 14, 1863; pyæmia.
442	Remninger, A., Pt., F, 131st Pennsylvania.	Dec. 13, 13, '62.	Left. Died January 2, 1863.
443	Rhinehart, A. R., Pt., H, 124th New York.	May 3, 3, '63.	Left. Died May 25, 1863.
444	Rice, H. J., Pt., A, 3d Ohio.	Oct. 8, 8, '62.	Right. Died November 4, 1862; typhoid fever.
445	Rice, J. H., Pt., B, 11th New Jersey.	July 3, 3, '63.	——. Died July 11, 1863.
446	Richard, J., Corp'l, B, 143d Penn., age 23.	May 10, 10, '64.	Left (also flesh w'nd right thigh). Died August 4, 1864.
447	Rickard, N., Pt., A, 50th Pennsylvania.	May 9, —, '64.	——. Died May 19, 1864.
448	Roberts, P., Pt., H, 41st Illinois.	July 12, —, '63.	Right. Died July 24, 1863.
449	Robinson, W., Pt., I, 6th New Jersey.	May 5, —, '62.	——. Died June 2, 1862.
450	Rodgers, S. E., Pt., C, 15th Kentucky.	Oct. 8, 8, '62.	Right. Died October 25, 1862.
451	Rogers, R., Pt., B, 6th Michigan Cavalry.	July 14, —, '63.	Left. Died July 30, '63; wounds.
452	Rollins, E. G., Pt., A, 12th New Hampshire.	May 3, 3, '63.	Left. Died June 2, 1863.
453	Ross, E. D., Pt., I, 5th Michigan.	May 5, 5, '62.	——. Died.
454	*Rosser, E. A.*, Pt., C, 10th Georgia.	July 3, —, '63.	——. Died July 6, 1863.
455	Rue, M., Pt., K, 111th New York.	July 1, —, '63.	Left. Surg. H. M. McAbee, 4th Ohio. Died July 4, 1863.
456	Ryan, S., Corp'l, C, 66th Ohio.	June 15, 15, '64.	Right. Died July 2, 1864.
457	Sarles, A., Pt., F, 53d Illinois.	Oct. 5, —, '62.	——. Died November 3, 1862.
458	Savage, W. E., Pt., K, 114th New York.	Sept. 19, 19, '64.	Left. Surg. L. P. Wagner, 114th N. Y. Tetanus. Died Oct. 27, 1864; phthisis and exhaustion.
459	Saxby, W. H., Pt., K, 91st New York, age 22.	May 27, 27, '63.	Right. Died May 30, 1863.
460	Schell, J., Pt., I, 1st N. York Artillery.	Aug. 19, 19, '64.	Left. Died August 27, 1864.
461	Schilling, J., Pt., F, 3d Missouri.	Jan. 11, 11, '63.	Right. Died January 24, 1863.
462	Schwab, D., Pt., H, 33d New York.	May 3, —, '63.	Left. Died June 10, 1863.
463	Scott, C. V., Lieut., G, 1st Rhode Island Battery.	Oct. 19, 19, '64.	Left; posterior flap. Died January 21, 1865.
464	*Scott, H. R. K.*, Lieut., H, 8th Alabama.	July 3, —, '63.	Right. Died July 29, 1863.
465	Scott, J., Pt., I, 1st New York Dragoons.	June 1, 1, '64.	Left. Died June 19, 1864.
466	Scott, J. W., Pt., D, 2d Wisconsin.	July 1, 2, '63.	Right. Died August 5, 1863.
467	Sernson, S. A., Pt., G, 12th Iowa.	July 14, 14, '64.	——. Died July 17, 1864.
468 469	Shearer, F., Pt., I, 35th Indiana.	Dec. 15, 15, '64.	Both. Died December 16, 1864.
470	Shinn, W., Pt., I, 5th New Jersey.	June 18, 18, '64.	Left. Surg. S. H. Plumb, 82d N. Y. Died June 18, 1864.
471	Shores, P., Pt., D, 40th Illinois.	July 8, 8, '64.	Left. Died July 18, 1864.
472	Simpson, H., Pt., D, 137th New York.	June 15, 15, '64.	Left. Died July 11, 1864.
473	Slattery, E. T., Serg't, I, 55th Illinois.	April 7, 7, '62.	Right. Died April 17, 1862.
474	Small, J. F., Pt., B, 1st Mass. H'vy Artillery.	June 18, 18, '64.	——. Died June 29, 1864.
475	Smeltz, J. M., Pt., I, 98th Ohio.	June 27, 27, '64.	Right. Died July 5, 1864.
476	*Smith, B. M.*, Pt., K, 8th Florida.	Sept. 17, 17, '62.	Right. Died September 28, 1862.
477	Smith, E., Pt., H, 2d N. York H'vy Artillery.	June 17, 18, '64.	Left. Died June 28, 1864.
478	Smith, E., Pt., C, 11th Maine, age 42.	Aug. 14, 14, '64.	Right; circular. Died September 4, 1864; pyæmia.
479	Smith, P., Corp'l, C, 3d New Hamp., age 19.	Aug. 16, 16, '64.	Right. Aug. 22, amp. left. Died August 30, 1864; exhaustion.
480	Snapp, W., Serg't, F, 5th Kentucky.	Dec. 31, 31, '62.	Left. Died April 7, 1863.
481	Spinning, W. W., Pt., B, 93d Ohio.	Sept. 19, 19, '63.	Left. Died.
482	*Stadsker, D. F.*, Pt., C, 32d Alabama.	May 14, —, '64.	Left. Died May 28, 1864.
483	Stanley, W., Pt., H, 53d Pennsylvania.	Dec. 13, 13, '62.	Right. Died April 26, 1863; amputation and diarrhœa.
484	Starr, A., Pt., G, 106th Pennsylvania.	July 3, 3, '63.	Left. Surg. O. Munson, 108th N. Y. Died July 15, 1863.
485	*Stephens, J. D.*, Pt., C, 17th Mississippi.	July 3, —, '63.	——. Died July 18, 1863; hæmorrhage.
486	Stephenson, W. C., Pt., C, 3d Iowa.	July 12, —, '63.	Left (also wound of thigh). Died July 23, 1863.
487	Stern, P., Pt., B, 29th New York.	Aug. 28, —, '62.	——. Surg. S. S. Schultz, 26th Penn. Died Sept. 22, 1862.
488	Stevens, J. C., Capt., H, 46th Illinois.	April 6, 6, '62.	——. Died April 16, 1862.
489	Stevens, M., Pt., B, 1st New York Engineers.	July 9, 9, '64.	Left. Died July 9, 1864.
490	Stinbacker, J., Pt., H, 50th Penn., age 36.	May 12, —, '64.	Left. Died May 20, 1864.
491	Stockhammer, F., Serg't, G, 12th Missouri.	May 14, —, '64.	——. Died May 22, 1864.
492	Stone, D. C., Serg't, F, 28th Illinois.	Oct. 5, 5, '62.	——. Died October 9, 1862.
493	*Stone*, —, Page's Battery.	July 2, 2, '63.	Left. Died July 11, 1863.
494	Stonestifler, J., Pt., E, 1st Maryland.	June 18, 18, '64.	Right. Died June 18, 1864.
495	Stoutenger, J., Pt., G, 147th New York.	July 2, 2, '63.	——. Died July —, 1863.
496	Stowbridge, B., Pt., I, 82d Colored Troops.	April 8, 8, '65.	Left. Died April 8, 1865.
497	Spears, T. W., Pt., B, 29th Maine.	Oct. 19, 19, '64.	——. Died October 22, 1864.
498	Sperl, H., Pt., H, 2d Maryland.	Dec. 1, 1, '63.	Right. Surg. J. S. Ross, 11th N. Hampshire. Died Dec. 5, 1863.
499	Tatlock, A., Pt., E, 53d Indiana.	Oct. 5, 5, '62.	——. Died October 16, 1862.
500	Taylor, G., Pt., G, 111th New York.	July 2, 3, '63.	——. Died July 20, 1863.
501	Terwillager, T. S. G., Pt., B, 120th N. Y.	May 5, 5, '64.	——. Died May 26, 1864.
502	Tewel, W., Pt., A, 15th West Virginia.	Sept. 19, 19, '64.	——; flap. Died September —, 1864.
503	*Thomas, G. B.*, Pt., C, 51st Georgia.	July —, —, '63.	——. Died July 10, 1863.
504	Thomas, I., Pt., H, 8th Kentucky.	Dec. 31, 31, '62.	——. Died January 8, 1863.
505	Thompson, P., Corp'l, E, 30th Iowa.	Nov. 27, 27, '63.	Right (flesh w'nd left leg). Ass't Surg. S. S. Buck, 103d Illinois. Died December 12, 1863.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
506	*Tiffany, J.*, Lieut., D, 27th Virginia.	July 3, 3, '63.	——. Died July 10, 1863.
507	Tinkham, C. G., Serg't, A, 12th Mass., age 36.	Sept. 17, 17, '62.	Left. Died September 30, 1862.
508	Tolbogs, R. V., Pt., C, 35th Iowa.	Oct. 5, —, '64.	Right. Died October 14, 1864.
509	Trowbridge, J. E., S'g't. E, 5th N. Y. Cavalry.	July 3, —, '63.	——. Died July 14, 1863.
510	Trumbull, A., Pt., K, 159th New York.	May 27, 27, '63.	Right. Surg. C. A. Robertson, 159th N. Y. Died June 23, '63.
511	Tubbs, B. N., Pt.,—, 81st Pennsylvania.	July 2, 4, '62.	——. Captured and died while in prison.
512	[1]*Unknown*.....	——	—— ; Lenoir's method; also Pirogoff's amp. other foot. Surg. J. T. Gilmore, C. S. A. Died.
513	Van Kleet, C. H., Pt., G, 77th N. Y., age 21.	June 3, 3, '64.	Left; circ. Surg. G. T. Stevens, 77th N. Y. Died July 26, 1864; exhaustion, diarrhœa.
514	Vanwinkle, M., Pt., E, 111th New York.	July 2, 3, '63.	Left. Surg. H. M. McAbee, 4th Ohio. Died July 27, '63; gang.
515	Varney, A. C., Pt., K, 9th Maine.	Aug. 6, 6, '63.	Left. Died August 21, 1863.
516	Virgin, A. J., Pt., K, 25th Iowa, age 25.	Jan. 11, —, '63.	Right. Died January 15, 1863.
517	Wagnor, E. R., Pt., A, 75th New York.	June 14, 14, '63.	Right. Died August 13, 1863.
518	Wales, W., Pt., F, 51st Ohio.	Dec. 31, 31, '62.	Left. Died January 7, 1863.
519	Wallack, I., Pt., G, 49th Ohio.	Nov. 24, 24, '63.	Right. Died November 27, 1863.
520	*Waller, D. J.*, —, E, 23d South Carolina.	Sept. 14, 15, '62.	——. Sept. 25, hæm.; amputat'n thigh. Died Oct. 13, 1862.
521	Walters, J. H., Pt., K, 14th New York.	Aug. 22, 22, '62.	Left; flap. Died September 3, 1862.
522	Wanzer, J., Pt., G, 12th Illinois.	April 6, 6, '62.	——. Died April 14, 1862.
523	Watson, S., Pt., C, 118th Pennsylvania.	Sept. 21, 21, '62.	Left. October 14, hæmorrhage. Died Oct. 15, 1862; tetanus.
524	Welch, W., Pt., I., 8th N. Y. H. A., age 43.	June 3, 4, '64.	Left; gangrene. Died July 13, 1864.
525	Welker, J., Pt., G, 35th Illinois.	Sept. 19, 19, '63.	Left. Died October 11, 1863.
526	Wickham, I., Pt., A, 13th Iowa.	July 22, 22, '64.	Left (also wound left arm). Died July 27, 1864.
527	Wilburn, J. C., Pt., D, 22d Kentucky.	May 23, —, '63.	Right. Died May 28, 1863; pyæmia.
528	Willey, C. W., Corp'l, C, 26th Connecticut.	June 14, 14, '63.	Left. Died June 14, 1863.
529	Williams, J. M., Corp'l, I, 69th Ohio.	Dec. 31, 31, '62.	——. Died January 24, 1863.
530	Williston, R. S., Serg't, G, 2d Massachusetts.	Aug. 9, 9, '62.	—— (also wound of hand). Died August 9, 1862.
531	Willson, J. W., Major, 14th Ohio.	Sept. 1, 1, '64.	Right. Died October 3, 1864.
532	*Winchester, W. H.*, Lt., I, 13th N. C., age 23.	July 1, 2, '63.	Left. Died August 1, 1863; pyæmia.
533	Winegar, A., Pt., F, 111th New York, age 18.	May 6, 6, '64.	Left. Died June 13, 1864.
534	Winemiller, J. C., Serg't, I., 1st Md. Cavalry.	Aug. 16, 16, '64.	Right. Died August 24, 1864.
535	Wood, E. C., Pt., B, 141st Pennsylvania.	July 3, —, '63.	Right. Died July 13, 1863.
536	Woodside, H., Pt., C, 81st Illinois.	May —, —, '63.	Left. Died July 1, 1863.
537	Worcester, J. H., Lieut., H. 7th New Hamp.	July 11, —, '63.	Left; flap. Died July 26. 1863.
538	Worcester, O. P., Pt., C, 7th Ohio.	Mar. 23, —, '62.	——. Died April 15, 1862.
539	Yantz, J., Pt., I, 9th Iowa.	Mar. 7, —, '62.	Left. Died March 12, 1862.
540	York, B. F., Pt., F, 2d Maine.	Dec. 13, 13, '62.	Right. Died December 27, 1862.
541	York, J. M., Pt., E, 66th Illinois.	May 16, 16, '64.	——. Died May 22, 1864.
542	Young, J., Pt., F, 28th Iowa.	Oct. 19, 19, '64.	Right. Died October 20, 1864.
543	*Bolman, J. W.*, Pt., G, 2d South Carolina.	Oct. 7, —, '64.	Left.
544	Boroff, J. H., Serg't, A, 123d Ohio.	June 5, —, '64.	Right.
545	*Cook*, —, Lieut.-Col., 8th Virginia Cavalry.	Jan. 11, 11, '65.	Left.
546	*Derr, A. J.*, Corp'l, C, 37th N. C., age 31.	May 3, 4, '63.	——; circular; sloughing.
547	Harrison, L., Corp'l, F, 63d Ohio.	Oct. 4, —, '62.	Left.
548	*Hemingway, T.*, Pt., B, Hampton's Legion, S.C.	Oct. 13, —, '64.	Left.
549	*James, F. M.*, Pt., B, 31st Mississippi.	July 20, —, '64.	Left.
550	*Kelley, J. W.*, Pt., G, 40th Mississippi.	July 20, —, '64.	——
551	*Lineberger, J. L.*, Pt., H, 23d North Carolina.	May 2, 2, '63.	Left. Ass't Surgeon B. Howard, U. S. A.
552	*Lisebone, J. H.*, Pt., 28th North Carolina.	July 27. —, '62.	——
553	Mason, W. A., Pt., B, 82d Ohio.	Aug. 28. —, '62.	——
554	*McCray, C. B.*, Corp'l, I, 36th Alabama.	May 15, —, '64.	Right.
555	*Razenmand, C.*, Pt., ——	May —, —, '64.	——
556	Read, W. H., Pt., A, 58th Illinois.	July 13, 13, '64.	Left. Supposed to have died.
557	*Rearly, W.*, Pt., —, 37th North Carolina.	May 27, —, '62.	——
558	Reedy, D. E., Pt., E, 48th Pennsylvania.	June 3, —, '64.	——
559	Rinehart, L., Pt., E, 32d Indiana.	June 20, 20, '64.	Right.
560	Robertson, A. S., Pt., —, 28th Illinois.	Oct. 5, —, '62.	——
561	Rothrock, B., Pt., B, 81st Pennsylvania.	Dec. 13, 13, '62.	Right (also wound of side and foot).
562	Scherring, H. P., Pt., —, 4th Maryland.	June 5, —, '64.	Right.
563	*Sherrill, J. M.*, Pt., D, 18th North Carolina.	——	——
564	Smith, J., Pt., D, 9th Illinois.	Oct. 4, —, '62.	——
565	*Songtitcry, J.*, Pt., E, 55th Alabama.	July 20, —, '64.	Left.
566	*Stephens, J. F.*, Pt., A, 49th Georgia, age 23.	May 3, 4, '63.	——; flap.
567	*Swaford, W. H.*, Pt., C, 33d Mississippi.	July 20, —, '64.	Left.
568	*Talifero*, —, Lieut., 9th Virginia Cavalry.	Nov. 5, 5, '62.	——
569	*Willard, J.*, Pt., A, — South Carolina.	Aug. 14, —, '64.	Right.
570	*Williams, T. J.*, Pt., H, 20th South Carolina.	July 28, —, '64.	Left.
571	*Wilson, A. W.*, Pt., C, 19th Louisiana.	July 28, —, '64.	Left.

Of the five hundred and seventy-one operations recorded in the foregoing table the amputation was performed in the right limb in one hundred and seventy-seven, in the left limb in two hundred and eight cases; in one hundred and eighty-six instances the side was not indicated.

INTERMEDIARY AMPUTATIONS IN THE CONTINUITY OF THE LEG FOR SHOT INJURY.—One thousand and forty-six of the five thousand four hundred and fifty-two amputations in the leg were intermediary operations. The results were determined in all cases; six hundred and eighty-two were followed by recovery, and three hundred and sixty-four by death, a mortality rate of 34.7 per cent., exceeding that of the primary operations (30.9 per cent.) 3.8 per cent. Two hundred and ninety-six operations were performed

[1] Holloway (J. M.), *Comparative Advantages of Pirogoff's, Syme's, and Chopart's Amputations and Excision of the Ankle Joint by Hancock's Method, after Gunshot Wounds and other Injuries*, in *American Journal Medical Sciences*, Vol. LI, p. 85.

in the upper, three hundred and sixty-eight in the middle, and three hundred and thirty-five in the lower third of the leg; in forty-seven the seat of the amputation was not indicated.

Intermediary Amputations in the Upper Third of the Leg for Shot Injury.—Two hundred and ninety-six operations were recorded; one hundred and ninety-four had successful, and one hundred and two fatal terminations, a mortality of 34.4 per cent.

Successful Intermediary Amputations in the Upper Third of the Leg.—The one hundred and ninety-four operations were performed—one on a civil employé, twenty-two on Confederate, and one hundred and seventy-one on Union soldiers. Of the latter, one officer was placed on the retired list, and one hundred and sixty-eight enlisted men became pensioners, of whom twenty have died since their discharge. In three instances the amputation in the leg was followed by amputation in the thigh.[1]

CASE 754.—Colonel F. Fessenden, 30th Maine, aged 25 years, was wounded in the right leg during an engagement near Cane River, April 23, 1864, and entered St. James (Officers') Hospital, New Orleans, six days afterwards. Assistant Surgeon S. H. Orton, U. S. A., reported: "The tibia was fractured irregularly for two and a half inches at the upper part of the middle third, two pieces of bone being entirely detached. Flap amputation at the upper third was performed on April 30th, by Surgeon F. Bacon, U. S. V.; chloroform was used. At the time of the operation the periosteum was detached, with infiltration of pus beneath the integuments down to the ankle joint. The patient's constitutional condition was good and he progressed favorably. He was granted a leave of absence, and left the hospital May 18, 1864." The specimen (3603) shown in the annexed wood-cut (FIG. 294) was contributed to the Museum by the operator, with the following supplementary description of the case: "The tibia was splintered by a glancing bullet, which did not lodge in the leg and made but a single wound in the integuments. The fibula was not fractured and has not been preserved. I first examined the wound some seven days after it had been received and was surprised—in view of its apparently small extent—to find the bones stripped of periosteum and evidently dead for a distance of several inches above and below. One of the fissures ran directly across the nutrient foramen. The artery had been ruptured at that point and considerable hæmorrhage had ensued, the blood being evidently infiltrated through the calf of the leg. To this fact I attributed the loss of vitality which had taken place even in the larger fragments of the bone. The leg was amputated without delay immediately after the examination." After leaving the hospital Colonel Fessenden returned to active service, and was promoted to Brigadier General and subsequently to Major General. He was retired from service November 1, 1866. At the battle of Shiloh, April 7, 1862, he had also been wounded in the arm.

FIG. 294.—Right tibia fractured in middle third. *Spec.* 3603.

CASE 755.—Private J. Wheeler, Co. A, 8th Connecticut, aged 23 years, was wounded at Antietam, September 17, 1862. Surgeon T. H. Squire, 89th New York, recorded his admission to the Locust Spring field hospital, near Sharpsburg, and noted the following description of the case: "The wound was through the right ankle joint by a musket ball. The leg was amputated one week after the injury by Surgeon W. H. Leonard, 51st New York, at the junction of the upper and middle thirds. The flaps sloughed and the ends of both bones became exposed, being surrounded by red granulations. By a healing process the stump slowly changed for the better, the efforts of nature being supported by treatment as good as could be, and the patient being cheerful and expecting a good recovery. On November 12th, the ends of the bones exfoliated and were taken away, after which the stump improved and the patient's general health became quite good." He subsequently passed through hospitals at Frederick, was transferred to Knight Hospital, New Haven, and finally admitted to Central Park, New York City, October 30, 1863. Acting Assistant Surgeon S. Teats reported from the latter hospital that "the stump had healed up perfectly sound by June 1, 1863; also that the patient had been discharged from service November 17, 1863, and received an artificial leg. The man has been paid as a pensioner to September 4, 1880. In his application for commutation, dated 1875, he described the stump as being "very uneven and sensitive;" but five years later he reported its condition as "sound." A plaster cast of the stump (*Spec.* 2746), contributed by Assistant Surgeon J. W. S. Gouley, U. S. A., is represented in the annexed wood-cut (FIG. 295). The specimen indicates the amputation to have been performed by the posterior flap, while the cicatrices resemble those following a circular operation. The integument on the anterior surface appears tightly drawn over the bone.

FIG. 295.—Stump after flap amputation at junction of upper and middle thirds of leg. *Spec.* 2746.

CASE 756.—Brigadier-General H. E. Payne, U. S. V., aged 37 years, was wounded at Port Hudson, June 14, 1863. He was conveyed to the field hospital of the 3d division, Nineteenth Corps, whence Surgeon S. C. Hartwell, 38th Massachusetts, reported: "Shot wound of left leg." Two days after the reception of the injury, which involved the fracture of both bones of the leg, he was conveyed to New Orleans, whence Dr. P. C. Boyer reported that the patient "was under treatment at the Hotel Dieu Hospital from June 16th to July 22d for gunshot wound of leg and amputation." The operation was performed by Dr.

[1] Two of the operations were done in the middle third of the thigh: Cases of Pt. A. J. Cheever, H, 16th Mass. (TABLE XXXV, No. 35, p. 280, *ante*): Corporal H. W. Hughes, I, 133d New York (TABLE XXXIX, No. 43, p. 314, *ante*); and one in the lower third: Pt. F. Hoffman, H, 2d Penn. Artillery (TABLE XL, No. 47, p. 320).

Warren Stone, of New Orleans, on June 23d, four inches below the knee; the patient entirely recovered and became able to walk with the aid of an artificial limb. General Paine ultimately resigned his commission May 15, 1865, after which he was pensioned. Since leaving the service he has served as a member of Congress, and has been Commissioner of Patents.

CASE 757.—Private A. Rutter, Co. C, 100th Pennsylvania, aged 20 years, was wounded, at Bethesda Church, June 2, 1864. Surgeon M. K. Hogan, U. S. V., reported his admission to the field hospital of the 1st division, Ninth Corps, with "shot fracture of right leg by minié ball." Surgeon G. L. Pancoast, U. S. V., who amputated the limb, made the following report: "The wounded man was admitted to Finley Hospital, Washington, on June 15th, from the field hospital. His injury consisted of a compound comminuted fracture of the right tibia, for which amputation was performed at the upper third on June 20th. The operation was done by the flap method and chloroform was used as the anæsthetic, the patient's general condition being excellent. After two days of suffering the patient's progress of recovery was rapid. Cold-water dressings were applied." A part of the amputated tibia (*Spec.* 2587), showing fracture in the upper third and exhibiting well-marked necrosis, was contributed by the operator and is represented in the wood-cut (FIG. 296). The patient was subsequently transferred to Judiciary Square Hospital, where, after being furnished with an artificial limb by Jewett's Patent Leg Co., he was discharged from service May 4, 1865, and pensioned. His pension was paid June 4, 1880. In his applications for commutation he reported the condition of the stump as continuing "all right."

FIG. 296.—Fractured portion of right tibia; necrosis. *Sp.* 2587.

CASE 758.—Sergeant W. F. Johnson, Co. H, 84th Illinois, aged 19 years, was wounded in the right leg, at Dallas, May 30, 1864. Surgeon J. D. Brumley, U. S. V., reported his admission to the field hospital of the 1st division, Fourth Corps, with "shot fracture of tibia, lower third." Assistant Surgeon C. C. Byrne, U. S. A., who amputated the limb at the Field General Hospital at Chattanooga, made the following report: "The wounded man was admitted June 6th, and on the following day circular amputation was performed at the junction of the upper and middle thirds of the leg. Chloroform constituted the anæsthetic. The patient's constitutional condition at the time of the operation was good, but the injured parts were swollen, infiltrated, and œdematous, and there was some erysipelatous inflammation. Two days afterwards the parts assumed a decidedly gangrenous appearance, and the pus become fetid, black, and profuse. This rapidly increased, though liquor of chlorinate of soda was freely applied. On the third day pure bromine was applied, which arrested it. A second application gave the parts a healthy aspect, granulations springing up at once. Tonics and stimulants were given internally." On August 29th, the patient was transferred to hospital No. 19, at Nashville, where he obtained a furlough and was allowed to proceed to his home. In the following November he entered the Post Hospital at Rock Island, whence Acting Assistant Surgeon P. Gregg reported that "either in consequence of deficient flap or subsequent sloughing the bones protruded and became necrosed. It was deemed necessary by Surgeon W. Watson, U. S. V., in charge, and myself to re-amputate. I performed the operation on May 17, 1865. It was necessary to remove the head of the fibula. The joint is useless for any practical purpose." The patient was discharged from service August 10, 1865, and pensioned, since when he has been supplied with artificial limbs at stated intervals. Surgeon G. G. Craig, of Rock Island, who examined the stump on February 9, 1877, reported that "the patella and a portion only of the head of the tibia are remaining, which are drawn back and anchylosed." The pensioner was paid June 4, 1880.

CASE 759.—Lieutenant-Colonel E. P. Taft, 9th New York Heavy Artillery, aged 32 years, was wounded in the left leg, at the battle of Monocacy, July 9, 1864. Assistant Surgeon T. H. Helsby, U. S. A., reported: "The patient was admitted to hospital at Frederick the day after receiving the injury, which consisted of a fracture of the tibia and fibula in the lower third, caused by a conical bullet. Buck's extension apparatus was applied, with water dressings to the wound, and a generous diet was ordered. Secondary hæmorrhage having occurred from the posterior tibial artery, it became necessary on July 22d to amputate the limb. The operation was performed by Assistant Surgeon R. F. Weir, U. S. A., in the upper third, near the tubercle, by the circular method. At the time of the operation the parts were in an unfavorable condition from fading erysipelas and loss of blood, and the constitutional state of the patient was anæmic and depressed. Simple dressing was applied and a good diet administered. Secondary hæmorrhage occurred from the stump on July 24th, for which the popliteal artery was ligated in the stump. Moderate sloughing was arrested by the application of a solution of permanganate of potash, and the after treatment consisted of quinine, porter, and stimulants. On September 7th, the patient received a leave of absence. When he left the hospital he was in fine spirits, his appetite and general condition was good, and the stump looked healthy and was almost healed." The amputated bones of the leg (*Spec.* 3926), showing the tibia to be shattered and the fibula fractured transversely, were forwarded to the Museum by the operator and are represented in the wood-cut (FIG. 297). Lieutenant-Colonel Taft was mustered out November 28, 1864, and subsequently re-commissioned as Colonel. He became a pensioner after being ultimately discharged from service. Dr. William G. David, of Lyons, N. Y., who testified that he was the attending physician of the pensioner, reported that "the shock to his constitution from the wound and loss of the limb, as well as the long-continued and excessive discharge from the stump, so prostrated and reduced him that he never recovered his health, but continued anæmic, and died of dropsy on January 20, 1867."

FIG. 297.—Lower third, left leg: tibia shattered and fibula transversely fractured. *Spec.* 3926.

Fatal Intermediary Amputations in the Upper Third of the Leg.—The operations belonging to this group number one hundred and two—fifteen performed on Confederate and eighty-seven on Union soldiers. Erysipelas was noted in five, tetanus in six, gangrene in eighteen, and pyæmia in nineteen instances. Specimens in twenty-two of the cases are preserved in the Army Medical Museum.

CASE 760.—Private J. N. Coder, Co. K, 46th Pennsylvania, was wounded in the left leg, at Cedar Mountain, August 9, 1862. He was admitted to Wolfe Street Hospital, Alexandria, five days afterwards, where amputation was performed by Acting Assistant Surgeon S. E. Fuller, who reported the following history: "A rifle ball passed through the leg, fracturing the tibia about its middle. The limb was amputated three inches below the knee joint by the circular method, by order of Surgeon J. E. Summers, U. S. A., in charge of the hospital, on August 27th. Three days after the operation the stump had become much swollen, with red streaks extending up the limb; no suppuration. Quinine and brandy were ordered internally and warm-water dressings were applied to the stump. August 31st, patient much the same; treatment continued, and limb painted with muriated tincture of iron as far as the redness extended. September 1st, swelling great and no suppuration; sutures removed and some thick dark-colored fetid matter washed out of the stump. September 4th, redness disappeared; swelling less; no suppuration; treatment continued. On September 7th some sloughing of the stump appeared, when lint wet with solution of chloride of soda was applied, and the parts were occasionally touched with nitric acid. On September 14th about two inches of the soft parts came entirely away, leaving a granulating surface, and the patient appeared better and had good appetite. On September 16th, I called at 2 A. M., found the peroneal artery bleeding freely, and applied a tourniquet to the femoral, giving brandy and opium internally. There was no return of the hæmorrhage, but the patient gradually sank, and died September 19, 1862." The amputated tibia, showing periostitis to have covered the shaft with a delicate coating of callus, was contributed by the operator, and is specimen 321 of the Surgical Section A. M. M.

CASE 761.—Private G. Kimmel, Battery I, 1st New York Light Artillery, was wounded in the right leg, at Chancellorsville, May 3, 1863. Assistant Surgeon J. R. Smith, 136th New York, recorded the wounded man's admission to the field hospital of the 2d division, Eleventh Corps, May 15th, and his "death from pyæmia, after amputation of the leg below the knee, June 3, 1863." Surgeon R. Thomaine, 29th New York, who contributed the specimen (No. 1542) shown in the adjoining wood-cut (FIG. 298), reported that the attempt was made to save the leg, but amputation had to be performed thirteen days after the reception of the injury on account of suppuration. The specimen consists of the amputated bones of the leg, exhibiting the tibia to be shattered in the upper third, and showing a decided effort of nature to throw off the dead bone.

FIG. 298.—Portions of bones of right leg; tibia fractured in upper third. *Spec.* 1542.

CASE 762.—Private E. Williams, Co. F, 136th Pennsylvania, aged 45 years, was wounded at Fredericksburg, December 13, 1862. Surgeon C. J. Nordquist, 83d New York, reported his admission to the field hospital of the 2d division, First Corps, with "shot wound of right leg." Surgeon O. A. Judson, U. S. V., contributed the pathological specimen with the following description: "The wound was caused by a minié ball entering the upper part of the middle third of the tibia, passing obliquely downward and backward, fracturing the bone in its course and wounding the anterior tibial artery, and emerging through the gastrocnemius muscle. The patient was admitted to Carver Hospital, Washington, December 21st. The leg was placed in a fracture box and the bone kept well in apposition. Water dressings were applied. The patient progressed favorably until December 28th, when a profuse and continually recurring hæmorrhage set in which resisted ordinary measures for its control. Amputation was accordingly resorted to, and performed at the upper third of the leg by flap operation. On January 1, 1863, hæmorrhage to the amount of thirty ounces occurred from the anterior tibial artery in the stump, which was laid open and the bleeding vessel was secured. But the patient gradually sank, and died the evening of the same day. His system was also infected with pyæmia. Examination revealed an oblique fracture of the tibia, also that a piece of bone had been driven into the anterior tibial artery. The inter-muscular tissues of the limb were distended by pus." The wood-cut (FIG. 299) is a representation of the amputated shaft of the tibia (*Spec.* 634), which was comminuted in the middle third but shows very little displacement of fragments.

FIG. 299.—Fracture in middle third of right tibia. *Spec.* 634.

TABLE LXXII.

Summary of Two Hundred and Ninety-six Cases of Intermediary Amputations in the Upper Third of the Leg for Shot Injuries.

[Recoveries, 1—194; Deaths, 195—296.]

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.	No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	Adams, W. J., Pt., A, 12th Ohio.	Sept. 14, 17, '62.	Right. Discharged Nov. 29, 1862. Suicide January 4, 1870.	9	Barron, J. G., Pt., C, 4th Artillery, age 19.	May 3, 18, '63.	Left; flap. Surg. C. S. Wood, 66th New York. Discharged August 20, 1863.
2	Ames, G. W., Pt., E, 3d Michigan, age 20.	Aug. 30, Sept. 15, 1862.	Left; circular. A. A. Surg. R. Ottman. Discharged July 26, 1863.	10	Barrows, H. C., Pt., F, 9th Maine.	July 18, 21, '63.	Left; circ. Confederate surgeon. Discharged March 8, 1864.
3	*Antry, W. W.*, Serg't, C, 24th N. C., age 25.	April 6, 9, '65.	Left; circular. To prison April 17, 1865.	11	Beaty, M., Pt., C, 149th New York.	May 3, 16, '63.	Right. Ass't Surg. D. H. Strickland, 111th Penn. Discharged March 31, 1864. *Spec.* 1271.
4	Armstrong, R., Pt., G, 14th Infantry, age 23.	July 2, 9, '63.	Left (also wound left arm); post. flap. Ass't Surg. W. R. Ramsay, U. S. A. Disch'd Sept. 15, 1863.	12	Beehtel, H., Pt., I, 51st Indiana, age 24.	Dec. 16, 21, '64.	Left; ant. post. flap; gangrene. Discharged June 27, 1865.
5	Arnold, L., Pt., G, 143d Pennsylvania, age 20.	May 25, 29, '64.	Right (May 25, exo'n tibia): flap. A. A. Surg. C. Darby. Disch'd June 17, 1865.	13	Beckel, M., Pt., A, 25th Illinois.	Dec.31,'62, Jan.6,'63.	Right. Surg. J. Blount, 25th Ill. Discharged July 20, 1863.
6	Baker, D., Lieut., G, 8th Kansas, age 30.	Sept. 19, 23, '63.	Left; ant. post. flap. To Veteran Reserve Corps June 28, 1864.	14	*Billings, C. T.*, Pt., D, 7th South Carolina.	July 10, 14, '63.	Right; circular. Exchanged July 23, 1863.
7	Barnes, R. H., Pt., B, 5th Vermont, age 47.	May 5, 12, '64.	Left; flap. Discharged July 15, 1865.	15	Booth, H., Pt., H, 40th New York.	Aug. 29, Sep.6,'62.	Left; post. flap. A. Surg. G. M. McGill, U. S. A. Discharged July 7, 1863. *Spec.* 1966.
8	*Barnett, A. J.*, Serg't, D, 32d Georgia, age 35.	July 2, 6, '63.	Right; flap. Exchanged September 25, 1863.	16	Bowen, F. A., Serg't, K, 36th New York.	July 1, 6, '62.	Left; flap. Discharged October 1, 1862.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
17	Bowers, E., Pt., B, 2d Col'd Troops, age 25.	Mar. 6, 9, '65.	Right; circ. Confederate surgeon. Discharged Jan. 18, 1866.
18	Bowles, J. L., Pt., A, 101st New York.	Sept. 1, 4, '62.	Right; post. flap. Discharged February 12, 1863.
19	*Bowman, F. M.*, Pt., H, 1st Missouri.	May 16, 19, '63.	——. Retired February 9, 1865.
20	Bradish, A. L., Pt., K, 6th Maine, age 40.	May 3, 6, '63.	Left; flap. Surg. F. S. Holmes, 6th Maine. Disch'd Aug. 21,'63.
21	Briggs, D. J., Pt., B, 1st Michigan.	July 21, 26,'61.	Right; circ. Surg. St. G. Peachy, U. A. C. S. Disch'd Jan. 26, '63.
22	Brooks, E., Pt., C, 145th New York, age 18.	May 3, 17, '63.	Left; post. flap. Ass't Surg. L. W. Kennedy, 123d New York. Discharged August 21, 1863.
23	Brooks, S. S., Pt., B, 8th Indiana, age 23.	Oct. 19, 29, '64.	Left; lateral oval flap. A. A. Surg. R. H. Sterling. Disch'd July 28, 1865.
24	Brown, H., Corporal, I. 50th Penn., age 31.	Sept. 30, Oct. 14, 1864.	Left: anterior posterior flap. Confederate surgeon. Discharged March 19, 1865.
25	*Brown, P. J.*, Pt., E, 24th Alabama, age 24.	Jan. 3, 1863.	Right; circ. Furloughed June 16, 1863.
26	Buttle, S. W., Pt., G, 36th New York.	May 31, June 20, 1862.	Right; circ. A. Surg. W. Thomson. June 28. hæm. Disch'd May 25, 1863. Died Jan. 28, 1869. *Spec.* 4937.
27	Carnahan, T. A., Corp'l, I, 9th Pennsylvania.	June 30, J'y 3,'62.	Left. Discharged September 2, 1862.
28	Case, H., Pt., I, 12th New York.	Aug. 29, Sep.8,'62.	Right; flap. Act. Ass't Surg. D. Weisel. Disch'd Nov. 11, 1862.
29	*Catew, J. P.*, Pt., E, 11th Virginia.	July 3, 10, '63.	Left. Union surgeon. Transferred July 23, 1863.
30	Cavanaugh, J., Pt., B, 12th Massachusetts.	Sept. 17, Oct. 15, 1862.	Left. Surg. B. A. Vanderkieft, U. S. V. Discharged December 27, 1862.
31	*Chapman, J. P.*, Pt., I, 61st Georgia, age 27.	July 9, 21, '64.	Left (also w'nd chest and thigh); circ. Surg. C. H. Todd, C. S. A. Exchanged Oct. 17, 1864.
32	Cheever, A. J., Pt., K, 16th Massachusetts.	July 2, 14, '63.	Left July 18, amputation thigh, middle third. Discharged January 27, 1864.
33	Clark, G. W., Serg't, C, 30th New York.	Aug. 30, Sept. 6, 1862.	Right. A. Surg. B. Howard, U. S. A. Disch'd Nov. 22, '62. Died April 17, 1868.
34	Clark, W. S., Pt., G, 5th Artillery.	May 2, 21, '63.	Left; circular. Discharged.
35	Clements, I. N., Pt., F, 122d New York, age 23.	May 5, 10, '64.	Left; circ. Confederate surgeon. Disch'd November 30, 1864.
36	Colson, C. H., Pt., B, 31st Maine, age 22.	July 3, 30, '64.	Right; circular. Discharged January 6, 1865.
37	Connolly, T., Pt., H, 115th N. Y., age 20.	Feb. 20, 24, '64.	Left; ant. post. flap. Surg. E. Giddings, C. S. A. Discharged June 9, 1865.
38	Cooper, W. H. M., Pt., K, 19th Indiana, age 22.	Aug. 27, 27, '62.	Right; flap. A. Surg. Green, 19th Ind. Disch'd August 26, 1863.
39	Cotter, T., Pt., F, 30th Massachusetts.	May 27, June 4, 1863.	Left; flap. Surg. S. K. Towle, 30th Mass. Discharged August 25, 1863.
40	Cotton, T., Pt., I. 26th Col'd Troops, age 38.	July 7, 10, '64.	Right; flap. Discharged July 7, 1865.
41	*Courtney, A. H.*, Corp'l, F, 26th N. C., age 26.	July 1, 6, '63.	Left. Paroled September 22, '63.
42	Covert, A., Pt., I, 12th Michigan.	April 6, May1.'62.	Left; flap. Discharged August 8, 1862.
43	Craft, W. S., Capt., H. 1st Penn., age 23.	May 27, June 17, 1864.	Right; ant. post. flap. A. A. Surg. W. H. Finn. Discharged September 27, 1864.
44	Curtz, G. R., Pt., H, 61st Penn., age 18.	May 6, 9, '64.	Right; flap. Disch'd April 20, 1865. Died December 28, 1874; chronic bronchitis.
45	Davis, H., Pt., K, 1st Kansas.	Aug. 10, —, '61.	Right. Discharged December 30, 1861.
46	Davis, M., Pt., F, 14th New Hamp., age 19.	Sept. 19, 22, '64.	Left; circular. Discharged July 19, 1865.
47	Davis, W. B., Pt., C, 10th New York, age 21.	Oct. 27. Nv. 4,'64.	Right: ant. post. flap. Disch'd July 27, 1865.
48	Day, H. F., Pt., F, 12th New Hampshire.	July 2, 29, '63.	Right; ant. post. flap. A. A. Surg. J. Dickson. Discharged July 9, 1864. *Spec.* 1611.
49	Decatur, D. F., Pt., K, 35th Massachusetts.	Sept. 17, Oc.17,'62.	Right. A. A. Surg. W. E. Townsend. Disch'd March 13, 1863.
50	*Dedman, J. H.*, Pt., A, 50th Virginia, age 30.	July 2, 5, '63.	Left. Surg. — Harrison, C. S. A. Paroled Sept. 25, 1863.
51	Deery, S., Pt., K, 90th New York.	July 13, 21, '63.	Left; flap. Surg. A. H. Van Nostrand, 4th Wisconsin. Disch'd December 10, 1863.
52	De Laney, C., colored, civilian, age 47.	Mar. 10, April 4, 1865.	Left; flap. A. Surg. E. Gregory, 17th Conn. April 9, hæmorrhage. Recovery May 18, 1865.
53	Dew, A., Pt., I, 31st Ohio. age 20.	Sept. 20, Oct. 4, 1863.	Right (necro.; gang.); ant. post. flap. A. A. Surg. C. E. Boyle. Discharged February 3, 1865.
54	Diviney, P., Pt., B, 170th New York, age 23.	June 16, 20, '64.	Left; lat. flap. Dr. A. Garcelon, of Maine. Discharged Feb. 1. 1865. *Spec.* 2775.
55	Down, H., Pt., K, 44th New York, age 22.	June 22, J'y 6, '64.	Left; circ. A. Surg. A. Delany. Disch'd Mar. 18,'65. *Spec.* 2807.
56	Dudley, W. W., Lieut. Colonel, 19th Indiana.	July 1, 9, '63.	Right. Dr. S. O. Kinger, Littlestown. (July 3, exeision fibula: gangrene; hæmorrhage.) Discharged April, 1864.
57	Duffy, H., Pt., G, 8th New York, age 19.	Oct. 27, 30, '64.	Left; circular. Confederate surgeon. Disch'd Aug. 7, 1865.
58	Duffy, P., Pt., A, 59th Massachusetts, age 45.	May 24, June 17, 1864.	Left; ant. post. flap. A. A. Surg. H. M. Dean. Discharged Aug. 24, 1865.
59	*Duncan, J. F.*, Pt., H, 4th Alabama, age 19.	July 2, 29, '63.	Right. Exchanged November 12, 1863.
60	Elmer, H., Corp'l, A, 11th Mass., age 24.	July 2, 12, '63.	Right. Discharged February 19, 1864.
61	*Farmer, M. S.*, Pt., B, 17th Kentucky.	Feb. 15, 25, '62.	Left. A. Surg. A. P. Shackleford, 17th Kentucky. Disch'd July 16, 1862.
62	Fessenden, F., Colonel, 30th Maine.	April 23, 30, '64.	Right; flap. Surg. F. Bacon, U. S. V. Promoted Brig. Gen. May, 1864, and retired. *Spec.* 3603.
63	Fleming, S., Pt., D, 12th West Virginia.	June 13, 19, '63.	Right. A. Surg. S. P. Bryan, 12th West Virginia. Disch'd April 21, 1864.
64	Flyhouse, P., Pt., A, 10th Infantry, age 27.	May 6, 12, '64.	Left; circular. Recovery. Accidentally killed Jan. 26, 1865.
65	Foss, H., Pt., H, 9th Ohio, age 25.	Sept. 19, 23, '63.	Right. Confed. surgeon. Discharged June 4, 1864.
66	*Fox, J. N.*, Pt., K, 24th Alabama.	Nov. 25, Dec.8,'63.	Right; post. flap (hæmorrhage). Exchanged February 14, 1864.
67	Friend, J., Pt., E, 43d Ohio.	Mar. 4, 20, '62.	Left. Surg. F. M. Rose, 42d Ohio. Discharged August 7, 1862.
68	Fuchs, F., Serg't, A, 5th Ohio.	Mar. 23, 30, '62.	Left; flap. Discharged July 18, 1862.
69	Gage, C. F., Pt., I, 15th Massachusetts.	Sept. 17, 20, '62.	Left. Surg. S. N. Sherman, 34th N.Y. Discharged Jan. 10, 1863.
70	Galloway, E. T., Pt., D, 56th Penn., age 15.	May 5, 29, '64.	Right; circ. Surg. J. A. Phillips, 9th Penn. Reserves. Disch'd May 19, 1865.
71	Garvin, M., Pt., D, 69th New York, age 22.	July 1, 18, '62.	Right; circ. A. A. Surg. D. W. Cheever. Disch'd May 22, 1863. Died June 23, 1869: consumption. *Spec.* 22.
72	Gates, C. H., Pt., H, 1st New York, age 20.	July 2, 5, '63.	Right; circ. Surg. N. Hayward, 20th Mass. Disch'd Oct. 17, '64.
73	George, G. W., Lieut., I, 5th New Hampshire.	Sept. 17, 21, '62.	Left. Surg. L. M. Knight, 5th N. H. Disch'd March 7, 1863.
74	Glenn, E., Corp'l, D, 24th Wisconsin, age 19.	Sept. 20, 30, '63.	Right; circ. (other w'nds). Surg. T. L. Magee, 51st Ill. Disch'd Nov. 28, 1864. Insane, 1872.
75	Goodrich, L. H., Pt., B, 6th Vermont, age 30.	May 4, 7, '63.	Left; flap. Confederate surgeon. May 10. hæm.: lig. ant. tibial. Discharged March 19, 1864.
76	Graham, W. H., Pt., E, 1st W. Virginia, age 21.	June 5, 25, '64.	Left; circ. (recur. hæmorrhages). Discharged November 26, 1864. Died December 9, 1867.
77	Grant, A. D., Pt., K, 8th Vermont, age 21.	Oct. 19, Nov. 13, 1864.	Left; ant. post. flap. A. A. Surg. A. W. Emory. Discharged June 28, 1865. *Spec.* 3475.
78	Grant, J., Pt., A, 7th Wisconsin.	Sept. 14, Oct. 4, 1862.	Left. Ass't Surg. A. H. Smith, U. S. A. Gangrene. Disch'd April 2, 1863. *Specs.* 741, 785.
79	Greenough, L., Pt., B, 1st La. Cavalry, age 23.	May 17, 20, '63.	Right; flap. Discharged March 14, 1864.
80	Grigsby, P., Pt., C, 7th Ohio.	De.27,'62, Ja.20,'63.	Right. Surg. A. K. Fifield, 29th Ohio. Disch'd Aug. 13, 1863.
81	Guilford, G., Pt., A, 67th Ohio, age 20.	July 18, 21, '63.	Right; ant. post. flap (two w'nds of left leg); gangrene. Disch'd August 23, 1864. *Spec.* 4304.
82	Hachmann, J., Pt., B, 41st New York.	Aug. 30, Se. 14,'62.	Left. Ass't Surg. A. M. Clark, U. S. V. Disch'd Oct. 7, 1863.
83	Hall, J. O., Pt., D, 8th N. Y. Heavy Artillery, age 28.	June 16, 21, '64.	Left; circ. A. Surg. G. F. Winslow, U. S. N. Gangrene. Discharged June 19, '65. *Spec.* 502.
84	Hamilton, A. C., Pt., H, 18th Ohio.	Jan. 1, 15, '63.	Right; flap. Discharged April 27, 1863.
85	Hammond, R., Pt., A, 15th Ohio, age 24.	April 7, 11, '62.	Right; flap. Discharged February 21, 1863.
86	Harkins, T., Pt., I, 115th Pennsylvania, age 21.	July 3, 10, '63.	Right; flap. Discharged September 20, 1864.
87	Hatch, O. C., Pt., C, 48th Pennsylvania, age 29.	Aug. 29, Sep.5,'62.	Right; ant. post. flap. Disch'd September 29, 1863.
88	Hauer, L., Pt., C, 1st Missouri Lt. Artillery.	Aug. 10, Sep.4,'61.	Right; circular. Discharged.
89	Hay, T. H., Lieut., B, 54th New York.	July 2, 23, '63.	Left. Surg. Z. E. Bliss, U. S. V. Discharged June 19, 1864.
90	Hibbard, J. J., Serg't, D, 7th Wisconsin.	July 1, 20, '63.	Left; circular. Discharged June 6, 1864.
91	Heart, W. A., Corp'l, D, 29th Ohio.	June 9, —, '62.	Right. A. A. Surg. W. B. Crain. Disch'd Dec. 23, 1862. Died September 24, '72; colliquative diarrhœa. *Spec.* 4544.
92	*Hedgpath, J. P.*, Pt., A, 31st N. C., age 25.	May 16, June 7,'64.	Left; post. flap. Retired December 8, 1864.
93	Hoffman, F., Pt., H, 2d Penn. Heavy Artillery, age 18.	June 18, July 18, 1864.	Left; circ. A. A. Surg. J. Moneypenny. Necrosis. Dec. 6, 1864. amputation thigh. Discharged Aug. 15, 1865. *Spec.* 3714.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
94	*Hollinsworth, J. W.*, Sergeant, G, 22d Alabama, age 22.	Dec. 15, 16, '64.	Left; ant. post. flap. A. A. Surg. A. Rolls. Hæmorrhage. To Provost Marshal March 27, 1865.
95	Hooper, G. A., Pt., M, 1st Maine Cav., age 25.	Oct. 2, 29, '64.	Right circular. Disch'd April 15, 1865.
96	Housely, H., Cook with the 33d Wisconsin, age 20.	April 2, 11, '65.	Left; ant. post. skin flap, circ. of muscles. Also amp. right thigh. Surg. F. E. Piquette, 86th Col'd Troops. Recovery.
97	Hughes, H. W., Corp'l, I, 133d New York.	June 14, 24, '63.	Right. A. Surg. J. Homans, jr., U. S. A. Disch'd Oct. 12, 1863. Amputation thigh. Recovery.
98	*Hughes, J. D.*, Serg't, B, Morgan's Cav., age 31.	June 10, 23, '64.	Left; ant. post. skin flap. A. A. Surg. I. L. Stockwell. Hæmor. To Provost Marshal Oct. 13, '64.
99	Hunt, H. C., Pt., C, 22d Wisconsin, age 31.	July 20, 29, '64.	Left; circ. Surg. E. L. Bissell, 5th Conn. Disch'd Aug. 22, '65.
100	Hutchinson, H., Corp'l, G, 15th Conn, age 25.	Mar. 8, 14, '65.	Right. Surg. E. B. Haywood, C. S. A. Disch'd Nov. 7, 1865.
101	Irons, D. H., Pt., A, 6th Colored Troops, age 24.	Sept. 29, Oct. 2, '64.	Right. Discharged May 16, 1865.
102	Jeffords, F., Pt., C, 77th New York.	April 4, 7, '62.	Right; flap. Surg. A. Campbell, 77th N. Y. Disch'd June 9, '62.
103	Johnson, A. C., Pt., C, 3d Michigan.	Sept. 26, 29, '61.	Right; ant. post. flap. A. Surg. J. W. S. Gouley, U. S. A. Discharged Jan. 26, 1862. *Spec.* 345.
104	Johnson, W. F., Serg't, H, 84th Illinois, age 19.	May 30, June 7, 1864.	Right: circular. A. Surg. C. C. Byrne, U. S. A. May 17, reamp. leg. Discharged June 8, 1865.
105	Jokel, O., Pt., K, 15th Missouri, age 23.	Nov 30, Dec. 5, '64.	Right; circ. Confederate surgeon. Discharged August 1, 1865.
106	Jones, J. A., Pt., I, 8th Colored Troops.	Feb. 20, M'h 6, '64.	Left; circular. Discharged Oct. 5, 1865.
107	Keeney, R., Corp'l, K, 143d Penn., age 21.	May 5, 30, '64.	Left: circ. A. A. Surg. D. G. Caldwell. Disch'd Nov. 17, 1864.
108	Kehr, C., Pt., I, 58th N. York, age 35.	Aug. 30, Sep. 2, '62.	Left; circular. Discharged February 1, 1864.
109	Kenyon, L., Pt., D, 28th New York, age 20.	Aug. 9, 12, '62.	Left; circ. Disch'd Nov. 19, '62. Died September 12, 1868.
110	Kerns, G. D., Pt., H, 155th Penn., age 19.	June 18, 30, '64.	Left; circ. A. A. Surg. W. E. Sparrow. Disch'd Jan. 10, 1865.
111	Kinney, I. N., Pt., D, 35th Illinois.	Mar. 7, 26, '62.	Right. A. Surg. W. S. Grimes, 4th Iowa. Disch'd July 30, '62.
112	Klinker, H., Pt., C, 26th Wisconsin, age 28.	July 1, 7, '63.	Left. Surg. J. A. Armstrong, 75th Penn. Disch'd April 9, 1865.
113	Koeth, G., Pt., B, 140th New York, age 24.	May 8, 14, '64.	Right; post. flap. Discharged April 28, 1865.
114	Krieger, A., Pt., B, 43d Illinois.	April 6, 9, '62.	Left: flap. Discharged August 7, 1862.
115	*Lackey, J.*, Sergeant, G, 14th La., age 23.	May 5, 12, '64.	Left; circular. Paroled July 12, 1865.
116	Lawson, J., Pt., H, 12th Penn. Reserves, age 21.	Dec. 13, 17, '62.	Right: flap. Discharged August 24, 1864.
117	Leonard, J., Pt., D, 36th New York, age 21.	July 1, 13, '62.	Left. Surg. A. B. Mott, U. S. V. Discharged May 6, 1863.
118	Lucas, J. P., Lieut., E, 5th Penn. Reserves.	Dec. 13, 17, '62.	Right. Confed. surgeon; gang. Discharged Sept. 17, 1863.
119	Marble, J. D., Pt., D, 7th Wisconsin.	Aug. 28, Sep. 1, '62.	Right; circ. Discharged January 22, 1863.
120	Martin, J., Pt., G, 4th New York, age 27.	Sept. 17, Oct. 12, 1862.	Left; flap. A. A. Surg. J. H. Peabody. Disch'd Dec. 13, '62. Died Dec. 24, '76. *Specs.* 744, 4433.
121	Martin, S. J., Serg't, G, 6th Kansas Cavalry, age 27.	Mar. 14, 21, '64.	Right; flap. Surg. J. S. Redfield, 6th Kansas Cavalry. Disch'd October 7, 1864.
122	McCracken, J. H., Corp'l, A, 8th Md., age 24.	May 8, 12, '64.	Right; circ. Surg. S. Moore, C. S. A. Disch'd March 17, 1865.
123	McDonald, J. S., Capt., B, 15th New Jersey, age 22.	May 6, 13, '64.	Right (also other wounds); circ. Surg. L. W. Oakley, 2d N. J. Discharged December 15, 1864.
124	McGuire, J., Pt., F, 73d New York, age 17.	May 4, 21, '63.	Right; circ. Surg. A. B. Mott, U. S. V. Disch'd May 11, 1865.
125	[1]McKnight, J., Pt., A, 17th Mass., age 25.	Dec. 16, 29, '62.	Left; flap. Surg. I. F. Galloupe, 17th Mass. Discharged June 2, 1863.
126	McLaughlin, H., Pt., E, 10th Infantry, age 22.	June 27, 30, '62.	Left. Confederate surgeon. Discharged January 22, 1863.
127	McNanny, C., Pt., G, 106th N. York, age 35.	Aug. 26, Sept. 21, 1864.	Left; circ. A. A. Surg. C. H. Jones. Discharged June 1, '65. *Spec.* 3432.
128	Metcalf, L. H., Pt., E, 11th New York.	July 21, 26, '61.	Left; flap. Surgs. Gibson and Peachy, C. S. A. Discharged.
129	*Milan, J.*, Pt., G, 1st Texas, age 30.	July 2, 23, '63.	Right: short ant., long post. flap. A. A. Surg. B. Stone. Recovery. *Spec.* 2052.
130	*Mille, J. M.*, Serg't, G, 8th South Carolina.	Sept. 20, 27, '63.	——. Surg. J. T. Gilmore, C. S. A. Recovery.
131	Miller, C., Pt., G, 9th Pennsylvania, age 19.	June 30, July 30, 1862.	Left; circular. Aug. 14, hæmorrhage; ligation femoral artery. Discharged June 29, 1863.
132	Mundhenk, H. W., Pt., B, 93d Ohio, age 20.	May 9, 29, '64.	Left; circular. A. A. Surg. L. E. Tracy. Necrosis. Discharged February 17, 1865.
133	Murphy, J., Pt., F, 52d Pennsylvania, age 21.	May 5, 13, '62.	Left; ant. post. flap. Discharged August 9, 1864.
134	Myers, M. S., Pt., F, 76th New York.	July 1, 22, '63.	Right; circ. Discharged Sept. 26, 1864. *Spec.* 2456.
135	Nearee, J., Pt., H, 27th Illinois.	Nov. 7, 14, '61.	Right; flap. Surg. E. H. Bowman, 27th Illinois. Discharged August 7, 1863.
136	Neff, W. W., Pt., G, 6th Michigan Cav., age 18.	July 6, 9, '63.	Left; flap. Confederate surgeon. Disch'd May 24, '64. *Spec.* 6691.
137	Newton, W. C., Serg't, G, 3d Iowa.	Oct. 5, 8, '62.	Right. Discharged April 7, 1863.
138	Nichols, A. F., Pt., G, 4th Penn., age 22.	May 9, 13, '64.	Left; circular. Duty September 19, 1864.
139	O'Leary, J., Pt., A, 8th Infantry.	Aug 9, 14, '62.	Left; long post. flap. Surg. J. E. Summers, U. S. A. Discharged June 16, 1863. *Spec.* 3646.
140	O'Rourke, P., Pt., F, 7th New York Heavy Artillery, age 41.	May 31, June 6, 1864.	Left; circ. A. Surg. W. Thomson, U. S. A. (May 31, excision 6 ins. tibia.) Discharged July 28, 1865. *Specs.* 1502, 3546.
141	Oviatt, F. V., Pt., A, 37th Massachusetts, age 37.	Aug. 21, Sept. 2, 1864.	Right; semi-oval skin flap, circ. tissue flaps. A. A. Surg. G. H. Dare. Disch'd Aug. 2, 1865.
142	*Owens, J.*, Pt., H, 10th Louisiana.	July 1, 21, '62.	——; circ. Surg. — Rosser, C. S. A. Retired March 1, 1865.
143	*Owens, W.*, Pt., H, Elliott's Regiment, age 39.	Oct. 25, Nov. 15, 1864.	Right; ant. post. flap. A. Surg. W. H. Warner, 3d Wis. Cavalry. Exchanged January 27, 1865.
144	Paine, H. E., Brigadier General, U. S. V., age 37.	June 14, 24, '63.	Left. Dr. Stone, New Orleans, La. Resigned May 15, 1865. Commissioner of General Land Office in 1878.
145	Partingall, I., Pt., E, 3d N. Y. Artillery, age 21.	May 16, 19, '64.	Right; flap. Confederate surgeon. Discharged June 25, 1865.
146	Post, T. H., Pt., H, 2d Infantry, age 30.	Oct. 19, 24, '63.	Left; circ. A. A. Surg. R. Bartholow. Nov., gangrene. Disch'd February 18, 1864.
147	Power, W., Corp'l, D, 47th New York, age 23.	July 30, Aug. 3, 1864.	Right; flap. A. A. Surg. S. J. Holly. Disch'd March 2, 1865. Died Sept. 18, '70; consumpt'n.
148	Proper, J., Pt., K, 20th New York.	Sept. 1, 12, '62.	Right; circular. A. A. Surg. C. M. Ford. Discharged November 27, 1862.
149	Rand, W. H., Pt., F, 4th Mass. Cavalry, age 19.	July 3, 22, '64.	Left; flap. Ass't Surg. H. M. Sprague, U. S. A. Discharged December 13, 1864.
150	Rapp, A., Pt., I, 5th N. Jersey.	May 3, 10, '63.	Right; post. and ant. flaps. Surg. G. P. Oliver, 111th Penn. Discharged Mar. 18, '64. *Spec.* 6695.
151	Rewitzer, E., Pt., I, 15th New Hampshire.	May 27, June 4, '63.	Left; flap. Mustered out Aug. 15, 1863.
152	Ritter, J. J., Serg't, B, 1st Kentucky, age 30.	Sept. 19, Oct. 17, '63.	Left. Surg. — Fithian, C. S. A. Discharged June 18, 1864.
153	Ritter, M. V., Lieut., C, 23d Ohio.	Sept. 14, 17, '62.	Right. Resigned February 14, 1863.
154	Rolph, S., Pt., H, 8th Ohio.	Mar. 23, 27, '62.	Left; circ. Surg. G. W. Clippinger, 14th Indiana. Discharged October 25, 1862.
155	Rowe, R. W., Pt., H, 1st Missouri Artillery.	Aug. 10, 24, '61.	Left; flap. A. Surg. S. H. Melcher, 5th Mo. Discharged.
156	*Ruffenah, J.*, Serg't, E, 48th Miss., age 31.	May 3, 10, '63.	Left: flap. Retired February 22, 1865.
157	Rutter, A., Pt., C, 100th Pennsylvania, age 20.	June 2, 20, '64.	Right; flap. Surg. G. L. Pancoast, U. S. V. Disch'd May 4, 1865. *Spec.* 2587.
158	Sandford, R. L., Corp'l, E, 118th Penn., age 30.	Sept. 17, Oc. 15, '62.	Left. Surg. M. Storrs, 8th Conn. Discharged March 16, 1863.
159	*Sandford, W. R.*, Pt., D, 23d Virginia, age 25.	July 3, 17, '63.	Right. Surg. — Dorbet, C. S. A. Necrosis; hæmorrhage; erysipelas. Exch'd March 17, 1864.
160	Shantz, J. J., Pt., K, 1st Michigan, age 33.	Feb. 6, 10, '65.	Right; circ. Discharged Aug. 4, 1865.
161	Smith, R. A., Pt., G, 77th Ohio.	April 6, 11, '62.	Right. Discharged September 29, 1862.
162	Spahman, J., Pt., F, 62d Pennsylvania.	July 1, 4, '62.	Left; flap. Discharged October 14, 1862.
163	Squire, W. P., Pt., C, 75th Illinois, age 20.	Sept. 2, 19, '64.	Left; circ. A. Surg. T. A. McGraw, U. S. V. Disch'd March 6, 1865. Sept., 1865, amp. thigh, middle third; gangrene.
164	Stack, W., Boatswain's Mate, U. S. Steamer Meteor, age 25.	Mar. 20, 26, '65.	Right. Dr. Langler, U. S. N. Discharged August 18, 1865. Died July 29, 1872.
165	Starkey, G. L., Pt., D, 19th Maine, age 21.	July 2, 11, '63.	Left; circ. A. Surg. H. C. Levensaller, 19th Maine. Recovery. Died January 31, 1877.
166	Steele, W., Pt., G, 70th New York.	July 22, Au. 3, '63.	Left; flap. Discharged January 30, 1864.
167	Sullivan, J., Pt., D, 6th Massachusetts.	Aug. 29, Sep.—, '62.	Left. Discharged May 5, 1863. Died April 8, '70; lung disease.
168	Sullivan, P., Corp'l, K, 82d Illinois.	May 2, 6, '62.	Left; flap. Discharged September 11, 1863.
169	Taft, E. P., Lieut.-Col., 9th New York Heavy Artillery, age 32.	July 9, 22, '64.	Left (hæm.); circ. A. Surg. R. F. Wier, U. S. A. Ligation popliteal artery. Disch'd Nov. 28, 1864. *Spec.* 3926. Died Jan. 20, 1867; dropsy.

[1] Galloupe (I. F.). *Army Medical Intelligence*, in *Boston Medical and Surgical Journal*, 1863, Vol. LXVIII, p. 205.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
170	Thomas, J. A., Pt., K, 111th N. York, age 19.	July 2, 10, '63.	Left. Surg. H. M. McAbee, 4th Ohio. Hæmorrhage. Disch'd April 25, 1864.
171	Tracy, G., Pt., M, 1st Maine Cavalry, age 29.	Mar. 31, Ap. 18, '65.	Left; circ. A. A. Surg. F. H. Colton. Disch'd July 13, 1865.
172	Turner, J. W., Pt., A, 5th C. Troops, age 34.	Sept. 27, Oct. 3, '64.	Right; circular; gangrene. Discharged March 27, 1865.
173	Tyrrell, P., Pt., F, 4th Rhode Island, age 18.	Sept. 17, Oct. 5, 1862.	Right; flap. Surg. H. W. Rivers, 4th R. I. Discharged March 6, 1863. Died Dec. 10, 1871.
174	Vangorp, J., Pt., C, 1st Missouri.	Oct. 5, 9, '62.	Right; flap. Discharged February 24, 1863.
175	Wald, C., Pt., C, 68th New York, age 25.	July 2, 9, '63.	Right; circular. Discharged January 19, 1864.
176	Warren, E. E., Corp'l, I, 144th New York.	Nov. 26, 29, '62.	Left. A. A. Surg. W. H. Butler. Discharged February 25, 1863.
177	Watson, C., Corp'l, C, 6th Kansas Cavalry.	Aug. 24, Se. 19, '62.	Right; flap. Surg. J. E. Quidor, U. S. V. Disch'd Aug. 26, 1863.
178	Watts, T., Pt., D, 40th New York.	Sept. 1, 5, '62.	Right; circ. Discharged May 23, 1863.
179	Webber, E., Corp'l, H, 2d Massachusetts.	Aug. 9, 12, '62.	Left. A. Surg. J. Wightman, 2d Mass. Disch'd Jan. 15, 1863.
180	Weiss, E., Pt., A, 1st Missouri Lt. Artillery.	Aug. 10, Sep. 4, '61.	Right; flap. Discharged November 29, 1861.
181	Welch, T., Pt., D, 30th Illinois.	De. 29, '62, Jan. 5, '63.	Right; flap. Discharged October 12, 1863.
182	Whalley, E., Pt., B, 18th Massachusetts, age 30.	De. 13, '62, Jan. 3, '63.	Left; circular. Discharged April 25, 1863.
183	Wheeler, J., Pt., A, 8th Connecticut, age 23.	Sept. 17, 23, '62.	Right; post. flap. Surg. W. H. Leonard, 51st N. Y. Hæmorrh.; exfol.; bone removed. Disch'd November 16, 1863. *Spec.* 2746.
184	White, F., Pt., G, 119th Pennsylvania, age 21.	May 5, 9, '64.	Left; circ. Surg. P. Leidy, 119th Penn. Disch'd October 27, 1864. Died Dec. 2, '73; consumption. *Spec.* 1425.
185	White, J., Pt., I, 14th Indiana, age 23.	May 5, 18, '64.	Right. Discharged October 11, 1864.
186	White, R., Pt., B, 17th Indiana, age 35.	April 2, 7, '65.	Right; flap. A. Surg. R. W. Coale, U. S. V. Disch'd May 31, 1865.
187	Whitehouse, J., Pt., F, 5th N. Hamp., age 17.	April 7, 20, '65.	Right; circ. A. A. Surg. J. Sweet. Disch'd Sept. 29, 1865. Died February 9, 1868. *Spec.* 4097.
188	Whitner, D., Corp'l, A, 107th Ohio, age 21.	July 1, 24, '63.	Left; circular. Discharged February 7, 1864.
189	Williams, S. J., Pt., B, 24th Wisconsin.	De. 31, '62, Jan. 6, '63.	Right. A. Surg. H. M. Duff, 52d Ohio. Disch'd Feb. 25, 1863.
190	Wilson, J., Pt., E, 56th New York, age 25.	May 31, J'e 3, '62.	Right; circular. Discharged August 9, 1862.
191	Winter, A., Corp'l, C, 6th Connecticut.	July 18, 21, '63.	Left. Confederate surgeon. Discharged February 20, 1864.
192	*Woods, W. B.*, Pt., C, 11th Alabama, age 25.	June 30, J'y 3, '62.	——; flap. Surg. A. Wauld, C. S. A. Recovery.
193	Yingling, G., Pt., D, 105th Penn., age 37.	Oct. 27, No. 22, '64.	Right; circ. Confed. surgeon. Discharged June 26, 1865.
194	[1]Zuelch, G., Serg't, K, 7th New York, age 25.	Dec. 13, 18, '62.	Left; circ. Surg. C. Gray, 7th N. Y. Gang. Disch'd May 8, '63. Died July 2, '70; heart disease.
195	Ackland, G., Corp'l, H, 21st Missouri, age 25.	April 4, 24, '65.	Left; ant. post. flap. A. A. Surg. R. W. Tooker. April 27, hæm.; 29, lig. fem. Died May 1, 1865.
196	*Adair, F. M.*, Pt., D, 32d Texas, age 27.	April 8, 13, '65.	Left; ant. post. flap. Surg. J. B. G. Baxter, U. S. V. Died April 22, 1865; typhoid pneumonia.
197	Allen, J. P., Pt., D, 7th Massachusetts.	May 5, 10, '64.	Left. Surg. G. T. Stevens, 77th N. Y. Died May —, 1864.
198	*Ash, G. W.*, Corp'l, K, 23d Kentucky, age 31.	July 27, Au. 12, '64.	Right; circ. A. A. Surg. C. S. Merrill. Irritative fever. Died August 13, 1864; non-reaction.
199	Bates, S., Pt., I, 14th N. Jersey, age 18.	July 9, 29, '64.	Right. A. A. Surg. G. M. Paullin. (Hæmorrhage.) Died August 23, 1864; pyæmia. *Spec.* 3941.
200	*Beck, W. A.*, Pt., F, Thomas's Legion.	Sept. 19, Oct. 4, 1864.	——; circular. Ass't Surg. J. M. Lawson, 30th N. C. Died October 6, 1864; pyæmia.
201	*Bee, J. L.*, Pt., B, 4th S. Carolina Cav., age 21.	May 30, June 29, 1864.	Right; oval flap. A. Surg. J. C. McKee, U. S. A. Died July 2, 1864. *Spec.* 2716.
202	*Benson, N.*, Pt., C, 45th N. Carolina, age 42.	July 12, Aug. 1, '64.	Left; circ. A. A. Surg. N. A. Robbins. Died Aug. 7, '64; exhaus.
203	Bland, F. M., Pt., D, 23d Ohio.	May 19, June 17, 1863.	Left. A. A. Surg. J. Thompson. (May 19, Syme's amp. ankle j't; periostitis.) July 2, amp. thigh. Died July 16, 1863; exhaustion. *Spec.* 1706.
204	Bly, E. P., Pt., A, 83d Pennsylvania, age 23.	July 1, 5, '62.	Left. Died July 25, 1862.
205	Bond, A., Pt., K, 27th Pennsylvania, age 37.	July 3, 7, '63.	Left. Died September 30, 1863; exhaustion; diarrhœa.
206	Brooks, H., Pt., K, 20th Michigan, age 22.	Mar. 8. 25, '65.	Right (gangrene). Died April 14, 1865.
207	Brown, T. C., Pt., F, 34th Illinois.	De. 31, '62, Ja. 12, '63.	Right. Died January 21, 1863.
208	Brownfield, G., Pt., 19th Indiana Bat'ry, age 24.	Sept. 19, Oct. 8, '63.	Right; sloughing. Died November 19, 1863.
209	Buck, M. H., Pt., B, — Infantry, age 25.	Nov. 27, Dec. 13, 1863.	Left; flap. Surg. E. Bentley, U. S. V. Gangrene. Died December 24, 1863; pyæmia.
210	Burns, H. C., Serg't, H, 7th Penn. Cav., age 39.	Oct. 21, Nov. 2, 1864.	Left; circ. A. Surg. T. A. McGraw, U. S. V. Gangrene. Died November 19, '64; exhaustion.
211	Butts, J. H., Pt., F, 129th Pennsylvania.	Dec. 13, 2'5, '62.	Left. Jan. —, 1863, re-amp. leg; hæmorrhage. Died Jan. 30, '63.
212	Cain, P., Pt., D, 88th New York, age 34.	May 18, June 8, 1864.	Left; flap (erysipelas); hæmorrhage. Died June 14, '64; hæmorrhage. *Spec.* 2489.
213	Camp, T. S., Serg't, C, 2d Infantry.	May 3, 8, '63.	Left. Surg. G. P. Oliver, 111th Penn. Died May, 1863.
214	Campbell, W. H., Pt., B, 139th N. York, age 23.	June 3, 17, '64.	Left; circ. A. A. Surg. H. M. Dean. Died June 28, '64; hæm. R't; flap. Surg. G. L. Pancoast, U. S. V. Died July 28, 1864.
215	Canfield, D. W., Pt., M, 14th N. Y. H. A., age 21.	June 17, 28, '64.	Left; ant. post. skin flap. A. A. Surg. J. S. Waggoner. Died Sept. 30, 1864; tetanus.
216	Castle, W., Pt., D, 17th Maine, age 39.	Sept. 21, 29, '64.	Left. (May 24, amput'n at ankle joint.) Died June 22, 1864.
217	*Cecil, R.*, Lieut., K, 1st Virginia Cavalry.	May 24, —, '64.	——. Surg. G. P. Oliver, 111th Penn. Died May 15, 1863.
218	Clare, J., Pt., C, 145th New York.	May 2, 8, '63.	Left. Surg. A. T. Barnes, 98th Illinois. Died Nov. 9, 1864.
219	Cloniger, J. W., Pt., K, 72d Indiana, age 22.	Sept. 27, Oc. 14, '64.	Left; circ. A. A. Surg. S. E. Fuller. Erysipelas; hæmorrhage. Died Sept. 19, 1862. *Spec.* 321.
220	Coder, J. N., Pt., K, 46th Pennsylvania.	Aug. 9, 27, '62.	Left; flap. A. A. Surg. J. C. Nelson. Died; irritative fever and exhaustion. *Spec.* 2585.
221	Crabe, A. B., Pt., H, 58th Massachusetts, age 18.	June 4, 16, '64.	Right. Surg. E. Bentley, U. S. V. Died September 25, 1862.
222	Davidson, J., Pt., E, 88th Pennsylvania.	Aug. 30, Se. 12, '62.	Left; circ. Surg. R. B. Bontecou, U. S. V. Died July 10, 1864; exhaustion.
223	Delaney, J., Pt., G, 67th New York, age 20.	May 6, 27, '64.	Left. Died June 18, 1864; diphtheria.
224	Dow, W. R., Pt., E, 15th New Jersey, age 35.	May 10, J'e 2, '64.	Left. Surg. P. Pineo, U. S. V. Died January 7, 1863.
225	Ellis, C. F., Pt., I, 20th Massachusetts, age 23.	Dec. 13, —, '62.	Left. Surg. Z. E. Bliss. (Gangrenous.) Died Sept. 23, 1864.
226	Eshleman, L., Pt., E, 17th Penn. Cavalry, age 31.	Aug. 25, Sep. 7, '64.	Right; flap. Surg. E. Bentley, U. S. V. Died September 29, 1862; pyæmia.
227	Ettinger, I., Serg't, F, 6th New Jersey.	Aug. 29, Sept. 19, 1862.	Left. Surg. C. H. Lord, 102d N. Y. (Also w'nd of right leg.) Died May 26, 1863.
228	Fisher, A., Pt., H, 6th New Jersey.	May 3, —, '63.	Left. Died December 27, 1864; pyæmia.
229	Gauges, P., Pt., H, 32d Col'd Troops, age 23.	Nov. 30, Dec. 4, '64.	Right. Died May 16, 1863.
230	Gerral, J., Pt., D, 14th Indiana.	May 1, 15, '63.	Left; flap. A. A. Surg. J. H. Green. (Gangrenous.) Died October 2, 1864; pyæmia.
231	Gray, J. A., Lieut., B, 8th Indiana Cavalry, age 32.	Sept. 5, 22, '64.	Left; ant. post. flap. A. A. Surg. R. L. McClure. Died December 23, 1864; exhaustion.
232	*Gressnon, E.*, Pt., Darden's Louisiana Battery, age 28.	Dec. 16, 19, '64.	Left; circular. Died September 4, 1863; erysipelas.
233	Grube, C. W., Pt., F, 153d Penn., age 31.	July 1, 19, '63.	Left. July 7, hæmorrhage. Died July 8, 1864.
234	Haines, J., Pt., A, 26th Michigan, age 46.	May 12, 28, '64.	Left; circ. A. Surg. H. C. Roberts, U. S. V. Died May 16, 1864.
235	*Hall, W. H.*, Pt., D, 11th South Carolina, age 34.	May 9, 16, '64.	Left. Aug. 11, amputation thigh. Died September 9, 1864; irritative fever.
236	Hathaway, G. R., Pt., A, 125th Illinois, age 24.	June 27, July —, 1864.	Right; posterior flap. A. A. Surg. W. M. Hudson. Died November 24, 1863.
237	Herdman, G., Pt., G, 121st New York, age 20.	Nov. 17, 19, '63.	Right; lat. flap. A. A. Surg. R. Ottman. Died June 26, 1864. *Spec.* 2472.
238	Hogan, D., Pt., H, 170th New York, age 40.	May 24, 30, '64.	Right. Surg. D. W. Bliss, U. S. V. Died June 7, '64; hæmorrhage and diarrhœa.
239	Holmes, J. B., Pt., F, 1st Maine Heavy Artillery, age 18.	May 19, 25, '64.	Left; flap. Surg. B. S. Herndon, C. S. A. Died Sept. 9, 1864.
240	Homer, C. H., Corp'l, L, 10th N. Y. Cav., age 39.	June 24, J'y 9, '64.	——. Surg. E. C. Franklin, U. S. V. Died April 26, 1862.
241	Hood, T. M., Lieut., G, 46th Illinois.	April 6, 12, '62.	Left; circular. A. A. Surg. W. W. Valk. Died July 26, 1864.
242	Hotaling, A., Serg't, A, 7th N. Y. H. A., age 25.	June 22, J'y 13, '64.	Left. Surg. G. P. Oliver, 111th Penn. Died May 19, 1863.
243	Hughs, E., Pt., G, 124th New York.	May 3, 9, '63.	Left. Surg. G. T. Stevens, 77th N. Y. Died June 9, '64; pyæm.
244	Hurlbut, A. R., Capt., A, 5th Vermont, age 27.	May 5, 10, '64.	Right; flap. Surg. G. W. Brooks, 12th Ohio. Aug. 28, hæmorrh. Died Sept. 15, '64; hectic fever.
245	Huston, A., Pt., H, 12th Ohio Cavalry, age 18.	July 20, 28, '64.	Left; ant. post. flap. A. Surg. J. B. Brinton, U. S. A. Aug. 18, hæm.; ligation of ant. tibial and interosseous arteries; gangrene. Died August 20, 1862.
246	Jones, J., Pt., I, 27th Indiana.	Aug. 9, 15, '62.	

[1] THOMSON (W.), *Report of Cases of Hospital Gangrene treated in Douglas Hospital, Washington*, in *Am. Jour. Med. Sci's*, 1864, Vol. XLVII, p. 389

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
247	Kelly, P., Pt., I, 65th New York, age 26.	Oct. 19, 27, '64.	Left; circ. A. A. Surg. J. Neff. Died Nov. 8, 1864; pyæmia.
248	Kimmel, G., Pt., Battery I, 1st New York Light Artillery.	May 3, 16, '63.	Right. Died June 3, 1863; pyæmia. *Spec.* 1542.
249	*Kirby, H. W.*, Pt., B, 27th S. C., age 50.	May 19, 1864.	——; posterior flap. Died May 26, 1864; pyæmia.
250	Klump, G., Pt., D, 98th Pennsylvania, age 50.	July 11, 26, '64.	Right; circ. (hæmorrhage). Died August 3, 1864. *Spec.* 2888.
251	Lamoy, W. H., Pt., I, 97th New York, age 30.	Mar. 31, April 11, 1865.	Right; post. flap. Surg. N. R. Moseley, U. S. V. Died April 27, 1865; exhaustion.
252	*Latimer, J. W.*, Pt., G, 9th Virginia, age 24.	July 3, 8, '63.	Left. Aug. 15, gangrene. Died Sept. 8, 1863; gang.; diarrhœa. *Spec.* 1977.
253	Lattin, J. M., Capt., E, 111th N. York, age 28.	June 21, July 13,'64.	Left; circular. Surg. A. B. Mott, U. S. V. Died July 15, 1864.
254	Loftice, D., Pt., K, 5th Tennessee, age 26.	May 14, June 1, 1864.	Left; circ. A. A. Surg. M. L. Herr. Died June 10, 1864; exhaustion. *Spec.* 3503.
255	Luther, A. E., Pt., E, 3d Mass. Cavalry, age 32.	Mar. 4, 19, '64.	Left; circ. A. A. Surg. R. W.W. Carroll. (March 13, excision; 15, hæmorrhage.) Died April 6, 1864; pyæmia.
256	McBride, F., Pt., H, 75th Ohio.	May 3, 9, '63.	Right. Died May 12, 1863; pyæmia.
257	McDermott, J., Pt., A, 155th New York.	June 3, 12, '64.	Left; ant. post. flap. Surg. N. R. Moseley, U. S. V. Died July 7, 1864.
258	McGeary, J. S., Corp'l, H, 8th Pennsylvania Reserves, age 20.	Dec. 13, 28, '62.	Right; ant. post. skin flap. A. A. Surg. D. Weisel. Died Feb. 5, 1863; pneumonia. *Spec.* 206.
259	McKay, G.W., Capt., K, 34th Ohio, age 23.	July 24, 29, '64.	Right; flap. A. Surg. C.W. Stinson, 23d Ill. Died Aug. 13, '64.
260	McKenna, J., Pt., I, 11th Pennsylvania.	Aug. 30, Sept. 3, 1862.	——. Ass't Surg. B. Howard, U. S. A. Died September 18, 1862; tetanus.
261	McQune, A., Pt., H, 14th Infantry, age 40.	May 12, 23, '64.	——; flap. A. A. Surg. J. H. Thompson. May 26, hæmorrh. Died June 11, 1864; exhaustion.
262	*McWilliams, D. W.*, Pt., B, 17th Miss., age 34.	July 2, —, '63.	Left (necrosis). Died Sept. 11, 1863. *Spec.* 1979.
263	Mills, N.W., Lieut.-Col., 2d Iowa.	Oct. 4, 11, '62.	Right; circular. Died October 12, 1862; tetanus.
264	Moore, C., Serg't, D, 42d New York.	July 2, Aug. 1, 1863.	Left (hæm.; July 24, lig. post. tibial). Aug. 20, capillary hæm. Died Sept. 5, 1863. *Spec.* 1648.
265	Moore, G.W., Corp'l, C, 8th N. Y. Art'y, age 26.	June 3, 13, '64.	Left; circ. A.A. Surg. C. P. Bigelow. Died June 20, 1864; hæm.
266	Moore, R. A., Serg't, I, 4th Penn. Reserves.	Dec. 13, 29, '62.	Right. Died January 8, 1863; hæmorrhage. *Spec.* 581.
267	Myres, D. T., Pt., H, 51st Indiana, age 20.	Dec. 16, '64, Jan. 4, '65.	Left. A. A. Surg. W. Anderson. Died January 9, 1865.
268	Norris, J., Pt., K, 68th Pennsylvania, age 30.	July 2, 28, '63.	Left; hæmorrhage, 16 oz. Died August 1, 1863.
269	O'Leary, T., Pt., K, 4th Artillery.	May 2, 8, '63.	Right. Surg. G. P. Oliver, 111th Penn. (Also wound of left leg.) Died May 14, 1863.
270	Passenge, C. E., Serg't, E, 37th Illinois, age 23.	Oct. 26, Nov. 24, 1864.	Left; circ. Surg. S. S. Boyd, 84th Ind. (Hæmorrhage; ligation.) Died December 13, 1864.
271	Randall, C. E., Major, 25th Ohio, age 26.	Nov. 30, Dec. 8, '64.	Left; circ. Surg. A. Wynkoop, U. S. V. Died Dec. 15, 1864.
272	*Ray, J. L.*, Pt., D, 10th Kentucky Cav., age 18.	June 9, 19, '64.	Left. A. A. Surg. D. Buck. Died June 26, 1864; exhaustion.
273	*Reddick, M.*, Pt., E, 1st Florida.	Jan. 2, 5, '63.	Right. Surg. C. J. Walton, 21st Ky. (Also wound of left foot.) Died January 8, 1863.
274	*Redmond, J. W.*, Pt., D, 25th S. C., age 45.	Aug. 21, 31, '64.	Left; circ. A. A. Surg. J. Cass. Died Sept. 3, 1864; diarrhœa.
275	*Roberts, W. J.*, Pt., D, 4th North Carolina.	Sept. 19, 24, '64.	——; circular. A. Surg. G. M. Burdett, P. A. C. S. Hæmorrhage. Died October 11, 1864; exhaustion.
276	Schwerin, H. R., Capt., C, 119th New York.	May 2, 9, '63.	Right. Surg. J. D. Hewett, 119th N. Y. (Hæm.; May 5, excision.) Anæmic. Died May 10, 1863.
277	Sheldon, B., Corp'l, C, 4th N. Y. Heavy Artillery, age 29.	Oct. 28, Nov. 12, 1864.	Right; circ. Surg. O. A. Judson, U. S. V. Died Nov. 16, 1864; pyæmia.
278	Sheppard, M., Pt., C, 7th N. Y. Heavy Artillery, age 41.	May 21, June 6, 1864.	Right; oval. A. A. Surg. J. C. Nelson. Died June 11, 1864; diarrhœa. *Spec.* 2475.
279	Shull, W. J., Pt., F, 37th Indiana.	Jan. 2, 5, '63.	Left. Surgeon C. J. Walton, 21st Kentucky. Died January 11, 1863; tetanus.
280	[1] Skinner, J. S., Pt., K, 2d New Jersey.	May 2, 16, '63.	Right. Surg. J. A. Lidell, U.S.V. (Also wound of left foot.) Died May 20, 1863; pyæmia.
281	Stalker, G.W., Pt., I, 83d Pennsylvania, age 23.	July 2, 9, '63.	Left. Died July 10, 1863; tetanus.
282	Stander, C., Pt., D, 17th Infantry.	Dec. 13, 20, '62.	Left. Died December 23, 1862.
283	Stetson, M., Pt., A, 35th New York.	Aug. 29, Sept. 5, 1862.	Left; ant. post. flap. A. A. Surg. R. Reyburn. Gangrene. Died September 11, 1862.
284	Stout, J. H., Pt., B, 13th Tenn. Cav., age 16.	April 12, 16, '64.	Right; flap. Surg. H. Wardner, U. S. V. Died April 29, 1864; diarrhœa. *Spec.* 3314.
285	Strasburg, W., Pt., F, 8th N. Y. Hvy Art., age 19.	June 3, 6, '64.	Right. Surg. S. H. Plumb, 82d N. Y. Died July 5, '64; pyæmia.
286	Tefft, J. A., Corp'l, I, 146th N. York, age 25.	Mar. 31, April 25, 1865.	Right. A. A. Surg. C. E. Goldsborough. Erysip.; typhoid fev. Died May 25, 1865; prostration.
287	Thayer, A. H., Pt., H, 40th Mass., age 39.	May 21, 25, '64.	Left; circ. A. Surg. H. C. Roberts, U. S. V. Died June 8, '64; exhaustion.
288	*Thompson, J. W.*, Pt., G, 10th Alabama, age 38.	July 3, Aug. 1, 1863.	Left. (Also flesh wound thigh.) Aug. 19, slough. Sept. 8, hæm. Died Sept. 18, '63; hæmorrhage and gangrene. *Spec.* 1974.
289	Van Buskirk, I., Lieut., F, 27th Indiana.	May 3, 16, '63.	Right. Surg. W. H. Twiford, 27th Indiana. Died May 20, 1863. *Spec.* 1149.
290	Van Antwerp, W., Lieut., F, 13th Indiana, age 24.	May 8, 21, '64.	Right; circular. A. A. Surg. G. Colooosdian. Died May 26, 1864; exhaustion.
291	*Vaughn, N.*, Pt., H, 1st Virginia, age 30.	April 1, 20, '65.	Left; circular. A. A. Surg. C. B. Wright. (Gangrene.) Hæmorrhage; ligation posterior tibial. Died April 30, 1865; exhaustion.
292	Wade, H. P., Pt., K, 32d Massachusetts, age 30.	July 2, 5, '63.	Left. Died July 31, '63; pyæmia.
293	Whitney, A. S., Pt., E, 3d New Jersey, age 22.	May 8, 28, '64.	Right; circular. A. A. Surg. C. A. Lindsay. Died June 13, '64; pyæmia. *Spec.* 4576.
294	Williams, E., Pt., F, 136th Penn., age 45.	Dec. 13, 28, '62.	Right; flap. (Hæmorrhage.) Jan. 1, '63, lig. ant. tibial. Died Jan. 3, 1863, hæmorrhage. *Spec.* 634.
295	Wood, J., Pt., A, 3d Maryland Cavalry, age 21.	May 18, June 3, 1864.	Right; double flap. A. A. Surg. C. Bauseh. Died June 11, 1864; pyæmia.
296	York, M., Pt., E, 120th New York, age 20.	July 2, 27, '63.	Left. A. A. Surg. F. Hinkle. (Gang.) July 28, amp. right leg, lower third. Died Aug. 8, 1863; exhaustion. *Specs.* 1605, 1609.

The operations were performed in the right leg in one hundred and twenty-seven and in the left leg in one hundred and fifty-eight instances; in eleven cases the side was not indicated.

Intermediary Amputations in the Middle Third of the Leg.—Three hundred and sixty-eight cases of intermediary amputations in the middle third of the leg are found on the records. The terminations are ascertained in all: two hundred and fifty-eight ended in recovery and one hundred and ten in death, a mortality rate of 29.8 per cent.

Recoveries after Intermediary Amputations in the Middle Third of the Leg.—The two hundred and fifty-eight operations of this group were performed on two hundred and thirteen Union and forty-four Confederate soldiers; in one instance the patient was a citizen employé. Of the two hundred and thirteen Union soldiers the names of two hundred and

[1] Lidell (J. A.), *On the Major Amputations for Injuries in both Civil and Military Practice*, in *Am. Jour. Med. Sci's*, 1864, Vol. XLVII, p. 365.

ten were found on the Pension Rolls. Fourteen have died since the date of their discharge, one from constant discharge of stump, six from phthisis, and seven from causes not stated. In four instances amputation in the thigh was subsequently performed.

CASE 763.—Private G. W. Smith, Co. F, 76th New York, aged 20 years, was wounded in the left leg, at Gettysburg, July 1, 1863. He was conveyed to a field hospital of the First Corps, where amputation was performed but not recorded. Surgeon H. Janes, U. S. V., reported that the wounded man was admitted to Camp Letterman August 20th, his injured leg having been previously amputated, also that the patient did well and required no other treatment than simple dressings to the wound. Surgeon B. A. Clements, U. S. A., reported the following description and termination of the case: "The injury involved the ankle joint and was caused by a minié ball, which passed through antero-posteriorly, fracturing the bones. The leg was amputated by the circular method, at the Express Office Hospital, Gettysburg, five days after the reception of the injury. The man at the same time was wounded by another ball in the upper part of the left thigh. This was a flesh wound and healed in about two months. The stump healed kindly, and was entirely well when the patient was transferred to Central Park Hospital, New York City, on October 14th. In December following the stump ulcerated and a portion of a ligature escaped, after which it again healed." On May 20, 1864, when discharged from service at his own request, the patient's general condition was good and motion of the knee joint perfect. After leaving the hospital he was furnished with a "Palmer" artificial leg. In his application for commutation the pensioner describes the stump as remaining in "good condition," and states that Surgeon J. H. Beach, 24th Michigan, performed the amputation. The pensioner was paid March 4, 1880. A cast of the stump (*Spec.* 4318), showing amputation to have been performed at the middle third, and exhibiting the curious marking of an equal-armed cross on the cicatrix, was contributed by Acting Assistant Surgeon G. F. Shrady, and is represented in the wood-cut (FIG. 300).

FIG. 300.—Stump of left leg 10 months after circular amputation in middle third. *Spec.* 4318. [From a cast.]

CASE 764.—Private G. Cullom,[1] Co. D, 83d Ohio, aged 20 years, was severely wounded in the left ankle joint, at Champion Hills, May 16, 1863. He entered and remained at a field hospital for three weeks, when he was sent on board of a Hospital transport. Assistant Surgeon H. M. Sprague, U. S. A., recorded the wounded man's admission on board of the Steamer City of Memphis, June 8th, and his transfer to Jackson Hospital, Memphis, June 14th. Surgeon W. Watson, U. S. V., in charge of Jackson Hospital, contributed the pathological specimen with the following history: "The patient was under the attendance of Acting Assistant Surgeon J. Witham. When admitted he was very much reduced by diarrhœa, greatly emaciated, and suffering from extensive bed-sores over the sacrum. He had undergone amputation of the wounded leg, eight inches below the knee, previous to admission, and both bones were protruding from the stump. Simple dressings were used and adhesive plasters applied to the bed-sores, and he was allowed a generous and nourishing diet, with porter. On June 18th, he was placed upon a water-bed, after which a constant but slow improvement ensued and the stump was healing. On August 25th the bone, having become entirely detached, was removed. After this operation the patient's progress was more rapid, and he acquired strength enough to go about on crutches. On September 30th, when the patient was transferred to St. Louis, the stump had nearly healed." The removed fragment (*Cat. Surg. Sect.*, 1866, p 405, *Spec.* 2099), consisting of semi-tubular sequestrum from the tibia, five inches in length, is represented on PLATE LXXI, FIGURE 4, opposite page 428. The patient was discharged from service, at Jefferson Barracks Hospital, October 19, 1863, and pensioned. In the following year he was supplied with an artificial limb by Dr. Douglas Bly who described the amputation as having been performed by the flap method. In his application for commutation, dated 1870, the pensioner stated that his limb was amputated twenty-five days after the reception of the injury. The pensioner died August 27, 1872, of consumption, superinduced by the amputation, his attending physician certifying that the stump never healed and never ceased to suppurate, discharging fragments of bone at times.

FIG. 301.—Fractures in lower thirds of the bones of left leg. *Spec.* 2284.

CASE 765.—Private J. Sterritt, Co. C, 119th Pennsylvania, aged 39 years, was wounded in the lower part of the left leg, at Spottsylvania, May 10, 1864. Surgeon O. A. Judson, U. S. V., contributed the pathological specimen, shown in the annexed wood-cut (FIG. 301), with the following history: "The wound was caused by a conoidal ball entering the leg anteriorly about three inches above the ankle joint, passing transversely through, producing compound comminuted fracture of the lower third of the tibia and involving the ankle joint. The man entered Carver Hospital, Washington, three days after being wounded. At the date of his admission the injured ankle was tumid, red, and painful, and the foot œdematous; but his constitutional state was good and there was no emaciation. On May 14th the patient was etherized and the parts were examined, when the severity of the fracture was discovered and pus was found to have burrowed freely about the ankle joint. Consequently the leg was amputated at the middle third by the skin-flap method and circular section of muscles. The operation was performed by Acting Assistant Surgeon O. P. Sweet. The patient reacted well from the shock of the operation and continued to do well. Simple dressings were applied to the stump and stimulants were administered. About half of the anterior flap sloughed, but by June 1st the stump looked well and secreted laudable pus; granulations red and healthy. About June 12th an abscess formed on the crest of the tibia, probably resulting from necrosis of a small portion of the bone." The patient recovered and subsequently passed through different hospitals, being ultimately discharged August 7, 1865, and pensioned. Previous to leaving the service he was supplied with an artificial leg. In his application for commutation, dated 1870, he described the condition of the stump as "unhealthy at present," and six years later he reported it as "inclined to be sore." The pensioner was paid June 4, 1880. The specimen (No. 2284) consists of the amputated portions

[1] BRYAN (JAMES), *Seventeen Additional Cases of Amputations from the Armies of the South-West*, in *American Medical Times*, 1863, Vol. VII, p. 288.

of the bones of the leg, and shows the extremities of the fibula to have been carried away and the adjacent portion of the tibia to be broken. Another fracture, where the bone was chipped, is also exhibited five and a half inches above the joint, from which longitudinal fractures extend into the articulation.

CASE 766.—Sergeant J. Peart, Co. A, 21st New York Cavalry, aged 22 years, was wounded in the left leg, at Ashby's Gap, July 18, 1864, and entered the General Hospital at Frederick nine days afterwards. Assistant Surgeon R. F. Weir, U. S. A., in charge, reported the following history: "The injury was caused by a minié ball, which shattered the tibia near the ankle. When admitted here the limb was in a very bad state, being œdematous, ecchymosed, and discolored. Amputation of the leg in the middle third was performed by Acting Assistant Surgeon J. H. Bartholf on July 31st, by lateral flaps of skin and fascia and circular method through muscles. The patient's constitutional condition at the time of the operation was fair and his health good. One week afterwards the stump became gangrenous, when nitric acid was applied with success. The patient's progress went on gradually to recovery. Though the stump was not entirely cicatrized at the end of three months it was in good shape and there was no retraction of the flaps, extension of them by weight and pulley having been adopted at the beginning. The stump was healed, and the patient in good health on December 20th, when he was transferred to Central Park Hospital, New York City, for an artificial limb." The patient was discharged from service at the latter hospital May 23, 1865, and pensioned, and several weeks afterwards he was furnished with an artificial leg. In his application for commutation the pensioner described the stump as continuing in a "healthy condition." His pension was paid March 4, 1880.

CASE 767.—Private C. Burbridge, Co. K, 88th Pennsylvania, aged 40 years, was wounded at Spottsylvania, May 10, 1864, and entered Mount Pleasant Hospital, Washington, three days afterwards. Assistant Surgeon C. A. McCall, U. S. A., reported: "The injury was caused by a minié ball entering at the internal malleolus of the right leg, comminuting the fibular extremity and the astragalus and laying bare the tendon. The parts became swollen, tense, and discolored, and synovitis was fully developed. Amputation at the junction of the middle and lower thirds of the leg was performed by the antero-posterior flap method on May 24th, by Acting Assistant Surgeon P. C. Potter. The anæsthetic was made up of two parts chloroform and one part ether. At the time of the operation the patient was in a weak and debilitated condition and failing hourly, suffering from nervous trembling, restlessness, exhausting insomnia, and severe pain, which was lancinating and at times grinding and unsupportable. There was also copious discharge of ichor from the wound, and a sinus and abscess had extended up the limb and was opened a day or two before the operation. Interrupted sutures were applied to the stump, which broke out from ulceration of the flaps on the third day. Straps were then used and a tendency to slough counteracted by antiseptic poultices. Tonics and malt drinks were administered. By June 30th, the sloughing had stopped and abundant granulations were springing up. The greatest point of difficulty in this case was produced by the flaps falling asunder at each dressing, thus breaking up the nearly healed union and allowing the tibia to protrude." In the following month the patient was transferred to York, and subsequently he passed through various hospitals at Philadelphia, being ultimately discharged from service at Chester, June 27, 1865, and pensioned. He had been previously supplied with an artificial leg. In his application for commutation, dated 1870, the pensioner described the stump as being "tender;" but in his subsequent statements he represented it in "good condition." The pensioner was paid June 4, 1880.

Fatal Cases of Intermediary Amputation in the Middle Third of the Leg.—The one hundred and ten operations of this group were performed on one hundred and nine patients, in one instance both legs having been amputated. Ninety-eight were Union and eleven Confederate soldiers. In one case the amputation in the leg was followed by amputation in the thigh in the lower third. Death is ascribed to pyæmia in thirty-four, exhaustion in eighteen, gangrene in five, and tetanus in four instances.

CASE 768.—Private J. Heakin, Co. D, 6th U. S. Cavalry, aged 24 years, was wounded in the right ankle, at the battle of Old Church, May 31, 1864. He was admitted to Stanton Hospital, Washington, four days afterwards, where amputation was performed by Surgeon J. A. Lidell, U. S. V., who made the following report:[1] "The wound was inflicted by a minié ball, which entered anteriorly, passed backward and inward, apparently going close to the posterior tibial artery and escaping behind the lower end of the tibia. The ankle joint was involved. The parts became swollen, red, and tender. During the night of June 7th the patient had secondary hæmorrhage from the wound, losing about a pint of blood, bright red in color. On the following day the leg was amputated at the place of election by double flap method, the anterior flap being shorter than the posterior, and the tibia being divided after the procedure of Sanson. Sulphuric ether constituted the anæsthetic. The loss of blood was trifling during the operation and the patient's general condition at the time was favorable, there being no constitutional disturbance worth mentioning. The shock of the operation was little and passed away quickly; reaction moderate. The patient died of pyæmia June 21, 1864. The examination of the injured member showed the lower end of the tibia to be badly comminuted into the ankle joint, which was filled with pus. The posterior tibial artery was grazed by the bullet and some very small fragments of bone had been driven into it. The hæmorrhage occurred on the detaching of these fragments by suppuration, together with the separation of the bruised tissue belonging to the wall of the artery. The astragalus was uninjured." The latter bone and the lower portion of the amputated tibia (*Spec.* 2470) were contributed to the Museum by the operator, and are represented in the wood-cut (FIG. 302).

FIG. 302.—Bones of the right ankle joint; tibia fractured. *Spec.* 2470.

CASE 769.—Private W. Nixon, Co. H, 20th Illinois, was wounded in the lower part of the right leg, near Kenesaw Mountain, June 17, 1864, by a musket ball striking the anterior surface of the tibia and entering the bone. He was admitted to a field hospital at Big Shanty, and thence, ten days later, to the general hospital at Rome. Slight hæmorrhage is said to have

[1] LIDELL (J. A.), *Secondary Hæmorrhage from Posterior Tibial Artery, etc.*, in *U. S. Sanitary Commission Memoirs*, New York, 1870, Vol. I, p. 23.

occurred on June 21st, and while being transported in the railroad cars from Big Shanty to Rome the patient bled to syncope. After several more slight hæmorrhages, which were temporarily checked by plugging the wound, it was found that the bleeding could no longer be restrained, it being impossible to secure the vessel at the point of the injury on account of extensive disorganization around the wound as well as on account of the depth of the artery and the uncertainty of finding it. Amputation was then decided upon and performed through the middle third of the leg, on July 6th, by Surgeon G. F. French, U. S. V. The ball was found in the medulla of the amputated bone, and the bleeding vessel was discovered to be the anterior tibial artery. At the time of the operation the patient was enfeebled by the loss of blood. Reaction was fair, but his condition was low; pulse feeble; lips and skin very pale. For some days his condition continued very critical. On July 27th, a slight diarrhœa came on and the patient's condition, although improved, was still critical. On August 3d, colliquative diarrhœa set in and the patient's strength was fast failing; pulse flagging; appetite entirely lost. He died on August 19, 1864, of exhaustion, though every effort had been made from the beginning to sustain his strength by a nutritious diet and the generous use of stimulants. At the time of his death the stump had almost entirely healed. The amputated tibia (*Spec.* 3382), longitudinally fractured, with a battered conoidal ball lodging in the lowest third of the bone, was contributed, with the history, by the operator, and is shown in the wood-cut (FIG. 303).

FIG. 303.—Fractured lower portion of the right tibia. *Spec.* 3382.

CASE 770.—Sergeant P. Smith, Co. K, 69th New York, aged 30 years, was wounded at Deep Bottom, August 16, 1864. Surgeon J. F. Dyer, 19th Massachusetts, reported his admission to the field hospital of the 2d division, Second Corps, with "shot fracture of both legs." Four days after receiving the injury the wounded man was admitted to Satterlee Hospital at Philadelphia, where both limbs were amputated by Acting Assistant Surgeon J. H. Hutchinson, who described the wound as follows: "A conoidal ball entered the left foot a little in front of the external malleolus, which it fractured, thence passing behind the joint and making its exit below and posterior to the internal malleolus. The missile then entered the right foot just in front of the internal malleolus, penetrated the joint, and lodged against the external malleolus, whence it was removed August 26th. Considerable difficulty was experienced in discovering the position of the ball, a large mass of loose bone having to be removed before it could be found. After the patient's admission it at once became evident that he would have to lose both feet; but it was considered more prudent to wait for the establishment of suppuration. About September 3d, both feet were discharging a large amount of healthy pus, and the patient was weak in consequence of this excessive drain, but was supported by means of quinine, beef essence, and milk punch. On September 6th I amputated both legs by the circular method, the left one above the ankle joint (at the junction of the middle and lower thirds) and the right one and a half inches higher up, the patient being etherized during the operation. By September 23d the patient, considering his situation, was still doing well. Considerable sloughing had taken place, particularly in the left stump, where the tibia was exposed. There was also two slight bed-sores notwithstanding the very careful nursing the patient received." Surgeon I. I. Hays, U. S. V., in charge of the hospital, reported that the patient died of exhaustion October 10, 1864. The amputated bones of the ankles of both legs (*Spec.* 3644) were forwarded to the Museum by the operator and are shown in the wood-cut (FIG. 304). In addition to the injuries described the specimen exhibits the left astragalus to be fractured, the base of the right tibia to be shattered, and the right fibula fractured transversely just above the malleolus as if by the propagated force. There are also traces of periosteal disturbance.

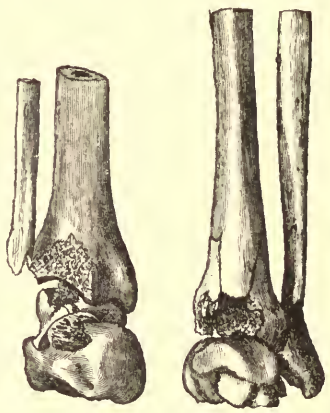

FIG. 304.—Bones of both ankles. The astragalus and outer malleolus of the left and the base of the tibia of the right ankle are fractured. *Spec.* 3644.

TABLE LXXIII.

Summary of Three Hundred and Sixty-eight Cases of Intermediary Amputations in the Middle Third of the Leg for Shot Injury.

[Recoveries, 1—258; Deaths, 259—368.]

NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.	NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	Ackley, C., Pt., I, 50th Pennsylvania, age 21.	May 12, 21, '64.	Right; circular. Disch'd March 28, 1865.	8	Barber, J. M., Pt., H, 21st Ohio.	Sept. 20, Oc.10,'63.	Right; circular. Discharged February 27, 1864.
2	Adams, A. B., Pt., C, 16th Maine, age 19.	Dec. 13, 22, '62.	Left. Surg. E. Bentley, U. S. V. Disch'd May 20, 1863. *Spec.* 596.	9	Barney, H. F., Pt., A, 8th New Hampshire.	July 6, 16, '63.	Right; circular. Surgeon E. A. Thompson, 12th Maine. Disch'd Sept. 27, 1863. Re-amp. in 1864.
3	Allen, C., Corp'l, G, 62d New York, age 20.	Oct. 19, 28, '64.	Right; lat. flap. A. A. Surg. C. H. Jones. Hæmorrhage. Discharged Oct. 4, 1865. *Spec.* 104.	10	Beauboucher, V., Pt., E, 28th Mass., age 27.	June 4, 8, '64.	Left; circular. Surg. E. Bentley, U. S. V. Disch'd Jan. 6, 1865.
4	Allen, H., Sergeant, G, 119th Penn., age 22.	May 3, 30, '63.	Right; flap. Surg. J. H. Baxter, U. S. V. Discharged November 14, 1863. *Specs.* 1184, 1185.	11	*Beevers, H. G.*, Pt., A, 3d Arkansas.	Sept. 21, Oc.12,'63.	Left. Surg. — Sleighton, C. S. A. Recovered.
5	Atkinson, P., Pt., G, 67th New York, age 31.	July 1, 17, '62.	Right; double flap. Ass't Surg. W. Webster, U. S. A. Disch'd April 23, 1863.	12	Bennett, C., Pt., H, 14th N. Y. State Militia.	Aug. 29, Sep.4,'62.	Left. Discharged Oct. 8, 1862.
6	Bain, T., Pt., G, 60th Illinois, age 34.	July 4, Aug. 1, 1864.	Left; flap. (July 4, excision of 4 inches of tibia.) Gangrene. Discharged May 9, 1865.	13	Benning, E., Pt., I, 52d New York, age 28.	May 12, 19, '64.	Left; double flap. A. A. Surg. J. F. Thompson. Discharged March 17, 1865.
7	*Barbee, J.*, Pt., B, 5th North Carolina, age 29.	May 12, 20, '64.	Left; anterior posterior skin flap. Surg. D. W. Bliss, U. S. V. Exchanged. *Spec.* 2312.	14	Benson, T., Pt., A, 32d Maine, age 20.	May 12, 20, '64.	Left; oval flap. Discharged September 2, 1864.
				15	Berkley, C., Pt., E, 1st Colored Troops, age 19.	June 15, July 13, 1864.	Right; posterior flap. A. Surg. J. H. Frantz, U. S. A. Disch'd July 12, 1865.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
16	Billman, H., Pt., A, 46th Ohio, age 25.	Nov. 25, Dec. 19, 1863.	Right; flap. Surg. W. W. Bridge, 46th Ohio. Discharged March 31, 1865.
17	Bolen, J., Pt., E, 6th Mass. Cavalry, age 25.	April 8, May 7, 1864.	Right; anterior posterior skin flap. A. A. Surg. R. W. W. Carroll. Discharged October 4, 1865.
18	*Bowers, S. M.*, Pt., F, 11th Mississippi, age 21.	July 3, 7, '63.	Right; circ. Exchanged March 3, 1864.
19	*Bowles, G. S.*, Pt., G, 18th Virginia, age 27.	July 3, 7, '63.	Right; circ. Exchanged March 17, 1864.
20	Boyson, W. G., Boatswain's Mate, U. S. Steamer Osage, age 39.	Mar. 29, April 1, 1865.	Right; circ. Surg. T. J. Turner, U. S. N. Discharged August 5, 1865. Died June 20, 1868.
21	Brannan, J. J., Serg't, G, 10th W. Virginia, age 27.	Sept. 19, Oct. 14, 1864.	Right; anterior posterior flap. Surg. H. F. Garrett, 10th W. Va. Discharged August 29, 1865.
22	Bressin, C., Pt., K, 4th Ohio Cavalry.	May 2, 10, '62.	Left. Ass't Surg. T. McMillan, 4th Ohio Cavalry. Discharged July 8, 1862.
23	*Bronn, H. G.*, Pt., A, 6th Georgia.	June 27, J'y 1, '62.	——. Surgeon — McKinney, C. S. A. Recovered.
24	Brooks, A., Pt., E, 72d New York, age 21.	July 2, 5, '63.	Right; flap. Discharged February 24, 1864.
25	Brooks, N. M., Capt., C, 12th N. Jersey, age 22.	May 12, June 2, 1864.	Right; flap. Surg. D. W. Bliss, U. S. V. Discharged October 4, 1864. *Spec.* 2429.
26	Brotts, H. A., Corp'l, H, 8th Ohio, age 23.	July 3, 25, '63.	Left; flap. Surg. N. Hayward, 20th Mass. Bone removed. Discharged December 15, 1863.
27	Bullock, S. J., Serg't, A, 108th New York, age 20.	July 3, 6, '63.	Right; circular. Ass't Surg. F. Wolf, 39th N. Y. Sept. 1, rem. necrosed bone. Discharged July 15, 1864. *Spec.* 4370.
28	Burbridge, C., Pt., A, 88th Pennsylvania, age 40.	May 10, 23, '64.	Right; anterior posterior flap. A. A. Surg. P. C. Porter. Disch'd June 27, 1865.
29	Burr, H. C., Pt., K, 8th Connecticut, age 35.	Sept. 17, Oct. 15, 1862.	Right; ant. posterior flap. Surg. G. H. Oliver, 111th Penn. Discharged April 14, 1863.
30	Butler, J., Pt., C, 3d Michigan.	May 3, 6, '63.	Right. Discharged May 1, 1864.
31	Buttinger, C., Corp'l, B, 20th Massachusetts.	June 30, July 4, 1862.	Right. Surgeon M. S. Kittinger, 100th N.Y. Disch'd Sept. 25, '62. Died Oct. 9, '65; consumption.
32	Cadugan, A., Corp'l, I, 116th New York.	July 13, Aug. 10, 1863.	Right; flap. Surg C. B. Hutchins, 116th N. Y. Discharged September 19, 1863.
33	*Caldwell, J. N.*, Pt., K, 3d N. C., age 30.	May 12, 15, '64.	Right; circular. Old Capitol prison October 14, 1864.
34	*Campbell, J.*, Pt., Stewart's La. Scouts, age 32.	Nov. 30, Dec. 7, '64.	Right; circular. Transferred to prison July 22, 1865.
35	Campbell, J. H., Pt., D, 95th Pennsylvania, age 15.	Aug. 21, 28, '64.	Left; lateral flap. A. A. Surg. W. B. Morrison. Disch'd Aug. 7, 1865. Subsequent operation.
36	Carr, C., Pt., E, 26th Pennsylvania.	Aug. 29, Sep. 6, '62.	Left. Discharged February 12, 1863.
37	Caufman, C. E., Pt., K, 1st Penn. Reserves.	June 30, J'y 3, '62.	Right. A. A. Surg. J. Swinburne, Discharged November 3, 1862.
38	Church, G. S., Pt., G, 6th Penn. Reserves.	Dec. 13, 25, '62.	Left; flap. Discharged March 19, 1863. *Spec.* 649.
39	Church, M. F., Pt., B, 16th New York, age 21.	June 27, July 22, 1862.	Left. Ass't Surg. R. Bartholow, U. S. A. Necrosed bone rem'd. Discharged January 11, 1863.
40	Cole, J., Pt., D, 188th Pennsylvania, age 21.	June 3, 22, '64.	Left (June 3, amp. toes; gang.; hæm.); anterior post. flap. A. A. Surg. H. M. Dean. Disch'd August 3, 1864. *Spec.* 2635.
41	Condon, T., Pt, K, 42d Illinois, age 32.	Jan. 1, 15, '63.	Left; circular. Surgeon T. D. Fitch, 42d Illinois. Discharged October 21, 1864. *Spec.* 277.
42	*Cook, M.*, Pt., I, 20th Louisiana, age 23.	April 7, 20, '62.	——; erysipelas. Trans. October 11, 1862, to military prison.
43	Courter, W. C., Pt., F, 43d Ohio, age 23.	Mar. 6, 11, '65.	Left; anterior flap. A. A. Surg. E. L. Mola. Discharged Aug. 8, 1865.
44	Cover, P., Pt., G, 14th Pennsylvania Cavalry, age 26.	Aug. 26, Sept. 23, 1863.	Right; posterior flap. Surg. J. Paddock, 22d Virginia, C. S. A. Discharged May 14, 1865. Died May 24, '65; phthisis pulmonalis.
45	Crawford, E., Pt., F, 105th Ohio, age 20.	Sept. 19, Oct. 4, '63.	Right; ant. post. flap. Surg. W. L. Johnson, 18th Ohio. Aug. 5, 1864, amp. thigh, lower third. Hæm.; ligat'n of profunda. Discharged Mar. 18, '65. *Spec.* 3108.
46	Crawford, T., Pt., I, 8th Michigan.	Sept. 14, 17, '62.	Right; circular. February, 1863, operation 8 ins. below the knee. Discharged February 5, 1863.
47	[1] Cullom, G., Pt., D, 83d Ohio, age 20.	May 16, June 10, 1863.	Left; flap. Aug. 25, rem. necro. bone. Discharged Oct. 19, 1863. Died August 27, 1872; phthisis pulmonalis. *Spec.* 2099.
48	Dallmeyer, F., Lieut., C, 12th Missouri, age 24.	May 22, 26, '63.	Right. Skey's method. A. Surg. H. M. Sprague, U. S. A. Discharged Nov. 14, 1864. Died July 18, 1871. *Spec.* 1627.
49	Devan, R. P., Pt., D, 3d Wisconsin.	Aug. 9, 17, '62.	Left; circular. A. A. Surgeon S. E. Fuller. Discharged October 29, 1862. *Spec.* 54.
50	Dickens, H. S., Pt., H, 126th N. York, age 30.	July 3, 11, '63.	Left; flap. A. A. Surg. S. R. Skillern. April 24, 1864, ant. post. flap amput'n thigh, lower third. Disch'd April 28, '65. *Spec.* 2740.
51	Dietz, W., Serg't, I, 29th New York.	May 2, 10, '63.	Right; circular. Surg. R. Thomain, 29th New York. Discharged June 20, 1863.
52	Dillen, F. M., Pt., H, 7th Wisconsin, age 24.	May 10, 13, '64.	Left; circ. Surg. D. C. Ayres, 7th Wis. Disch'd Oct. 8, 1864.
53	Dotts, J. L., Lieut., D, 54th Penn., age 22.	Sept. 22, Oc. 15, '64.	Right; circ. A. A. Surg. B. B. Miles. Discharged May 14, '65.
54	Dresser, W. M., Pt., G, 35th Mass., age 24.	Sept. 17, 22, '62.	Right; flap. Surg. W. H. Leonard, 51st N. Y. Discharged.
55	Drummond, R. A., Pt., I, 89th Indiana.	April 9, 12, '64.	Right; circ. Discharged April 30, 1865.
56	Ellis, W. F., Pt., B, 2d Maine, age 24.	Aug. 30, Sep. 2, '62.	Left; circular. Discharged May 23, 1863.
57	Fairfield, S. G., Pt., C, 1st Mass. Heavy Artillery, age 43.	May 10, June 8, 1864.	Left; modificat'n of anterior flap. Surg. D. P. Smith, U. S. V. Discharged July 8, '64. *Spec.* 3300.
58	Farmer, S., Pt., H, 1st West Virginia, age 22.	June 5, J'y 2, '64.	Left; circular. Confederate surgeon. Discharged June 2, 1865.
59	*Fernandez, J.*, Serg't, A, 2d Florida, age 19.	May 5, June 4, 1862.	Right. (Bone removed; hæm.; erysip.) Teale's method. Ass't Surgeon J. S. Billings, U. S. A. Old Capitol prison July 21, 1862.
60	Finn, E. A., Corp'l, G, 13th Michigan, age 28.	Sept. 19, Oct. –, '63.	Right; flap. Discharged December 14, 1864. Subseq. operation.
61	Foote, G. A., Serg't, I, 14th Conn., age 28.	Dec. 14, 17, '62.	Left; circular. Discharged July 31, 1863. Died Nov. 13, 1869.
62	*Ford, T.*, Pt., K, 1st Florida, age 17.	Jan. 2, 5, '63.	Left. A. A. Surg. W. G. Workman. Discharged June 5, 1865.
63	Foster, H. S., Serg't, E, 104th N. Y., age 22.	July 1, 8, '63.	Left; flap. Surg. C. H. Richmond, 104th N.Y. Disch'd Mar. 22, '64.
64	Garlock, D. C., Pt., C, 111th New York.	July 3, 27, '63.	Left; circular. Ass't Surg. D. C. Peters, U. S. A. Discharged September 14, 1863. *Spec.* 1606.
65	Gibson, E. M., Serg't, A, 19th Indiana, age 21.	July 1, 14, '63.	Right. Surg. J. M. Farley, 84th N. Y. Discharged June 25, '64.
66	*Gifford, J.*, Pt., C, 1st Louisiana.	Aug. 29, Sep. 9, '62.	Right. Surg. H. Black, C. S. A. Retired December 26, 1864.
67	Gifford, W. W., Pt., D, 36th Illinois.	Sept. 19, 26, '63.	Right; flap. Discharged November 11, 1863.
68	Gilmar, J., Pt., A, 1st Vermont Cavalry, age 20.	July 8, 28, '64.	Left; flap. Surg. N. R. Moseley, U. S. V. Discharged February 17, 1865. *Spec.* 2895.
69	Ginsenger, J., Pt., K, 58th New York.	Aug. 30, Sept. 15, 1862.	Right; double flap. Surg. D. P. Smith, U. S. V. Discharged November 13, 1862.
70	Goodell, F. A., Pt., B, 75th New York.	July 7, 28, '63.	Left; anterior post. flap. Surg. S. K. Towle, 30th Massachusetts. Discharged November 21, 1863.
71	Granger, G., Corp'l, D, 5th Ohio.	Aug. 9, Sep. 3, '62.	Right; circular. Discharged November 12, 1862.
72	*Griffin, J. M.*, Pt., H, 16th Miss., age 21.	July 3, 12, '63.	Right. Exchanged November 12, 1863.
73	*Grigsby, J. L.*, Pt., K, 23d Kentucky.	Sept. 20, 25, '63.	Left; flap. Discharged.
74	Gutheridge, J. L., Corp'l, A, 66th Ohio.	Aug. 9, 15, '62.	Left; double flap. Ass't Surg. J. B. Brinton, U. S. A. Disch'd October 27, 1862. *Spec.* 38.
75	Haggerty, J., Pt., I, 35th Indiana, age 30.	June 21, 27, '64.	Left; circular. A. A. Surg. J. W. Digby. Discharged July 10, 1864. *Spec.* 2311.
76	*Hall, A. M.*, Serg't, B, 53d N. C., age 26.	July 2, 13, '63.	Left. Paroled September 25, '63. Retired from service Feb. 10, '65.
77	Hall, W., Corp'l, I, 4th Col'd Troops, age 23.	June 17, July 3, 1864.	Right; post. flap. Ass't Surg. J. H. Frantz, U. S. A. Discharged November 28, 1865.
78	Halley, M., Corp'l, E, 63d New York.	Sept. 17, 23, '62.	Left; post. flap. Surg. L. Reynolds, 63d N. Y. Discharged December 15, 1862.
79	Harvey, W., Pt., C, 88th Penn., age 24.	Aug. 16, 27, '64.	Left; circular. A. A. Surg. E. B. Woolston. Disch'd Nov. 22, '64.
80	Hasel, G., Pt., E, 72d Ohio, age 20.	April 6, 15, '62.	Left; flap. Discharged February 22, 1863.
81	Healey, R. A., Pt., B, 4th R. I., age 21.	Mar. 14, 21, '62.	Left; circular. Surg. S. A. Green, 24th Mass. Disch'd Sept. 9, '62.
82	Heitzman, F., Pt., K, 97th New York, age 31.	Sept. 17, 21, '62.	Right; anterior post. flap. Discharged April 30, 1863. Died June 15, 1866; continual discharge from stump. *Spec.* 1040.
83	Heller, A. E., Pt., C, 49th Pennsylvania.	Sept. 17, 20, '62.	Left. Discharged January 24, 1863.
84	Herring, C. P., Lieut.-Colonel, 118th Penn.	Feb. 6, 20, '65.	Right. Discharged June 1, 1865.
85	*Hipps, J. E.*, Pt., H, 17th Mississippi, age 21.	July 2, 26, '63.	Left; flap. Furloughed December 1, 1863.
86	*Hodge, F. M.*, Pt., D, 5th Arkansas.	Sept. 20, Oct. 6, '63.	——. Surgeon G. G. Crawford, P. A. C. S. Recovered.
87	Hofses, L. W., Pt., D, 19th Maine, age 28.	July 3, 11, '63.	Right; circular. Discharged August 27, 1864.

[1] Bryan (J.), *Seventeen Additional Cases of Amputations from the Armies of the South-West*, in *American Medical Times*, 1863, Vol. VII, p. 288

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
88	Hogan, C. H., Corp'l, A, 89th Ohio, age 26.	Sept. 19, Oct. 9, 1863.	Left; anterior post. flap. Ass't Surgeon C. S. Frink, U. S. V. Discharged December 5, 1863.
89	*Hootsell, J. F.*, Pt., A, 2d Louisiana.	Feb. 8, 15, '62.	Right. Surgeon G. L. Miller, C. S. A. Recovered.
90	*House, P. A.*, Pt, B, 33d North Carolina.	Aug. 16, 20, '64.	Left. Recovered.
91	Huntzinger, J. W., Pt., A, 21st Indiana.	Aug. 5, 25, '62.	Right. Discharged November 15, 1862.
92	Hutchins, A. J., Pt., K, 25th Ohio.	May 1, 26, '63.	Right; posterior flap. Surg. C. L. Wilson, 75th Ohio. Disch'd March 19, 1864. *Spec.* 6705.
93	Jamison, R. E., Pt., K, 19th Iowa.	Dec. 7, 28, '62.	Left; flap. Discharged December 12, 1864.
94	*Jenkins, D. A.*, Pt., A, 19th Alabama, age 25.	De.16,'64. Jan. 11, 1865.	Right; anterior posterior flap. A. A. Surg. L. Sinclair. To Provost Marshal March 7, 1865.
95	Johnson, E., Pt., G, 54th Massachusetts, age 35.	Feb. 20, Mar.6,'64.	Right; flap. Discharged July 16, 1865.
96	Johnson, T. G., Corp'l, H, 40th Illinois.	April 6, 14, '62.	Left. Discharged July 11, 1862.
97	Johnson, W., Pt., I, 149th Pennsylvania, age 23.	July 1, 7, '63.	Left; anterior posterior flap. Discharged January 30, 1864.
98	Johnson, W. H., Capt., F, 144th N. Y., age 27.	Feb. 10, 23, '65.	Left; circ. Ass't Surg. J. G. Murphy, U. S. V. Feb. 17, lig. ant. tib. art'y. Disch'd May 15, '65.
99	Jones, B., Pt., A, 5th Col'd Troops, age 18.	Sept. 29, Oct. 2, '64.	Right; flap. Discharged June 21, 1865.
100	June, M. F., Pt., L, 9th N. Y. Heavy Artillery, age 17.	Oct. 19, Nov. 2, 1864.	Right; lateral skin flap and circ. section of muscles. A. A. Surg. J. Neff. Disch'd May 13, 1865. *Spec.* 3428.
101	Kahl, C., Serg't-Major, 75th Penn., age 29.	July 1, 4, '63.	Left; flap (also flesh wound of shoulder). Disch'd Feb. 26, '64.
102	Kehoe, J., Serg't, H, 39th New Jersey, age 29.	April 21, 26, '65.	Right; circ. (erysipelas). A. A. Surgeon W. B. Chambers. Discharged June 8, 1865.
103	*Kelly, T.*, Pt, A, 22d Kentucky.	De.29,'62, Jan. 18, 1863.	Right; flap. Surg. H. P. Stearn, U. S. V. Re-amputated. Discharged June 2, 1863.
104	Kimball, W., Pt., K, 88th Illinois, age 29.	July 20, Aug. 19, 1864.	Right; anterior posterior flap. A. A. Surg. M. W. Benjamin. Discharged June 9, 1865.
105	Kinnan, V., Pt., H, 147th New York, age 22.	June 19, July 5, 1864.	Right; flap. Surg. E. Bentley, U. S. V. Discharged October 27, 1865. *Specs.* 2517, 2833.
106	Kinney, V. F., Pt., C, 2d Wisconsin, age 21.	July 1, 4, '63.	Left; circular. Discharged November 28, 1863.
107	Knox, R. F., Pt., C, 11th Pennsylvania, age 28.	Aug. 31, Sept. 15, 1862.	Left; anterior post. flap. A. A. Surg. J. E. Warner. March 12, 1863, removal of exfoliat'n from tibia. Discharged April 24, '63.
108	Koehler, J., Pt., I, 150th Pennsylvania, age 36.	May 5, 29, '64.	Left; circular. A. A. Surg. H. Gibbons, jr. (May 5, excision 4 inches of fibula.) Discharged April 19, 1865. *Specs.* 3533, 2404.
109	Koontz, A., Pt., H, 19th Ohio.	Jan. 1, 5, '63.	Right; flap. Discharged May, 1863.
110	Laird, S., Pt., F, 4th Vermont, age 21.	De.16,'62, Jan. 12, 1863.	Right; circ. Surg. A. M. Wilder, U. S. V. Discharged April 5, 1864. *Spec.* 4319.
111	Laverty, E., Pt., E, 53d Pennsylvania, age 43.	Dec. 13, 30, 62.	Left; posterior flap. Surg. O. A. Judson, U. S. V. Discharged October 4, 1864. Died January 4, 1880. *Spec.* 6712.
112	Lease, D., Pt., E, 1st Ohio, age 25.	Sept. 19, 26, '63.	Right; circular. Surg. D. S. Young, 21st Ohio. Discharged October 7, 1864.
113	Leslie, G., Pt., C, 5th New Hampshire.	Dec. 13, 23, '62.	Right; circ. Discharged April 4, 1863.
114	Littlefield, A., Pt., C, 2d Rhode Island.	May 3, 20, '63.	Right; ant. post. flap. Surg. J. H. Baxter, U. S. V. Discharged Oct. 7, 1863. Died Dec. 6, 1877; phthisis pulmonalis. *Spec.* 1135.
115	Lonergan, T., Serg't, B, 142d Penn., age 39.	Dec. 13, 17, '62.	Right; circular. Surg. T. Jones, 8th Penn. Reserves. Discharged March 10, 1864.
116	Loughlin, J., Pt., A, 69th New York, age 36.	July 2, 5, '63.	Right; circular. August 5, re-amputation; erysipelas. Discharged March 18, 1865.
117	Lowry, H., Pt., D, 93d Pennsylvania, age 19.	May 12, June 6, 1864.	Right; anterior posterior flap. Surgeon C. Page, U. S. A. Discharged March 23, 1865.
118	Lubbert, W., Pt., B, 20th Massachusetts, age 32.	June 3, 9, '64.	Left; double flap. Surg. E. Bentley, U. S. V. Disch'd Nov., 1865. Died Oct. 6, '66; phthisis pulm.
119	*McAuley, A.*, Pt., H, 7th Louisiana.	June 9, 12, '62.	Left. Recovered.
120	McCarthy, J., Pt., D, 71st New York.	May 3, 10, '63.	Right. Surg. C. K. Irwine, 72d N. Y. Discharged July 30, 1864.
121	McCarty, W., Pt., B, 23d Illinois, age 40.	July 21, 28, '64.	Left; flap. Ass't Surg. J. S. Taylor, 23d Ill. Disch'd May 3, '66.
122	McFadden, D., Pt., G, 26th Ohio, age 39.	Sept. 20, 26, '63.	Left; flap. Discharged August 26, 1864.
123	McGivern, L., Pt., G, 5th Kentucky, age 50.	Nov. 25, 28, '63.	Right; flap. Discharged September 27, 1864.
124	McGonigle, H., Pt., F, 73d Penn., age 51.	Nov. 25, Dec. 25, 1863.	Right; ant. post. flap. Surg. W. H. Gunkle, 73d Penn. Disch'd April 25, 1864. Died April 5, 1868; consumption.
125	*McGriff, J. C.*, Pt., B, 7th Georgia.	Aug. 30, Se.20,'62.	——. Ass't Surg. H. W. Harding, C. S. A. Recovered.
126	*McGukin, W. P.*, Pt., F, 2d S. C. Rifles, age 30.	May 3, 7, '63.	Right; circ. Transferred June 9, 1864.
127	McIlvaine, R. L., Serg't, K, 8th Penn. Reserves.	Aug. 29, Sept. 16, 1862.	Right; circular. A. A. Surg. J. N. Goff. Discharged November 29, 1862.
128	McTaggart, J., Pt., D, 46th Indiana, age 35.	April 8, 12, '64.	Right; flap. Surg. J. F. Hess, 96th Ohio. Duty July 8, 1864.
129	Magee, W., Pt., K, 81st Pennsylvania.	De.13,'62, Jan. 1,'63.	Left. Surg. D. W. Bliss, U. S. V. Disch'd Dec. 5, 1863. *Spec.* 943.
130	Maguire, S., Serg't, G, 11th Penn. Res., age 24.	May 6, 31, '64.	Left; circular. A. A. Surg. D. L. Haight. Hæmorrhage; gang. Discharged. *Spec.* 1222.
131	Malone, S. S., Pt., K, 10th West Virginia, age 20.	July 23, Au.11,'64.	Left; circular. A. A. Surg. C. H. Jones. Disch'd June 14, 1865.
132	Manning, T., Pt., H, 5th Ohio, age 23.	Aug. 9, 19, '62.	Right; flap. Ass't Surg. J. F. Day, 10th Maine. Discharged May 5, 1863. *Spec.* 6768.
133	Marston, B. F., Serg't-Major, 3d Maryland.	Aug. 9, 12, '62.	Left; circular. A. A. Surg. M. H. Barton. Disch'd Nov. 28, 1862.
134	*Masterson, M.*, Pt., H, 10th Louisiana.	Nov. 27, De.12,'63.	——. Surg. W. P. Young, C. S. A. Recovered.
135	Mauk, S. S., Pt., E, 90th Ohio.	Sept. 20, 24, '63.	Right; circ. Surg. H. Herrick, 17th Ohio. Disch'd May 13,'64.
136	Mays, C., Pt., K, 1st Artillery, age 19.	June 6, 24, '64.	Left; circular flap. A. A. Surg. T. Carroll. Disch'd July 17,'65.
137	Meagher, D., Pt., C, 5th Connecticut.	Aug. 9, 23, '62.	Right; flap. Discharged October 27, 1862.
138	Merrill, S., Pt., F, 2d New Hamp., age 33.	July 2, 5, '63.	Left; flap. Surg. J. M. Merron, 2d N. H. Disch'd June 21, 1864.
139	Miller, C., Pt., D, 53d Pennsylvania.	Dec. 13, 16, '62.	Left. Discharged September 19, 1863.
140	Miller, R. F., Pt., E, 123d Illinois, age 27.	Jan. 11, 14, '65.	Left; flap. A. A. Surgeon E. L. Jones. Disch'd June 4, 1865.
141	Miller, W. W., Pt., G, 40th New York, age 27.	Dec. 13, 16, '62.	Right. Discharged April 2, 1863.
142	Minott, J. S., Corp'l, F, 1st Michigan Sharpshooters, age 31.	May 12, 27, '64.	Left; circular skin flap. Surg. E. Bentley, U. S. V. Discharged October 17, 1864.
143	Myers, D., Pt., K, 12th Pennsylvania, age 20.	June 27, J'y 23,'62.	Right. Ass't Surg. R. Bartholow, U. S. A. Disch'd Oct. 16, 1862.
144	Newkirk, G. W., Pt., I, 42d Indiana, age 22.	Oct. 8, 22, '62.	Left; flap. Discharged June 19, 1863.
145	Newman, O., Pt., K, 7th New York, age 20.	Mar. 31, April 8, 1865.	Right; circular. Surgeon A. F. Sheldon, U. S. V. Discharged August 2, 1865. *Spec.* 4877.
146	*Nichols, A.*, Pt., C, 6th North Carolina, age 20.	July 2, 30, '63.	Left. Surg. — Hawley, C. S. A. Spic. rem. Retired Mar. 14, '65.
147	Norton, M., Pt., I, 52d New York, age 37.	May 9, 12, '64.	Left; circular. Discharged October 26, 1865.
148	Nussbaumer, B., Pt., B, 67th Ohio, age 27.	Mar. 23, April 22, 1862.	Left. Surg. A. D. Gall, 13th Ind. (Also w'nds of breast and leg.) Disch'd July 28, 1862. Caries of stump. 1863, amputation thigh, middle third.
149	O'Brien, J., Pt., K, 124th New York.	May 3, 9, '63.	Right. Surg. G. P. Oliver, 111th Penn. Disch'd April 5, 1864.
150	O'Bryan, J. C., Pt., K, 45th Penn., age 18.	June 27, J'y 18,'64.	Right; flap. Dr. F. Hinkle, of Marietta, Penn. Discharged.
151	*O'Donall, P.*, Pt., B, 27th Virginia.	July 1, 21, '61.	Left. Surgeon — Hunt, C. S. A. Recovered.
152	O'Donnell, J., Corp'l, F, 81st Pennsylvania.	July 1, 22, '62.	Left. Ass't Surg. J. R. Smith, U. S. A. Disch'd Oct. 16, 1862.
153	O'Neal, J., Pt., I, 153d New York, age 28.	Sept. 19, Oct. 19, 1864.	Right; flap. Surg. L. P. Wagner, 114th New York. Discharged February 11, 1865.
154	O'Neil, J., Pt., A, 3d Penn. Reserves.	May 11, 31, '64.	Right; flap. Surg. S. A. Welch, 3d Penn. Reserves. Discharged September 23, 1864.
155	*Ortle, H.*, Pt., A, 5th Louisiana.	May 5, 30, '64.	——. Surg. J. R. Page, C. S. A. Retired from military service March 6, 1865.
156	*Paine, J. A.*, Pt., E, 2d Missouri, age 21.	Nov. 30, Dec.2,'64.	Left; circular. Provost Marshal May 6, 1865.
157	Palmer, W., Lieut., B, 82d New York, age 29.	July 1, 31, '63.	Left; circular. Surg. A. B. Mott, U. S. V. Transferred to Vet. Res. Corps. Disch'd June 30,'66.
158	Parris, G. W., Pt., C, 19th Massachusetts.	June 30, J'y 4,'62.	Left. Discharged December 11, 1862.
159	Patterson, W. L., Corp'l, C, 198th Penn., age 21.	Mar. 29, April 3, 1865.	Left; circular. A. A. Surg. M. J. Munger. Discharged August 7, 1865. *Spec.* 4037.
160	Patty, T. W., Pt., E, 40th Indiana, age 18.	Nov. 25, Dec. 6, 1863.	Left. March 12, 1864, re-amputation 3 inches above. Discharged January 11, 1865.
161	Paul, L., Pt., C, 28th Massachusetts, age 40.	June 2, 9, '64.	Right; flap. Surg. E. Bentley, U. S. V. Discharged March 29, 1865. Died July 24, 1869.
162	Peart, J., Serg't, A, 21st N. Y. Cavalry, age 22.	July 18, 31, '64.	Left; lateral flap of skin and circ. of muscles. A. A. Surg. J. H. Bartholf. Disch'd May 23, 1865.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
163	Peck, H. C., Serg't, B, 5th New York, age 26.	Aug. 30, Sep.2,'62.	Left; flap. Surg. R. H. Coolidge, U. S. A. Discharged May 14, 1863.
164	*Perkins, J. D.*, Lieut., M, 2d Florida, age 19.	July 2, 5, '63.	Left (also amputation left thumb). Trans. to Provost Marshal October 22, 1863. Exchanged.
165	*Phillips, D. W.*, Pt., F, 32d Georgia, age 32.	Dec. 16, 19, '64.	Left; circular. A. A. Surg. R. L. McClure. To Provost Marshal May 6, 1865.
166	Piggott, M., Capt., F, 66th Illinois, age 29.	May 14, June 5, 1864.	Right; flap. Ass't Surg. T. A. McGraw, U. S. A. Discharged January 24, 1865.
167	Pitts, R., Pt., F, 76th New York, age 26.	July 2, 16, '63.	Left; anterior posterior flap. Discharged August 26, 1864.
168	*Pollard, J.*, Capt., H, 9th Virginia Cavalry.	June 24, J'y 4,'64.	——. Surg. J. G. Dudley, P. A. C. S. Recovered.
169	Poole, C. H., Pt., G, 39th Massachusetts, age 18.	May 5, 26, '64.	Left; circular; gangrene. Surg. D. W. Bliss, U. S. V. Disch'd Dec. 17, 1864. *Spec.* 2354.
170	Porter, H. M., Pt., H, 11th Infantry.	July 2, 9, '63.	Left; flap. Ass't Surg. W. R. Ramsay, U. S. A. Transferred to regiment Sept. 12, 1864.
171	Potts, J., Pt., H, 123d Pennsylvania.	Dec. 13, 28, '62.	Left. Discharged March 9, 1863. *Spec.* 981.
172	Price, J. W., Corp'l, I, 20th Conn., age 24.	July 3, Aug. 1, 1863.	Left; post. flap. Surg. H. Janes, U. S. V. Nov. 9, re-amp. at junc. of middle and upper thirds, flap method. Disch'd June 24, 1864.
173	Pust, H., Pt., K, 104th Illinois, age 25.	Dec. 7, 11, '62.	Left; flap. Surgeon R. F. Dyer, 104th Illinois. Anchy. of knee. Oct. 24, 1863, amp. thigh, mid. third. Disch'd March 4, 1864.
174	Reece, B., Pt., K, 49th Illinois.	April 7, 13, '62.	Right; flap. Discharged July 7, 1862.
175	Reynolds, J., Serg't, C, 6th Michigan Cavalry, age 30.	July 14, 17, '63.	Right; flap. June 12, 1864, removal of necrosed end of tibia. Discharged October 26, 1864.
176	*Richardson, J. M.*, Pt., H, 35th Mississippi.	Oct. 4, 21, '62.	Right. Surg. S. L. Nidet, C. S. A. Recovered.
177	Richardson, O., Serg't-Maj., 7th Minn., age 31.	July 13, 31, '64.	Left; circular. A. A. Surg. J. A. Edmonson. Disch'd April 10,'65.
178	Rigor, D., Pt., H, 36th Indiana, age 26.	Sept. 19, 28, '63.	Left; flap. Discharged September 21, 1864.
179	Rinard, C. B., Pt., K, 4th Iowa Cavalry, age 15.	July 15, 21, '64.	Left; circular. A. A. Surg. A. Sterling. Discharged September 1, 1865.
180	Ritzert, P., Pt., K, 100th New York.	July 18, 22, '63.	Right; circular. Surg. D. Merritt, 55th Penn. Discharged December 22, 1863.
181	*Roberts, D. R.*, Pt., B, 3d South Carolina, age 33.	Nov. 30, Dec. 29, 1864.	Right; anterior posterior flap. A. A. Surg. W. Vance. Trans. to Provost Marshal March 7, 1865.
182	Roberts, M. S., Pt., B, 5th Maine, age 23.	May 3, 7, '63.	Left. Confed. surgeon. Disch'd March 15, '64. *Spec.* 6694.
183	Robinson, R. R., Gov't employé, age 24.	Feb. 20, 26, '65.	Right; circular. Surgeon J. H. Phillips, U. S. V. Recovery.
184	Rodenhoffer, L., Pt., A, 117th Penn., age 18.	June 18, July 13, 1864.	Left; circular; gangrene. A. A. Surg. T. L. Van Norden. Discharged March 24, 1865.
185	Ryan, J., Pt., H, 20th Connecticut, age 39.	May 3, 6, '63.	Right; anterior post. flap. Confederate surgeon. Discharged June 30, 1865.
186	*Ryan, V.*, Pt., D, 1st Arkansas.	Sept. 20, 24, '63.	Right. Surgeon — Sizemore, C. S. A. Recovered.
187	Sanders, I. J., Pt., E, 31st Illinois.	Nov. 7, 10, '61.	Right. Surgeon T. Sim, U. S. V. Discharged August 2, 1862.
188	Scarberry, J., Pt., D, 91st Ohio, age 19.	May 9, 26, '64.	Left; flap. A. A. Surg. W. W. Mills. Disch'd July 30, 1864.
189	Scism, J., Pt., L, 2d Missouri S. M. Cavalry, age 18.	Oct, 25, Nov. 2, 1864.	Left; anterior posterior flap. A. A. Surg. J. H. Page. Necrosis. Discharged June 11, 1865.
190	Scott, C. L., Serg't, E, 154th New York.	May 3, 19, '63.	Right. Surg. R. Thomain, 29th New York. Discharged Nov. 4, 1863. *Spec.* 1544.
191	Seligar, A., Pt., A, 43d Illinois, age 27.	April 7, 17, '62.	Left; flap. A. A. Surg. O. Blanck. Discharged October 7, 1862.
192	Sercey, W., Colored fireman, Steamer, age 25.	Nov. 1, —, '64.	Left; anterior posterior flap. Duty January 28, 1865.
193	Shaffer, F., Capt., I, 73d Pennsylvania, age 26.	Nov. 25, De.11,'63.	Left. Surg. B. L. Hovey, 136th N. Y. Resigned July 5, 1864.
194	*Shell, M. C.*, Serg't, C, 31st Miss., age 32.	Nov. 30, Dec. 26, 1864.	Left; anterior posterior flap. A. A. Surg. T. Morrison. Trans. to Provost Marshal March 7, 1865.
195	Shewalter, C. W., Pt., G, 8th Tenn. Cavalry.	April 12, 16, '65.	Left; flap. Discharged August 11, 1865.
196	Shute, W. A., Pt., I, 13th Massachusetts, age 31.	Aug. 30, Sept. 2, 1862.	Left; double flap. Surgeon J. Jamison, 86th New York. Discharged June 4, 1863.
197	Skigell, I., Pt., M 2d N. Y. H'vy Art'y, age 22.	April 7, 18, '65.	Right; circ. Discharged July 29, 1865.
198	Slack, R., Pt., B, 100th New York, age 27.	May 3, 13, '64.	Right; anterior post. flap. Ass't Surg. W. D. Murray. 100th N. Y. Discharged December 26, 1864.
199	Smith, C. W., Pt., D, 10th West Virginia, age 21.	July 3, 29, '64.	Left; single flap. Surg. F. H. Gross, U. S. V. Discharged March 18, 1865.
200	Smith, G., Pt., K, 81st New York, age 26.	June 3, 13, '64.	Right; anterior post. flap. Surg. A. T. Sheldon, U. S. V. Discharged January 6, 1865.
201	Smith, G. W., Pt., F, 76th New York, age 20.	July 1, 5, '63.	Left; circular. Surgeon J. H. Beach, 24th Mich. Discharged May 20, 1864. *Spec.* 4318.
202	Snyder, P., Pt., E, 151st Pennsylvania, age 21.	July 1, 7, '63.	Left; circular. Discharged July 27, 1863.
203	Sparks, M. G., Serg't, I, 10th New Jersey, age 25.	April 2, 13, '65.	Right; ant. post. skin flap. A. A. Surg. Z. P. Denneler. (April 2, 1865. excis. of fibular portion of ankle.) Disch'd Feb. 2, 1866.
204	Speelman, B., Pt., K, 98th Ohio, age 20.	Sept. 20, 24, '63.	Left; flap. Confederate surgeon. Discharged January 31, 1865.
205	*Sprauer, H.*, Lieut., F, 2d Louisiana.	May 27, 31, '63.	Right. Surgeon J. B. G. Baxter, U. S. V. Disch'd July 31, 1863.
206	Steenis, P., Pt., E, 6th Wisconsin, age 23.	Sept. 14, 30, '62.	Left; anterior post. flap. A. A. Surg. W. W. Keen. Discharged Jan. 23, 1864. *Specs.* 791, 3833.
207	Steinbaus, F., Pt., H, 26th Wisconsin.	July 1, 12, '63.	Right; flap. Discharged May 14, 1864.
208	Steinmetz, W., Pt., F, 8th New York.	June 8, 25, '62.	Right. Ass't Surg. T. H. Legler, 8th New York. Discharged December 12, 1863.
209	Sterritt, J., Pt., C, 119th Pennsylvania, age 38.	May 10, 14, '64.	Left; skin flap and circ. section of musc. A. A. Surg. O. P. Sweet. Disch'd Aug. 7,'65. *Spec.* 2284.
210	*Stevens, T. M.*, Serg't, B, 45th N. C., age 21.	July 3, 6, '63.	Right. Surgeon J. R. Raine, 45th N. C. Erysipelas. Exchanged November 12, 1863.
211	Stief, P., Pt., K, 139th New York, age 30.	July 30, Aug. 14, 1864.	Right; flap. A. A. Surg. S. J. Holley. (Excision 3 ins. shaft of tibia.) Disch'd June 19, 1865.
212	*Stigall, R.*, Corp'l, G, 1st Florida.	Jan. 2, —, '63.	Left. Surgeon C. J. Walton, 21st Kentucky. Recovered.
213	Stilts, A., Pt., I, 4th New Jersey.	Sept. 14, 21, '62.	Left; circ. Surg. L. W. Oakley, 2d N. J. Disch'd Jan. 3, 1863.
214	Stone, E. W., Corp'l, A, 21st Massachusetts.	Mar. 14, April 6, 1862.	Right; circular. Surg. George Derby, 23d Mass. Discharged February 17, 1863.
215	Storke, L., Pt., A, 72d New York.	July 1, 23, '62.	Left. Discharged.
216	Strayer, L., Serg't, A, 210th Pennsylvania.	April 1, 14, '65.	Right; flap. Discharged August 4, 1865.
217	Sullivan, J., Corp'l, F, 40th New York.	Aug. 30, Sep.7,'62.	Right. Discharged August 11, 1863.
218	Sullivan, P. T., Pt., A, 1st Mass. Heavy Artillery, age 38.	June 16, July 9, 1864.	Right; anterior post. flap. A. A. Surg. J. M. Boisnot. Discharged June 13, 1865.
219	*Swing, H.*, Pt., A, 1st Louisiana.	May 3, 9, '63.	Left. Surgeon — Bratton, C.S.A. Recovered.
220	Terry, J. D., Serg't, E, 23d Massachusetts.	Mar. 14, 22, '62.	Left; circular. Surg. S. E. Stone, 23d Mass. Disch'd July 7, 1863.
221	Texter, G., Corp'l, I, 7th New York Artillery, age 27.	June 16, 25, '64.	Left; circular. Surg. W. Watson, 105th Penn. Discharged July 14, 1865. *Specs.* 818, 3081.
222	Thomas, F. M., Serg't, I, 8th Iowa Cav., age 22.	July 30, Au. 4,'64.	Left; lateral flap. Discharged July 14, 1865.
223	Thompson, B., Pt., C, 28th Pennsylvania, age 33.	Sept. 17, Oct. 4, 1862.	Right; flap; gang.; erysipelas. April 14, 1863, circ. amp. thigh, lower third. Discharged May 6, 1863. *Specs.* 3883, 3965.
224	*Todd, J. C.*, Capt., A, 14th Alabama.	May 3, 15, '63.	Right. Ass't Surg. W. C. Goodwin, C. S. A. Discharged January 14, 1865.
225	Toomey, J. J., Pt., A, 29th Pennsylvania, age 21.	May 15, 31, '64.	Left; circular. Ass't Surg. M. C. Woodworth, U. S. V. (May 15, excis. lower third fib.) Disch'd July 2, 1865. *Spec.* 5361.
226	Trapp, D., Pt., E, 125th New York, age 32.	June 18, July 2, 1864.	Left; circular. Surgeon A. F. Sheldon, U. S. V. Discharged June 8, 1865.
227	*Trausdale, W. F.*, Lieut., E, 7th Alabama Cav.	May 14, 27, 64.	Left. Surg. W. F. Westmoreland, P. A. C. S. Recovered.
228	Travis, J. A., Serg't, D, 86th N. York, age 26.	May 3, 20, '63.	Right. Ass't Surg. C. C. Byrne, U. S. A. (Hæmorrhage.) Discharged March 28, 1864.
229	Truckey, P., Pt., G, 14th Indiana.	Sept. 17, 25, '62.	Right. A. A. Surg. J. C. Douglas. Discharged March 4, 1863.
230	Tryon, L. J., Corp'l, K, 81st New York, age 21.	June 2, 11, '64.	Left; ant. post. flap. Surg. N. R. Moseley, U. S. V. Discharged September 30, 1864. *Spec.* 203.
231	Tucker, J. G., Pt., K, 20th Michigan, age 22.	June 18, July 8, 1864.	Right; circ. A. A. Surg. A. F. A. King. Disch'd April 4, 1865. *Spec.* 2826.
232	Upright, G. T., Pt., B, 8th Ohio, age 21.	July 2, 23, '63.	Right; circ. A. A. Surg. A. A. Hamilton. Disch'd May 9, 1864.
233	Van Gundy, J., Pt., K, 4th Iowa, age 18.	Mar. 3, Apr.1,'62.	Right; flap. Discharged January 28, 1863.
234	*Walker, J.*, Pt., Carpenter's Battery.	May 25, 29, '62.	Left. Surg. W. H. Baldwin, C. S. A. Recovered.
235	Ward, A. S., Serg't, C, 107th N. York, age 22.	May 3, 8, '63.	Right. Surg. H. E. Goodman, 28th Penn. Disch'd July 27, '63.
236	*Ware, E. S.*, Serg't, C, 19th Virginia, age 25.	July 3, 6, '63.	Left. Surgeon C. S. Wood, 66th New York. Exchanged Nov. 12, 1863.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
237	Watson, W., Pt., E, 7th Michigan, age 24.	May 15, 21, '64.	Right; flap; gangrene. Disch'd December 29, 1864. *Spec.* 4540.
238	Weaver, J., Pt., C, 154th New York.	Mar. 1, 12, '65.	Left; circular. A. A. Surg. E. L. Mola. Disch'd June 15, 1865.
239	Webster, E. H., Pt., I, 98th Illinois, age 26.	Sept. 19, 24, '63.	Right; anterior post. flap. Surg. S. B. Hawley, 35th Ill. Discharged April 26, 1864.
240	Welker, C., Pt., K, 9th Michigan.	July 12, 15, '62.	Right; flap. Surgeon C. Smith, 9th Michigan. Discharged November 29, 1862.
241	Welsh, J., Pt., H, 61st New York, age 26.	Sept. 17, 29, '62.	Right. Surg. H. S. Hewit, U.S.V. Gangrene. Disch'd July 23, '63. Died May 4, 1868. *Spec.* 402.
242	Welsh, M., Pt., I, 154th New York.	May 3, 25, '63.	Right. Surg. S. N. Sherman, 34th New York. Discharged March 3, 1864. *Spec.* 1550.
243	Weston, W. P., Pt., H, 64th Ohio.	De.31, '62, Ja. 12, '63.	Left; flap. Discharged May 11, 1863.
244	Wheeler, H., Ordinary Seaman, U.S.N., age 23.	Jan. 15, 30, '65.	Left. Dr. H. N. Adams, U. S. N. Discharged October 13, 1865.
245	[1] *Whitaker, J. F.*, Pt., K, 8th Tenn., age 26.	May 16, J'e 12, '64.	Right; circular. June 30, 1864, improving.
246	*Whitesel, J. W.*, Serg't, B, 19th Virginia, age 25.	July 3, 6, '63.	Left; circular. Surg. — Chase, C. S. A. Transferred for exchange November 12, 1863.
247	Wicand, J., Pt., B, 47th Pennsylvania.	Oct. 22, 25, '62.	Right; posterior flap. Discharged December 3, 1862. *Spec.* 687.
248	*Wildman, E. S.*, Lieut., G, 28th Virginia, age 35.	July 2, 7, '63.	Right. Surg. — Given, C. S. A. To Provost Marshal Sept. 25, '63.
249	Willburn, R., Pt., A, 81st Illinois.	May 22, 26, '63.	Right. A. Surg. H. M. Sprague, U. S. A. Discharged August 22, 1863. *Spec.* 1628.
250	Willetts, J. F., Pt., B, 1st New Jersey, age 22.	June 1, 7, '64.	Right; circular. Surg. E. Bentley, U. S. V. Gangrene. Disch'd June 8, 1865. Died Dec. 10, '66.
251	William, J., Pt., E, 118th New York, age 19.	May 16, June 9, 1864.	Right; flap. Surg. — Gibbs, C. S. A. Disch'd May 27, 1865. Re-amp. in up. third Dec., 1865.
252	Wilson, G., Pt., B, 18th Missouri.	April 5, 26, '62.	Left; flap. Surgeon S. B. Houts, 18th Mo. Disch'd July 15, 1862.
253	Wilson, L. F., Corp'l, K, 88th Pennsylvania.	Sept. 17, 21, '62.	Left; flap. Ass't Surg. W. M. Notson, U. S. A. Discharged February 19, 1863.
254	Yost, S. R., Pt., A, 28th Pennsylvania, age 24.	Sept. 17, Oct. 5, 1862.	Left; anterior post. flap. Ass't Surgeon C. P. Russell, U. S. A. Disch'd March 19, '63. *Spec.* 810.
255	Young, W., Pt., F, 7th Indiana.	Aug. 9, 12, '62.	Left; flap. Discharged November 19, 1862.
256	*Zant, J. H.*, Pt., A, 37th Georgia.	Nov. 25, De.18, '63.	——. Surgeon G. M. McDowell, C. S. A. Recovered.
257	Zerger, J., Pt., B, 53d Pennsylvania.	June 1, 5, '62.	Left; circular. Subsequent amputation. Disch'd Nov. 7, 1864.
258	Zook, C., Pt., C, 8th Pennsylvania, age 19.	Dec. 13, 21, '62.	Right; anterior post. flap. A. A. Surgeon A. W. Tryon. Disch'd Nov. 15, 1863. *Specs.* 650, 1596.
259	Andrews, J., Pt., C, 5th Artillery, age 19.	Dec. 13, 20, '62.	Left; flap. Surgeon E. Bentley, U. S. V. Died December 30, 1862; pyæmia. *Spec.* 599.
260	Apgar, J., Pt., A, 15th New Jersey.	May 2, 16, '63.	Right; anterior post. flap. A. A. Surg. C. Carvallo. (Ball extr.; gangrene.) Died May 20, 1863; exhaustion. *Specs.* 1251, 2226.
261	Bambauer, J., Musician, H, 56th New York, age 22.	Nov. 30, Dec. 20, 1864.	Right; lateral flap. Ass't Surg. J. F. Huber, U. S. V. (Dec. 2, excision tarsus.) Died December 26, 1864; pyæmia.
262	Barber, W. B., Serg't, I, 93d New York, age 32.	May 23, 30, '64.	Right; anterior post. flap. Surg. A. F. Sheldon, U. S. V. Died June 11, 1864; gangrene.
263	Baxter, F., Pt., D, 1st Potomac Home Brig.	July 2, 5, '63.	Right; flap. Died July 26, 1863.
264	Berry, J., Pt., B, 39th Illinois, age 38.	Aug. 16, 21, '64.	Left; circular. A. A. Surg. S. J. Holley. Died September 4, '64; irritative fever.
265	Bigelow, L., Corp'l, B, 13th Massachusetts.	Aug. 30, —, '62.	——. Died October 18, 1862.
266	Biggs, M. L., Corp'l, A, 53d Kentucky, age 20.	April 30, May 12, 1865.	Left; flap. Surg. N. Gay, U.S.V. Died June 17, 1865; exhaustion.
267	Biornson, C., Pt., C, 2d Conn. H. Art., age 33.	June 1, 14, '64.	Left; flap. A. A. Surgeon S. B. Ward. Died June 18, '64; gang.
268	Blanchard, E. W., Pt., H, 45th Penn., age 16.	June 3, 16, '64.	Left; circular. Surg. E. Bentley, U. S. V. Died June 20, 1864; tetanus. *Spec.* 2710.
269	Blodgett, E. J., Pt., E, 6th New Hampshire, age 22.	May 6, 26, '64.	Left; anterior post. flap. Surg. A. Delany, U. S. V. Died May 30, 1864; exhaustion.
270	*Blois, E.*, Lieut., C, 18th Georgia, age 24.	April 6, 27, '65.	Left; circular. A. A. Surg. J. P. Arthur. (Also w'nd left thigh. Erysipelas.) Died May 4, 1865; exhaustion.
271	Bolt, S., Pt., A, 77th Illinois, age 25.	May 22, June 3, 1863.	Right. A. Surg. H. M. Sprague, U. S. A. Died June 21, 1863; pyæmia. *Spec.* 1633.
272	*Bourn, W. I.*, Pt., F, 12th Georgia, age 30.	July 9, 13, '64.	Right; circular. A. A. Surg. T. E. Mitchell. Died August 12, 1864; diarrhœa.
273	Boylan, A., Pt., E, 35th New York.	Aug. 30, Se. 10, '62.	Right. A. A. Surgeon W. Eddy. Died October 12, 1862. *Spec.* 61.
274	Bradbury, G. W., Corp'l, A, 98th Illinois.	Sept. 19, Oc. 16, '63.	Left. Died November 1, 1863; secondary hæm. and pyæmia.
275	*Bullen, H. W.*, Lieut., Darden's La. Battery.	Nov. 30, Dec. 30, 1864.	Right; lateral flap. A. A. Surg. R. McNeily. Tetanus. Jan. 6, 1865, amp. thigh, lower third. Died January 7, 1865; tetanus.
276	Bumpus, M., Pt., A, 5th Maine, age 29.	May 10, 24, '64.	Right; ant. skin flap and post. musc. flap. Surg. A. F. Sheldon, U. S. V. (May 19, lig. of ant. tibial artery for secondary hæm. Diarrhœa; pyæmia.) Died May 29, 1864; toxæmia.
277	*Burton, J. M.*, Serg't; G, 1st Tenn. Artillery, age 38.	Mar. 7, 20, '65.	Left; anterior post. flap. Surg. B. B. Breed, U. S. V. Gangrene. Died March 26, '65; exhaustion.
278	Butters, T. S., Corp'l, I, 2d Mass., age 22.	July 3, 17, '63.	Right. July 21, hæmorrhage; diphtheria. Died July 31, 1863.
279	Buxton, G. W., Corp'l, A, 2d Massachusetts.	Aug. 9, 15, '62.	Left. A. A. Surg. O. F. Scheldt. Diarrhœa. Died Aug. 31, 1862; pyæmia. *Spec.* 43.
280	Castle, E. W., Pt., D, 2d Conn. Heavy Artillery, age 20.	April 6, 18, '65.	Left; posterior flap. Surgeon B. A. Vanderkieft, U. S. V. Died April 23, 1865. *Spec.* 4100.
281	Caughey, L., Lieut., C, 16th Pennsylvania Cavalry, age 23.	July 28, Aug 15, 1864.	Right; circular. Surgeon A. B. Mott, U. S. V. Diarrhœa. Died August 23, 1864.
282	Cavaugh, G., Pt., I, 10th New York.	Aug. 30, Sept. 5, 1862.	Left. Ass't Surgeon B. Howard, U. S. A. Died September 13, 1862; pyæmia.
283	Cave, W. M., Pt., E, 18th Indiana, age 22.	Oct. 19, Nov. 9, 1864.	Left; lat. skin flap and circ. sect. musc. A. A. Surg. C. H. Jones. Died Nov. 21, '64; exhaustion.
284	Cearfas, G. W., Pt., D, 100th Penn.. age 30.	May 12, June 10, 1864.	Right; lateral flap. Chills. Died June 22, '64.
285	Chase, C. B., Pt., G, 7th Maine.	Sept. 17, Oct. 11, 1862.	Left; circular. Ass't Surg. J. H. Searle, 26th N. Y. Died Oct. 30, 1862; pyæmia. *Spec.* 770.
286	Clark, E. J., Pt., I, 8th Michigan, age 36.	May 10, June 4, 1864.	Left; circular. Surg. A. F. Sheldon, U. S. V. June 6, hæm.; lig. ant. tib. art. Died June 16, 1864; secondary hæmorrhage.
287	Clock, C. H., Pt., G, 10th Connecticut, age 23.	Aug. 16, 26, '64.	Right; circular. Ass't Surg. C. Wagner, U. S. A. Died September 11, 1864; exhaustion. *Spec.* 3707.
288	Covil, G. B., Serg't, H, 11th Conn., age 32.	June 3, 10, '64.	Right; circ. Surg. N. R. Moseley, U. S. V. June 13, hæm. Died June 14, 1864; secondary hæmorrhage. *Spec.* 2485.
289	Craig, W., Pt., E, 74th Illinois.	Nov. 25, 28, '63.	Right; flap; hæm.; lig. of post. tib. art. Dec. 4, re-amp. in upper third. Died Dec. 11, 1863.
290	Crowter, J. D., Pt., D, 4th N. Y. Heavy Artillery, age 24.	April 2, 23, '65.	Right; circular. Ass't Surg. W. F. Norris, U. S. A. Died May 7, 1865; pyæmia. *Spec.* 226.
291	Despond, F., Pt., A, 5th Michigan.	June 17, 20, '64.	Left. Died June 22, 1864.
292	Detrich, C., Pt., K, 82d Ohio.	Aug. 29, Sept. 18, 1862.	Left. Ass't Surg. B. A. Clements, U. S. A. Died Oct. 28, 1862; pyæmia. *Spec.* 62.
293	Dowling, J. T., Lieut., 17th Infantry, age 35.	May 10, 20, '64.	Right; circular. Med. Insp. F. H. Hamilton. Died June 1, 1864; pyæmia.
294	Eastman, C. E., Pt., E, 9th Maine.	July 18, 23, '63.	Left. Surg. D. Merritt, 55th Penn. Hæm. July 25, lig. of peroneal artery. Died August 8, 1863.
295	Evans, A., Pt., E, 1st Illinois Artillery, age 27.	Mar. 12, April 4, 1864.	Right. A. A. Surg. A. Sterling. Died May 6, 1864; typhoid fever and pyæmia.
296	Faust, J., Pt., H, 119th Pennsylvania, age 24.	May 2, 17, '63.	Right. A. Surg. C. C. Lee, U.S.A. Died May 19, 1863. *Spec.* 1250.
297	Frampton, T. H., Pt., G, 22d Mass., age 18.	May 22, 30, '64.	Left; rectangular flap. A. A. Surg. R. Ottman. Died June 9, 1864; exhaustion. *Spec.* 2474.
298	Fuller, J. P., Pt., F, 4th Michigan, age 35.	May 5, 12, '64.	Left. Died June 21, 1864.
299	*Gammel, M. A.*, Pt., G, — Arkansas, age 23.	Sept. 17, 30, '62.	Left; gangrene. Died December 5, 1862.
300	Gibney, J., Pt., L, 2d N. York Heavy Artillery, age 18.	June 16, —, '64.	Right. Ass't Surgeon F. Wolf, U. S. V. Died July 16, 1864. *Spec.* 2419.
301	Gilmore, J., Pt., F, 144th New York.	Feb. 10, 22, '65.	Right; anterior flap. A. A. Surg. E. L. Mola. (Erysipelas.) Died February 28, 1865.
302	Grace, E. C., Lieut., A, 139th Penn., age 24.	May 5, 20, '64.	Right; circular. Med. Inspector F. H. Hamilton, U. S. A. Died June 5, '64; pyæmia. *Spec.* 4545.
303	Granger, B., Pt., K, 1st Penn. Rifles.	Aug. 29, '62. Int.	Left. Died October 2, 1862.

[1] O'KEEFE (D. C.), *Surgical Cases of Interest treated at Institute Hospital, Atlanta, Ga., May and June*, 1864, in *Confederate States Medical and Surgical Journal*, Richmond, 1865, Vol. II, p. 28.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
304	Grover, J. C., Corp'l, M, 1st Massachusetts H'vy Artillery, age 20.	June 18, July 10, 1864.	Right; circ. A. A. Surg. A. J. Smith. Gangrene. Died July 15, 1864; exhaustion.
305	Harris, A. F., Corp'l, G, 52d New York, age 37.	June 16, 19, '64.	Right; double flap. Died June 29, 1864; pyæmia.
306	Havens, W., Pt., K, 7th New York Heavy Artillery, age 29.	June 25, July 19, 1864.	Right. A. A. Surgeon W. H. B. Post. (June 25, amp. 2d and 3d toes; gangrene. July 14, Pirogoff's amputation.) Died July 21, 1864; exhaustion.
307	[1] Heakin, J., Pt., D, 6th Cavalry, age 24.	May 31, June 8, 1864.	Right; short ant. and long post. flap. Surg. J. A. Lidell, U. S.V. (Hæmorrhage.) Died June 21, 1864; pyæmia. *Spec.* 2470.
308	Jordan, W., Pt., D, 1st Alabama Artillery, age 27.	April 12, 15, '64.	Left; ant. post. flap. Surg. H. Wardner, U. S. V. (Also w'nds of head left humerus, left arm, and right thigh.) Died April 23, 1864; pyæmia. *Specs.* 3311, 3312.
309	Keegan, T. F., Pt., B, 73d New York, age 20.	July 3, 12, '63.	Left. Died August 1, 1863; exhaustion. *Spec.* 1450.
310	Kensey, R. C., Pt., K, 104th Pennsylvania.	June 1, 8, '62.	Right; sloughing; hæmorrhage. June 14, femoral artery tied. Died June 14, 1862.
311	[2] Kroft, J., Pt., D, 7th New York, age 33.	Sept. 16, Oct. 8, 1864.	Left; circular. A. A. Surg. J. S. Waggoner. Nov. 16, re-amputation. Died November 16, 1864; effects of anæstbetic.
312	Lahser, A., Pt., I, 24th Michigan, age 20.	May 23, June 9, 1864.	Right. Surgeon G. L. Pancoast, U. S. V. Died June 18, 1864. *Spec.* 2464.
313	Lannahan, J., Pt., H, 9th N. Y. Heavy Artillery, age 20.	Oct. 19, Nov. 7, 1864.	Left; circular. A. A. Surg. R. H. Stirling. (Gangrene.) Died December 5, 1864; pyæmia.
314	Laveve, D., Pt., F, 5th New York, age 24.	June 2, 19, '64.	Right. A. A. Surg. W. H. Randolph. (Erysipelas.) Died June 27, 1864; asthenia.
315	McClellan, J., Pt., I, 40th Ohio, age 19.	May 15, June 4, 1864.	Left; circular. A. A. Surgeon H. C. May. Sloughing. Died June 23, 1864; exhaustion.
316	McClure, R., Pt., K, 82d Pennsylvania, age 37.	April 1, 17, '65.	Right; circular. A. A. Surg. A. V. Cherbonnier. Died July 3, 1865; dysentery. *Spec.* 4103.
317	McCoy, G., Pt., E, 62d Pennsylvania.	Jan. 23, Feb. 12, 1864.	Left; circular. A. A. Surg. W. F. Peck. Died February 26, 1864; pyæmia.
318	McGeough, M., Lieut., H, 1st Sharpshooters, age 30.	May 7, 17, '64.	Left; circular. A. A. Surg. J. C. McGee. Died May 22, 1864; pyæmia. *Spec.* 2275.
319	McMillen, J., Pt., K, 86th Illinois, age 23.	July 10, 17, '64.	Left; circular. Died August 17, 1864; exhaustion.
320	McMullen, G., Lieut., C, 110th Ohio, age 34.	July 9, 21, '64.	Left; circular. A. A. Surg. J. H. Bartholf. Died Aug. 21, 1864.
321	Madris, J., Pt., C, 33d Indiana, age 35.	July 20, Aug. 13, 1864.	Right; ant. post. flap. Ass't Surg. W. B. Trull, U.S.V. Died Aug. 29, 1864; irritative fever.
322	Magoon, J. B., Pt., A, 33d Mass., age 42.	June 22, July 15, 1864.	Left; ant. post. flap. Ass't Surg. B. E. Fryer, U.S.A. Died July 18, 1864; pyæmia.
323	*Martin, P.*, Pt., F, 18th Louisiana, age 32.	April 7, 16, '62.	——; erysipelas. Died April 25, 1862; mortification of leg.
324	Mayne, R., Pt., K, 6th Vermont, age 20.	May 5, 29, '64.	Right. Surg. Z. E. Bliss, U. S.V. (May 22, rem. of ball and fragments of bone; erysipelas.) Died June 2, 1864.
325	Miller, A. L., Pt., D, 121st New York, age 23.	May 11, 17, '64.	Left flap. A. A. Surgeon W. E. Clark. Died May 23, 1864; pyæmia.
326	Miller, L., Pt., 18th Ohio Battery, age 19.	De.16,'64, Jan. 8,'65.	Right; flap. A. A. Surg. F. G. Albright. Died Jan. 18, 1865.
327	Moore, C., Pt., E, 1st R. I. Light Art'ry, age 38.	May 3, 12, '63.	Left. Died June 30, 1863.
328	Morrison, D., Pt., A, 11th Maine.	May 31, June 29, 1862.	Left. A. A. Surg. F. H. Brown. (Also wound of right femur.) Died July 25, '62; tuberculosis. *Spec.* 13.
329	Mullen, E., Pt., D, 5th N.Y. H'vy Art., age 25.	July 18, 24, '64.	Left; flap. Ass't Surg. J. Willard, 1st Md. Died July 28, 1864.
330	Musser, W., Pt., I, 83d Pennsylvania, age 22.	July 1, 8, '62.	Right; flap. Ass't Surgeon J. S. Billings, U. S. A. Gangrene; diarrhœa. Died July 15, 1862.
331	*Neil, J. P.*, Pt., G, 14th South Carolina, age 18.	April 2, 9, '65.	Left. A. A. Surg. J. M. Hotaling. Died April 20, 1865; diarrhœa.
332	Nicholson, J., Corp'l, C, 40th Penn., age 27.	April 2, 22, '65.	Right; circular. A. Surgeon F. E. Martindale, U. S. V. Died April 24, 1865.
333	Nixon, W., Pt., H, 20th Illinois.	June 17, July 6, 1864.	Right. Surg. G. F. French, U.S.V. (Hæmorrhage); diarrhœa. Died Aug. 19, '64; exh'n. *Spec.* 3382.
334	Norton, A. L., Corp'l, D, 14th Conn., age 29.	June 3, 6, '64.	Left. Died June 29, 1864; pyæmia.
335	O'Harran, P., Pt., A, 52d New York, age 40.	June 16, July 16, 1864.	Left; posterior flap. A. A. Surg. E. Seyffarth. Gangrene. Died July 25, 1864; pyæmia.
336	Parry, W., Pt., B, 5th Mich. Cavalry, age 33.	May 28, J'ne 6,'64.	Left. A. A. Surg. J. H. Thompson. Died June 15, 1864; pyæmia.
337	*Parsons, B. F.*, Lieut., G, 4th Georgia, age 22.	July 13, 18, '64.	Right. A. A. Surg. N. A. Robbins. Died July 30, 1864.
338	Patterson, A., Pt., K, 4th Maine, age 35.	Oct. 28, Nov. 13, 1861.	Left; circular. Ass't Surg. W. Thomson, U. S. A. Died Nov. 19, 1861; gangrene. *Spec.* 4926.
339	*Peed, J.*, Pt., A, 16th Kentucky, age 28.	Nov. 30, Dec. 15, 1864.	Left; circular. Surg. J. R. Ludlow, U. S. V. Died January 8, 1865; pyæmia.
340	Perkins, A. W., Pt., E, 11th Infantry, age 40.	May 8, 24, '64.	Left; circular. Ass't Surg. W. F. Norris, U.S.A. Hæmorrhage. Died June 1, 1864; pyæmia.
341	Piper, E. C., Serg't, K, 12th New Hampshire, age 28.	June 3, 29, '64.	Left; ant. post. flap. A. A. Surg. L. C. Dodge. Died August 8, 1864; chr. diarrhœa. *Spec.* 2715.
342	Pittman, N., Pt., D, 1st Massachusetts Heavy Artillery, age 32.	May 19, June 10, 1864.	Left; circular. A. A. Surgs. H. B. Knowles and M. F. Price. Died June 14, 1864; pyæmia.
343	Pitzel, A., Pt., E, 34th Ohio.	Sept. 10, 14, '62.	Left. Died September 16, 1862; tetanus.
344	*Pressgraves, J. R.*, Lieut., 8th Virginia.	July 2, 13, '63.	Left. Surgeon C. S. Wood, 66th New York. Died July 15, 1863; tetanus.
345	Reynolds, W., Corp'l, I, 6th N.Y. H. A., age 32.	May 31, J'e 15,'64.	Left. A. A. Surg. J. H. Thompson. Died July 6, 1864; pyæmia.
346	Ross, W. A., Pt., I. 123d Pennsylvania, age 18.	Dec. 13, 18, '62.	Right. Died January 4, 1863; diarrhœa. *Spec.* 677.
347	Schuler, C., Corp'l, C, 71st New York, age 23.	July 2, 13, '63.	Left; hæmorrhage. Died July 21, 1863; hæmorrhage.
348	Scott, E., Pt., G, 25th Ohio, age 18.	Nov. 30, Dec. 4, 1864.	Left; anterior posterior flap. A. A. Surgeon W. Balser. Died December 28, 1864; hectic fever.
349	Sharp, W., Pt., I, 8th N. York Heavy Artillery, age 21.	June 3, 7, '64.	Left; anterior flaps. Surg. F. F. Burmeister, 69th Penn. (Hæm.) Died July 12, 1864. *Spec.* 3204.
350	Sieker, H., Pt., K, 35th Ohio.	Sept. 19, 22, '63.	Left; sloughing. Died October 16, 1863.
351 152	Smith, P., Serg't, K, 69th New York, age 30.	Aug. 16, Sept. 6, 1864.	Both; circular. A. A. Surgeon J. H. Hutchinson. Sloughing; bed-sores. Died October 10, 1864; exhaustion. *Spec.* 3644.
353	Spiller, J. F., Corp'l, I, 7th New Hampshire, age 21.	Feb. 11, Mar. 6, 1865.	Right; lateral flap. A. A. Surg. B. B. Miles. Died March 13, 1865; pyæmia.
354	Steele, G. A., Serg't, K, 1st New Hamp. Cav.	Oct. 6, 9, '64.	Right; circular. Died November 12, 1864; gangrene.
355	Stilwell, C., Pt., K, 57th New York.	Sept. 17, Oct. 3,'62.	Left. Surg. H. S. Hewit, U. S.V. Died October 9, 1862. *Spec.* 762.
356	Temple, A., Serg't, F, 1st Missouri Cavalry, age 24.	Aug. 21, Sept. 6, 1864.	Right; circular. A. A. Surgeon C. A. Warner. Died September 20, 1864; pyæmia.
357	[3] Tillapaugh, G. W., Corporal, B, 151st N. Y., age 23.	May 31, June 6, 1864.	Right; circular. A. A. Surgeon C. H. Osborne. Died June 21, 1864; pyæmia.
358	Umbarger, J. W., Corp'l, I, 117th Illinois, age 30.	Dec. 5, 1864, Jan. 12, 1865.	Left. A. A. Surgeon H. M. Lilly. (Dec. 15, 1864, Chopart's amp. foot; gangrene.) Died January 14, 1865; pyæmia.
359	Vangeson, J., Corp'l, F, 4th Artillery, age 35.	Aug. 16, 23, '64.	Left; circular. A. A. Surg. S. J. Holley. Died September 2, '64; exhaustion.
360	Van Scoter, G., Pt., G, 5th New York.	Aug. 29, '62. Int.	Left. Died October 12, 1862.
361	Velie, G. W., Pt., C, 24th Michigan, age 28.	June 3, 28, '64.	Right; circular. Surgeon D. W. Bliss, U. S.V. (Excision ankle.) Gangrene. Died July 18, 1864.
362	White, A. J., Pt., A, 8th New York Heavy Artillery.	June 3, 9, '64.	Left; rectangular flap. Surg. E. Bentley, U.S.V. Flaps sloughed. Died July 10, 1864; exhaustion. *Specs.* 2497, 3340.
363	*Williamson, H.*, Pt., D, 11th Miss., age 20.	July 2, 5, '63.	Right; sloughing. Died February 18, 1864.
364	Witzel, J., Serg't, I, 1st Maryland, age 24.	Aug. 19, 22, '64.	Right; circular flap. Surg. A. A. White, 8th Maryland. Died September 16, 1864.
365	Wood, F., Serg't, A, 5th Michigan Cavalry, age 22.	Oct. 19, Nov. 7, 1864.	Right; anterior post. flap. Ass't Surgeon D. C. Peters, U. S. A. Died Nov. 18, 1864; pyæmia.
366	*Woolten, T.*, Pt., F, 32d Virginia.	Mar. 10, 14, '64.	——; flap. Surgeon C. B. Gibson, C. S. A. Died May 19, 1864.
367	Wright, B., Pt., G, 8th Michigan, age 23.	May 6, 27, '64.	Right; anterior post. skin flap. Surgeon A. F. Sheldon, U. S. V. Died June 11, 1864; exhaustion and typhoid condition.
368	Yagle, J. F., Pt., E, 87th Indiana, age 23.	Sept. 20, Oct. 5, 1863.	Left; circular (gangrene). Died October 14, 1863.

[1] Lidell (J. A.), *On the Wounds of Blood Vessels, etc.*, in *United States Sanitary Commission Memoirs*, New York, 1870, Surgical Vol. I, p. 23.

[2] Packard (John H.), *Death from Chloroform*, in *American Journal Medical Sciences*, 1865, Vol. XLIX, N. S., p. 272.

[3] Lidell (J. A.) (*Secondary Traumatic Lesions of Bone, etc.*, in *U. S. San. Comm. Mem.*. Surg. Vol. I, N. Y., 1870, p. 408) cites this case as an amputation in the thigh; but in his report of cases of pyæmia, at Stanton Hospital, for the second quarter, 1864, he designates the operation an amputation in the leg.

Intermediary Amputations in the Lower Third of the Leg for Shot Injury.—The number of the intermediary amputations in the lower third of the leg is three hundred and thirty-five; two hundred and fifteen were successful and one hundred and twenty fatal—a mortality of 35.8 per cent.

Recoveries after Intermediary Amputation in the Lower Third of the Leg.—The two hundred and fifteen operations of this group were performed on two hundred and fourteen patients—fifty Confederate and one hundred and sixty-four Union soldiers. Of the latter, one hundred and sixty-two have been allowed pensions; the claim of one soldier is still pending, and the name of another has never appeared on the Pension Rolls. Twelve have died since their discharge from the service—three of phthisis, one of softening of the brain, one of ulceration of the stump, six of causes not reported; one pensioner was accidentally drowned.

CASE 771.—Private O. Payne, Co. D, 20th Colored Troops, aged 19 years, was wounded in the right foot, near Petersburg, June 7, 1864, and entered Mount Pleasant Hospital, at Washington, three days afterwards. Assistant Surgeon C. A. McCall, U. S. A., reported: "Accidental gunshot wound through tendo-achillis, passing through the ankle joint and emerging almost at right angle with the line of entrance, literally grinding the astragalus and part of the os calcis. Sanguineous fluid was discharged from the wounds, and the foot became somewhat œdematous as far as above the malleoli. Two weeks after the patient's admission his pulse grew weaker, more compressible, and frequent, which was attended by loss of appetite and sleep. On June 27th, an anæsthetic consisting of equal parts of ether and chloroform was administered, and the leg was amputated by the circular method, by Acting Assistant Surgeon A. Transue, the bone being divided one and a half inches above the malleoli. The patient reacted finely, and after the operation his appetite improved, he slept well, and the parts looked favorable." On October 8th, he was transferred to hospital at New Albany, where a second operation was performed by Acting Assistant Surgeon W. A. Clapp, who contributed the following description of the case: "The patient stated that he contracted syphilis previous to being wounded. Extensive necrosis of the shafts of the tibia and fibula followed the first amputation, and the pain and discharge from the stump became so great as to necessitate a re-amputation, which was performed by the circular method, three inches below the knee, on March 18, 1865. At the time of the operation firm sequestra had formed and there was great swelling of the soft parts. The subsequent progress was favorable." The patient was ultimately discharged from service, at the Joe Holt Hospital, Jeffersonville, August 1, 1865, and pensioned, and one year afterwards he was furnished with an artificial limb of the Palmer patent. The bones removed at the second amputation were subsequently contributed to the Museum by Dr. T. W. Fry, late Surgeon U. S. V., who at the same time stated that the man was in good health and walking about on crutches, with a good stump, which had healed kindly. The specimen is numbered 4740 of the Surgical Section, and is represented in PLATE LXXII, FIGURE 1, opposite page 317, *ante*. The pensioner was paid March 4, 1880.

FIG. 305.—Lower extremities of bones of left leg; the ball lodged in tibia. *Spec.* 4054.

CASE 772.—Private L. Vermilyea, Co. K, 91st New York, aged 21 years, was wounded at Gravelly Run, March 31, 1865. He was conveyed to the field hospital of the 3d division, Fifth Corps, whence Surgeon A. S. Coe, 147th New York, reported "a bullet wound with fracture of left ankle joint." Surgeon A. F. Sheldon, U. S. V., reported the following description and result of the injury: "A musket ball entered the lower extremity of the tibia anteriorly, fracturing it into the joint and upwards for four inches. The wounded man was admitted to Campbell Hospital at Washington, six days after the injury. Suppuration set in about the wounded foot and extended to the muscle of the calf and the patient suffered considerable fever and irritation of the system. On April 11th, circular amputation of the lower third of the leg was performed by Assistant Surgeon A. Delany, U. S. V., the operation being attended with the usual amount of hæmorrhage and three ligatures being applied. Anæsthesia was produced by sulphuric ether. The patient did well after the operation, and was discharged from service June 19, 1865." Several months later he was furnished with an artificial limb by the Salem Leg Company. The amputated portions of the bones of the leg (*Spec.* 4054) were contributed to the Museum by the operator and are represented in the annexed wood-cut (FIG. 305), showing the tibia to be fractured by a round ball, which is lodged just above the ankle, fissuring into it. In his first application for commutation, dated 1870, the pensioner represented the stump as being in a sound condition, but in subsequent statements he reported it as troublesome. The Albany Examining Board, on February 5th, 1879, certified to the amputation, and stated that "the stump is tender and abscesses occasionally form on the posterior aspect of the leg, more especially if an artificial limb is worn for a few weeks at a time. The pensioner also states that he has neuralgic pains and is now and then laid up for from one to three weeks." The pensioner was paid June 4, 1880.

CASE 773.—Private T. B. Stewart, Co. C, 2d Connecticut Heavy Artillery, aged 31 years, was wounded, at Opequan Creek, September 19, 1864, and admitted to the Depot Field Hospital at Winchester three days afterwards. Surgeon R. Sharpe, 15th New Jersey, in charge, recorded the following history: "The injury consisted of a shot wound of both feet by a shell, severely fracturing and comminuting all the tarsal bones. On September 23d the right leg was amputated, and on the following day the left leg was amputated, both by circular operation, at the lower third, by Assistant Surgeon J. G. Thompson, 77th New York. Severe sloughing of the stumps followed, and on October 2d there was secondary hæmorrhage from the interosseous artery of the left leg, which was controlled by taking up the vessel with the forceps. The patient recovered and was transferred from Winchester November 8th." He was subsequently admitted to hospital at Frederick, and lastly he entered Central Park Hospital at New York City, where he was furnished with artificial legs by Dr. E. D. Hudson. On August 13, 1865,

the man was discharged from service and pensioned. In his application for commutation, dated 1870, he described both stumps as being in "sound condition;" but five years later he reported that "the bones stick out." The pensioner was paid March 4, 1880.

CASE 774.—Private G. Morgan, Co. E, 97th New York, aged 30 years, was wounded in the left ankle joint, at Hatcher's Run, February 6, 1865. Assistant Surgeon D. C. Peters, U. S. A., reported: "The wounded man was admitted to Jarvis Hospital, Baltimore, February 11th. The injury was caused by a musket ball entering the external malleolus, fracturing the astragalus, and making its exit internally. Caries of the astragalus ensued and the foot became greatly inflamed. On March 2d, the leg was amputated at the lower third by Acting Assistant Surgeon B. B. Miles. Ether was used, and the operation was performed by lateral flaps with circular section of muscles." The patient was subsequently transferred to Ira Harris Hospital at Albany, where he was discharged from service October 13, 1865, and pensioned. A plaster cast of the stump (*Spec.* 1025), represented in the annexed cut (FIG. 306), was contributed to the Museum by Assistant Surgeon J. H. Armsby, U. S. V., in charge of the latter hospital, and shows the ends of the bone apparently rounded and sufficiently covered, while the cicatrix is slightly but not injuriously drawn on the posterior surface. In his application for commutation the pensioner described the stump as continuing in a "healthy condition." His pension was paid June 4, 1880.

FIG. 306.—Stump after flap amputation in lower third of the left leg. [From a cast.] *Spec.* 1025.

CASE 775.—E. Robinson, a landsman (colored), aged 24 years, while attached to the U. S. Steamer Rodolph, was wounded in the left leg by the explosion of a torpedo in Mobile Bay, April 1, 1865. The injury involved a dislocation of the tibia at the knee and a compound comminuted fracture of the fibula and tibia near the ankle of the same leg. The fracture was impacted as well as comminuted. When he was admitted to the Naval Hospital at Pensacola, three days afterwards, the dislocation had been reduced, but on examination (the patient being under the influence of chloroform) both the tibia and fibula were found to be severely injured near the ankle, the bones protruding from the wound and large and small fragments being easily felt by introducing the finger. It was then deemed useless to attempt to save the limb, and amputation was performed about four inches above the injury. The dislocated bone was kept in position by pasteboard splints and the greatest care was used in dressing the stump. The case progressed favorably until April 22d, when the patient complained of headache and nausea, followed in a short time by a severe chill and high fever. Pyæmia being apprehended, the stump, though nearly healed at the time, was carefully examined, and fluctuation was detected at the under portion near the cicatrix. After the escape of pus by free incision into this part the patient, who was a man of strong constitution, over six feet high and stout in proportion, improved rapidly under the administration of quinine, and was soon able to be transferred to New York, where he entered the Naval Hospital on June 15th. He was discharged from service November 24, 1865, with a good stump, being able to walk easily and well on an artificial limb and suffering no weakness of the knee consequent upon the dislocation. The history was contributed by Passed Assistant Surgeon J. R. Tryon, U. S. N., who also forwarded the amputated bones of the leg, which constitute specimen 5662 of the Surgical Section of the Museum, and exhibit the seat of the injury, including a longitudinal fissure in the tibia about three inches in length. The man is a pensioner and was paid September 4, 1880. He reported the stump as continuing in "good and healthy condition."

CASE 776.—Private O. M. Armstrong, Co. B, 120th New York, aged 33 years, was wounded at Cold Harbor, June 3, 1864. Surgeon F. F. Burmeister, 69th Pennsylvania, reported his admission to the Second Corps Hospital, at White House, with "shot wound of left ankle joint, for which amputation was performed by Dr. Henry McLean, of Troy, N. Y., on June 10th." Two days afterwards the patient entered Armory Square Hospital, Washington, where a subsequent operation was performed by Surgeon D. W. Bliss, U. S. V., who described the case as follows: "The man was admitted with amputation of the leg at the lower third. The stump was very painful and symptoms of necrosis were exhibited. Simple dressings were used, and stimulants and nourishing diet were prescribed. On October 11th, the patient was placed upon the operating table and put under the influence of chloroform, when the stump was opened and a ring of necrosed bone, which encircled the tibia, was taken away by means of a pair of dressing forceps. The patient did well after the operation, and was transferred to hospital at Rochester in February following." The removed fragment, consisting of a tubular sequestrum four inches long, was contributed to the Museum by the operator (*Cat. Surg. Sect.*, 1866, p. 404, *Spec.* 3284), and is represented on PLATE LXXI, FIGURE 3, opposite page 428, *ante*. The patient was discharged from service May 31, 1865, and pensioned, having been previously supplied with an artificial limb by Dr. D. Bly, who described the amputation as having been performed by the flap method. The pensioner died October 22, 1870. The cause of his death is reported to have been softening of the brain.

Fatal Intermediary Amputations in the Lower Third of the Leg.—One hundred and twenty amputations—one hundred and three performed on Union and seventeen on Confederate soldiers—belong to this category. In two instances amputation in the lower third of the thigh was unavailingly resorted to. Death was ascribed to pyæmia in thirty-five, exhaustion in twenty, tetanus in five, gangrene in three, and secondary hæmorrhage in four instances.

CASE 777.—Private L. Mock, Co. I, 119th Pennsylvania, aged 22 years, was wounded in the left foot, at Rappahannock Station, November 7, 1863, by a musket ball, which entered about one and a half inches below the internal malleolus, passing upward and outward, making its exit anterior and under the external malleolus and opening the ankle joint in its passage through the parts. He entered Armory Square Hospital at Washington two days after receiving the injury. On December 6th, Surgeon D. W. Bliss, U. S. V., amputated the leg above the ankle by flap operation, the patient being under ether, to

which a little chloroform was added towards the last. Three vessels were ligated, the loss of blood being small. The patient reacted well from the anæsthetic. At the time of the operation his constitutional condition was tolerably good and the tissues of the wounded parts were in a healthy state. The stump grew painful, but its appearance was good. Cold-water dressing was used and nourishing diet with stimulants were administered. On December 9th the patient had three chills, followed by profuse perspiration. On the following day there was no chill, the stump still looked well, and the patient suffered no pain. Quinine and opium were now prescribed in addition to the former treatment. By December 18th there was well-developed pyæmia, from the effects of which the patient died December 21, 1863. After death yellowness, to an extreme degree, came on, and, on inspection, the shoulder and elbow were found to contain pus, the shoulder having a large quantity and the other joints being believed to be in a like condition. The tarsal bones of the amputated limb, contributed with the history by the operator, constitute specimen 1903 of the Surgical Section of the Museum. The specimen exhibits no perceptible attempt at repair, and shows that the ball passed through the calcaneum, which is necrosed, and grazed the astragalus, opening the ankle joint. The appearance of the entrance and exit wounds is shown in PLATE XXXIX, FIGURE 2.

CASE 778.—Corporal G. B. Scott, Co. K, 8th New York Cavalry, aged 19 years, was wounded in the right lower extremity, at Beverly Ford, June 9, 1863. He was conveyed to Washington and admitted to Lincoln Hospital on the following day, whence Surgeon G. S. Palmer, U. S. V., contributed the pathological specimen (No. 1347) represented in the adjoining wood-cut (FIG. 307), with the following description and result of the injury: "The wound was of the right ankle joint, affecting the internal malleolus and bones of the foot. The ball entered over the inner malleolus and was not extracted. Incisions with the knife were made over the external malleolus, allowing the free flow of pus, and fragments of bone were daily extracted. The leg was amputated at the lower third on June 20th. The patient never recovered from the shock of the operation. On the second day he had a severe chill, followed by profuse sweating. His tongue became dry and he complained of great thirst; pulse 130; appetite capricious. The flaps of the stump grew whitish around the ligatures, and a watery offensive discharge commenced to escape from the stump. On the third day the anterior flap became tawny, having a decided tendency to slough, and the limb became decidedly erysipelatous. On June 24th, profuse diarrhœa set in and the patient complained of pain in the loins, but his mind was yet clear and he was in excellent spirits. The stump now had no sensation in it whatever. The chills followed each other in rapid succession, the patient having as many as two daily, followed in each case by diaphoresis. He rested well until the evening of June 29th. On the following day twenty-five drops of laudanum were administered, which produced a quiet slumber. On awakening from this he became delirious and very restless; pulse 183 and compressible; respiration thirty-five per minute and labored; fever intense. He died on the morning of July 1, 1863. The wound at no time discharged purulent matter, but profuse, thin, and offensive fluid, staining the dressings with a dirty blood color. The flaps retained their proper relations, the ligatures not loosening. No erysipelas existed beyond the knee, which was slightly swollen. At the *post-mortem* examination the stump was found to have become blackened, the epidermis being readily detached from its base, and a large bleb full of brownish serum was discovered on the inner side of the knee. The anterior flap was perfectly black, and the muscles in the posterior flap had become a softened pultaceous mass. The periosteum of the fibula was detached and of a dark green color; the muscles were affected as far up as the union of the tibia and fibula. The anterior portion of the fibula and the crest of the tibia were dotted with a reddish color, the rest of the bones being pure white." The specimen consists of the amputated lower extremities of the bones of the leg, the external malleolus being broken off.

FIG. 307.—The lower portions of the bones of right leg. *Spec.* 1347.

CASE 779.—Sergeant *W. H. Gaskins*, Co. K, 8th Virginia, aged 20 years, was wounded and captured at Gettysburg, July 3, 1863. His injury was described by Assistant Surgeon W. F. Richardson, C. S. A., from Camp Letterman, as follows: "A minié ball entered the centre of the sole of the right foot, passing through the tarsus and emerging at the top of the foot. The leg was amputated at the lower third on August 1st. The patient was troubled with abscesses which formed in the stump, and now and then attacks of diarrhœa came on, which brought his condition down. Astringents, nourishing diet, tonics, and stimulants were administered. In the beginning of September the discharge had grown very slight; but about October 20th the stump became much swollen and inflamed, the discharge copious and unhealthy, and the tibia protruded one-half inch, the bone being necrosed for six inches above the end of the stump. Diarrhœa was now profuse and obstinate. By October 30th the patient had become much reduced and the necrosed portion of the tibia was loose. On November 4th the diseased portion of the bone, six inches in length, was removed. The patient died on the following day, November 5, 1863." A section of the bones of the stump (*Spec.* 1962), showing very extended ravages of disease, was contributed by Acting Assistant Surgeon E. P. Townsend and is represented in the wood-cut (FIG. 308).

FIG. 308.—Sections of right tibia and fibula, three months after amputation in lower third. *Spec.* 1962.

CASE 780.—Private L. Smith, Co. D, 12th Infantry, aged 24 years, was wounded in the left foot, at Spottsylvania, May 12, 1864, and entered Stanton Hospital, Washington, six days afterwards. Surgeon J. A. Lidell, U. S. V., reported: "The nature of the injury was an extensive shell wound on the plantar surface, all the tarsal bones except the cuboid being fractured. The foot became much swollen and inflamed and the wound was sloughing and full of maggots. Acting Assistant Surgeon C. H. Osborn amputated the leg at the lower third, on May 21st, by the circular method, using sulphuric ether as the anæsthetic. But little blood was lost during the operation. The patient reacted promptly and did not suffer much shock. Tonics and stimulants were administered. On May 26th, there was a pyæmic chill, which returned at intervals for two weeks. The stump commenced to slough, abscesses formed in the thigh, and large bed-sores came on over the sacrum. The patient was also troubled with diarrhœa. Death resulted from pyæmia July 3, 1864. At the autopsy the anterior part of the stump was found to have sloughed to within one inch below the tubercle of the tibia, exposing the bone, which was denuded of its periosteum. There were two large abscesses, one in the popliteal space and the other in the middle third of the thigh; small thrombi in the veins. The lungs

contained several superficial abscesses; the liver was enlarged, soft, and fatty; spleen soft and enlarged. All the other viscera were in a normal condition." The stump of the leg, showing the tibia to be exposed for the extent of six inches, was contributed to the Museum by Assistant Surgeon G. A. Mursick, U. S. V., and constitutes specimen 2739 of the Surgical Section.

TABLE LXXIV.

Summary of Three Hundred and Thirty-five Cases of Intermediary Amputations in the Lower Third of the Leg for Shot Injury.

[Recoveries, 1—215; Deaths, 216—335.]

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	Adams, S. N., Pt., D, 110th Ohio, age 29.	April 2, 12, '65.	Right; flap. A. A. Surg. F. H. Colton. (Also fracture and exc. left tibia.) Disch'd Sept. 11,'65.
2	Agan, H., Pt., I, 7th Michigan, age 17.	Sept. 17, 24, '62.	Right; circular. S. G. Gray, Acting Medical Cadet, U. S. A. Discharged June 6, 1863.
3	Anderson, R., Pt., H, 76th Colored Troops, age 25.	April 12, 20, '65.	Left; ant. post. skin flap; circular section muscles. Surgeon F. E. Piquette, 86th Colored Troops. Discharged June 10, 1865.
4	Armstrong, O. M., Pt., B, 120th N. York, age 33.	June 3, 10, '64.	Left; flap. Dr. H. McLean, Troy. Necrosis; sequestra removed. Disch'd May 31, 1865. *Spec.* 3284. Died October 22, 1870; softening of brain.
5	Babcock, E. G., Pt., I, 34th Mass., age 27.	June 18, July2,'64.	Left; flap. Confederate surgeon. Discharged July 6, 1865.
6	Bachtell, S., Pt., H, 7th Pennsylvania Cavalry, age 22.	Aug. 18, Sept. 17, 1864.	Right; circular. A. Surg. T. A. McGraw, U. S. V. Disch'd Jan. 30, 1866; subsequently re-amp.
7	*Bacon, A.*, Pt., B. 2d S. Carolina, age 21.	July 2, 26, '63.	Left; circular. Surg. S. Baruch, 3d Battalion, S. C. To Provost Marshal September 17, 1863.
8	Bacon, W., Pt., D, 7th Maine, age 21.	July 12, 15, '64.	Left; circular. A. A. Surg. T. Carroll. Necrosis. Discharged June 16, 1865. Amputation thigh in 1866. *Spec.* 2841.
9	Barnett, J. B., Pt., E, 191st Penn., age 33.	Mar. 31, April 8, 1865.	Left; ant. post. flap. Surgeon N. R. Moseley, U. S. V. (April 1, Syme's amp. ankle joint; sloughing.) Disch'd June 28, 1865.
10	Bathurst, J. F., Serg't, I, 5th Pennsylvania Reserves, age 23.	Dec. 13, 28, '62.	Left; circular. A. A. Surg. D. Weisel. Gangrene; exfoliat'n. Discharged December 19, 1863.
11	*Betty, W. M.*, Pt., K, 7th Arkansas.	Sept. 19, 28, '63.	Right. Surg. P. F. Eve, C. S. A. Recovery.
12	*Biglow, I.*, Pt., E, 8th Louisiana.	Sept. 17, 20, '63.	——. Union surgeon. Recovery.
13	Bisbee, A., Corp'l, B, 7th Maine, age 25.	April 16, May 12, 1862.	Right; circular. Surgeon R. B. Bontecou, U. S. V. Discharged February 10, 1863. April 8, 1863, amputation thigh.
14	*Blankenship, W. A.*, Capt., F, 25th Virginia, age 21.	July 2, 9, '63.	Right. Ass't Surg. W. Black, C. S. A. Exchanged Dec. 5, 1863.
15	Boardwell, I., Pt., C, 36th Wisconsin, age 18.	June 6, 19, '64.	Left; double flap. Ass't Surg. S. B. Ward, U. S. V. Disch'd May 4, 1865.
16	*Bowles, R. A.*, Pt., H, 22d Virginia Battery.	June 28, July3,'62.	——. Surg. —Peticolas, C. S. A. Recovery.
17	Brady, B., Pt., E, 73d Ohio, age 21.	May 15, June 5, 1864.	Left; circular. A. A. Surg. C. S. Merrill. Erysipelas. Disch'd February 28, 1865.
18	Brennan, W. D., Capt., A, 142d New York, age 24.	Sept. 29, Oct. 19, 1864.	Left; circular. Surg. D. G. Rush, 101st Penn. Discharged May 15, 1865.
19	Bromley, W., Pt., A, 149th N. York, age 33.	May 6, 13, '64.	Left; circular. Discharged May 25, 1865.
20	*Brown, A. T.*, Pt., B, 43d North Carolina.	Oct. 19, 25, '64.	——. Surgeon R. T. Baldwin, C. S. A. Recovery.
21	Brown, C. F., Pt., F, 1st Connecticut Cavalry, age 24.	June 20, July 3, 1864.	Left; circular. Surg. A. F. Sheldon, U. S. V. Disch'd March 26, 1865. March, 1868, re-amputation. *Specs.* 2765, 4700.
22	Brown, J. C., Pt., E, 52d Ohio, age 20.	July 21, Aug. 6, 1864.	Right; skin flap. A. A. Surg. S. W. Blackwood. April 22, 1865, re-amp. leg. Disch'd June 3, '65.
23	Brown, J. D., Pt., I, 109th New York, age 19.	Nov. 3, 6, '63.	Left; circular. Surgeon D. W. Bliss, U. S. V. Disch'd March 27, 1864. *Spec.* 1764.
24	Brown, S., Pt., I, 107th Ohio, age 21.	July 2, 5, '63.	Right; circular. Discharged February 7, 1864.
25	*Brown, W. A.*, Pt., F, 38th Alabama.	Nov. 25, Dec. 5, 1863.	Left; flap. Surg. J. C. Morgan, 29th Mo. (Also wound of right leg.) Transferred.
26	*Buist, C. B.*, Pt., C, 27th South Carolina.	June 16, 23, '62.	——. Surg. H. Iluger, P.A.C. S. Recovery.
27	Burke, J., Serg't, H, 7th N. Y. H'vy Art., age 21.	June 16, 28, '64.	Left; necrosis. July 16, re-amp. Disch'd Mar. 3, '65. *Spec.* 2880.
28	Bush, H., Pt., D, 85th Pennsylvania, age 33	Aug. 29, Sept. 1, 1863.	Left; circular. Surg. D. Merritt, 55th Penn. Sloughing; erysipelas. Discharged July 6, 1864.
29	Bush, J., Pt., B, 54th Indiana.	May 31, June 3, 1863.	Left; flap. A. A. Surgeon M. B. Graff. Trans. July 24, 1863. Died Jan. 14, 1870; ulceration of stump. *Spec.* 1629.
30	*Carver, S.*, Pt., G, 45th North Carolina.	May 5, 8, '64.	Left. Surg. J. B. Edelin, C. S. A. Discharged March 4, 1865.
31	Clark, R. A., Pt., F, 14th New Jersey, age 21.	July 9, Aug. 3, 1864.	Left; circ. A. A. Surgeon J. C. Shimer. (Also penetr. wound of lung.) Discharged September 11, 1865. *Spec.* 3922.
32	Cluck, J., Pt., B, 7th Penn. Reserves, age 30.	Dec. 13, 28, '62.	Left; circular. Surg. H. Bryant, U. S. V. (Also w'nd of hand and back.) Discharged December 11, 1863. *Spec.* 4548.
33	Conklin, J. H., Pt., A, 40th New York, age 22.	May 5, 8, '64.	Left; circular. Discharged May 15, 1865.
34	Conroy, J., Pt., C, 4th Infantry.	Aug. 30, Sept. 4, 1862.	Right; flap. A. A. Surg. F. H. Brown. Aug. 9, '63, bone rem.; gangrene. Discharged.
35	Coombs, L. D., Corp'l, F, 2d Wisconsin, age 28.	May 5, 15, '64.	Right; anterior posterior flap. Surg. E. Bentley, U. S. V. Discharged December 22, 1864.
36	Corey, R., Pt., C, 18th Connecticut, age 34.	July 18, 28, '64.	Left; circular. A. A. Surgeon J. Goldsborough. Disch'd March 23, 1865.
37	Crocker, N. C., Pt., A, 11th Maine, age 28.	Aug. 14, 25, '64.	Right; circular. A. A. Surgeon R. O. Sidney. Discharged June 12, 1865.
38	Cruger, E., Pt., E, 5th New York.	Aug. 30, Se.20,'62.	Right. Discharged February 11, 1863.
39	Curtis, H. H., Pt., C, 7th Wisconsin, age 22.	May 5, 31, '64.	Left; circ. Confederate surgeon. Discharged May 26, 1865.
40	Curtis, J. B., Pt., I, 8th New York Artillery, age 21.	June 3, 14, '64.	Left; circular. A. A. Surg. A. N. K. Andrews. Sloughing. Discharged November 10, 1864. *Spec.* 2533.
41	Davidson, S., Pt., B, 7th Indiana, age 23.	June 9, 13, '62.	Right; circ. Surg. P. F. Whitehead, C. S. A. Discharged October 3, 1862.
42	Dayton, B. F., Pt., B, 57th Mass., age 18.	May 12, 27, '64.	Left; circular. Surg. O. A. Judson, U. S. V. August, 1864, re-amp. Disch'd Dec. 27, 1864.
43	Denniston, J. F., Capt. and Commissary, U. S. V., age 24.	Aug. 25, Sept. 10, 1864.	Right; circular. Surgeon D. W. Bliss, U. S. V. (Aug. 25, Pirogoff's amp. ankle joint.) Disch'd January 1, 1867. *Spec.* 3211.
44	Dersam, F. E., Pt., H, 8th New York Heavy Artillery, age 31.	June 3, 9, '64.	Right; ant. posterior flap. Ass't Surg. S. B. Ward, U. S. V. Discharged Sept. 13,'65. *Spec.* 2664.
45	Devlin, J. R., Pt., E, 20th Massachusetts.	Sept. 17, 20, '62.	Left; flap. Discharged December 12, 1862.
46	Dodge, T. A., Lieut., —, 119th New York.	July 1, 6, '63.	Right; flap. Ass't Surg. G. M. McGill, U. S. A. To V. R. C. November 26, 1863.
47	*Downey, S. W.*, Lieut., G, 28th Alabama, age 39.	Dec. 15, 18, '64.	Left; circular. A. A. Surg. R. L. McClure. To Provost Marshal February 6, 1865.
48	Driscoll, D. O., Pt., B, 14th Infantry, age 19.	May 5, 8, '64.	Right; circular. To regiment October 7, 1864.
49	Dudley, E. H., Pt., K, 16th Vermont, age 20.	July 3, 18, '63.	Left; circular. (July 4. Syme's amputat'n foot; sloughing); necrosis. Dec. 21, re-amputation. Discharged April 23, 1864.
50	Dyer, S. M., Pt., I, 5th Wisconsin, age 20.	May 4, 7, '63.	Left. Confederate surgeon. Discharged April 25, 1864.
51	Emory, J., Pt., A, 36th Indiana, age 28.	Sept. 19, 22, '63.	Left; flap. Discharged September 21, 1864.
52	Emory, J. D., Pt., B, 139th Penn., age 24.	May 5, 13, '64.	Left; flap. Discharged February 25, 1865.
53	*Fale, L.*, Pt., G, 13th Mississippi, age 23.	Oct. 19, 28, '64.	Left; flap. To prison June 6, 1865.
54	Ferris, R. P., Pt., F, 101st New York.	Aug. 29, Sep.—,'62	——. Discharged November 1, 1862.
55	*Fesperman, W. C.*, Serg't, F, 7th North Carolina.	De.13,'62, Jan.—,'63.	——. Surg. — Miller, C. S. A. Recovery.
56	Finnagan, P., Pt., D, 108th N. York, age 24.	Sept. 17, Oc.11,'62.	Left; flap; exfol. Discharged November 13, 1862. *Spec* 386.
57	Fleetwood, L. A., Pt., C, 54th Massachusetts (C. T.), age 22.	July 18, 23, '63.	Left (carious). Nov. 6, re-amp. Discharged June 8, 1864. Died September 3, 1866. *Spec.* 4311.
58	*Flippin, E.*, Pt., F, 49th Virginia, age 28.	May 30, J'ne 5, '64.	Right; circ. Exchanged March 1, 1865.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
59	*Forloine, R.*, Serg't, E, 15th Virginia.	May 16, 29, '64.	——. Surg. J. G. Dudley, P. A. C. S. Discharged Oct. 2, 1864.
60	Friddle, W., Pt., D, 21st Illinois, age 25.	June 10, 26, '64.	Left. Ass't Surg. C. C. Byrne, U. S. A. Disch'd Feb. 18, 1865.
61	Fuhrman, J., Pt., K, 27th Indiana, age 24.	May 3, 21, '63.	Right; ant. post. flap. Ass't Surg. W. Thomson, U. S. A. Erysipelas. Disch'd Sept. 16, 1863. *Spec.* 1851. Died March 31, 1876.
62	*Gaines, W. R.*, Lieut., B, 14th Virginia Cavalry.	Aug. 17, Se. 15, '64.	Left. Surgeon — Butler, C. S. A. Recovery.
63	Gardner, C. J., Serg't, C, 1st N. York Dragoons, age 21.	Aug. 11, 26, '64.	Right; long ant. short post. flap. A. A. Surgeon G. H. Dare. Discharged April 28, 1865.
64	Glenn, W., Pt., A, 10th Pennsylvania, age 25.	June 27, July 21, 1862.	Right; sloughing. Sept. 4, re-amp. posterior flap. Discharged July 25, 1864.
65	Grindstaff, J. R., Pt., A, 7th West Virginia, age 38.	May 12, June 4, 1864.	Right; circular. Surgeon D. W. Bliss, U. S. V. Discharged April 15, 1865. *Spec.* 2428.
66	Gross, J., Pt., E, 200th Pennsylvania, age 21.	Mar. 25, Ap. 24, '65.	Left; flap. Surgeon E. Bentley, U. S. V. Disch'd July 15, 1867.
67	Hannon, M., Pt., A, 9th New York Heavy Artillery, age 30.	Oct. 19, Nov. 9, 1864.	Left; lateral skin flap; circular section muscles. A. A. Surg. B. B. Miles. (Necrosis.) Discharged August 2, 1865.
68	Happe, J., Pt., B, 4th Artillery, age 30.	July 1, 6, '63.	Left; circular. Discharged December 9, 1863.
69	Hardern, R., Pt., C, 61st Pennsylvania, age 51.	May 12, 28, '64.	Right; ant. posterior flap. Surg. E. Bentley, U. S. V. Disch'd June 8, 1865.
70	Hare, D., Pt., I, 95th Ohio.	Mar. 12, 15, '63.	Right. A. A. Surg. J. B. Taylor. Discharged August 22, 1863.
71	*Harp, A.*, Pt., D, 8th Alabama, age 35.	July 3, 28, '63.	Right. Exchanged November 12, 1863.
72	Harris, W. W., Pt., B, 186th N. York, age 34.	April 2, 17, '65.	Left; flap. A. A. Surgeon W. F. Goodwin. Disch'd July 20, '65.
73	Hart, J., Pt., A, 14th Connecticut.	Dec. 13, 17, '62.	Left; flap. Discharged August 1, 1863.
74	Harty, D., Pt., F, 69th New York.	Sept. 17, 25, '62.	Right; circular. Surgeon H. S. Hewit, U. S. V. Exfol. Disch'd January 2, 1863. *Spec.* 210.
75	Harvey, G. W., Pt., I, 14th New York Heavy Artillery, age 20.	June 17, 20, '64.	Right; flap. Surg. I. V. Miller, 14th N. York Heavy Artillery. Discharged June 8, 1865
76	Hausbeck, A., Pt., G, 105th Penn., age 19.	May 5, June 2, 1864.	Right; circular flap. Surg. E. Bentley, U. S. V. Gangrene. Disch'd May 25, '65. Necrosis. Nov. 29, 1865, re-amputation.
77	Hawk, J., Pt., I, 36th Ohio.	Sept. 19, Oc. 19, '63.	Left; flap. Discharged February 15, 1864.
78	Hoerr, P., Pt., B, 62d Pennsylvania, age 23.	July 2, 12, '63.	Left; circular. Surg. J. Thomas, 118th Penn. Discharged July 13, 1864.
79	*Hombree, J.*, Pt., B, 16th North Carolina.	July 1, 22, '63.	Right. Recovery.
80	*Hooks, J. R.*, Pt., K, 12th Georgia.	May 10, J'ne 5, '64.	——. Surg. — Goodlett, C. S. A. Recovery.
81	Hosington, G., Pt., E, 125d Ohio, age 36.	June 13, 21, '63.	Left. (June 14, amp. ankle joint.) Necrosis. Sept. 17, re-amput'n. Discharged May 16, 1865. Died December 16, 1866.
82	*Hork, A.*, Pt., D, 8th Mississippi.	July 2. 28, '63.	Right. For exchange November 12, 1863.
83	Hunter, W., Pt., I, 113th Ohio, age 54.	Sept. 18, Oct. 3, 1864.	Right; circular. A. A. Surgeon J. B. McPherson. Gangrene. Feb. 27, '65, removed exfoliat'n. Discharged July 3, 1865.
84	Jaeger, C., Corp'l, G, 46th New York, age 27.	May 12, 31, '64.	Left; circular. A. A. Surg. D. L. Haight. Hæm. Sept. 30, bone removed. Disch'd Oct. 27, 1864.
85	Jarvis, H. D., Lieut., A, 24th Mass., age 19.	June 5, 8, '62.	Left; circ. Surg. S. A. Green, 24th Mass. Disch'd Sept. 9, 1863. Necrosed bone removed in 1866.
86	*Johns, D. S.*, Pt., G, 23d South Carolina.	Aug. 30, Sep. 2, '62.	——. Surg. — Michell, C. S. A. Recovery.
87	Johnson, D. B., Pt., H, 8th N. Y. H. A., age 21.	June 3, 8, '64.	Right; ant. posterior flap. Discharged August 2, 1865.
88	Kendall, J., Pt., K, 2d Delaware, age 21.	Sept. 17, Oct. 6, 1862.	Left; ant. post. flap. A. A. Surg. J. Sweet. Necrosis. Discharged January 16, 1863. April, 1864, bone removed. *Spec.* 2757.
89	Keys, H., Pt., A, 18th Massachusetts, age 20.	Dec. 14, 19, '62.	Right. A. A. Surgeon W. A. Harvey. Discharged June 10, 1863. *Spec.* 980.
90	King, A., Lieut., K, 62d Pennsylvania, age 25.	June 27, July —, 1862.	Right. (June 28, amput'n foot.) 1863, re-amput'n. Discharged March 17, '63. Died July 12, 72.
91	King, S. S., Serg't, I, 190th Pennsylvania.	May 22, June 17, 1864.	Right; circular. A. A. Surgeon M. F. Price. Discharged June 29, 1865.
92	Lamont, H., Pt., B, 8th Connecticut, age 40.	Sept. 29, Oct. 27, 1864.	Right; flap. A. A. Surgeon E. K. Deemey. Discharged October 28, 1865.
93	Lane, I., Pt., A, 8th Michigan, age 24.	Sept. 17, Oct. 14, 1862.	Left; circular. Ass't Surgeon J. Oliver, 21st Mass. Discharged April 2, 1863.
94	Lavell, M., Serg't, A, 7th Michigan, age 26.	July 3, 14, '63.	Left; flap. Discharged June 4, 1864.
95	Leary, *alias* Connell, D., Pt., C, 28th Massachusetts, age 32.	June 3, 9, '64.	Right; circular. Surg. E. Bentley, U. S. V. Discharged May 25, 1865. *Spec.* 2663. Nov. 30, 1867, re-amp. Died of hæm. of lungs February 7, 1873.
96	Leary, J., Pt., I, 106th New York, age 45.	Oct. 19, Nov. 17, 1864.	Right; lateral flap. A. A. Surg. R. H. Sterling. Disch'd June 14, 1865.
97	*Leathers, J. A.*, Pt., K, 19th Virginia, age 24.	July 3, 17, '63.	Left. Exchanged November 12, 1863.
98	Leslie, A., Pt., D, 9th New York, age 21.	Dec. 13, 28, '62.	Left; ant. posterior flap. A. A. Surg. T. H. Dearing. Disch'd July 29, 1864. *Spec.* 716.
99	Lewis, T. A., Pt., I, 2d Illinois Cav., age 25.	April 8, 22, '64.	Right; circular. A. A. Surg. H. Smith. Disch'd June 15, 1864.
100	Lindley, T., Pt., L, 1st Penn. Cav., age 21.	Sept. 13, Oct. 9, '63.	Left. Surgeon D. W. Bliss, U. S. V. Discharged April 14, 1864.
101	Lister, J., Pt., M, 2d New York Heavy Artillery, age 26.	June 1, 10, '64.	Left; flap. Surgeon W. Watson, 105th Penn. Discharged Nov. 22, 1864. *Spec.* 3259.
102	*Loggins, N.*, Pt., A, 26th N. Carolina, age 23.	July 2, 23, '63.	——. Surgeon — Bork, C. S. A. Paroled November 12, 1863.
103	*Lowry, J. C.*, Corp'l, F, 38th Tennessee, age 26.	Nov. 30, Dec. 28, 1864.	Right; flap. A. A. Surg. J. E. Patterson. To Provost Marshal March 7, 1865.
104	Mathews, B., Pt., B, 14th New Jersey, age 23.	June 1, 28, '64.	Right; ant. post. flap. Surg. E. Bentley, U. S. V. Discharged April 15, 1865.
105	Matteson, P., Pt., C, 186th New York.	April 2, 29, '65.	Left; circular. Surg. E. Bentley, U. S. V. (Winds shoulder, back, and hip.) Disch'd July 15, 1865.
106	May, C. H., Pt., B, 16th Massachusetts, age 28.	June 18, 27, '64.	Left; circular. Discharged February 18, 1865.
107	Mayer, H., Pt., B, 12th Maine, age 20.	Sept. 19, Oc. 10, '64.	Right. A. A. Surgeon L. Fassitt. Discharged June 1, 1865.
108	McCann, H., Pt., D, 127th Illinois.	Jan. 11, 31, '63.	Right; lateral flap. A. A. Surg. T. T. Smiley. Erysipelas; necrosis. Disch'd Nov. 6, 1863.
109	McGuire, G. F., Pt., I, 57th New York, age 21.	Dec. 13, 24, '62.	Right; circular. Ass't Surgeon G. M. McGill, U. S. A. Discharged December 16, 1864.
110	*McLaughlin, I. T.*, Pt., B, 13th Ala., age 48.	July 3, 6, '63.	Left. Surgeon C. S. Wood, 66th New York. July 14, tetanus. Exchanged April 27, 1864.
111	McLaughlin, M., Pt., H, 31st New York.	May 3, 17, '63.	Left; circular. Discharged December 8, 1863.
112	McMontry, H., Corp'l, A, 16th Infantry, age 34.	May 28, J'ne 3, '64.	Left; circular. To regiment September 29, 1864.
113	McPherson, A. D., Serg't, A, 105th Pennsylvania.	July 2, Aug. 1, 1863.	Left. A. A. Surgeon J. Dickson. Discharged June 4, 1864. *Spec.* 1649.
114	McQuilkin, D. L., Pt., E, 38th Ohio.	Nov. 25, 28, '63.	Left; flap. Discharged August 11, 1864.
115	McQuinn, J., Pt., K, 35th Massachusetts, age 42.	July 30, Aug. 20, 1864.	Right; double flap. A. A. Surg. E. Seyffarth. Discharged June 15, 1865.
116	*Meinhard, P.*, Pt., D, 6th Louisiana.	May 2, 5, '63.	Right. Surg. W. A. Robertson, P. A. C. S. Disch'd Sept. 1, '64.
117	Merrill, J., Pt., B, 5th Wisconsin, age 35.	May 10, 13, '64.	Right; flap. Confed. surgeon. Discharged June 17, 1865.
118	Miller, W., Pt., A, 72d Pennsylvania.	Sept. 17, 28, '62.	Left; circular. A. A. Surgeon P. Middleton. Necrosis. April 28, 1864, amp. thigh. Discharged September 3, 1864. *Specs.* 97, 2748, 4172.
119	Moffit, W., Pt., F, 1st Connecticut, age 20.	Sept. 17, Oct. 10, 1862.	Left; circular. Surgeon B. Beust, U. S. V. Discharged August 5, 1863.
120	Moore, O., Pt., I, 5th Ohio.	June 9, 13, '62.	Left; flap. Surg. P. F. Whitehead, P. A. C. S. Disch'd Feb. 1, 1863.
121	Morgan, C. F., Pt., B, 1st Massachusetts.	Aug. 19, 29, '62.	Right; circular. Discharged November 8, 1862.
122	Morgan, G., Pt., E, 97th New York, age 30.	Feb. 6, Mar. 2, 1865.	Left; lateral flap. A. A. Surgeon B. B. Miles. Disch'd October 13, 1865. *Spec.* 1025.
123	Morgan, J. M., Blacksmith, H, 13th Pennsylvania Cav., age 17.	June 16, July 10 1863.	Left. Surgeon J. H. Baxter, U. S. V. Disch'd March 6, 1865.
124	Morrill, J. A., Pt., A, 10th Vermont, age 19.	June 1, 7, '64.	Left; flap. Surg. E. Bentley, U. S. V. Discharged January 2, 1865. *Spec.* 2548.
125	*Morris, J.*, Serg't, C, 11th Mississippi, age 23.	July 3, 7, '63.	Left; circular. Surg. S. R. Chambers, P. A. C. S. Recovery.
126	Mueller, J., Capt., B, 17th Missouri.	Nov. 27, Dec. 1, '63.	Left; flap. Discharged September 14, 1864.
127	Mulligan, J., Pt., D, 89th Pennsylvania, age 32.	Sept. 17, 21, '62.	Left. Surg. T. H. Squire, 89th N. Y. Disch'd May 21, 1864.
128	Murphy, T., Pt., C, 15th Iowa, age 13.	July 21, 28, '64.	Right; flap. Surg. W. H. Gibbon, 15th Iowa. Discharged July 26, 1865.
129	Myers, S. H., Pt., E, 75th Indiana, age 20.	June 20, 30, '64.	Left; circular. A. A. Surg. E. Stubbs. (June 21, excision of ankle joint.) Disch'd March 7, 1865. Died April 12, 1872.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
130	Nase, A., Capt., K, 15th Illinois.	April 6, 24, '62.	Right. Surgeon E. S. Fenner, C. S. A. Resigned July 7, 1863.
131	Nash, C., Serg't, A, 83d Col'd Troops, age 21.	April 4, 18, '65.	Right; ant. post. skin flap; circ. sect. mus. Surg. F. E. Piquette, 86th C. T. (April 4. exc. of 3d meta. bone.) Disch'd May 30, '65.
132	Nason, C. T., Pt., C, 1st Massachusetts Heavy Artillery, age 25.	May 19, 22, '64.	Left; ant. post. skin flap. Nov. 15, removed nec. bone. Disch'd June 30, 1865. *Specs.* 4758, 3411.
133	O'Connor, J., Pt., I, 11th Massachusetts, age 44.	Aug. 30, Se.11, '62.	Right; circular. Disch'd April 29, 1863. Drowned Mar. 27, '70.
134	Osgood. L., Pt., B, 11th N. Hampshire, age 23.	Dec. 13, 19, '62.	Left; circular; necrosed. Jan. 2, 1863, re-amp. Discharged May 3, 1864. *Spec.* 268.
135	Palmer. O., Pt., F, 45th Pennsylvania.	Sept. 17, Oct. 2, 1862.	Left; flap. Surgeon H. S. Hewit, U. S. V. Necrosis. Discharged March 6, 1863.
136	*Parker, G. L.*, Pt., I, 1st Virginia, age 25.	July 3, 7, '63.	Left; circular. Ass't Surgeon P. C. Yates, C. S. A. Erysipelas. Recovery.
137	*Parrott, J.*, Serg't, H, 28th Tennessee, age 34.	Nov. 30, Dec. 28, 1864.	Right; ant. posterior flap. A. A. Surg. J. E. Patterson. To Provost Marshal March 7, 1865.
138	Parsons, H., Pt, C, 9th West Virginia, age 23.	July 20, Aug. 3, 1864.	Left; anterior posterior skin flap. A. A. Surg. M. M. Townsend. Discharged May 31, 1865.
139	Pastorius, H., Pt., E, 62d Pennsylvania, age 25.	May 25, 31, '64.	Right; circular. A. A. Surg. M. F. Price. Disch'd Jan. 18, 1865.
140	*Paxton, J.*, Pt., F, 23d Virginia, age 33.	April 6, 15, '65.	Right; circular. Released June 24, 1865.
141	Payne, O., Pt., D, 28th Col'd Troops, age 19.	June 7, 27, '64.	Right; circular. A. A. Surg. A. Transue. Necrosis. March 8, 1865, re-amp. Discharged Aug. 1, 1865. *Spec.* 4740.
142	Pingel, F., Pt., C, 17th Wisconsin, age 25.	Mar. 16, 19, '65.	Right; circular. Discharged September 1, 1865.
143	*Pope, R.*, Pt., I, 53d N. Carolina, age 20.	July 2, 6, '63.	Right. Paroled November 12, 1863.
144	Powers, J.A., Pt., E, 63d Pennsylvania.	Aug. 29, Sept. 3, 1862.	Left; flap. Discharged January 19, 1863. Died December 5, 1866; consumption.
145	*Price, T.*, Pt., I, 43d N. Carolina, age 18.	Sept. 5, 19, '64.	Left. To Provost Marshal April 1, 1865.
146	Raborn, I., Pt., F, 40th Indiana, age 20.	Dec. 1, 13, '64.	Right. A. A. Surg. R. McNeilly. Discharged May 20, 1865.
147	Reagles, E., Pt., A, 36th Wisconsin, age 30.	Aug. 16, Sept. 4, 1864.	Left; circular. A. A. Surg. J. B. Roe. (Gangrene.) Discharged May 23, 1865.
148	Reden, H., Pt., B, 11th New Hamp., age 30.	June 20, 30, '64.	Left; flap. Surg. J. D. Mitchell, 31st Maine. Disch'd Oct. 17, '65.
149	Reeder, S. B., Serg't, U. S. Marines, age 21.	Mar. 3, 21, '65.	Left. Discharged August 26, 1865.
150	Richard, J., Pt., D, 5th Connecticut, age 19.	July 4, —, '64.	Left. (July 4. exc. 4th and 5th met.) Aug. 12, re-amp. Disch'd May 12, 1865. Died Feb. 24, '67.
151	Richardson, G. O., Pt., K, 13th New York.	Dec. 13, 16, '62.	Left; circular. Disch'd March 10, 1863.
152	Ridenour, W. M., Pt., B, 14th W. Va., age 20.	June 15, 30, '64.	Right; circular. Discharged.
153	*Rideout, J. J.*, Pt., F, 12th Virginia, age 21.	July 3, 12, '63.	Right. Surg. — Dailert, C. S. A. Necrosis; erysipelas. Exch'd March 17, 1864.
154	Riebe, H., Pt., F, 68th New York, age 40.	July 1, 4, '63.	Left. Discharged May 21, 1864.
155	Rix, G. S., Artificer, A, 8th New York Heavy Artillery.	June 22, July 7, 1864.	Right; circular. A. A. Surgeon W. C. Mulford. Discharged March 27, 1865.
156	Robinson, E., Landsman, U. S. Steamer Rodolph, age 24.	April 1, 4, '65.	Left. Ass't Surg. J. R. Tryon, U. S. N. Discharged November 24, 1865. *Spec.* 5662.
157	Rose, E. P., Pt., K, 6th Wisconsin, age 25.	July 1, 6, '63.	Right; circular. Ass't Surgeon A. D. Andrew, 6th Wisconsin. Discharged January 11, 1864.
158	*Ross, J.*, Pt., F, 2d South Carolina.	July 3, 20, '63.	Left. Surgeon — Barnes, C. S. A. Recovery November 12, 1863.
159	Ross, W. W., Pt., I, 9th New Hamp., age 21.	June 21, 29, '64.	Right; circular. Surgeon A. F. Sheldon, U. S. V. Discharged November 18, 1864.
160	*Savage, J. W.*, Serg't, K, 13th Alabama, age 27.	Sept. 30, Oc.15, '64.	Right. Retired March 20, 1865.
161	Scullen, M. P., Pt., D, 13th Vermont, age 21.	July 3, 19, '63.	Right; anterior posterior flap. Ass't Surgeon J. D. Johnson, U. S. V. *Spec.* 1696.
162	Sears, O. H., Pt., K, 6th Vermont, age 24.	Sept 19, Oct. 13, 1864.	Left; circular. A. A. Surg. T. J. Dunott. (Amp. right great toe.) Oct. 13, hæmorrhage; necrosis. Discharged October 28, 1865.
163	Selah, T., Serg't, E, 96th Pennsylvania.	May 3, 6, '63.	Right; circular. Discharged August 7, 1863.
164	*Sevael, N. B.*, Turner's Brigade, age 23.	Jan. 8, 14, '65.	Left; circular. Ass't Surg. H. T. Legler, U. S. V. To Provost Marshal March 2. 1865.
165	Shappeard, S., Pt., D, 142d New York, age 19.	May 26, June 9, 1864.	Left; ant. posterior flap. Ass't Surgeon W. Webster, U. S. A. Discharged April 3, 1865.
166	Sherman, A., Pt., D, 20th Massachusetts.	Oct. 20, Nov. 14, 1861.	Right; circular. Surg. N. Hayward, 20th Mass. Discharged February 27, 1862.
167	Shirk, J. G., Pt., F, 207th Pennsylvania, age 26.	April 6, 29, '65.	Right; circular. A. A. Surgeon F. H. Getchell. Disch'd September 23, 1865.
168	*Simmons, J. J.*, Lieut., A, 6th Mississippi, age 24.	Nov. 30, Dec. 26, 1864.	Right; circular. A. A. Surgeon R. McNeilly. To Provost Marshal March 7, 1865.
169	*Sitgreaves, J.*, Pt., C, 8th Virginia, age 25.	April 6, 12, '65.	Right. (Erysipelas.) Released June 15, 1865.
170	Smith, A. S., Pt., D, 104th Illinois.	Nov. 25, De.12, '63.	Left; flap. Surg. R. F. Dyer, 104th Ill. Disch'd May 6, 1864.
171	Smith, R. R., Pt., E, 3d Ohio Cavalry, age 23.	Aug. 20, 24, '64.	Left; flap. A. Surg. T. A. McGraw, U. S. V. Disch'd April 8, 1865.
172	Smith, T. G., Pt., F, 107th New York.	Sept. 17, 20, '62.	Right. Surg. S. N. Sherman, 34th N. Y. Disch'd Dec. 6, 1862.
173	*Spearse, G. W.*, Pt., G, 40th Mississippi.	Sept. 19, 29, '63.	——. Surg. — Roberts, C. S. A. Recovery.
174	Stabenfeldt, E., Pt., A, 3d Wisconsin, age 30.	Sept. 17, Oct. 3, 1862.	Right; flap. Ass't Surgeon J. B. Brinton, U. S. A. Oct. 8, ligat'n ant. tibial. Disch'd Mar. 6, 1863.
175	*Stamps, J. R.*, Pt., A, 12th Georgia, age 21.	July 9, Aug. 6, 1864.	Left; circular. A. A. Surg. J. H. Coover. Exchanged October 17, 1864. *Spec.* 3816.
176	*Statem, E. S.*, Pt., B, 45th Virginia, age 23.	Sept. 19, 23, '64.	Right. Surgeon — Hill, C. S. A. Exchanged November 24, 1864.
177	Stealey, J., Corp'l, E, 10th W. Va., age 22.	Sept. 19, 23, '64.	Left; flap. Discharged February 5, 1865.
178	*Stewart, J. L.*, Pt., D, 49th N. C., age 30.	April 1, 21, '65.	Left; circular. A. A. Surg. W. E. Roberts. Released Aug. 2, 1865.
179	Stewart, T. B., Pt., G, 21st Massachusetts, age 21.	June 2, 24, '64.	Left; circular. A. A. Surg. W. C. Mulford. Disch'd Oct. 16, 1865. Nov., 1867, re-amp. upper third.
180	Stewart, T. B., Pt., C, 2d Connecticut H'vy Artillery, age 31.	Sept. 19, 23, '64.	Both; right, Sept. 23d; left, 24th. Ass't Surgeon J. G. Thompson, 77th N. Y. Oct. 2, hæmorrhage. Discharged August 7, 1865.
181			
182	*Suite, J. M.*, Pt., E, 23d N. Carolina, age 20.	May 2, 14, '63.	Left. Surgeon — Lott, C. S. A. Retired March 24, 1865.
183	[1] *S———, L.*, Pt., —, 22d N. Carolina, age 21.	May 3, 25, '63.	Left; circular flap. Recovery.
184	Terwilleger, T. R., Corporal, D, 85th N. York, age 21.	April 20, May 11, 1864.	Right; circular. Confed. surgeon. Partial anchylosis knee joint. Discharged July 27, 1865.
185	*Thayer, P. O.*, Corp'l, F, 8th Georgia, age 23.	July 2, 5, '63.	Right. Surgeon — Meoms, 11th Georgia. Recovery.
186	Thompson, M., Pt., C, 7th Indiana, age 25.	July 22, Aug. 10, 1864.	Left; double flap. A. A. Surg. E. Seyffarth. (Hæmorrhage.) Discharged September 20, 1864.
187	Tibbetts, J. G., Pt., M, 1st Maine Heavy Artillery, age 28.	June 3, 9, '64.	Left; circular. Surg. W. Watson, 105th Penn. Discharged Jan. 6, 1865. Died January 6, 1871.
188	*Tibbler, N. R.*, Lieut., K, 6th Arkansas, age 26.	Nov. 30, Dec. 29, 1864.	Left; anterior posterior skin flap. A. A. Surg. R. McNeilly. To Provost Marshal Feb. 6, 1865.
189	*Toothe, I. H.*, Pt., B, 61st Georgia, age 23.	July 1, 4, '63.	Left. Paroled September 25, '63.
190	*Turner, S.*, Corp'l, H, 21st Virginia, age 20.	July 2, 10, '63.	Left; circular. Surg. — Black, C. S. A. Exch'd March 3, 1864.
191	Valentine, C. L., Pt., B, 5th Wisconsin, age 34.	May 11, 15, '64.	Right; circular. Surgeon O. A. Judson, U. S. V. Discharged September 12, 1865.
192	Vermilyea, L., Pt., K, 91st New York, age 21.	Mar. 31, April 11, 1865.	Left; circular. Ass't Surgeon A. Delany, U. S. V. Discharged June 21, 1865. *Spec.* 4054.
193	*Vick, T. W.*, Pt., C, 3d Arkansas.	May 6, 9, '64.	——. Surg. — Brown, C. S. A. Recovery.
194	Wakefield, S. D., Pt., E, 3d Maine, age 24.	June 4, 7, '64.	Left; ant. posterior flap. Surg. A. Garcelon, of Maine. Disch'd March 6, 1865. *Spec.* 4474.
195	Waldon, E., Pt., E, 3d Delaware, age 25.	April 1, 11, '65.	Right; circular. A. A. Surg. F. Hall. Discharged October 6, 1865. *Spec.* 4055.
196	Walsh, R., Pt., C, 11th Massachusetts, age 20.	June 25, J'y 6, '62.	Right. A. A. Surg. C. H. Stowe. Discharged June 10, 1863.
197	Wanzer, S. O., Pt., K, 36th Illinois, age 20.	Sept. 20, 23, '63.	Left; circular. Disch'd March 16, 1864.
198	Warddle, J., Pt., G, 16th Massachusetts.	Aug. 29, Sep.3, '62.	Left. Discharged February 4, 1863.
199	Warner, J., Pt., C, 3d Wisconsin, age 32.	May 3, 15, '63.	Left; flap. Ass't Surg. W. Towers, 3d Wisconsin. Discharged August 25, 1863.
200	Weaver, H. F., Corp'l, B, 155th Pennsylvania, age 19.	July 2, 5, '63.	Right; circular skin flap. Surg. J. A. E. Reed, 155th Penn. Reamputation; hæmorrhage. Discharged July 21, 1865.
201	Welsheimer, E. W., Pt., G, 73d Ohio, age 19.	Oct. 29, Nov. 16, 1863.	Left; anterior posterior flap. A. A. Surg. C. F. Haynes. Hæmorrhage. Disch'd Dec. 30, 1864.
202	Welton, J. A., Lieut., E, 51st Indiana.	April 30, May 4, '63.	Left. Confederate surgeon. Discharged June 20, 1864.
203	Wheeler, W. W., Pt, E, 16th Maine, age 20.	Dec. 13, 22, '62.	Left; circular. Surg. E. Bentley, U. S. V. Discharged May 21, 1863. *Spec.* 597.

[1] Semmes (A. J.), *Surgical Notes of the late War*, in *New Orleans Medical and Surgical Journal*, 1866, Volume XIX, p. 68.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
204	Wheelock, G. C., Pt., K, 7th Michigan, age 20.	July 24, Aug. 6, 1864.	Right; circular. Surg G. L. Miller, C. S. A. Discharged Aug. 29, 1865.
205	White, J., Pt., D, 2d Maryland, age 30.	Aug. 29, Sep. 4, '62.	Right; circular. Discharged September 29, 1863.
206	Williams, J. C., Pt., F, 27th Indiana.	Sept. 17, Oct. 5, '62.	Left; flap. Discharged January 5, 1863.
207	Winters, Z., Pt., C, 129th Illinois, age 23.	July 10, 13, '64.	Right; circular. Surgeon A. W. Reagan, 70th Indiana. Disch'd July 29, 1865.
208	Wood, D., Pt., A, 56th Ohio.	May 16, 19, '63.	Right. Surg. W. N. King, 56th Ohio. Disch'd August 19, 1863.
209	*Woolbright, J. F.*, Pt., D, Orr's S. C. Rifles.	May 5, 12, '64.	——. Surgeon — Fletcher, C. S. A. Recovery.
210	[1] *Wright, A.*, —, H, 9th Kentucky.	Sept. 19, Oct. 1, '63.	Right. Surg. P. F. Eve, C. S. A. Hæmorrhage. Recovery.
211	Wright, H. D., Pt., D, 5th Mich. Cavalry, age 21.	Nov. 12, 19, '64.	Left; circular. A. A. Surg. W. P. Moon. Disch'd June 24, 1865.
212	[2] Wright, J. B., Pt., H, 16th Mass., age 30.	Aug. 30, Sept. 13, 1862.	Right; circular. Ass't Surg. C. A. McCall, U. S. A. (Hæm.) Nov. 3, 1862, re-amputation. Disch'd June 18, 1863. *Spec.* 136.
213	Wright, W. H., Pt., E, 30th New York, age 23.	Aug. 30, Sept. 7, 1862.	Right; necrosis. Jan. 16, 1864, re-amputat'n. Discharged September 28, 1864. Died May 20, 187[illegible]; consumption.
214	Yates, G., Pt., I, 4th N. Jersey, age 25.	May 5, 18, '64.	Right; flap. Surg. D. W. Bliss, U. S. V. Disch'd March 16, 1865.
215	Zimmer, D., Corp'l, E, 2d Ohio.	Sept. 20, Oct. 14, 63.	Right; circular. Discharged.
216	[3] Acker, T., Pt., A, 155th New York, age 40.	May 28, June 13, 1864.	Right; ant. posterior skin flaps. Surgeon J. A. Lidell, U. S. V. (Hæmorrhage.) Died June 22, 1864; exhaustion.
217	Adams, W., Pt., D, 3d New York Artillery, age 24.	June 27, July 14, 1864.	Left; circular. Ass't Surg. E. F. Hendrick, 15th Conn. Died July 30, 1864; irritative fever.
218	Auliff, M., Corp'l, G, 7th Wisconsin, age 20.	May 10, 16, '64.	Right; ant. posterior flap. Surg. E. Bentley, U. S. V. Gangrene. Died June 16, 1864; pyæmia.
219	*Barker, L. A.*, Pt., E, 37th Georgia, age 43.	Dec. 16, 20, '64.	Right; circular. A. A. Surg. R. L. McClure. (Gangrene.) Died December 28, 1864.
220	Barker, M. H., Serg't, C, 6th Vermont, age 26.	May 10, 20, '64.	Left; anterior posterior flap. A. A. Surgeon O. P. Sweet. Died May 24, 1864; pyæmia.
221	Belger, W., Pt., C, 1st Massachusetts Heavy Artillery, age 30.	May 12, 23, '64.	Right; circular. Surgeon N. R. Moseley, U. S. V. Died June 16, 1864; pyæmia.
222	Bliss, G. F., Corp'l, D, 30th Maine, age 21.	May 23, 31, '64.	Left; circular. A. A. Surg. M. F. Price. Died July 6, 1864; asthma.
223	Bollinger, B., Pt., C, 143d Pennsylvania, age 32.	June 20, July 10, 1864.	Right; circular. A. A. Surg. M. L. Baxter. Died July 15, 1864; exhaustion.
224	Brooks, J. P., Serg't, K, 57th Mass., age 26.	May 18, June 5, 1864.	Left; ant. posterior flap. Surg. C. Page, U. S. A. Died July 14, 1864; typhoid fever.
225	*Brown, A. A.*, Pt., D, 5th Florida.	July 2, 13, '63.	——. Died July 14, 1863; tetanus.
226	Brown, J., Capt., H, 92d Ohio.	Sept. 19, 27, '63.	Right. Sept. 28, hæm.; ligation on face of stump. Died October 5, 1863; hæmorrhage.
227	Burch, T. C., Pt., F, 83d New York, age 43.	May 8, 15, '64.	Right; ant. posterior flap. A. A. Surg. A. P. Craft. Died June 9, 1864; exhaustion.
228	Burns, J., Pt., C, 147th Pennsylvania.	Nov. 25, —, '63.	Left. (Gangrene.) Died December 3, 1863.
229	*C——, D.*, Pt., —, —.	Feb. 15, 26, '62.	Right; circular. Died March 9, 1862; erysipelas.
230	Cain, J. L., Pt., G, 1st Maine H. Art., age 23.	June 18, 21, '64.	Left; circular. Died August 5, 1864; pyæmia.
231	Campton, J. D., Pt., H, 33d Iowa.	April 30, May 3, '64.	Right. Died May 13, 1864.
232	Carthey, M. L., Pt., G, 50th Indiana.	April 30, May 25, 1864.	Left. Died May 28, 1864.
233	Childers, L. H., Corp'l, G, 110th Ohio, age 26.	June 3, 27, '64.	Left; circular. A. A. Surg. G. W. Edwards. Died July 14, 1864; exhaustion.
234	Clark, H., Pt., D, 8th Col'd Troops, age 33.	Sept. 29, Oct. 4, 1864.	Left; circular. A. A. Surgeon T. Hopkins. Died October 6, 1864; tetanus.
235	Cohatci, J., 2d Assistant Engineer, age 24.	June 4, 29, '64.	Left; circular; sloughing. Died July 26, 1864; pyæmia.
236	Cowdrey, E. A., Capt., A, 95th New York, age 31.	Mar. 31, April 16, 1865.	Right; anterior posterior flap. Surg. H. W. Ducachet, U. S. V. Died May 7, 1865; pyæmia. *Spec.* 4078.
237	Cummings, R. W., Pt., D, 28th N. J., age 21.	Dec. 13, 26, '62.	——. Died January 15, 1863; pyæmia.
238	*Defnell, D.*, Pt., G, 10th Georgia, age 21.	July 2, 18, '63.	——. Died August 17, 1863; pyæmia.
239	Dodge, L., Pt., D, 10th Vermont, age 27.	Sept. 22, Oct. 12, 1864.	Left; circular. Surg. Z. E. Bliss, U. S. V. Died October 29, 1864; pyæmia.
240	Engleman, C., Adj't, 4th Pennsylvania Cavalry, age 26.	Mar. 30, April 19, 1865.	Left; circular. Surgeon D. W. Bliss, U. S. V. Died May 12, 1865; pyæmia.
241	Farnham, L., Pt., D, 5th New Hampshire, age 37.	June 3, 9, '64.	Left; ant. posterior flap. Surg. E. Bentley, U. S. V. Died June 20, 1864; gangrene.
242	Ford, J. E., Pt., A, 33d Ohio, age 29.	Mar. 19, April 8, 1865.	Left; flap. Ass't Surgeon W. Webster, U. S. A. Died May 13, 1865.
243	Frodine, J. W., Pt., G, 6th Wisconsin.	Sept. 17, Oct. 6, 1862.	Left. Ass't Surg. C. Bacon, jr., U.S.A. (Necrosis.) Hæm. Died Oct. 15, 1862; hæm. *Spec.* 363.
244	[4] Frost, G., Pt., B, 57th Ohio.	Jan. 3, 22, '63.	Left; flap. Surg. J. Shrady, 2d Tenn. Died Jan. 28, '63; pyæm.
245	Gallagher, E., Pt., F, 69th N. York, age 37.	June 3, 17, '64.	Right. A. A. Surgeon A. Ansell. Died June 28, 1864; pyæmia. *Spec.* 2572.
246	*Gaskins, W. H.*, Serg't, K, 8th Virginia, age 20.	July 2, Aug. 1, 1863.	Right. Nov. 4, removed 6 ins. end of tibia. Died Nov. 5, 1863; diarrhœa. *Spec.* 1962.
247	Gattan, T., Pt., C, 64th Ohio.	Dec. 31, Jan. 4, 1863.	Left. Ass't Surg. H. P. Anderson, 64th Ohio. Died January 8, 1863; gangrene.
248	Gesner, H., Corp'l, G, 176th N. York, age 18.	Oct. 19, Nov. 7, 1864.	Right. A. A. Surg. B. B. Miles. Died Nov. 26, 1864; exhaustion. *Spec.* 3429.
249	*Gilreath, L. P.*, Pt., B, 2d S. Carolina, age 22.	July 2, 20, '63.	Left; circular; necrosis of tibia. Died October 2, 1863.
250	Gravenstine, C., Pt., E, 95th Pennsylvania, age 24.	Aug. 2, 29, '64.	Right; circular. Surgeon Z. E. Bliss, U. S. V. Gangrenous. Died August 31, 1864; pyæmia.
251	Guntman, C., Pt., A, 27th Pennsylvania.	May 3, —, '63.	Left. Died June 7, 1863; typhoid fever. *Spec.* 1548.
252	Hall, M. J., Pt., G, 2d New Hampshire.	Aug. 30, Sep. 8, '62.	Right. Died September 16, 1862; tetanus.
253	Hannans, J., Pt., K, 97th Pennsylvania, age 23.	May 20, June 11, 1864.	Right; circular. A. A. Surgeon O. W. Peck. Died September 20, 1864; diarrhœa.
254	Harrington, H., Serg't, B, 109th N. Y., age 26.	June 23, July 20, 1864.	Left; circular. A. A. Surgeon A. Ansell. (Gangrene.) Died August 26, 1864. *Spec.* 3125.
255	Heagy, P., Pt., C, 7th Pennsylvania Res.	Dec. 13, 24, '62.	Left; flap. (Hæmorrhage.) Dec. 27, hæm.; ligation. Jan. 1, '63, hæmorrhage. Died January 30, 1863. *Spec.* 562.
256	Hill, A., Pt., F, 18th Massachusetts, age 27.	Dec. 15, 1862, Jan. 4, '63.	Right. January 25, hæmorrhage, 36 oz. Died January 29, 1863; hæmorrhage.
257	Hodgkinson, W., Corp'l, A, 9th New York State Militia, age 23.	Dec. 13, 17, '62.	Left. Died January 27, 1863; pyæmia.
258	*Hoffsticker, W.*, Pt., B, 3d Mississippi, age 19.	Dec. 16, 1864, Jan. 2, '65.	Right; circular. A. A. Surg. E. Woodruff. Carious; gangrene. Died Jan. 11, 1865; exhaustion.
259	Holt, J., Pt., H, 6th Wisconsin.	July 1, —, '63.	Left. Surg. S. P. Bonner, 47th Ohio. Died July 16, '63; tetanus.
260	*Hudson, H. J.*, Pt., D, 12th Georgia Battery, age 24.	July 9, 22, '64.	Right; circular. A. A. Surg. T. E. Mitchell. Died July 31, 1864; chronic diarrhœa. *Spec.* 3942.
261	*Hulle, H. R.*, Pt., A, 3d Mississippi, age 24.	Dec. 5, 16, '64.	Right. Died January 14, 1865; amputation and diarrhœa.
262	Hyler, F. H., Pt., B, 55th Ohio, age 20.	May 15, June 6, 1864.	Left; circular. A. A. Surg. L. Sinclair. Died June 8, 1864; exhaustion.
263	Iron, F., Pt., A, 76th Col'd Troops, age 20.	April 1, 26, '65.	Right; ant. post. skin flap; circular section muscles. Surg. F. E. Piquette, 86th C. T. (Gangrene; diarrhœa.) Died May 11, 1865; hectic fever and acute diarrhœa.
264	Johl, W. H., Pt., D, 52d New York.	May 3, 17, '63.	Left. Surg. C. S. Wood, 66th N. Y. Died May 26, 1863. *Spec.* 1173.
265	[5] Johnson, M., Pt., G, 23d Wisconsin.	Jan. 11, 31, '63.	Left. A. A. Surg. T. T. Smiley. Died Feb. 5, 1863; exhaustion.
266	Jones, R. B., Pt., B, 7th Illinois Cavalry.	Oct. 9, Nov. 11, 1863.	Left; circular. A. Surg. J. C. G. Happersett, U. S. A. Died Nov. 15, 1863; congestive chill.
267	Karnes, O. W., Pt., E, 65th New York, age 35.	Oct. 19, Nov. 18, 1864.	Left; lateral flap A. A. Surgeon R. H. Stirling Died November 20, 1864; pyæmia.
268	Keller, W., Pt., I, 1st Cavalry, age 39.	Mar. 28, April 12, 1865.	Right; ant. post. flap. A. A. Surg. J. H. Thompson. Died April 18, 1865; pyæmia and gangrene.

[1] Eve (P. F.), *Cases of Secondary Hæmorrhage*, in *U. S. Sanitary Commission Memoirs*, 1870, Surgical Volume I, pp. 210, 211.

[2] Coues (E.), *Report of Some Cases of Amputations, etc.*, in *Medical and Surgical Reporter*, 1862-63, Volume IX, p. 196.

[3] Lidell (J. A.), *On the Wounds of Blood Vessels, etc.*, in *U. S. Sanitary Commission Memoirs*, 1870, Surgical Volume I, p. 24.

[4] Shrady (J., jr.), *Gunshot Wound—Compound Comminuted Fracture of Left Metatarsus, etc.*, in *Am. Med. Times*, 1863, Volume VI, p. 113.

[5] Smiley (T. T.), *Gunshot Wounds from Arkansas Post*, in *Boston Medical and Surgical Journal*, 1863, Volume LXIX, p. 159.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
269	Kelly, T., Corp'l, D, 4th Maine, age 42.	May 5, 15, '64.	Left; antero-posterior flap. Surg. E. Bentley, U. S. V. Died May 21, 1864; exhaustion.
270	King, T., Pt., —, 4th Michigan, age 22.	May 31, June 11, 1864.	Left; circular. A. A. Surg. H. B. Knowles. Died Oct. 24, 1864.
271	Knowles, A. J., Corp'l, M, 1st Maine Heavy Artillery, age 34.	June 18, July 10, 1864.	Right; circular. A. A. Surgeon M. L. Baxter. Died July 17, 1864; exhaustion. *Spec.* 2829.
272	Kurtz, F. E., Serg't, G, 159th N. York, age 22.	Aug. 25, 28, '64.	Right; circ. Surg. Z. E. Bliss, U. S. V. Died April 28, 1865.
273	Lake, J., Pt., D, 6th N. York Heavy Artillery, age 40.	May 19, June 18, 1864.	Right; ant. post. skin flap. Ass't Surgeon W. Thomson, U. S. A. Died July 11, 1864. *Spec.* 3565.
274	Lance, S., Pt., I, 29th Missouri.	De.29,'62, Jan. 19, 1863.	Right. Died January 23, 1863. *Spec.* 1031.
275	Linekin, J. F., Pt., K, 20th Maine, age 17.	May 5, 8, '64.	Left; ant. post. flap. Died June 19, 1864; exh'n and privation.
276	Ling, C. B., Pt., B, 56th Pennsylvania.	July 1, 16, '63.	Right. Died July 18, 1863.
277	Long, T., Pt., H, 37th Wisconsin, age 34.	June 18, J'y 2, '64.	Left; flap. Surg. T. R. Crosby, U. S. V. Died July 7, 1864; exhaustion.
278	McCawley, S. E., Pt., H, 28th Iowa, age 19.	Oct. 19, Nov. 7, 1864.	Right; circ. A. A. Surg. E. R. Fell. (Necrosis); hæmorrhage. Nov. 11, ligation anterior tibial. Died Nov. 19, '64; hæmorrhage.
279	McCleary, A. P., Pt., B, 63d Penn., age 25.	July 2, 8, '63.	Right. Died November 7, 1863.
280	McClure, R. C., Pt., H, 29th Iowa.	April 30, May 3,'64.	Right. Died May 22, 1864.
281	*McGilton, J. F.*, Pt., G, 6th Texas, age 18.	Nov. 30, Dec. 26, 1864.	Right; circular. A. A. Surgeon L. Sinclair. Died February 6, 1865.
282	[1]Minamom, J. G., Pt., L, 1st New York Artillery, age 23.	May 18, 21, '64.	Left; double ant. posterior flap. Ass't Surg. G. A. Mursick, U. S. V. Died June 8, 1864; pyæmic pneumonia. *Spec.* 2494.
283	Mitchell, T., Pt., C, 36th Indiana.	Sept. 19, Oct. 7, 1863.	Left; flap. A. A. Surgeon J. A. Romayne. (Gangrene.) Died October 15, 1863; pyæmia.
284	Mock, L., Pt., I, 119th Pennsylvania, age 22.	Nov. 7, Dec. 6, 1863.	Left; flap. Surgeon D. W. Bliss, U. S. V. (Necrosis.) Died Dec. 21, 1863; pyæmia. *Spec.* 1903.
285	Morrison, S., Corp'l, D, 81st New York, age 24.	June 3, 27, '64.	Left. Died July 26, 1864; pyæmia.
286	*Moulton, B.*, Pt., H, Gordon's Cavalry, age 28.	Oct. 20, 31, '64.	Right; flap. Surg. G. W. Hogeboom, U. S. V. Gangrene. Died Nov. 6, 1864; typhoid fever.
287	Murray, L., Pt., H, 1st Maine Heavy Artillery, age 18.	May 27, June 8, 1864.	Left; circular. Surg. R. B. Bontecou, U. S. V. Died June 8, '1864; exhaustion.
288	Nailan, P., Pt., H, 3d Rhode Island.	June 16, —, '62.	Right. Died July 27, 1862; diarrhœa.
289	Newburg, H..Pt..F, 24th Massachusetts, age 28.	Aug. 12, 24, '64.	Left; circular. A. A. Surg. W. L. Welles. Died August 29, 1864; mortification of stump.
290	Nivemeyer, J., Pt., G, 33d Iowa.	April 30, May 4,'64.	Right. Died May 13, 1864.
291	Norton, M., Pt., I, 73d N. York, age 23.	July 3, 21, '63.	Left. Died August 1, 1863. *Spec.* 1453.
292	Owens, G. H., Pt., F, 6th Maine, age 18.	Nov. 7, 11, '63.	Right: circular. Surgeon D. W. Bliss, U. S. V. Died January 31, 1864; variola. *Spec.* 1769.
293	*Piles, W.*, Pt., A, 3d Virginia.	Aug. 30, Sept. 10, 1862.	Right. Died October 21, 1862; pyæmia.
294	Pinager, J., Pt., H, 12th Missouri Cavalry, age 24.	Dec. 15, 25, '64.	Left; ant. post. flap. Ass't Surg. W. B. Trull, U. S. V. (Gang.; tetanus.) Died December 27, 1864; inflammation of lungs.
295	Poole, J. H., Lieut., I, 52d Ohio, age 33.	June 27, July 17, 1864.	Left; flap. Surg. J. E. Herbst, U. S. V. (Gangrene.) Died July 30, 1864; pyæmia.
296	Porsno, L., Pt., B, 14th New Jersey, age 23.	May 6, 17, '64.	Left; circular. A. A. Surgeon T. Carroll. Died Sept. 24, 1864.
297	Porter, G. H., Pt., D, 3d Indiana Cavalry, age 31.	May 5, 17, '64.	Right; circular. Ass't Surg. W. Thomson, U. S. A. (May 5, Syme's amputat'n.) Died June 4, 1864; pyæmia.
298	*Redd, J. P. D.*, Serg't, E, 13th Virginia.	Dec. 13, 16, '62.	Left; circular. Died January 12, 1863.
299	Relyea, H., Pt., I, 2d N. York Heavy Artillery, age 52.	June 18, July 4, 1864.	Left; circular. A. A. Surg. W. H. True. (Gangrene.) Died July 10, '64; exhaustion. *Spec.* 2763.
300	Reynolds, P., Pt., K, 5th New Jersey, age 19.	June 17, 20, '64.	Left; circular. Surg. W. Watson, 105th Penn. Died July 30, 1864; exhaustion. *Spec.* 4578.
301	Rickman, F., Pt., K, 55th Massachusetts.	July 8, 13, '64.	Left; antero-posterior flap. Died July 28, 1864; pyæmia.
302	Ruthledge, J.W., Serg't, E, 97th Indiana, age 30.	June 15, 30, '64.	Right; circular. A. A. Surg. J. W. Digby. Died July 6, 1864.
303	Schulz, P., Pt., K, 4th Artillery, age 28.	May 3, 20, '63.	Right. Surg. J. H. Baxter, U. S. V. Died May 31, 1863; tetanus. *Spec.* 1136.
304	Scott.G.B.,Corp'l, K,8th N. Y. Cavalry, age 19.	June 9, 20, '63.	Right. Died July 1, 1863; erysipelas. *Spec.* 1347.
305	Shaffle, J., Pt., H, 90th Pennsylvania, age 29.	Dec. 13, 25, '62.	Right. A. A. Surg. D. Weisel. Died January 12, 1863; pyæmia. *Spec.* 479.
306	Shlaffly, C., Pt., F, 1st Pennsylvania Rifles.	Sept. 14, Oct. 3,'62.	Left. Surg. H. S. Hewit, U. S. V. Died October 17, 1862. *Spec.* 439.
307	Shoemnker, I., Pt., H, 57th Ohio, age 33.	Jan. 11, 31, '63.	Left. (Jan. —, amp. ankle joint.) Necrosis; gangrene. March 8, re-amp. leg, middle third. Died March 19, 1863; gangrene.
308	Simmons, N. E., Pt., K, 3d Tennessee, age 26.	May 14, June 8, 1864.	Right; circular. Ass't Surg. C. C. Byrne, U. S. A. Died June 16, 1864; pyæmia.
309	Simpson, C. H., Pt., C, 143d New York.	Oct. 29, Nov. 18, 1863.	Left. Ass't Surg. C. S. Frink, U. S. V. Died November 25, 1863; pyæmia.
310	Smith, H., Serg't, K, 2d Infantry.	Sept. 17, Oct. 3,'62.	Left. Died October 15, 1862.
311	Smith, H. S., Pt., F, 11th New Jersey, age 21.	May 12, 21, '64.	Left; ant. post. flap. Dr. Lewis, Philadelphia. Exfoliation. Died November 22, 1864; pyæmia.
312	Smith, L., Pt., D, 12th Infantry, age 24.	May 12, 21, '64.	Left; circular. A. A. Surg. C. H. Osborn. Large bed-sores. Died June 3,'64; pyæmia. *Spec.* 2739.
313	Smith, P., Corp'l, C, 3d New Hampshire, age 19.	Aug. 16, 22, '64.	Left; circular. A. A. Surg. C. F. Bullen. (Amp. right leg.) Died August 30, 1864; exhaustion.
314	Smith, T., Pt., G, 28th Connecticut.	June 14, —, '63.	Left. Died June 29, 1863.
315	Snyder, A. W., Corp'l, K, 183d Pennsylvania, age 20.	Mar. 25, April 5, 1865.	Right; circular. A. A. Surg. H. E. Woodbury. Died April 24, 1865; pyæmia.
316	*Starwalt, M.*, Pt., K, 5th North Carolina, age 21.	Oct. 19, Nov. 1, 1864.	Left; circular. A. Surg. W. H. Williams, 5th North Carolina. Died Nov. 10, 1864; pleuritis.
317	Sterling, G., Pt., I, 20th Maine, age 27.	Sept. 30, Oct. 11, 1864.	Left. Lenoir's method. Surg. R. B. Bontecou, U. S. V. Erysipelas; gangrene. Oct. 15, amp. thigh. Died October 20, 1864; exhaustion. *Spec.* 3285.
318	Steward. A. R., Pt., B, 34th Illinois.	April 6, 20, '62.	Left. Died April 25, 1862.
319	Steward. R., Pt., I, 8th Penn. Reserves.	Dec. 13, 27, '62.	Left. Died December 28, 1862.
320	Stoerzer, H., Pt., B, 22d Massachusetts.	July 1, 27, '62.	Left. Died July 28, 1862.
321	Stone, W., Pt., D, 2d Connecticut H'vy Artillery, age 32.	June 1, 27, '64.	Left; ant. post. flap. Ass't Surg. W. Webster, U. S. A. Died July 24, 1864; pyæmia.
322	Thompson, J., Pt., A, 14th N. York Cavalry, age 21.	April 9, 24, '64.	Left; flap (erysipelas). A. Surg. A. Hartsuff, U. S. A. Died May 5, 1864; pyæmia.
323	Trumpleman, O., Lieut., C, 119th New York.	July 3, 20, '63.	Right (hæmorrhage). Died July 24, 1863. *Spec.* 1459.
324	Vangelder, L., Pt., D, 107th N. York, age 21.	May 25, June 24, 1864.	Left; circular. A. A. Surg. H. C. May. (Necrosis.) Died July 29, 1864; diarrhœa. *Spec.* 3496.
325	*Vermillion, J. K.*, Pt., B, 1st Virginia Artillery, age 20.	July 24, Aug. 5, 1864.	Left; circular. A. A. Surg. A. R. Gray. (Necro.); pyæmia. Died August 20, 1864. *Spec.* 3808.
326	*Wagers, J.*, Pt., B, 14th South Carolina, age 17.	April 2, 5, '65.	Left; circular. Died April 19, 1865; pyæmia.
327	Waters, D. J., Pt., F, 60th Ohio, age 21.	May 11, 25, '64.	Left; circular. Surg. R. B. Bontecou, U. S. V. Died June 25, 1864; pyæmia.
328	Webber, G. A., Pt., A, 20th Maine, age 19.	May 6, 29, '64.	Left; circular. Ass't Surg. W. F. Norris, U. S. A. Died July 10, 1864; exhaustion and chronic diarrhœa. *Spec.* 3534.
329	Wetzel, J., Pt., C, 165th New York.	May 27, J'ne 8,'63.	Right. Died June 12, 1863. *Spec.* 1306.
330	Wilson, H., Serg't, A, 71st Ohio, age 26.	Sept. 2, 20, '64.	Left; flap. A. A. Surgeon D. H. Bell. (Gangrene.) Died Sept. 24, 1864; exhaustion.
331	Wood, L., Pt., D, 5th New Hampshire, age 15.	April 6, 18, '65.	Right; circular. A. A. Surg. C. H. Pegg. Died April 26, 1865. *Spec.* 4098.
332	Woodward, H. B., Serg't, E, 125th New York, age 22.	Aug. 16, Sept. 10, 1864.	Left; circular. A. A. Surg. G. P. Sargent. (Sloughing.) Sept. 20, and Oct. 5, hæmorrh. Died December 7, 1864; pneumonia. *Specs.* 3658, 3657.
333	*Wormsley, L. W.*, Pt., K, 8th Florida, age 35.	July 2, 6, '63.	Left; necrosis. Dec. 29, amput'n thigh. Died Dec. 30,'63; exh'n.
334	Wright, M. F., Major, 20th Ohio, age 26.	Dec. 20, —, '64.	Left. (Dec. 20, excision tarsus.) Died January 7, 1865.
335	York, M., Pt., E, 120th New York, age 20.	July 2, 28, '63.	Right. (July 27, amp. left leg.) A. A. Surg. F. Hinkle Died Aug. 8, 1863. *Specs.* 1605, 1609.

[1] LIDELL (J. A.), *On Thrombosis and Embolism*, in *American Journal Medical Sciences*, 1872, Volume LXIV, p. 354, and *On the Secondary Traumatic Lesions of Bone*, in *U. S. Sanitary Commission Memoirs*, 1870, Surgical Volume I, p. 330.

Intermediary Amputations in the Leg, in which the Point of Operation is not specified.

In forty-seven instances of intermediary amputation in the leg the precise point of ablation was not indicated. Fifteen operations were successful and thirty-two fatal; they were performed on forty-six patients, in a fatal instance both legs having been removed. Twenty-nine were Union and seventeen Confederate soldiers.

CASE 781.—Corporal *W. Dunlap*, Co. E, Confederate Marine Corps, aged 32 years. was wounded during the naval engagement with the Confederate Steamer Atlanta, June 17, 1863. He was captured and treated at various hospitals, lastly entering West's Buildings, Baltimore, on February 11, 1864. Surgeon T. H. Bache, U. S. V., in charge of the latter, described the injury as a "shot fracture of the right leg, produced by an iron splinter, for which amputation of the leg was performed on June 25th." Surgeon A. Chapel, U. S. V., reported that the patient recovered and was sent to Fort McHenry April 10, 1864. The Confederate hospital records show that the man was ultimately retired from service January 31, 1865.

CASE 782.—Private *R. Field*, Co. A, 6th Virginia, was wounded in the leg during an engagement on June 21, 1862. On the following day he was admitted to Confederate hospital Chimborazo No. 2, at Richmond, the records of which show the following description of the injury and its result: "There was a gunshot comminuted fracture of the tibia and fibula, implicating the ankle joint, the point of entrance being just above the external malleolus and that of exit three-fourths of an inch above the internal malleolus. When admitted the ankle joint was swollen and painful, but there was no swelling above the seat of the fracture, and no fever. On consultation it was decided to save the limb, which was laid on a pillow, cold-water dressings being applied and poultices used to promote suppuration. By June 26th there was high inflammatory fever, which abated on June 30th. The ankle joint was now greatly swollen and red and suppurating considerably; patient very much emaciated; appetite poor. Amputation of the leg was performed on July 2d, and on the night following hæmorrhage took place from the stump. This was checked by elevating the stump and the application of cold water. The patient continued to decline, and died on the next day, July 3, 1862. An examination of the amputated leg revealed extensive injury to the soft parts in addition to the comminution of the bone. The tibia was split for three inches, and the ankle joint was filled with pus."

TABLE LXXV.

Summary of Forty-seven Intermediary Amputations in the Leg, the Point of Ablation unspecified.

[Recoveries, 1—15; Deaths, 16—47.]

NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.	NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	*Ammons, S.*, Pt., G, 23d South Carolina.	Aug. 30, Sep.2,'62.	Left. Surg. W. M. Michel, P. A. C. S. Recovered	24	Fingerle, J. A., Pt., H, 9th Wisconsin.	April 30, May3,'64.	Left. Died May 9, 1864.
2	*Branson, J. W.*, Pt., G, 1st South Carolina.	Aug. 29, Sep.1,'62.	——. Surg.—Robertson, C. S. A. Recov'd. Disch'd Oct. 10, 1862.	25	Flemming, C., Pt., A, 35th New York.	Dec. 13, 18, '62.	Both. Died December 21, 1862.
3	*Cox, J.*, Pt., K, 58th N. Carolina.	Nov. 25, 28, '63.	Left. Transferred February 14, 1864.	27	Foster, S. C., Pt., G, 50th Indiana.	April 30, May3,'64.	Right. Died May 11, 1864.
4	*Dawson, W. L.*, Pt., G, 28th Tenn., age 30.	April 6, —, '62.	Left. Discharged June 27, 1862.	28	*Gardner, T.*, Pt., G, 10th Mississippi.	July 28, —, '64.	Right. Surg. J. Spiegelhalter, 12th Mo. Died Aug. 11, 1864.
5	*Dunlap, W.*, Corp'l, E, Conted. Marine Corps, age 32.	June 17, 25, '63.	Right. Retired from service January 31, 1865.	29	Grion, H. C., Serg't, G, 29th Iowa.	April 30, May3,'64.	Left. Died May 14, 1864.
6	*Gibson, J.R.*, Pt., E, 37th Virginia.	June 28, J'y 3, '62.	——. Surg.—Staunton, C. S. A. Recovered.	30	Hibbs, P. F., Lieut., D, 71st Pennsylvania.	Dec. 13, 22, '62.	Right; gangrene. Died December 30, 1862.
7	*Goodman, D. R.*, Pt., B, 19th Virginia.	Aug 30, Se.28,'62.	——. Surgs. W. J. Allen and J. E. Chancellor, C. S. A. Recovered.	31	Hodgeboom, W. B., Pt., K, 5th New York.	Aug. 30, Sep.4,'62.	——. Ass't Surgeon B. Howard, U. S. A. Died May 10, 1863.
8	Hill, A. C., Pt., D, 28th New York.	Aug. 9, 13, '62.	Right. Discharged January 14, 1863.	32	Inman, J. T., Serg't, K, 21st Ohio.	Sept. 1, 23, '64.	Right. Died October 1, 1864.
9	*Holt, J.*, Pt., B, 37th Virginia.	Aug. 9, 14, '62.	——. Union surgeon. Recovered.	33	Laugbery, J. M., Pt., B, 11th Pennsylvania Reserves, age 35.	Aug. 30, Sept. 4, 1862.	Right. (Also wounds right thigh and left leg.) Sept. 1, 4, hæm. Died Sept. 8, 1862; hæmorrhage.
10	*Humphries, L. D.*, Pt., H, 31st Virginia.	Aug. 7, 11, '64.	——. Surg. A. Atkinson, C. S. A. Recovered.	34	Madden, R., Pt., H, 29th Iowa.	April 30, May 26, 1864.	——. Died Aug. 16, 1864, while a prisoner of war.
11	*Lowrey, S. B.*, Pt., E, 2d Georgia, age 39.	July 2, —, '63.	Left. Transferred to Provost Marshal September 10, 1863.	35	Mandel, H., Pt., D, 27th Wisconsin.	April 30, May3,'64	Left. Died May 13, 1864.
12	Right, C., Pt., I, 48th Colored Troops, age 23.	April 1, 12, '65.	Right; ant. post. skin flap and circ. section of muscles. Surg. P. E. Piquette, 86th Colored Troops. Disch'd July 22, 1865.	36	McCollum, A., Signal Corps.	May 3, 7, '63.	——. Died May 14, 1863.
13	Unknown, 26th Pennsylvania.	Nov. 27, —, '63.	——. Ass't Surg. J. T. Calhoun, U. S. A. Recovered.	37	*McDaniel, M.*, Pt., K, 48th Virginia, age 51.	May 23, June 9, 1863.	Left; sloughing; hæm. June 27, femoral artery ligated. Died July 8, 1863.
14	Utt, L. H., Capt., A, 7th Kansas Cav., age 22.	April 24, 27, '63.	Left; flap. Surg. W. R. Marsh, 2d Iowa. Must. out Sept. 29,'65.	38	Mosely, J. P., Serg't., D, 13th Kansas.	April 30, May5,'64.	Left. Died May 11, 1864.
15	*Wood, C. E.*, Musician, 5th Virginia.	May 17, 25, '62.	——. Surg. R. F. Baldwin, P. A. C. S. Recovered.	39	[1] Newman, L. C., Lieut. Col., 31st New York.	May 3, 17, '63.	Left. Surg. M. Clymer, U. S. V. Tetanus; hæm. Died June 7, '63.
16	*Anderson, J.*, Pt., G, 5th North Carolina.	July —, —, '63.	——. Died July 11, 1863.	40	Richardson, J. H., Pt., D, 5th Kentucky.	June 20, 23, '64.	Right. Died June 29, 1864.
17	Baldwin, G., Pt., F, 86th Indiana, age 35.	Jan. 1, 11, '63.	——. Jan. 26, hæmorrhage from ant. tib. art. Died Jan. 15, 1863.	41	Schooling, J., Pt., D, 29th Iowa.	April 30, May3,'64.	Left Died June 4, 1864.
18	Cogin, J., Pt., B, 20th Tennessee, age 29.	April 7, 10, '62.	Right; tubercles; diarrh. Died April 25, 1862.	42	Smith, J. A., Pt., C, 29th Iowa.	April 30, May3, '64.	Left. Died May 5, 1865, while a prisoner of war at Tyler, Texas.
19	Cookson, A., Pt., K, 32d Maine.	May 12, —, '64.	Right. Died May 19, 1864.	43	*Taylor, R. C.*, Pt., K, 19th Virginia.	May 10, 13, '64.	——. Surg. C. B. Gibson, C. S. A. Died May 18, 1864.
20	Crawford, C. N., Pt., A, 104th Pennsylvania.	Sept. 17, 20, '62.	Right. Died October 2, 1862.	44	Weber, A., Pt., I, 9th Wisconsin.	April 30, May3,'64.	Left. Died May 7, 1864.
21	Farley, J., Pt., F, 72d New York.	July 2, 5, '62.	——. Died September 1, 1862.	45	Winn, M., Pt., G, 14th New York.	Aug. 30, Se. 21,'62.	Left. Died October 1, 1862; pyæmia.
22	Fellows, H. H., Pt., H, 12th New York.	July 2, 5, '62.	——. Also wounds of face and shoulder. Died July 6, 1862.	46	Wescott, O., Pt., C, 121st New York.	May 3, —, '63.	Right. Died May 14, 1863.
23	*Field, R.*, Pt., A, 6th Virginia.	June 21, J'y 2, '62.	——; hæmorrhage. Died July 3, 1862.	47	Youch, J., Pt., B, 28th Illinois.	April 6, 28, '62.	Right. Died May 15, 1862; pyæmia.

[1] SWINBURNE (J.), *Unnecessary Amputation of the Leg—Tetanus—Death*, in *Medical and Surgical Reporter*, Philadelphia, 1863, Vol. X, p. 319.

In the case of Private *M. McDaniel*, Co. K, 48th Virginia (No. 37, TABLE LXXV), the left femoral artery was unsuccessfully ligated eighteen days after the amputation.

SECONDARY AMPUTATIONS IN THE CONTINUITY OF THE LEG FOR SHOT INJURY.—Of the amputations in the leg for shot injury, the secondary operations give the most favorable results. Of four hundred and forty-four cases, one hundred and seventeen were fatal, a mortality rate of 26.3 per cent., or 4.6 per cent. less than the fatality of the primary operations. One hundred and thirty-three operations were performed in the upper third, one hundred and seventy-four in the middle third, one hundred and twenty-one in the lower third of the leg, and in sixteen instances the reports failed to indicate the precise point of ablation.

Secondary Amputations in the Upper Third of the Leg for Shot Injury.—Of the one hundred and thirty-three cases of this group, thirty-seven, or 27.8 per cent., had fatal terminations. In sixty-two cases the right, in sixty-seven the left leg was removed; in four this point was not recorded.

Examples of Recovery after Secondary Amputations in the Upper Third of the Leg for Shot Injury.—The ninety-six successful operations were performed—thirteen on Confederate and eighty-three on Union soldiers. Of the latter, eighty-one became pensioners; ten have died since the date of their discharge from the army.

CASE 783.—Private *B. Fields*, Co. C, 27th North Carolina, aged 21 years, was wounded in the right leg and taken prisoner at Antietam, September 17, 1862. He entered hospital No. 5, at Frederick, ten weeks afterwards, where Surgeon H. S. Hewit, U. S. V., recorded the following description of the injury: "A gunshot wound of the tibia and fibula by a minié ball; continuity of bone entirely destroyed; leg very much swollen, offensive, and filled with pus. Flap amputation at the upper third of the leg was performed on November 28th by Acting Assistant Surgeon A. V. Cherbonnier. The stump was closed with three stitches and wet strips of muslin. Reaction was very satisfactory; patient cheerful. On the next day the dressing was removed and some adhesive strips were applied, the stump looking well but there being some pain, for which one grain of morphia was administered. On November 30th the patient looked and felt well, having slept nearly all night; appetite good; wound suppurating well; stump dressed with lint and cold water and well supported with a roller. Secondary hæmorrhage occurred on December 1st, when the popliteal artery was ligated by Surgeon Hewit. One week afterwards the ligature had not yet come away, but there was hæmorrhage from the wound, the cause of which was not very obvious. The tourniquet was then applied to the femoral and the wound filled with charpie saturated with solution of persulphate of iron. By December 11th the wound in the popliteal space was suppurating; stump healthy looking and dressed with wet strips of muslin; patient pale in appearance, and ordered to take three grains of quinine and five grains of tartrate of iron and potassa every four hours. Early on the morning of December 15th another tolerably severe hæmorrhage took place, the popliteal ligature not yet having come away; continued the tourniquet to the femoral and prescribed quinine and iron, cod-liver oil, and egg-nog. Two days later the tibia was found to protrude; tourniquet still kept applied, though a little slackened. On December 18th there was another hæmorrhage, the loss of blood being about six ounces, controlled by tightening the tourniquet. By December 20th reaction was slowly established, though the patient's face was still bloodless; appetite tolerably good; treatment continued. An attack of diarrhœa had been promptly arrested by the administration of rhubarb powder, ipecacuanha, and opium. December 24th, patient rallying, though the stump still gives evidence of a low state of vital powers. Several days afterwards the stump looked healthier, and on December 29th, when the patient was transferred to hospital No. 1, he was in good spirits and good granulations were springing up." Assistant Surgeon R. F. Weir, U. S. A., in charge of the latter hospital, recorded the subsequent progress of the case as follows: "The stump continued to look and suppurate well, the patient having but very little pain and his bowels remaining in good condition; appetite improving. For three days previous to January 26th he complained of great tenderness along the inner side of the thigh, where, on examination, fluctuation was detected, and where an incision was made which was followed by the evacuation of ten ounces of pus, the sinus extending under the deep muscles of the posterior and outer aspect. Injections of hydrochloric acid and laudanum diluted in water were then used, and by January 27th the ulcer of the stump had nearly cicatrized and the cavity of the abscess was rapidly filling up; patient improving in general health and able to sit up most of the time. About two weeks later the patient was in very good condition and going about on crutches, the stump cicatrizing rapidly and looking healthy. On February 28th the patient was discharged from hospital treatment, his general condition having improved very rapidly and the ulcer of the stump having healed." Several days afterwards the patient was paroled and sent south. The Confederate hospital records show that the man was admitted, on March 18th, to the General Hospital at Petersburg, and that he was permitted to leave for his home, on furlough, April 6, 1863. The greater portion of the amputated bones of the injured leg (*Spec.* 751), contributed to the Museum

FIG. 309.—Ununited comminuted fracture in the right tibia and fibula.—*Spec.* 751.

by Dr. Cherbonnier, are represented in the annexed wood-cut (FIG. 309), showing an ununited comminuted fracture of both bones in the lower part, followed by an effusion of a large amount of callus, fragments being attached to the fibula, while the tibia is carious within.

CASE 784.—Private B. F. French, Co. H, 7th New Hampshire, aged 21 years, was wounded in the right ankle during the attack on Fort Wagner, July 18, 1863. On the following day he was admitted to hospital No. 9, at Beaufort, where secondary amputation was performed by Assistant Surgeon J. F. Weeds, U. S. A., who recorded "a musket ball wound of the right foot, followed, on September 19th, by amputation of the leg at the upper third, Lake's operation being employed." The patient was subsequently transferred to McDougall Hospital at Fort Schuyler, and thence, on November 4th, to Lovell, at Portsmouth Grove. Surgeon L. A. Edwards, U. S. A., in charge of the latter hospital, reported that the stump was the result of an antero-posterior flap amputation, also that it had become unhealthy at the time of admission and showed a disposition to slough, for which bromine was applied. On March 3, 1864, the patient obtained a furlough, and subsequently he entered Central Park Hospital, New York City, where he was supplied with a "Hudson" artificial leg. Surgeon B. A. Clements, U. S. A., reported the following recapitulation and result of the case: "The injury was at the ankle, the missile passing from within outward and fracturing the bones entering into the composition of the joint. Not much hæmorrhage took place. Water dressings were applied at first, and three days after the injury the ball was searched for but could not be found. Three weeks later the missile was removed, about which time erysipelas attacked the parts, extending up to the groin, but soon disappearing. The amputation was performed on account of extensive necrosis, the patient being under the influence of chloroform and ether. Sutures and adhesive strips were applied. The stump was very slow in healing, but at the time of the patient's admission to Central Park Hospital, June 21st, it was in good condition." The man was discharged from service at his own request, October 7, 1864, and pensioned. He was paid September 4, 1880. In his applications for commutation he continues to report the stump as being in good and healthy condition. A cast of the stump (*Spec.* 4373), made thirteen months after the date of the amputation and contributed by Acting Assistant Surgeon G. F. Shrady, is shown in the adjoining wood-cut (FIG. 310), and exhibits the cicatrix extending transversely across the face of the stump, which is well formed.

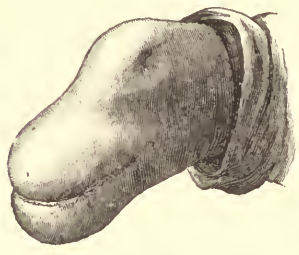

FIG. 310.—Stump of right leg thirteen months after antero-posterior flap operation. *Spec.* 4373.

CASE 785.—Private H. Dimock, Co. K, 52d Pennsylvania, aged 20 years, was wounded in the left leg, fracturing the tibia, at Fair Oaks, May 31, 1862. One week after the reception of the injury the wounded man was conveyed to Philadelphia, where, after undergoing treatment at various hospitals, he was discharged from service April 21, 1863, Surgeon I. I. Hayes, U. S. V., in charge of Saterlee, certifying to "the wound rendering the limb of no use." Examining Surgeon C. Marr, of Honesdale, Pennsylvania, certified, September 25, 1863: "He received a gunshot wound through the leg below the knee, producing a false joint." Several years later Drs. J. D. Lewis and J. M. Farrington, of Trumansburg, New York, testified that they examined the pensioner and found him suffering from the effects of the wound, also that they deemed amputation of said leg necessary, which was performed by the former on February 12, 1867, about five inches below the knee joint. They further certified that after the amputation they examined the wound carefully and found the tibia one and a half inches gone, a cartilaginous union having formed a false joint in its stead, and the fibula being partially dislocated at the knee joint in consequence of the whole weight of the body being thrown upon it in walking. Below the cartilaginous union in the tibia a number of pieces of lead were discovered in the substance of the bone below the periosteum, all of which rendered the leg useless and a source of irritation, causing a decline of his general health, etc. Dr. Farrington also stated that in addition to the condition described the tibia contained an oblique irregular fracture. About a year after the date of the amputation the pensioner was supplied with an artificial leg by the firm of B. F. Palmer, of Philadelphia, who described the operation as having been performed by "flap method." In his subsequent application for commutation the pensioner represented the condition of the stump as "sound." He was paid December 4, 1879.

FIG. 311.—Portions of left tibia and fibula—anterior view. *Spec.* 5580.

CASE 786.—Private G. C. Flanders, Co. E, 8th Ohio, aged 18 years, was wounded in the left leg, at Winchester, March 23, 1862. He was treated at several hospitals and lastly at Camp Dennison, where he was discharged for disability November 1, 1862. Surgeon B. Cloak, U. S. V., certified to "gunshot wound in the upper third of the tibia, producing compound comminuted fracture. At present the flexors of that extremity are very much contracted, rendering the leg nearly two inches shorter," etc. Some months after being discharged the man re-entered the service and joined the 11th Ohio Cavalry, in which organization he served until May 26, 1865, when he was finally mustered out and pensioned. At the time of receiving his last discharge he was quite lame, the wound having broken out anew about two months previously and requiring surgical operations subsequently. Examining Surgeon J. W. Toward, of Augusta, Maine, in 1867, certified to the injury, and stated that "some of the bone has been taken out and the ball remains in the leg. The wound frequently breaks out and is painful. He wears an apparatus attached to the boot and extending to the hip, relieving the leg of pressure by the weight being sustained by the hip and thigh. I think amputation will prove necessary," etc. Two years later Dr. J. C. Reeve, of Dayton, Ohio, certified that during the six years following the reception of the wound the pensioner had seven operations performed on the leg without cure, and added: "On June 17, 1868, I amputated Flanders' wounded limb, and subsequently I attended him for some weeks. Examination of the bones after the operation showed that the ball, apparently a minié, had perforated the bone in an upward direction and remained embedded in the head of the tibia just below the line of the amputation." The amputated bones are represented in the wood-cuts (FIGS. 311, 312). The missile is battered, considerably flattened, and embedded

FIG. 312.—Posterior view of the same specimen.—[*Spec.* 5580.]

in a projecting form in the posterior surface of the tibia. The specimens were contributed to the Museum by the operator. About nine months after the date of the amputation the pensioner was well enough to commence using a "Palmer" artificial leg. In the following year he described the stump as being in a "sound condition," but stated that the artificial limb did not prove satisfactory. He died on June 16, 1872. The immediate cause of his death has not been ascertained.

CASE 787.—Private F. Mullen, Co. E, 43d New York, aged 21 years, was wounded in the left leg, at Fredericksburg, May 3, 1863, and subsequently underwent secondary amputation. Surgeon J. A. Lidell, U. S. V., who performed the operation,[1] forwarded the following descriptive history: "The wound was caused by a minié ball, which passed through and fractured the tibia in the lower third. The man was brought to Stanton Hospital, Washington, three days afterwards. His general condition was good, and it was judged expedient to attempt to save the limb without operation. It was accordingly placed in Hodgen's splint and cold-water dressings were applied; stimulants administered. After several days the parts suppurated freely, and by June 1st the wounds were discharging a good and healthy pus, consolidation taking place, and appetite and pulse being normal. The parts continued to heal nicely up to July 28th, when the patient fell and re-fractured the limb while attempting to walk across the Ward. On August 2d, several pieces of bone were removed. August 15th, parts œdematous; discharge thin and fetid. On August 19th, several openings for the exit of pus were made, when a small necrosed splinter came away; pulse weak; general health suffering. The leg remained in about the same condition until September 1st, when compression by bandage was applied. About October 1st there was both general and local improvement, the discharge being of a thick and healthier character. The splints were now removed and stimulants continued. One month later necrosis of the shaft of the tibia had become extensive, the dead bone being completely encased in an involucrum; condition fair; discharges from several openings. But little change took place up to December 1st, and none for the better for one month afterwards. The involucrum was now large and the skin covering the front of it thin and about to ulcerate extensively; the foot being considerably twisted inward by abnormal muscular action (partial talipes varus) and the deformity steadily increasing; ankle joint also becoming stiff. There being now no hopes of preserving a useful limb it was deemed advisable to remove it by amputation. The operation was performed on January 9th, at the junction of the upper and middle thirds, by the flap method (double flaps, the anterior one being short). The sawn end of the tibia was beveled off as recommended by Sanson, that is, by placing the saw obliquely—not on the ridge, but on the internal surface of the bone. The fibula was divided somewhat higher up than the tibia, as practised by Roux. Throughout the operation the patient was kept insensible by sulphuric ether. He did not exhibit any perceptible shock. The flaps were carefully coaptated and secured at several points by interrupted sutures and strips of isinglass plaster. Several turns of a roller were placed around the leg to serve as a supporting bandage; but no other dressing was applied. A full anodyne was administered after the operation and another at 12 P. M. On the following day the patient was sitting up in bed reading a newspaper, the stump being in fine condition, free from heat and redness, and almost devoid of pain and swelling. On January 13th the sutures were removed and the stump was dressed for the first time and found to be uniting by primary adhesion. There was no constitutional disturbance whatever. On January 24th the last ligature, that of the posterior tibial artery, came away. The patient had not at any time nor in any way suffered in consequence of the amputation, and the stump had united by first intention. In short, he recovered precisely in the same way as the most fortunate cases of amputation of the leg on account of disease get well." The amputated bones of the leg (*Spec.* 2022) were contributed to the Museum by the operator and are represented in the wood-cut (FIG. 313), showing the fractured tibia, with an abundant involucrum formed to nearly the point of section, and a large detached but imprisoned sequestrum being exhibited through the cloacæ. A few points of osseous deposit are also seen on the fibula, which is uninjured. The patient entirely recovered, and was ultimately discharged September 5, 1864, and pensioned. In his application for commutation, dated 1870, he described the condition of the stump as being "in good order." He died March 5, 1871. The cause of his death has not been ascertained.

FIG. 313.—The lower thirds of the bones of the left leg, with involucrum of the tibia. *Spec.* 2022.

Fatal Cases of Secondary Amputations in the Upper Third of the Leg for Shot Injury.—The thirty-seven operations belonging to this group were performed—seven on Confederate and thirty on Union soldiers. Pyæmia was noted in eight, gangrene in one, secondary hæmorrhage in five, diarrhœa in three, and exhaustion in twelve instances as the immediate cause of death.

CASE 788.—Private S. R. Twitchell, Co. G, 89th New York, aged 25 years, was wounded in the left leg, at Antietam, September 17, 1862, and admitted to hospital at Chester two weeks afterwards. Surgeon J. L. LeConte, U. S. V., recorded the following history: "The injury was just above the ankle joint and was followed by limited necrosis of the tibia and formation of pus, which was evacuated by two incisions, one on the anterior aspect about six inches in length, and the other posteriorly about three inches long. For three weeks after the incisions were made the wound progressed favorably. It then commenced to slough, and this went on until the external wound measured six inches long and three inches wide. On February 15, 1863, amputation was performed by the flap method at the upper third by Acting Assistant Surgeon L. Fisher. Tonics, stimulants, perchloride of iron, quinine, whiskey, beef-tea, etc., were administered. The case progressed satisfactorily for a week after the operation, when signs of constitutional irritation showed themselves and the patient gradually became worse. On February 28th he had a rigor, lasting twenty-five minutes, and the case was diagnosed as one of pyæmia. After this time the patient continued to sink until March 5, 1863, when he died. The *post-mortem* examination revealed nothing but pus in the knee joint." The amputated two lower thirds of the bones of the leg (*Spec.* 2067), contributed by the operator, show that the tibia was partially fractured in the lowest third, the injury being nearly repaired by callus, leaving, however, a sinus in the bone.

[1] LIDELL (J. A.), *On the Major Amputations for Injuries in both Civil and Military Practice*, in *Am. Jour. Med. Sciences*, 1864, Vol. XLVII, p. 376.

CASE 789.—Private H. Linn, Co. A, 6th Pennsylvania Reserves, aged 25 years, received a shot fracture of the left leg, at Antietam, September 17, 1862. Two weeks afterwards he was admitted to hospital No. 5, at Frederick, where Surgeon H. S. Hewit, U. S. V., noted the following description and treatment of the injury: "A minié ball entered the lower part of the leg inside the gastrocnemius tendon, and emerged on the outer side of the leg near the crest of the tibia and six inches from the knee joint. On October 15th a fragment of lead was cut out from the outer part of the leg near the wound. Subsequently a sinus formed up the intermuscular space for four inches, for which incisions and poultices were applied, eight pieces of tibia being removed during the treatment. Towards the last week in November the patient was doing well. On December 3d a small portion of the fibula above the malleolus was excised. The bones were found considerably necrosed, and amputation, it was thought, would be necessary. On the next day the wound looked badly, the patient suffered a great deal, and amputation at the upper third was performed by flap method by Acting Assistant Surgeon A. V. Cherbonnier. In the following night the stump had to be re-opened in order to arrest hæmorrhage from some of the small vessels, persulphate of iron being used; and when the bleeding ceased dry lint was applied. By December 17th the soft parts of the stump were much retracted, the ends of both bones exposed and necrosed, and there was an apparent effort at formation of an involucrum. Ten days later the granulations were healthy and the patient's condition had improved." On December 29th the man was transferred to hospital No. 6, and subsequently to No. 1. Assistant Surgeon R. F. Weir, U. S. A., in charge of the latter, recorded the following result of the case: "Secondary amputation of the thigh was performed at the junction of the middle and lower thirds of the femur by Surgeon J. B. Lewis, U. S. V., on January 15, 1863. The patient progressed favorably until February 4th, when secondary hæmorrhage supervened, which was checked only by ligation of the femoral at the point of election. February 15th, patient about the same; pulse 135 and rather quick; tongue red and dry; sloughing condition of stump disappeared and healthy granulations commencing. Brandy administered every half hour; also beef-tea and cod-liver oil. After this the patient began to do well; appetite better; pulse much stronger; stump beginning to heal. On February 21st the ligature was removed from the femoral. On March 5th the patient was slightly etherized, and a piece of dead bone about one and a half inches in length was sawn off from the end of the femur; some small pieces were taken out with the forceps; patient doing well otherwise; stump dressed with adhesive strips and cold water. For about two weeks after this the patient still improved and felt quite comfortable; stump assuming a better appearance. At an examination on March 19th a sinus was discovered to be extending up on the posterior aspect to about the middle of the stump, and the bone was found to be dead when felt by the probe, with indications that the process of separation was going on; discharges copious, offensive, and of a dark color. Poultices were continued after syringing the parts with soda wash, and brandy, with generous diet, was ordered. By March 23d the patient's general health was quite poor and he had but little appetite; stump not looking very healthy, there being considerable necrosed bone to come away; suppuration not as healthy as before. Two days later the patient was worse and weaker; tongue coated; teeth covered with sordes; appetite poor; stump suppurating pretty freely and still having an offensive odor about it, but integuments looking healthy. On March 28th the patient complained of soreness over the shoulder; general health about the same; stump looking rather better; appetite improving. On March 30th he was quite weak; tongue coated and dry; pulse 140; skin dry and getting more yellow; stump doing poorly; discharge unhealthy. Extensive necrosis of the femur was felt by the probe; wound syringed with acid and soda wash alternately and poultices applied. The next day the patient failed rapidly. At 1 P. M. he had a slight hæmorrhage from the opening in the stump, losing about one and a half ounces of blood. No bleeding vessel could be found. Death occurred at 4 P. M. On examining the chest eleven hours after death the left lung was found thinly studded with tubercles; lower lobe of right lung thickly studded in upper and middle portion; middle lobe a complete mass of tubercular matter and filled here and there with abscesses from the size of a chestnut to that of a pullet's egg; upper lobe in the same condition. Heart normal in size; liver somewhat enlarged and very fatty; spleen very much enlarged and highly congested; kidneys enlarged and fatty, and pelvis containing a large amount of phosphatic deposit on right side, also renal calculi in upper portion of urethra. Specimen 3818 (FIG. 315), consisting of the stump of the femur, shows extensive necrosis from the seat of the operation to within an inch of the trochanter minor, the shaft on the outer side being thinly covered with an involucrum. On the posterior surface the involucrum is bare from the end of the bone to within three inches of the trochanter major, it having been broken down by ulcerative process, while on the anterior portion of the shaft the sequestrum is exposed at several points from the same cause. The neck of the bone was observed to be very short and its head quite large. Specimen 3983 (FIG. 316) comprises a portion of the external iliac and femoral arteries, including the occluded portion of the latter, also part of the profunda and anastomotica magna, the end of which is covered with adipose tissue." The amputated portions of the bones of the leg (*Spec.* 748), contributed by Surgeon Hewit, are shown in wood-cut (FIG. 314), exhibiting the fibula with loss of substance of one inch in the lower third, and the adjacent portion of the tibia, which is superficially necrosed, while the superior portion of the fibula shows increased periosteal action.

FIG. 314.—Portions of fractured tibia and fibula of left leg. *Spec.* 748.

FIG. 315.—Stump of left femur. *Spec.* 3818.

FIG. 316.—Portions of external iliac, femoral, profunda, and anastom mag.; femoral ligated. *Spec.* 3983.

CASE 790.—Private J. E. Eames, Co. F, 112th New York, aged 23 years, was wounded in the left leg, during the assault on Fort Fisher, January 15, 1865. He was conveyed to New York, and entered McDougall Hospital at Fort Schuyler ten

days after receiving the injury. Assistant Surgeon S. H. Orton, U. S. A., who amputated the wounded limb, made the following report: "The wound was caused by a minié ball striking the outer aspect one and a half inches above the ankle, passing downward, inward, and a little backward, and emerging at the internal border of the tendo-achillis. At the time of the amputation, February 28th, the muscles were pale and flabby and there was not much retraction. The operation was performed by the circular method about three inches below the patella, the spine of the tibia being sawn off after severing the bones. The soft parts were cut above the division of the popliteal, so that was the only artery requiring ligation. After severing the limb the incised edges of the integuments were brought together and held by a suitable number of sutures. Chloroform was used and the patient passed through the operation very well; in the evening his general appearance was better than it had been for a week. Water dressings were applied and oakum to catch the discharge. Stimulants, tonics, and a most nourishing diet were administered. On March 3d the ligature came away; stump looking healthy; discharge free; pulse 120. The integument over the upper part of what remained of the spine of the tibia ulcerated, exposing a small portion of the bone. The patient died of exhaustion March 17, 1865. An examination of the amputated limb showed that the ball had passed through the base of the external malleolus and grazed the external border of the articulating surfaces of the tibia and astragalus, both of which were apparently necrosed. The whole ankle joint was filled with pus, as was also the articulation between the astragalus and scaphoid bone. The soft parts were œdematous and filled with sinuses running in every direction. The foot presented the anatomical curiosity—though not bearing on the case—of containing six toes, the supernumerary one being situated between the normal fourth and fifth. On dissection it was found that there were only five metatarsal bones, but the fifth was double the natural size in breadth and had two phalangeal articulations. The patient stated that both his father and grandfather were afflicted with the same deformity. His right foot was normal."

CASE 791.—Private H. Loud, Co. A, 183d Pennsylvania, aged 18 years, was wounded at the Wilderness, May 8, 1864. Surgeon J. E. Pomfret, 7th New York Artillery, reported his admission to the field hospital of the 1st division, Second Corps, with "wound of left ankle by a musket ball." Surgeon N. R. Moseley, U. S. V., who amputated the fractured limb, reported the following result of the case: "The wounded man was admitted on May 28th to Emory Hospital, Washington, where the soft parts became gangrenous and the bones of the ankle joint necrosed; tibia and fibula denuded of periosteum some three inches above the wound. Flap amputation of the leg at the junction of the upper and middle thirds was performed on August 23d, chloroform and ether constituting the anæsthetic. The after-treatment consisted of cold-water dressings, tonics, stimulants, and nourishing diet. Redundant granulations required the application of caustics about three weeks after the amputation. The patient's condition varied much after the operation, alternately recuperating and declining. He became weaker, yet, being young, hopes were entertained of his recovery until within a couple of weeks of his decease, when his appetite failed and he sank rapidly. Death occurred on October 14, 1864, from exhaustion and nervous irritability." The bones of the stump (*Spec.* 3318), exhibiting but little healthy action and showing sequestra which are about separating from each bone, were contributed to the Museum by the operator, and are represented in the adjoining wood-cut (FIG. 317).

FIG. 317.—Bones of stump of left leg seven weeks after amputation. *Spec.* 3318.

TABLE LXXVI.

Summary of One Hundred and Thirty-three Secondary Amputations in the Upper Third of the Leg for Shot Injury.

[Recoveries, 1—96; Deaths, 97—133.]

NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.	NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	Allbee, O. S., Pt., K, 102d Illinois, age 18.	May 15, J'y 17,'64.	Left; flap. Discharged March 29, 1865.	11	Brown, L. K., Pt., H, Purnell Legion, Maryland Vols., age 19.	Au.29,'62, Jan. 8,'64.	Left; flap. Surg. D. W. Bliss, U. S. V. Discharged August 18, 1864.
2	Andrews, S. B., Pt., F, 72d New York, age 28.	May 10, Sept. 27, 1864.	Right; flap. A. A. Surg. W. S. Ward. (May 10, resection of 2½ ins. of tibia; necrosis.) Disch'd November 27, 1864.	12	*Busby, T.*, Pt., F, 19th South Carolina, age 23.	N'v30,'64, Feb. 20, 1865.	Left; oval skin flap. Surg. B. B. Breed, U. S. V. Transferred to Provost Marshal May 6, 1865.
3	Atkinson, C. T., Serg't, G, 11th Ohio, age 27.	Sept. 17, Oct. 21, 1862.	Right; flap. A. Surg. J. S. Emerson, 9th N. Hampshire. Discharged January 16, 1863. Died December 3, 1870.	13	Chapin, H., Capt., D, 27th Illinois.	Sept. 20, Nov. 27, 1863.	Right. A. A. Surg. C. C. Shoyer. Discharged September 20, 1864.
4	Barraby, M., Pt., I, 12th Vermont, age 27.	Nov. 1, Dec. 20, 1862.	Left; circular. Ass't Surg. C. Wagner, U. S. A. Discharged May 17, 1863.	14	Chapman, H. E., Pt., A, 6th New Hampshire.	Aug. 29, Oct. 4,'62.	Right. Surgeon C. Page, U. S. A. Discharged March 8, 1863.
5	Bartram, A. E., Corp'l, I, 8th Connecticut, age 21.	Sept. 29, Dec. 15, 1864.	Left; circular. A. A. Surg. T. S. Bartram. (Hæmorrhage.) Discharged August 23, 1865.	15	Charlemaine, A., Pt., A, 55th New York.	May 31, J'y 21,'62.	Right. Discharged March 6, '63.
6	Bates, E. G., Pt., A, 123d Ohio, age 19.	June 14, Au.14,'63.	Left; circular. Discharged April 26, 1864.	16	*Connor, J. O.*, Pt., C, 27th Virginia.	July 22, Sep.–,'61.	Right. Surg. — Cooper, C. S. A. Recovered.
7	Becker, H., Corp'l, G, 162d New York, age 30.	April 8, May 13, 1864.	Right; ant. posterior flap. Surg. F. Bacon, U. S. V. Discharged August 12, 1864. *Spec.* 4313.	17	Cook, J., Pt., H, 101st Illinois, age 19.	May 25, Aug. 10, 1864.	Right; oval flap. A. A. Surg. J. O'Connor. Discharged January 24, 1865.
8	Berry, W. F., Corp'l, G, 7th Missouri.	May 22, Oct. 6, 1863.	Left; flap. Ass't Surgeon H. R. Tilton, U. S. A. Discharged May 20, 1864.	18	Copas, W. H., Pt., B, 36th Ohio, age 28.	Sept. 19, Oct. 26, 1864.	Right; circular Surgeon Z. E. Bliss, U. S. V. Hæmorrhage. Oct. 27, ligation of post. tibial artery. Dis'h'd June 5, 1865.
9	*Brashear, R. H.*, Pt., H, 3d Arkansas, age 20.	July 2, Sept. 1, 1863.	Left. Surgeon R. Batty, C. S. A. Transferred for exchange Nov. 12, 1863.	19	Copeland, M., Pt., B, 2d Colored Cavalry, age 28.	Aug. 10, Oct. 24, 1865.	Right; circular skin flap. Surg. F. E. Piquette, 86th C. Troops. Discharged January 16, 1866.
10	Brown, W., Pt., C, 15th Infantry, age 30.	Aug. 7, Oct. 18, 1864.	Right; ant. posterior flap. Surg. B. B. Breed, U. S. V., and A. A. Surg. R. McNeilly. Discharged May 23, 1865.	20	Coyle, C. D., Pt., D, 83d Pennsylvania.	June 27, Aug. 1, 1862.	Left; flap. Ass't Surg. R. Bartholow, U. S. A. Discharged May 3, 1863.
				21	Crawford, H. M., Corp'l, K, 116th N. Y., age 28.	April 8, May 16, 1864.	Left; anterior posterior flap. A. A. Surg. H. Smith. Discharged July 14, 1864.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
22	Crist, A., Pt., F, 70th New York.	April 2, June 26, 1862.	Right; flap. Surg. A. B. Hasson, U. S. A. Discharged September 8, 1862.
23	*Daily, P.*, Pt., E, 48th Mississippi, age 25.	Oct. —, 20, '63.	——; flap. Surgeon — Holt, 16th Miss. Recovered.
24	Dawley, D., Pt., I, 9th Indiana, age 22.	June 2, J'y 6, '64.	Right; circular. Discharged May 15, 1865.
25	Dimock, H., Pt., K, 52d Pennsylvania, age 20.	May 31, 1862, Feb. 12, 1867.	Left; flap. Dr. J. D. Lewis of Trumansburg, N. Y. Disch'd April 21, 1863.
26	Dorn, D. H., Pt., E, 1st Cavalry, age 23.	June 12, Sept. 25, 1864.	Left; flap. Discharged May 15, 1865.
27	Eberhart, A. L., Pt., 1st W. Virginia Cavalry.	Sept. 12, 1862, J'e 18,'63.	Left. Dr. W. L. Clemmer, Brownsville, Penn. Recovered.
28	*Field, B.*, Pt., C, 27th North Carolina, age 21.	Sept. 17, Nov. 28, 1862.	Right; flap. A. A. Surg. A. V. Cherbonnier. Dec. 1, secondary hæm.; lig. of popliteal artery; recurrence. Exch'd. *Spec.* 751.
29	[1] *Finnigan, P.*, Pt., F, 1st Confederate Bat'ry.	June 2, Aug. 20, 1864.	Right; circular. Ass't Surg. W. F. Richardson, C. S. A. (June 3, Chopart's operat'n.) Recov'd.
30	Fisher, J. P., Pt., A, 7th Missouri Cavalry.	Aug. 16, Sept. —, 1862.	Right. Surg. E. P. Smith. 7th Missouri. Discharged February 6, 1863.
31	Fisher, P. B., Pt., I, 113th Ohio, age 27.	June 22, July 28, 1864.	Right; circular. Ass't Surg. G. W. Burke, 46th Penn. Disch'd June 26, 1865.
32	Flanders, G. C., Pt., E, 8th Ohio, age 18.	Mar. 23, 1862, J'e 17,'68.	Left; flap. Dr. J. C. Reeves, at Dayton, Ohio. Recov'd. Died June 16, 1872. *Spec.* 5580.
33	Flynn, M., Pt., A, 24th New York.	Aug. 30, Oct. 21, 1862.	Right. Ass't Surg. J. M. Palmer, 85th N. Y. Discharged September 26, 1863.
34	French, B. F., Pt., H, 7th New Hampshire, age 21.	July 18, Sept. 19, 1863.	Right; ant. posterior flap. Ass't Surgeon J. F. Weeds, U. S. A. Disch'd Oct. 7, 1864. *Spec.* 4373.
35	Gilson, D., Corp'l, G, 2d U. S. Sharpshooters.	Sept. 17, 1862, Sept. 17, 1863.	Left; flap. Dr. N. J. Moore, of Nashua, N. H. Disch'd March 2, 1863.
36	Goldsmith, W. H., Corp'l, F, 2d New Hampshire, age 24.	June 9, May 15, 1865.	Left; circular. A. A. Surg. J. S. Ross. (June 9, 1864, res. 4 ins. tibia.) Disch'd Oct. 14, 1865.
37	Grason, J. A., Pt., D, 6th West Virginia.	Aug. 28, 1864, Au. 8, '65.	Right; flap. Dr. J. R. Ramsey, of Clarksburg, West Virginia. Recovered.
38	Green, H. R., Pt., F, 81st Indiana.	De. 31,'62, Mar. 6, 1863.	Left; flap. Surg. F. Seymour, U. S. V. Discharged August 1, 1863.
39	Gurley, W., Pt., C, 11th Infantry, age 18.	May 12, 1864, Feb. 18, 1868.	Right. Dr. H. J. Bigelow, at the Mass. Gen'l Hosp. (June 1,'64, amp. at ankle joint. Necrosis.) Disch'd Feb. 7,'65. *Spec.* 2421.
40	Haire, R. R., Corp'l, E, 31st Illinois, age 32.	July 2, Aug. 10, 1864.	Left; circular. Surgeon G. L. Lucas, 47th Ill. (Gangrene.) Discharged June 22, 1865.
41	Hale, H., Pt., E, 84th Pennsylvania, age 20.	May 12, 1864, Jan. 8,'69.	Left. Dr. G. L. Potter, of Julian Furnace, Penn. Disch'd April 27, 1865.
42	Harback, M., Pt., D, 5th Kentucky, age 21.	May 27, Sept. 6, 1864.	Right; circular. Ass't Surg. T. A. McGraw, U. S. V. Disch'd June 9, 1865.
43	Hatch, D. A., Pt., C, 2d Massachusetts, age 25.	July 3, Dec. 16, 1863.	Right; ant. posterior flap. Surg. C. W. Jones, U. S. V. Disch'd April 2, 1864. *Spec.* 2155.
44	Hitchcock, J. N., Pt., F, 34th Massachusetts.	May 15, Sep. 5,'64.	Left; flap. A. A. Surg. A. Trau. Discharged April 19, 1865.
45	Hubbard, J. A., Corp'l, A, 115th New York.	Sept. 5, Oct. 9,'62.	Right; flap. Discharged December 30, 1862.
46	Hyatt, D., Pt., C, 4th Delaware, age 52.	June 18, Nov. 18, 1864.	Left; flap. A. A. Surg. A. Trau. (Erysipelas.) Discharged June 3, 1865.
47	Jenni, P., Serg't, C, Jefferson Co. State Militia, age 23.	Sept. 11, Oct. 18, 1862.	Right. (Also flesh w'nd of chest; hæm. from anterior tib. artery.) Discharged January 19, 1863.
48	Kellerman, M., Pt., D, 75th Penn., age 48.	May 2, June 18, 1863.	Left. Surg. D. W. Bliss, U. S. V. (Hæmorrhage.) Disch'd June 15, 1864. *Spec.* 1273.
49	[2] *Kelly, J. F.*, Pt., A, 26th Alabama, age 25.	July 28, Oc. 18,'64.	Right. Ass't Surg. A. H. Powell, P. A. C. S. (Gangrene.) Recov'd.
50	Keyes, C. W., Lieut., E, 32d Maine, age 33.	May 12, June 12, 1864.	Left; flap. Dr. P. Dyer, of Maine. (June 8, amp. foot.) Disch'd September 27, 1864.
51	Lay, R., Serg't, E, 1st Kentucky Light Artillery.	Dec. 18, 1864, Feb. 13, 1866.	Left; flap. Dr. C. P. West, at Louisville, Kentucky. Disch'd August 28, 1865.
52	Leighton, B. D., Pt., I, 9th New Hampshire.	June 4, July 29, 1864.	Left. Dr. O. H. Bradley, of East Jaffrey, N. H. Discharged February 11, 1865.
53	Lester, J. H., Pt., F, 1st New Jersey, age 20.	June 27, 1862, Feb. 8, 1863.	Left; posterior flap. A. A. Surg. R. A. Cleeman. Gangrene. Discharged December 24, 1863.
54	Logan, W. J., Pt., K, 9th Penn. Reserves.	Aug. 30, Dec. 23, 1869.	Left. Dr. J. Kirker, of Allegheny, Penn. 1869, popliteal aneurism; dry gangrene. Recovered.
55	Loughlin, J., Pt., K, 67th New York, age 22.	July 2, Sept. 16, 1862.	Left; flap. Surgeon S. D. Gross, U. S. V. (Erysipelas. July 26, Pirogoff's amp. at ankle joint.) Disch'd July 29, '63. *Spec.* 214.
56	McCarty, C., Corp'l, E, 1st New York, age 28.	June 30, Aug. 28, 1862.	Right. Ass't Surg. W. S. Forbes, U. S. V. (Excision of 3 ins. of tibia.) Discharged May 11, 1863. Died August 21, 1867.
57	McLain, D. P., Pt., F, 4th Cavalry, age 21.	Sept. 17, Dec. 22, 1863.	Right; flap. Discharged May 26, 1865.
58	Macomber, G. W., Pt., K, 126th New York, age 20.	July 2, Sept. 10, 1863.	Left; ant. posterior flap. (Gangrene.) Disch'd May 3, 1864. *Spec.* 4303.
59	Masten, D., Pt., G, 4th Illinois Cavalry.	Ap. 15,'64, April —, 1866.	Left. Surg. G. R. Bibb, of Jacksonville, Illinois. (Discharged September 17, 1864.)
60	*Moran, S.*, Pt., G, 26th North Carolina, age 24.	July 2, Oct. 28, 1863.	Right; flap. A. A. Surgeon J. E. Steele. Nov. 8, profuse hæmorrhage; flaps laid open; sloughing. Trans. to Fort Delaware April 19, 1864.
61	[3] Mullen, F., Pt., E, 43d New York, age 23.	May 3, 1863, Jan. 9, 1864.	Left; double flap. Surg. J. A. Lidell, U. S. V. Disch'd Sept. 5, 1864. *Spec.* 2022. Died March 5, 1871.
62	Newman, D. J., Pt., G, 24th Wisconsin, age 16.	June 27, July 31, 1864.	Left; circular. A. A. Surg. J. C. Thorp. (Gangrene.) Disch'd April 9, 1865.
63	*Newton, J. W.*, Pt., E, 14th Virginia, age 24.	July 3, Aug. 10, 1863.	Right; circular. (July 16, amp. foot, Pirogoff's opera.; sloughing.) Recovered. Transferred for exchange Nov. 12, 1863.
64	Norris, E., Civilian, age 20.	April 16, June 2, 1864.	Right; circular. Ass't Surg. J. E. Semple, U. S. A. Disch'd July 17, 1864.
65	Oughcltree, G., Serg't., A, 12th Infantry.	June 27, July 28, 1862.	Right. (Also fracture of skull.) Transferred to Veteran Reserve Corps August 14, 1863.
66	Perigo, R., Pt., G, 66th Ohio, age 44.	Aug. 14, Se. 20,'64.	Left; flap. Discharged June 9, 1865. Died September 4, 1866.
67	*Perrin, F.*, Pt., H, 8th Arkansas, age 25.	Nov. 30, 1864, Jan. 2, 1865.	Left; bi-lateral skin flap and circ. section of muscles. A. A. Surg. M. L. Herr. Trans. to Provost Marshal May 6, 1865.
68	Phillips, J. L., Serg't, C, 104th New York.	Sept. 17, Oc. 18,'62.	Right; flap. Discharged March 23, 1863.
69	*Pierce, O. H.*, Pt., H, 38th North Carolina.	June 30, Au. —,'62.	——. Surgeon W. A. Carrington, C. S. A. Recovered.
70	Powell, T., Pt., F, 6th Colored Troops, age 30.	Jan. 15, April 26, 1865.	Left; circular. Ass't Surg. S. H. Orton, U. S. A. (Jan. 15, exc. 3 ins. tibia.) Disch'd Oct. 14,'65.
71	Pyne, C. M., Lieut., I, 6th Infantry.	Aug. 30, 1862, M'y 4,'64.	Left; bi-lateral flap. Dr. W. H. Van Buren of New York. Retired December 15, 1870.
72	Redding, J., Pt., K, 42d Illinois, age 28.	Sept. 20, 1863, Jan. 17, 1864.	Left; circular flap. Surg. J. Y. Finley, 2d Kentucky Cavalry. Discharged Sept. 29, 1864.
73	Renold, C. D., Pt., D, 37th Ohio, age 22.	No. 25,'63, Feb. 26, 1864.	Left; circ. flap. Ass't Surg. B. E. Fryer, U. S. A. Disch'd Aug. 24, 1864. Died August 17, 1870.
74	Rhodes, J. H., Pt., A, 33d Ohio, age 30.	No. 25,'63, Jan. 13, 1864.	Left; flap. Ass't Surgeon A. G. Albright, 79th Penn. Disch'd July 15, 1864.
75	Ross, C., Lieut., E, 26th Pennsylvania, age 41.	July 2, —, '63.	Left. Discharged June 18, 1864. Died November 30, 1866.
76	Runyan, C. A., Musician, F, 9th N. Y. Heavy Artillery, age 19.	May 3, Oct. 17, 1863.	Left. Dr. L. Briggs of Auburn, N. Y. (May 3, excision of tibia.) Discharged July 26, 1865.
77	Sampson, T., Pt., H, 46th Colored Troops.	Sept. 8, Oct. 11, 1864.	Left; flap. Ass't Surg. J. H. Bennett, 46th Colored Troops. Discharged March 9, 1865.
78	Schmidt, C., Corp'l, K, 39th New York, age 36.	May 6, 1864, Feb. 18, 1865.	Right (May 23, 1864, lig. of ant. tibial art'y); ant. posterior flap. Surgeon S. B. Ward, U. S. V. Re-amputation April 18, 1865. Discharged July 14, 1865.
79	Shinn, W. J., Serg't, I, 5th New Jersey, age 25.	J'e 18,'64, Ja. 18,'65.	Right; flap. Surg. D. W. Maull, 1st Delaware. Discharged.

[1] Smith (Stephen), *Analysis of Four Hundred and Thirty-nine Recorded Amputations in the Continuity of the Lower Extremity*, in *United States Sanitary Commission Memoirs*, Surgical Volume II, New York, 1871, p. 140.

[2] Jones (J.), *Investigations upon the Nature, Causes, and Treatment of Hospital Gangrene as it prevailed in the Confederate Armies*, 1861–1865, in *United States Sanitary Commission Memoirs*, New York, 1871, Surgical Volume II, p. 292.

[3] Lidell (J. A.), *On the Major Amputation for Injuries in both Civil and Military Practice*, in *Am. Jour. Med. Sci's*, 1864, Vol. XLVII, N. S., p. 376.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
80	Smith, A. A., Pt., A, 3d Rhode Island Artillery.	April 8, July 10, 1863.	Right; circular. A. A. Surg. J. W. Cushing. (April 9, flap amputation left leg.) Discharged August 25, 1864. *Spec.* 1163.
81	Smith, H., Pt., H, 32d Colored Troops, age 37.	Feb. 10, Mar. 29, 1865.	Left; circ. Surg. A. H. Thurston, U. S. V. Discharged July 26, 1865.
82	*Snead, A. J.*, Pt., Courtney's Artillery.	Au. 9,'62, Aug. 9, 1863.	Right. Surg. T. H. Howard, C. S. A. Recovered. Furloughed November 26, 1864.
83	Spencer, C., Pt., A, 1st R. Island Light Artillery, age 32.	De.13,'62, Dec. 28, 1869.	Right; flap. Recovered. Died in 1871.
84	Spicer, J., Pt., K, 14th K'y Cavalry, age 23.	Mar. 9, June 30, 1863.	Right. Surg. J. M. Daniel, 47th Kentucky. Discharged March 24, 1864.
85	*Spivey, L. J.*, Serg't, F, 51st N. Carolina, nge 29.	May 16, June 17, 1864.	Right; posterior flap. Surg. — Sutton, P. A. C. S. Retired December 19, 1864.
86	Steinbeck, A., Pt., A, 59th New York, age 23.	Aug. 16, 1864, April 12, 1866.	Right. Dr. J. A. McArthur, Soldiers' Home, Philadelphia. (Discharged July 20, 1865.) Recovered. Died May 6, 1868.
87	Struble, C. W., Corp'l, F, 3d Infantry, age 23.	July 3, Aug. 5, 1863.	Left; flap. Surgeon H. Palmer, U. S. V. Discharged December 8, 1863.
88	Sullivan, A. W., Pt., F, 69th Ohio, age 20.	Sept. 25, Nov. 26, 1863.	Left; lateral flap. Surg. L. Slusser, 69th Ohio. March 3, 1864, spiculæ removed. Furloughed March 12, 1864.
89	Swallow, H. R., Serg't, G, 31st Massachusetts.	May 18, 1864, Dec.3,'68.	Left; flap. Dr. W. G. Breck, Springfield, Mass. Recovered.
90	Thompson, H., Pt., K, 6th Maine, age 24.	May 3, Sept. —, 1863.	Left; circ. A. A. Surg. J. B. Cutter. (June 9, diseased bones of foot rem'd.) Discharged May 14, 1864. *Spec.* 4316.
91	Vogel, P., Pt., I, 6th Infantry, age 25.	June 27, 1862, June 27, 1879.	Right. Act. Surgeon G. H. Marmion, Soldiers' Home, Hampton. (Also w'nds of groin and skull. Necrosed. Rem. of fragments—opening in occipital bone. Discharged Aug. 21, 1863.) *Specs.* 429, 6941.
92	Wheeler, C. D., Corp'l, B, 32d Col'd Troops, age 21.	Feb. 10, Mar. 16, 1865.	Left; circ. Surg. A. H. Thurston, U. S. V. Discharged Aug. 17, 1865. Died Jan. 22, 1870.
93	Wood, C. J., Pt., H, 149th New York, age 44.	May 3, Aug. 1, 1863.	Right. Surg. D. W. Bliss, U. S. V. Discharged November 16, 1863.
94	Woomer, E. M., Corp'l, A, 93d Penn., age 21.	May 5, July 21, 1864.	Left; flap. A. A. Surg. E. Hartshorne. Discharged September 9, 1865. *Spec.* 3078.
95	Worrell, B. F., Pt., A, 1st New Jersey.	April 14, Nov. —, 1862.	Left. A. A. Surg. O. F. Scheldt. Discharged January 5, 1863.
96	Wurth, L., Pt., C, 41st New York, age 27.	Aug. 30, Dec. 1, 1862.	Left; double flap. A. A. Surg. T. O. Bannister. Discharged September 14, 1863.
97	Brown, A. C., Serg't, G, 13th Penn. Cavalry, age 36.	Aug. 15, Oct. 20, 1864.	Right; flap. Surg. N. R. Moseley, U. S. V. Died October 29, 1864; exhaustion. *Spec.* 3316.
98	Cates, J. J., Pt., I, 4th Kentucky, age 22.	Sept. 20, 1863, May6,'64.	Left. Died May 18, 1864.
99	Christiana, G., Pt., A, 120th New York, age 36.	July 2, Aug. 10, 1863.	Right. Sept. 2, hæm.; amputat'n thigh. Died September 25, '63; exhaustion.
100	Conrad, A., Pt., H, 26th Wisconsin, age 22.	May 15, Aug 3, 1864.	Right; circular. A. A. Surg. N. R. Morris. (Gangrene.) Died August 25, 1864; diarrhœa.
101	Copeland, A. M., Lieut., C, 81st New York, age 25.	Sept. 30, Nov. 10, 1864.	Right. Surg. Z. E. Bliss, U. S. V. (Hæmorrhage; ligation.) Died January 4, 1865.
102	Crandall, S., Pt., G, 17th Michigan, age 18.	July 31, Sept. 1, 1864.	Left; circular. Surg. A. F. Sheldon, U. S. V. Died September 15, 1864; exhaust'n. *Spec.* 3126.
103	Eames, J. E., Pt., F, 112th New York, age 23.	Jan. 15, Feb. 28, 1865.	Left; circular. Ass't Surg. S. H. Orton, U. S. A. (Necrosis.) Died March 17, 1865; exhaust'n.
104	*Eubanks, L. M.*, Pt, I, 30th Alabama, age 33.	Nov. 24, 1864.	Left; circular. Surg. H. J. Phillips, U. S. V. (Gangrene.) Died November 30, 1864.
105	Frazer, P., Pt., B, 4th Artillery, age 24.	April 30, June 28, 1863.	Right. Died September 18, 1863; diarrhœa.
106	*Hand, J. C.*, Pt., C, 3d Mississippi, age 21.	July 20, Sept. 22, 1864.	Right; circular. Ass't Surg. T. A. McGraw, U. S. V. (Necrosed; gangrene.) Died Sept. 26, 1864; exhaustion.
107	Harness, J. C., Pt., A, 33d Ohio, age 21.	Aug. 3, Sept. 22, 1864.	Right; circular. Ass't Surg. T. A. McGraw, U. S. V. Died October 4, 1864.
108	Heddon, N., Corp'l, F, 150th New York, age 45.	Aug. 13, Sept. 17, 1864.	Left; ant. post. flap. A. A. Surg. J. C. Thorpe. (Gangrene; diarrhœa.) Died September 22,'64; hæmorrhage.
109	*Jackson*, W., Pt., K, 2d Florida.	May 5, June 28, 1862.	Left. Teale's method. A. Surg. J. S. Billings, U. S. A. (Erysipelas.) Died July 6,'62. *Spec.* 7.
110	Jones, M. M., Pt., D, 19th Michigan, age 25.	May 5, July 9, 1864.	Left; circular. A. A. Surg. F. C. Leber. Died July 20, 1864; pyæmia.
111	Keal, J., Pt., H, 118th Ohio, age 21.	May 14, June 27, 1864.	Left; hæmorrhage. 12 ounces. Died Aug. 20, 1864; exhaustion.
112	Kingsbury, A., Pt., D, 22d Massachusetts, age 18.	June 26, Aug. 1, 1862.	Right. A. A. Surg. S. D. Gross. (Aug. 12, hæmorrhge.) Died August 31, 1862; enteritis.
113	Levisee, I., Pt., E, 18th Wisconsin.	April 6, May 9, 1862.	—. Died May 10, 1862; pyæmia.
114	Linn, H., Pt., A, 6th Penn. Reserves, age 25.	Sept. 17, Dec. 4, 1862.	Left; flap. A. A. Surgeon A. V. Cherbonnier. (Excision); hæm. Jan. 15, 1863, amp. thigh; nec.; lig. of fem.; hæm. Died March 31, 1863. *Specs.* 3818, 3983, 748.
115	Loud, H., Pt., A, 183d Pennsylvania, age 18.	May 8, Aug. 23, 1864.	Left; flap. Surg. N. R. Moseley, U. S. V. (Necrosis.) Died Oct. 15, 1864; exhaust'n. *Spec.* 3318.
116	Lovell, P., Corp'l, C, 10th Missouri, age 41.	Nov. 25, 1863, Jan. 10, 1864.	Left; circular. Ass't Surg. R. Bartholow, U. S. A. (Primary excis.; hæm.) Jan. 15, sloughing; erysipelas; hæm. Feb. 2, amputation thigh. Died February 3, 1864. *Spec.* 2108.
117	[1]*Mabry, S. D.*, Pt., G, 6th Alabama, age 22.	Sept. 17, 1862, Mar. 16, 1863.	Right. Teale's method. (Gang.) Erysipelas; diarr. Died March 22,'63; exhaustion. *Spec.* 3891.
118	Marlett, G., Pt., M, 1st Michigan Cavalry, age 19.	June 5, July 19, 1864.	Left; circular. A. A. Surg. A. D. Hall. (Hæmorrh.) Died July 19, 1864; exhaustion.
119	*Merrill, J. A.*, Pt., G, 51st Tennessee.	Nov. 30, 1864, Jan. —, 1865.	Right. Died January 31, 1865; exhaustion.
120	Moore, J., Pt., E, 8th Penn. Reserves, age 20.	Dec. 13, 24, '62.	Left; flaps of skin and circ. sect. of muscles. Ass't Surg. G. M. McGill, U. S. A. (Hæmorrhage; diarrhœa.) Died Jan. 19, 1863; pyæmia. *Spec.* 4577.
121	O'Connor, J., Serg't, C, 11th Massachusetts.	May 3, June 16, 1863.	Left. (Necrosis.) Died June 23, 1863. *Spec.* 1237.
122	*Patten, W. F.*, Pt., C, 9th Mississippi, age 24.	Nov. 30, 1864, Mar. 19, 1865.	Right; ant. posterior flap. Ass't Surgeon J. C. Thorpe, U. S. V. (Gangrene; necrosis.) Hæm., 12 oz. March 24, amp. thigh. Died April 20, 1865; pyæmia.
123	Pierson, J. C., Pt., D, 19th Infantry, age 16.	July 28, Sept. 7, 1864.	Right; circular. A. A. Surg. E. M. Johnston. Died September 25, 1864; pyæmia.
124	Porter, W. C., Serg't, F, 66th Ohio.	—— 1862.	Right. Died October 10, 1862. *Spec.* 553.
125	[2]Rudolph, J., Pt., E, 4th Michigan, age 24.	June 3, Aug. 27, 1864.	Left; ant. post. flap. Surg. J. A. Lidell, U. S. V. (Hæmorrhage.) Died Sept. 16, 1864; exhaust'n.
126	Sands, P. E., Serg't, B, 1st Sharpshooters, age 31.	May 10, Oct. 19, 1864.	Right; circular. Surg. O. A. Judson, U. S. V. (Hæmorrh.) Died Nov. 4, 1864; exhaustion.
127	Slusser, C. C., Pt., H, 107th Ohio, age 21.	May 2, June 15, 1863.	—. (June 15, hæmorrhage.) Died June 29, 1863.
128	*Stevens, W. E.*, Pt., E, 5th Texas, age 18.	July 2, Aug. 3, 1863.	Right. Died September 4, 1863.
129	Tanner, N. A., Pt., I, 2d Michigan.	July 16, Sept. 26, 1863.	Right. (Hæmorrh.; gangrene.) Died October 11, 1863; pyæmia.
130	Twitchell, S. R., Pt., G, 89th New York, age 25.	Sept. 17, 1862, Feb. 15, 1863.	Left; flap. A. A. Surg. L. Fisher. (Sloughing; necrosis.) Died March 5, 1863; pyæmia. *Spec.* 2067.
131	Vogle, F., Pt., G, 74th Pennsylvania, age 28.	July 1, Aug. 13, 1863.	Right; flap. A. A. Surg. A. Hewson. (Gangrene; hæm.) Sept. 7, hæm.; lig. femoral. Sept. 19, lig. ext. iliac. Died Oct. 6, 1863; hæmorrhage. *Spec.* 2614.
132	Whistler, R., Pt., H, 49th Ohio.	June 2, July 5, 1864.	Right. (June 2, excision.) Died July 14, 1864; pyæmia.
133	Wilbur, W., Pt., B, 1st N. York Cavalry, age 27.	May 8, July 6, 1864.	Right; circular. A. A. Surg. H. B. Butcher. (May 28, Pirogoff's amputation; gangrene.) Died July 6, 1864; exhaustion.

[1] North (A.), *Report of Sixty Cases of Hospital Gangrene*, in *The American Medical Times*, 1863, Vol. VI, p. 255.

[2] Lidell (J. A.), *Gunshot Wound of Right Ankle Joint involving Tibia and Astragalus*, in *U. S. Sanitary Commission Memoirs*, Surgical Volume I, New York, 1870, p. 191.

In five of the one hundred and thirty-three secondary amputations in the upper third of the leg re-amputation in the thigh became necessary; one patient survived and four succumbed to the operation.

Secondary Amputations in the Middle Third of the Leg for Shot Injury.—One hundred and seventy-four cases are included in this group; one hundred and thirty-seven terminated successfully and thirty-seven fatally, a mortality rate of 19.7 per cent. In eighty instances the right and in eighty-seven the left limb was amputated, and in seven cases this point was not indicated.

Recoveries after Secondary Amputations in the Middle Third of the Leg for Shot Injury.—Of the one hundred and thirty-seven patients who survived secondary amputation in the middle third of the leg twenty-three were Confederate and one hundred and fourteen Union soldiers. Of the latter one hundred and thirteen became pensioners, but twelve have died since the date of their discharge from the service—one of pyæmia, one of continued suppuration of the stump, one of exhaustion, one of apoplexy, one of chronic diarrhœa, one of phthisis, and six of causes not stated.

CASE 792.—Private O. L. Bell, Co. D, 1st Delaware, aged 19 years, was wounded in the right leg, at Antietam, September 17, 1862, and admitted to hospital at Frederick ten days afterwards. Acting Assistant Surgeon W. S. Adams forwarded the following history: "An examination revealed extensive comminuted fracture of both bones of right leg at the upper portion of the lower third, a transverse fracture at the upper third, and an oblique fracture running down to within two inches of the external malleolus. The limb was in Smith's anterior splint, which had been badly applied; and a piece of adhesive plaster, which had been placed just above the knee, had been allowed to receive the weight of the limb for six weeks. The result was that it cut through the skin, fascia, and to a considerable extent into the muscles, the incision made being seven inches long and at its middle two and a half inches broad. After taking it off the limb was readjusted in the same splint, in which it remained about three weeks longer, when it was placed in a fracture box. After union the leg showed two inches shortening. The patient's condition had remained good throughout, but on the morning of December 26th he had a severe chill, followed at 10 A. M. by considerable fever. On the next day there was some evidence of erysipelas on the leg and thigh, and three grains of quinine were prescribed every three hours, also fifteen drops of tincture of chloride of iron every four hours. On the following day erysipelas was very evident and extended from the ankle to the hip; limb hot and much swollen; pulse 130; tongue furred and bowels constipated. Saline cathartics were now ordered and lead and opium wash was applied. On December 29th the patient was no better and there was total loss of appetite. The limb was now suspended in Smith's anterior splint so as to allow a free passage of air beneath and to facilitate the application of local remedies to all parts affected. After this the patient did quite well until January 10, 1863, when there was some evidence of an abscess on the anterior part of the thigh, but no distinct fluctuation could be recognized; patient having no pain and feeling quite well, his appetite having returned for some days. The quinine was now stopped and brandy and tonics were continued. On January 14th an extensive abscess was opened on the anterior part of the thigh and about a quart of pus was evacuated, after which the cavity was syringed with tepid water and a bandage was applied to the entire limb. One week later a solution of zinc was ordered to be used for syringing. Subsequently the patient continued to do well, requiring no treatment, and on February 10, 1863, he was discharged, the walls of the abscess having become adherent and the ulcer nearly cicatrized." The man subsequently re-enlisted in the 1st Delaware Cavalry and served for fifteen months, when the wound reopened. He then passed through various hospitals, being ultimately discharged for disability, from Jarvis Hospital, Baltimore, June 15, 1865, and pensioned. Examiner I. Jump, of Dover, Delaware, certified July 1, 1871: "There is a large open sore some four or five inches long and the skin or flesh on most of the leg is very much discolored, the discharge being very offensive except when counteracted by disinfectants. The pensioner had to take to his bed last February, being unable to bear any weight on the limb and suffering very much with it. His physician, who had served in the army, insisted on taking the leg off. I am of the opinion that it never will be healed; but I have advised that the diseased portions of the bones be removed; it is barely possible he may

FIG. 318.—Posterior and anterior views of the bones of the right leg. *Spec.* 6569.

FIG. 319.—Appearance of stump. [From a photograph.]

recover." Dr. J. F. M. Forwood, of Chester, Pennsylvania, who subsequently, on August 19, 1872, amputated the leg seven inches below the knee joint, communicated, in connection with the case, that after receiving his final discharge from service the man "roamed about and had one or two operations performed for his relief, staying some fifty days in St. Joseph's Hospital, Philadelphia, and finally drifting here, where I amputated his limb." At an examination of the stump in August, 1879, Examiner Jump reported: "There has been ulceration for ten months continuously, sometimes confining him to his bed." The pensioner was paid March 4, 1881. The amputated bones of the leg (*Spec.* 6569), together with a photograph of the pensioner, represented in the wood-cuts (FIGS. 318, 319), were contributed to the Museum by the operator.

CASE 793.—Private W. Holmes, Co. D, 18th Massachusetts, aged 20 years, was wounded in the right leg, at Fredericksburg, December 13, 1862. He passed from a field hospital to Campbell Hospital, Washington, two weeks after receiving the injury, and six months afterwards he was transferred to Mower Hospital, Philadelphia. Surgeon J. Hopkinson, U. S. V., in charge of the latter, recorded the following history: "The patient was suffering from a compound comminuted fracture of the tibia and fibula at the lower third. He also complained of diarrhœa, for which chalk mixture and laudanum were administered. Dead bone was discovered by the probe. The leg had been operated on and several pieces of bone removed. At the time of admission, June 20th, it was very much enlarged and disfigured by cicatrices. The wound was dressed with warm-water poultices every hour. On July 15th a large ulcer had broken out on the limb and a large piece of bone was taken away. Warm-water dressings were still continued, and the foot was kept elevated. On the following day the ulcer was found to be extending, and bread and milk poultices were ordered to be applied. Subsequently chlorate of potassa and muriatic disinfecting lotion were used. On July 19th, creasote was applied to the ulcer; warm-water dressings continued; bone now in a sad state. On July 22d the leg was removed by flap operation by Assistant Surgeon C. R. Greenleaf, U. S. A., half way between the ankle and the knee. The flaps were brought accurately together and dressed with water dressing. On the following day the patient felt easy, having slept well during the night after taking a half grain of morphia; pulse 100, full and soft. On July 26th the dressing was removed; stump looking well and patient doing well. Extra diet was given, and porter daily. The stump healed rapidly and the patient's general health was excellent. On September 30th the stump had entirely healed and the patient went home on furlough." He was subsequently transferred to Haddington Hospital, and later to Ladies' Home, New York City, where he was supplied with an artificial leg of the "Bly" pattern, and whence he was discharged April 12, 1864, and pensioned. In his subsequent applications for commutation he described the condition of the stump as continuing in a "healthy state." The amputated bones of the leg (*Spec.* 2594), contributed by the operator, are represented in the annexed wood-cut (FIG. 320) and exhibit the seat of the fracture, the fibula being firmly consolidated, and much callus being effused about the tibia, but caries having prevented firm union. The pensioner was paid March 4, 1881.

FIG. 320.—Bones of the right leg seven months after fracture. *Spec.* 2594.

CASE 794.—Private *E. Collins*, Co. A, 3d Mississippi, aged 22 years, was wounded above the right ankle, at Peach Tree Creek, July 20, 1864. He was under treatment at Confederate hospitals until June 7, 1865, when he was admitted to the Marine (Union) Hospital at Mobile. Surgeon S. Kneeland, U. S. V., in charge, contributed the specimen (No. 481), represented in the adjoining cut (FIG. 321), with the following description: "The missile, a minié ball, perforated the tibia in its course and lodged in the wounded man's shoe. The wound had never healed, and suppuration and hæmorrhage had continued up to the time of the patient's entrance into this hospital. For the last few weeks hæmorrhage had been frequent and profuse and it was with difficulty controlled by stuffing the cavity in the tibia, which was large enough to allow the finger to be introduced freely. Suppuration was also profuse, and there was great pain and swelling about the lower part of the tibia, the patient being considerably exhausted from these causes. Circular amputation of the leg near the middle was performed on June 8th by Acting Assistant Surgeon R. W. Coale, chloroform being used. The stump at first was disposed to slough, but under a tonic treatment and antiseptic applications it soon assumed a healthy appearance. The subsequent progress was favorable, and by June 30th the stump was nearly well." The records of the hospital show that the patient was discharged on parole July 9, 1865. The specimen comprises the lower portions of the bones of the injured leg, and exhibits the cavity in the tibia as well as external deposit of callus.

FIG. 321.—Bones of the right leg ten and a half months after injury. *Spec.* 481.

CASE 795.—Private P. Larkin, Co. C, 48th New York, aged 24 years, was wounded during the assault on Fort Wagner, July 18, 1863, by a canister shot, which fractured the right foot. Assistant Surgeon J. E. Semple, U. S. A., reported that the wounded man was conveyed to hospital at Hilton Head, where Pirogoff's amputation at the ankle joint was performed one week after the date of the injury. The patient recovered, and was discharged from service December 4, 1863, and pensioned. Dr. E. D. Hudson, of New York City, who supplied the pensioner with an artificial foot several years afterwards, reported that he saw the man some weeks after leaving the service and found that the tibia was extensively necrosed, that numerous pieces had exfoliated, and that there was copious discharge of pus from the leg, which was enlarged about one-third beyond its normal size, an involucrum being present corresponding to the extent of the necrosed bone, and several cloacæ having formed. The pensioner subsequently suffered re-amputation of the leg at the middle third (near the junction with the upper third) at the Soldiers' Home in Hampton, whence Dr. G. H. Marmion, surgeon in charge, described the case substantially as follows: "After receiving his discharge Larkin was sent to his home in Brooklyn, where he followed his trade as stucco-maker, but was com-

FIG. 322. — Bony stump of right leg, after Pirogoff's amputation at the ankle joint. *Spec.* 6913.

pelled to desist three months afterwards, necrosis setting in and continuing pretty much up to the present time. He is a man of apparently good constitution, and should have done well had the leg been amputated at the junction of the middle and lower thirds. As it was he led a life of suffering and mortification, the odor of his leg completely ostracising him from the society of his fellows. I think the operation of Syme or Pirogoff might be profitably abandoned. The re-amputation was performed by me on May 6, 1879, with the assistance of hospital nurses, none of them being professional men. The stump was kept constantly wet night and day with a dilute solution of carbolic acid. It healed entirely by first intention, and the patient is now (June 10, 1879) able to walk on crutches a few yards to the hospital piazza. I had some fears of an extension of the disease, but at present there is not nor has there been any indication of the remainder of the tibia being involved. The patient is in excellent physical condition, fat, rosy, and good spirits." The bones of the leg (*Spec.* 6913), removed at the re-amputation and contributed by the operator, are shown in the wood-cut (FIG. 322 on the preceding page), and exhibit a large involucrum embracing a cylindrical sequestrum of the tibia. The pensioner was paid March 4, 1881.[1]

CASE 796.—Private L. V. Grant, Co. M, 8th Illinois Cavalry, aged 23 years, was wounded in the left ankle, at Beverly Ford, June 9, 1863, and entered Lincoln Hospital, Washington, the following day. Assistant Surgeon J. C. McKee, U. S. A., who amputated the injured limb, reported as follows: "The wound was caused by the ball entering the inner malleolus posteriorly, penetrating the base of the tibia, and remaining embedded on the semi-cylindrical face of the astragalus. Upon taking charge of the hospital (December, 1863) I found the patient's condition as follows: Appetite capricious but well guarded by taking acceptable food; constant pain in left breast, accompanied by headache; eyes constantly suffused and face flushed, wakefulness, restlessness, and night-sweats; also a strong aortic direct murmur of the heart, with considerable hypertrophy and consequent labored heart action. He had to be propped up in bed to allow him any rest, his expression being anxious, appetite declining, pain of wound unremitting and excruciating, tissues inflamed and œdematous, and the joint immovable and firmly anchylosed, rendering it impossible for the patient to put his foot on the ground. He begged again and again to have the limb removed. An examination by the probe indicated diseased bone or foreign substance. The opinion of Acting Assistant Surgeon W. F. Peck—under whose care he had been for some months—as confirmed by the statement of the patient was that the ball had been extracted. Uninfluenced by the patient's constant and urgent solicitation I proceeded carefully to examine the case further; and not being satisfied that I had sufficient authority to remove the diseased and injured joint by amputation, I delayed for accumulative evidence, which was not long in presenting itself. The bad symptoms increasing, it became evident that some measure for relief must be promptly taken to save the life of the patient. Assistant Surgeon R. Bartholow, U. S. A., under whose care the patient had also been for some time, favored immediate amputation, and stated that he had intended to operate before my arrival. Assistant Surgeon H. Allen, U. S. A., was also present and favored the operation. Acting Assistant Surgeon W. F. Peck insisted upon removing the limb some time before I gave my consent; other medical gentlemen present were satisfied that the removal of the limb was called for to rid the patient of a deformity and an encumbrance. Amputation was accordingly performed on December 7, 1863, eight inches below the knee, by circular operation. Sulphuric ether was used and the patient reacted promptly. The stump was left laying open on a pillow and strapped, when the healing process commenced. Simple water dressings were applied. The aggravated symptoms of the heart disease became greatly modified after the operation. The patient's appetite improved, his night-sweats ceased, and he was delighted to be able to sleep and rest, stating that he had not enjoyed any comfort or relief from pain for months before. He obtained an excellent and useful stump. The ligatures came away two weeks after the operation. The patient was furloughed February 11th, and subsequently he was transferred to Judiciary Square Hospital to have an artificial limb applied." On September 24, 1864, his term of service expired and he was mustered out. He was a pensioner until August 21, 1865, when he died. The cause of his death has not been ascertained. The amputated part of the wounded limb, longitudinally bisected and exhibiting the place of lodgement of the missile, was contributed to the Museum by the operator and constitutes specimen 1899 of the Surgical Section.

Fatal Cases of Secondary Amputations in the Middle Third of the Leg for Shot Injury.—Thirty-seven operations were performed—six on Confederate and thirty-one on Union soldiers. Erysipelas was noted in one, pyæmia in seven, and gangrene in eleven cases; in two instances autopsies were reported.

CASE 797.—Private D. Bussler, Co. K, 93d Pennsylvania, aged 19 years, was wounded near the left ankle during the engagement near Fort Fisher, before Petersburg, March 25, 1865. Surgeon S. F. Chapin, 139th Pennsylvania, reported his admission to the field hospital of the 2d division, Sixth Corps. Assistant Surgeon H. Allen, U. S. A., contributed the pathological specimen, numbered 195 of the Surgical Section, A. M. M., with the following description and result of the injury: "The wound consisted of a compound comminuted fracture of the fibula; a conoidal ball had entered the outer aspect four inches above the external malleolus, and emerged at the inner aspect one and a half inches above the internal malleolus. The patient was admitted to Mount Pleasant Hospital, Washington, one week after receiving the injury. Circular amputation of the leg was performed by Acting Assistant Surgeon H. Craft, on May 6th, at the junction of the middle and lower thirds. Eight ligatures were applied and sulphuric ether was used. At the time of the operation the leg presented a large open surface on the posterior region, extending from one inch below the ankle joint to the junction of the middle and lower thirds of the limb. Several spiculæ had been removed previously and there had been gangrene; the patient had lost his appetite and was very weak; pulse small. Reaction came on slowly. On the evening of May 9th he had a severe chill; suppurative process not yet established; stump dark looking and flaps somewhat discolored; two ligatures now came away. Tincture of chloride of iron, with stimulants and nourishing diet, were prescribed, also a camphor and opium pill every liquid stool. On the following day there was another chill, followed by profuse cold sweat; previous treatment continued, and one-half drachm of bi-sulphate of soda dissolved in water was given every two hours. There was very little discharge from the stump, which was dressed with solution of bromine. On May 11th there were two chills and the treatment was continued. In the evening the bi-sulphate of soda was

[1] SMITH (S.), *Amputations at the Ankle Joint in Military Surgery*, in *U. S. Sanitary Commission Memoirs*, Surgical Volume II, p. 134.

stopped, but resumed the next morning. Several rigors occurred during the night and a slight chill on the morning of May 13th, when the patient had great pain in the stomach, and the bi-sulphate of soda was again stopped and morphia prescribed. In the afternoon the doses of bi-sulphate of soda were again resumed. He suffered great pain in the stomach through the night, and the next day the remedy was again stopped. There were now symptoms of gastritis and the patient was gradually sinking. The slough had all separated from the stump, which looked quite healthy. Poultices of charcoal, flaxseed, yeast, and creasote had been used for several days. On the morning of May 15th the patient was very low and in a dying condition, and all medicines except stimulants and beef-essence were stopped. Death, caused by pyæmia, supervened at 3 P. M. on May 15, 1865. At the autopsy the thoracic viscera were found to be normal with the exception of old adhesions of the right lung. The left lobe of the liver and the spleen contained metastatic abscesses; other abdominal viscera were normal. The stump was in a gangrenous condition. The medulla of the upper third of the femur was greatly inflamed, particularly so about one inch below the great trochanter; cancelli of upper part of femur very vascular; cancellous structure of tibia slightly vascular." The specimen consists of the amputated portion of the fibula, showing the seat of the injury without any attempt at repair.

CASE 798.—Sergeant J. C. Schmid, Co. F, 1st Rhode Island Light Artillery, aged 26 years, was wounded, before Petersburg, August 10, 1864, by a minié ball, which took effect above the malleoli of the left leg and implicated the bone. He was admitted to Satterlee Hospital, Philadelphia, one week after receiving the injury. By September 2d the wound had become gangrenous and was sloughing a little, the muscles and bone being exposed at the point of the injury. The patient was thin looking but apparently of good strength and constitution, having good appetite and being in good spirits. The wound became very large and deep, involving most of the muscular structure on the inner and posterior surfaces and extending from the internal malleolus to within two inches of the point of election. On September 22d the leg was amputated by Acting Assistant Surgeon G. P. Sargent just above the point of election, by the circular method, the anæsthetic consisting of two parts of ether to one part of chloroform. One week after the operation the patient's condition was weak and his appetite poor, and there was unhealthy inflammation. On October 6th there was gangrene of the stump, the swelling, inflammation, and discolored spots extending to the groin. The patient died at noon on October 7, 1864, having suffered much pain the previous night. The treatment embraced morphine, quinine, iron, and stimulants according to the condition of the patient. Astringent lotions, caustics, and cataplasms of charcoal and linseed meal were used to the wound and lead and opium solution to the thigh. A mixture consisting of one drachm of carbonate of ammonia, two ounces of syrup of acacia, and six ounces of brandy was administered in tablespoonful doses every four hours. The history, together with the amputated portion of the bones of the leg (represented in the annexed wood-cut, FIG. 323), was contributed by the operator. The specimen, No. 3647, shows that the tibia was nearly entirely fractured in the lowest third, a deposit of callus around the orifice, and an extensive loss of substance in the body of the bone, which is carious.

FIG. 323.—Lower portions of bones of the left leg one month and twelve days after injury. *Spec.* 3647.

CASE 799.—Sergeant J. Cannel, Co. I, 124th Ohio, aged 27 years, was wounded near Dalton, May 9, 1864. Surgeon R. D. Lynde, U. S. V., reported his admission to the field hospital of the 3d division, Fourth Corps, with "shot fracture of right leg and flesh wound of left leg." Eighteen days after receiving the injury the patient was transferred to hospital No. 1 at Nashville, whence Surgeon R. L. Stanford, U. S. V., reported the following: "The wound of the right leg was three-fourths of an inch above the external malleolus and posterior to the tibia, the ball passing inward and downward and emerging three-fourths of an inch below the internal malleolus, having fractured tarsal bones and opened the ankle joint. Circular amputation of the leg at the middle third was performed on June 11th by Acting Assistant Surgeon H. C. May, chloroform and ether being used. At the time of the operation the foot was tumefied and inflamed and the wounds were discharging sanious fetid pus. Abscesses existed through the whole region of the joint, with extensive necrosis of bone, and the patient was much emaciated by suppuration. Thirty-six hours after the amputation the integumentary flaps began to slough so as to expose the bones and face of the stump. Charcoal and yeast poultices were used and stimulants and supporting diet prescribed." The patient died of exhaustion October 4, 1864. Part of the tarsal bones of the amputated limb, somewhat eroded and showing no attempt at repair, were contributed to the Museum by the operator and constitute specimen 3359 of the Surgical Section.

TABLE LXXVII.

Summary of One Hundred and Seventy-four Secondary Amputations in the Middle Third of the Leg for Shot Injury.

[Recoveries, 1—137; Deaths, 138—174.]

NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.	NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	Ash, W., Pt., I, 15th Ohio, age 19.	Sept. 20, Dec. 18, 1863.	Right; circ. Surg. W. C. Otterson, U. S. V. Gangrene. Discharged July 25, 1864.	6	Bassett, A., Pt., H, 22d Massachusetts.	Oc.18,'63, Nov. 29, 1865.	Left; circular. Dr. W. Green, Pittsfield, Mass. Recovery.
2	Babb, L., Pt., B, 5th N. Hampshire, age 43.	April 7, Aug. 12, 1865.	Right; flap. Ass't Surg. G. M. McGill, U. S. A. Discharged October 5, 1865.	7	Bell, J. A., Pt., I, 22d Indiana.	De.31,'62, Dec. 17, 1863.	Left; flap. Discharged November 24, 1863.
3	Baker, J., Pt., K, 4th Penn. Reserves.	June 30, Au. 2,'62.	Right; circ. Discharged September 26, 1863.	8	Bell, O. L., Pt., D, 1st Delaware, age 19.	Sept. 17, 1862. Aug. 19, 1872.	Right. Dr. J. F. M. Forwood, Chester, Penn. (Dec., 1862, limb united; erysipelas. Discharged Feb. 10, 1863.) Two subsequent operations. *Spec.* 6569.
4	Ball, T., Corp'l, B, 54th New York, age 23.	July 4, Sept. 26, 1864.	Right; anterior posterior skin flap. A. A. Surg. W. Balser. Disch'd June 24, 1865.				
5	Barnett, B. W., Pt., E, 3d New York Light Artillery, age 19.	May 16, Aug. 15, 1864.	Right; double flap. A. A. Surg. E. Seyffarth. Discharged February 16, 1865.	9	*Bennett, F.*, Pt., G, 57th Virginia.	July 3, Aug. 18, 1863.	——. Surg. — Carter. Recovery.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
10	Blood, J. N., Pt., C, 16th Massachusetts.	July 3, Aug. 27, 1863.	Left; antero-posterior flap. A. A. Surg. F. Hinkle. Disch'd May 3, 1864. *Spec.* 1712.
11	*Boggs, P. F.*, Pt., A, 1st N. Carolina Cavalry.	July 3. Aug. 27, 1863.	Left. A. A. Surg. B. H. Washington, C. S. A. Recovery.
12	Brown, T. D., Pt., K, 95th Illinois.	May 22, June 27, 1863.	Left; circular. Surg. C. T. Alexander, U. S. A. (May 25, amp. toes.) Disch'd Aug. 12, 1863.
13	*Bugg, W. T.*, Serg't, B, 3d Arkansas.	July 4, Aug.8,'63.	Right. Recovery.
14	Buisch, G., Pt., C, 160th New York, age 44.	Se.16,'64, Jan. 28, 1865.	Left; oval flap. A. A. Surg. A. Trau. Disch'd May 31, 1865. Died July 31, 1876; chr. diarrh.
15	Burbank, B., Pt., H, 95th New York, age 22.	Jan. 13, April 3, 1863.	Left; flap. Ass't Surg. J. Homans, jr., U. S. A. Disch'd June 2, 1863. Died Sept. 17, 1868.
16	Campbell, J. N., Pt., G, 2d Michigan Cavalry, age 32.	Nov. 30, 1864, May 22, 1865.	Left; circular. Ass't Surg. G. M. Sternberg, U. S. A. Discharged July 17, 1865.
17	Campbell, S., Pt., G, 26th Illinois, age 22.	May 9. July 10, 1862.	Left; flap. Discharged October 13, 1862. Died April 17, 1870.
18	Carter, A. L., Lieut., B, 76th New York.	July 1, 1863, April 13, 1865.	Right; long posterior flap. Dr. F. Hyde, Cortland, N. Y. (Discharged November 9, 1863.)
19	Chellis, J. C., Pt., B, 41st Ohio, age 43.	Nov. 25, 1863, Jan. 7, 1865.	Right; antero-posterior flap. A. Surg. G. M. Sternberg, U. S. A. (Necrosis.) Disch'd May 18, 1865. *Spec.* 3607.
20	Clinger, I. W., Pt., I, 26th Ohio, age 20.	Dec. 27, 1862, Dec. 18, 1863.	Right; antero-posterior flap. A. A. Surg. J. Q. A. Banta. Discharged April 10, 1864.
21	*Collins, E.*, Pt., A, 3d Mississippi, age 22.	July 20, 1864, June 8, 1865.	Right; circular. A. A. Surgeon R. W. Coale. (Hæmorrhage.) Paroled July 9, 1865. *Spec.* 481.
22	Covert, B. C., Pt., B, 67th New York.	June 1, July 11, 1862.	Right; circ. Discharged September 7, 1862.
23	Cowling, J. R., Pt., A, 62d Pennsylvania, age 21.	July 2, 1863, Sept. 21, 1864.	Right. Surg. J. Kerr, 62d Penn. (Primary excis. tibia. Disch'd July 13, 1864.) Recovery.
24	Crawford, L. M., Corp'l, M, 13th Pennsylvania Cavalry, age 25.	Aug. 14, Dec. 23, 1864.	Right; circular. Surg. A. F. Sheldon, U. S. V. Discharged June 19, 1865. *Spec.* 3536.
25	Currin, O., Pt., A, 63d New York, age 50.	Sept. 17, Oct. 20, 1862.	Right; circular. Discharged January 12, 1863.
26	Davis, T. F., Pt., E, 82d Pennsylvania, age 24.	June 1, Dec. 14, 1864.	Left; flap. A. A. Surg. A. Trau. Discharged April 29, 1865.
27	Dellabella, F., Pt., D, 2d Missouri, age 28.	Sept. 20, 1863, Mar. 21, 1864.	Right; circular. Medical Cadet C. H. Fisher. (Gangrene; hæmorrhage.) Discharged October 7, 1864. *Spec.* 2205.
28	Dougherty, A., Pt., D, 44th Indiana.	April 6, June 25, 1862.	Left; flap. A. A. Surg. T. B. Harvey. (Erysipelas.) Disch'd September 12, 1862.
29	Douglas, A. L., Pt., H, 2d Maine.	July 21, Aug. 21, 1861.	Right; flap. Discharged October 5, 1861.
30	[1] Duffy, T., Pt., I, 70th New York, age 21.	June 1, 1862.	Left; posterior flap. (Primary amp. ankle joint. Gangrene.) Disch'd July 11, '63. *Spec.* 4312.
31	Dunn, T., Fireman, U.S. Steamer "Juliet," age 26.	April 26, June —, 1864.	Left. Discharged October 24, 1864.
32	Duran, J., Corp'l, C, 17th Maine, age 38.	May 6, Aug. 28, 1864.	Left; circular. A. A. Surg. G. E. Brickett. May 18, 1865, amp. thigh. Disch'd August 7, 1865.
33	Duran, J., Pt., D, 1st Maine Cavalry, age 48.	Oc.27,'64, April 30, 1865.	Left; circular. Discharged August 12, 1865. *Spec.* 4231.
34	Fagan, P., Pt., B, 170th New York, age 41.	June 18, Aug. 10, 1864.	Left; flap. A. A. Surg. G. W. Miller. (Primary amp. toes. Gangrene.) Discharged May 22, 1865. *Spec.* 3664.
35	Ferguson, E., Lieut., A, 1st Wisconsin.	Oct. 8, 1862, June 15, 1863.	Right; flap. Drs. T. Hatchard and E. B. Wolcott, of Milwaukee. Resigned June 17, 1864.
36	Fleming, A. J., Pt., I, 83d Pennsylvania, age 45.	June 27, July 28, 1862.	Left; flap. A. A. Surg. A. W. Calhoun. Discharged December 8, 1862.
37	Gamble, J., Pt., C, 15th West Virginia, age 23.	July 21, Oct. 12, 1864.	Right; lateral flap. Ass't Surg. G. M. McGill, U. S. A. Disch'd April 16, 1866. *Spec.* 2415.
38	*Gash, J. R.*, Serg't, I, 16th North Carolina.	July 1, Sept. 10, 1863.	Left. Surg. Massengale, C. S. A. Recovery.
39	Goode, S., Pt., K, 12th Virginia Cavalry.	Oct. 12, Nov. 12, 1863.	——. Surg. — ———, 9th N. Y. Recovery.
40	Grant, L. V., Pt., M, 8th Illinois Cavalry, age 23.	June 9, Dec. 7, 1863.	Left; circular. Ass't Surg. J. C. McKee, U. S. A. Discharged Sept. 24, 1864. Died August 21, 1865. *Spec.* 1899.
41	Griebe, J., Pt., E, 9th Wisconsin.	Sept. 30, Oct. 31, 1862.	Right; flap. Surg. H. Buckmaster, U. S. V. Discharged January 8, 1863.
42	Grieff, C. H., Pt., A, 96th Pennsylvania, age 21.	June 26, Aug. 1, 1862.	Left; circular. A. A. Surg. S. D. Gross. Erysipelas; hæmorrh. Discharged Dec. 5, 1863.
43	Grier, W., Pt., K, 2d Maine, age 38.	June 27, Aug. 21, 1862.	Left. Discharged November 1, 1864. Died August 25, 1865.
44	Grimes, M., Pt., A, 16th Kentucky, age 21.	May 28, June 29, 1864.	Right; lateral skin flap. Surg. C. McDermont, U. S. V. Disch'd April 1, 1865.
45	Griswold, D. P., Corp'l, C, 76th New York.	J'y 1, '63, May 11, 1869.	Left; flap. Dr. J. D. Trips, Virgil, N. Y. (July 5, excis. tibia. Disch'd Sept. 23, 1864.) Rec.
46	*Growner, H. L.*, Serg't, A, 20th North Carolina, age 33.	Sept. 14, Oct. 18, 1862.	Left. Exchanged December 20, 1862.
47	Hafer, W. H., Pt., E, 2d Pennsylvania Cavalry, age 24.	De.31,'63, Aug. 4, 1864.	Right; flap. Surg. S. P. Smith, 2d Maryland P. H. B. Disch'd April 10, 1865.
48	Hendricks, H., Pt., D, 49th Pennsylvania, age 18.	May 10, 1864, Feb.3,'65.	Right; circular. A. A. Surg. A. Transue. Discharged May 22, 1865.
49	*Henry, W. R.*, Pt., H, 38th Georgia.	De.13,'62, Feb.3,'63.	——. Recovery.
50	*Higinton, J. T.*, Pt., K, 10th Tennessee, age 18.	July 4, Aug. 30, 1864.	Left; circular. To Provost Marshal November 16, 1864.
51	Holmes, W., Pt., D, 18th Massachusetts, age 20.	Dec. 13, 1862, J'y 2, '63.	Right; flap. A. Surg. C. R. Greenleaf, U. S. A. Discharged April 12, 1864. *Spec.* 2594.
52	Horine, W. T., Serg't, K, 20th Indiana.	July 2, Aug. 13, 1863.	Right; flap. Surg. Z. E. Bliss, U. S. V. Discharged July 29, 1864.
53	House, C., Pt., K, 60th Ohio.	Sept. 15, Oct. 16, 1862.	Left; flap. Discharged.
54	Houser, W., Pt., D, 5th Cavalry, age 29.	June 27, Aug. 3, 1862.	Left; flap. A. A. Surg. S. D. Gross. Discharged August 8, 1863.
55	Howe, S. O., Pt., K, 57th Massachusetts.	Mar. 25, June 8, 1865.	Left; circular. Surg. D. W. Bliss, U. S. V. Discharged August 4, 1865.
56	Hubbard, A., Farrier, D, 6th New York Cavalry, age 32.	July 22, Sept. 2, 1864.	Left; antero-posterior flap. A. A. Surg. W. K. Cleveland. Jan. 1, 1865, amp. thigh. Disch'd November 7, 1865. *Spec.* 278.
57	Hudler, J. M., Pt., D, 4th Michigan, age 31.	July 2, Aug. 5, 1863.	Left; sloughing; exfoliat'n. Discharged May 27, 1864.
58	Ingraham, E., Pt., I, 21st Ohio, age 21.	Sept. 20, Dec. 14, 1863.	Right; flap. Ass't Surg. J. C. Patterson, 85th Ill. Discharged June 20, 1864. Died May 3, 1871; consumption.
59	*Jones, J. F.*, Pt., D, 7th Virginia, age 29.	July 3, Au. 4,'63.	Left; flap. Surg. — Shivers, C. S. A. Exch'd Nov. 12, 1863.
60	Jones, J. W., Pt., L, 13th Tennessee Cav'ry, age 21.	Oct. 28, Dec. 24, 1864.	Left; anterior posterior flap. Discharged June 10, 1865.
61	Kasher, J. A., Pt., G, 145th Penn., age 24.	Dec. 13, 1862, Mar. 26, 1863.	Right (erysipelas). Discharged March 25, 1864.
62	Kelley, W., Pt., M, 1st N. York Cavalry, age 38.	April 8, May 13, 1865.	Right; lateral flap. Ass't Surg. J. W. Williams, U. S. A. Discharged August 14, 1865.
63	*King, S. S.*, Pt., G, 13th South Carolina.	July 3. Aug. 24, 1863.	Right; flap. A. A. Surgeon G. Martin. Exchanged March 17, 1864. *Spec.* 2071.
64	Lackey, G. A., Serg't, D, 58th Massachusetts.	May 12, July 27, 1864.	Left; flap. (May 27, amp. foot.) Dr. C. E. Swann, Easton, Me. Discharged March 16, 1865.
65	Lane, D. C., Pt., A, 20th Massachusetts, age 37.	June 30, 1862, Jan. 2, 1863.	Left. A. A. Surg. C. J. Morton. Jan. 2, hæm. Disch'd August 1, 1864. Re-amp. Died Jan. 20, 1866; pyæmia. *Spec.* 861.
66	Larkin, P., Pt., C, 48th New York, age 24.	July 18, 1863, May 6, 1879.	Right. Dr. G. H. Marmion. (July 25, 1863, Pirogoff's amp. ankle. Discharged December 4, 1863. Necrosis.) *Spec.* 6913.
67	Laws, G. L., Serg't, H, 5th Wisconsin.	May 5, July 4, 1862.	Left. Ass't Surg. R. Bartholow, U. S. A. Discharged July 29, 1862.
68	Leigh, G., Pt., C, 3d Artillery, age 19.	Sept. 24, 1863, Mar. 29, 1864.	Right; double flap. Surg. J. A. Lidell, U.S.V. (Prim. amp. ank. joint.) Disch'd Sept. 17, 1864. Died Sept. 13, 1871. *Spec.* 2165.

[1] Stephen Smith, *Amputations at the Ankle Joint in Military Surgery*, in *U. S. Sanitary Commission Memoirs*, Surgical Volume II, p. 138

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
69	Lewis, F. D., Pt., I, 22d Illinois.	Jan. 1, Feb. 19, 1863.	Left; circular. Surg. T. D. Fitch, 42d Illinois. Discharged April 23, 1863.
70	Livengood, J. D., Pt., B, 19th Indiana.	Sept. 17, Nov. —, 1862.	Right. Ass't Surg. J. N. Green, 19th Indiana. Disch'd March 13, 1865.
71	Lyons, J., Pt., K, 9th West Virginia, age 19.	Aug. 26, Oct. 26, 1864.	Left; ant. posterior flap. Surg. N. F. Graham, 12th Ohio. Discharged.
72	McCarthy, J., Pt., F, 48th New York, age 38.	Mar. 2, 1864, April 25, 1865.	Right; circ. A. A. Surg. LeR. McLean. (Gangrene; ligation post. tibial artery. Mar. 21, '64, Chopart's amp.) Disch'd June 10, 1865. Died December 19, 1874. *Spec.* 3007.
73	McCarthy, J., Pt., A, 9th Massachusetts.	July 1, Au. —, '62.	Left; flap. A. A. Surg. J. H. Peabody. Disch'd June 26, '63.
74	McCosh, R., Pt., H, 30th Indiana.	Jan. 1, Apr. 1, '63.	Right; flap. Discharged July 8, 1863.
75	McDowell, J., Serg't, K, 111th N. York, age 39.	July 2, Oct. —, 1863.	Left; circular. A. A. Surg. B. B. Miles. Discharged April 16, 1864. *Spec.* 1731.
76	McGill, J. H., Pt., D, 60th Illinois, age 24.	May 9, 1864, Mar. 4, 1867.	Right. Dr. W. S. A. Cox, Long Prairie, Ill. (Caries; ulcers; gangrene. Disch'd March 14, 1865.) Recovery.
77	McKelvey, A., Pt., F, 169th N. York, age 20.	June 30, Aug. 9, 1864.	Left; short anterior, long post. flap. A. A. Surg. W. L. Welles. Discharged August 21, 1865.
78	McKeever, D., Pt., B, 99th Pennsylvania, age 40.	May 15, 1864, Ja. 24, '65.	Right; posterior flap. Ass't Surg. S. B. Ward, U. S. V. Disch'd June 15, 1865.
79	McMonigal, N., Corp'l, F, 69th Pennsylvania, age 27.	July 9, 1862, Jan. —, '63.	Left; flap. A. A. Surgeon J. A. Cross. Discharged August 29, 1863.
80	Miller, N., Pt., H, 1st Artillery, age 34.	June 24, 1864, M'h 1, '65.	Left; flap. Surgeon D. P. Smith, U. S. V. To regiment June 7, 1865.
81	Moore, J. E., Pt., C, 73d Illinois.	Oct. 8, '62, April 4, 1864.	Right; flap. Dr. J. C. Cook, Newport, Ind. Discharged March 17, 1863.
82	*Moore, W.*, Pt., G, 1st North Carolina.	June 26, 1862, Ja. 13, '63.	Right. Surgeon J. G. Brodnax, C. S. A. Recovery.
83	*Morris, S. W.*, Pt., G, 55th N. Carolina, age 23.	July 1, Oct. 2, 1863.	Left; antero-posterior flap. A. A. Surg. J. Priestly. To prison April 20, 1864.
84	*Moucha, J.*, Pt., C, 5th Florida.	July 2, Au. 6, '63.	Left; circular. Erysipelas. Exchanged November 12, 1863.
85	*O'Neill, J.*, Serg't, E, 1st Louisiana.	J'y 2, '63, M'h —, '64.	——. Surg. G. A. Nott, P.A.C.S. Retired January 30, 1865.
86	[1] O'Reilly, C., Pt., F, 164th New York, age 23.	May 18, Feb. 12, 1865.	Right. A. A. Surg. W. Robie. (Prim. amp. ank. joint; Syme's.) Discharged May 31, 1865.
87	Palmer, A., Pt., G, 3d Michigan, age 37.	July 3, Aug. 15, 1863.	Left; flap. Sept. 2, hæmorrhage; ligation anterior tibial artery. Discharged May 31, 1864.
88	Parker, W. B., Pt., G, 2d Michigan, age 24.	June 19, Nov. 10, 1864.	Left; circular. Surg. E. Bentley, U. S. V. To Vet. Res. Corps February 17, 1865. *Spec.* 3407.
89	Parkinson, J. R., Pt., A, 111th Illinois.	May 13, July 13, 1864.	Left; flap. Discharged March 28, 1865.
90	Peet, G. H., Pt., E, 5th Ohio.	Aug. 9, Sept. 17, 1862.	Right; flap. Confederate surgeon. Discharged February 12, 1863.
91	Philpot, G., Corp'l, I, 8th Kentucky.	Dec. 9, '62, Jan. —, 1863.	Right. Ass't Surg. F. L. Town, U. S. A. Discharged April 17, 1863.
92	Potter, J. W., Corp'l, C, 1st Michigan Sharpshooters, age 22.	Sept. 30, Nov. 4, 1864.	Left; antero-posterior flap. A. A. Surg. J. S. Wheeler. Discharged May 9, 1865. *Spec.* 4229.
93	Rathburn, C. W., Corp'l, B, 1st Rhode Island Artillery, age 29.	De. 13, '62, Sept. 16, 1863.	Left; flap. A. A. Surgeon E. Seyffarth. Discharged June 24, 1864.
94	Reed, J., Pt., E, 89th New York, age 24.	Sept. 29, Nov. 5, 1864.	Left; antero-posterior flap. Surg. G. S. Palmer, U. S. V. Furl'd April 10, 1865.
95	Roberts, H., Pt., F, 12th Kentucky, age 23.	No. 29, '64, April 20, 1865.	Left; oval flap. Discharged May 6, 1865.
96	Rounds, J. E., Pt., E, 2d U. S. Sharpshooters, age 25.	May 6, June 22, 1864.	Right; circular. Surgeon D. W. Bliss, U. S. V. Discharged May 15, 1865.
97	Ross, J., Pt., I, 2d N. Y. Heavy Artillery, age 40.	May 19, ——— 1864.	Left; flap. Surg. D. W. Bliss, U. S. V. (Prim. amp. ank. joint.) Disch'd March 15, 1865. Died Jan. 8, '77; apop. and hemiplegia.
98	Rumbaugh, W., Pt., D, 62d Pennsylvania.	April 5, July 11, 1862.	Left. Dr. R. Wallace, Butler Co., Penn. Discharged February 5, 1863.
99	Russell, A. K., Pt., H, 1st Massachusetts Artillery, age 43.	May 19, 1864.	Left. Surg. C. N. Chamberlain, U. S. V. (Primary amputation ankle joint; Syme's.) Disch'd June 2, 1865.
100	Schafer, W. A., Pt., H, 65th Ohio, age 22.	Nov. 30, 1864, Jan. 4, '65.	Right; flap. A. A. Surg. W. Anderson. Re-amputation. Discharged June 14, 1865.
101	Schemerhorn, G. C., Pt., D, 74th Illinois, age 20.	Nov. 27, 1864, Aug. 6, 1865.	Left; circular. Surg. R. R. Taylor, U. S. V. Disch'd October 30, 1865. Died November 18, 1867; exhaustion.
102	Schmidt, H., Corp'l, B, 8th New York Cavalry, age 25.	June 9, July 14, 1863.	Right; antero-post. flap. Ass't Surg. H. Allen, U. S. A. Discharged Sept. 2, '64. *Spec.* 1352.
103	Schmidtgrieber, J., Pt., A, 2d Massachusetts.	Mar. —, June 25, 1865.	Left; circular. Discharged May 24, 1866.
104	Schweitzer, J., Pt., I, 6th Kentucky.	Jan. 1, June 9, 1863.	Right; circular. A. Surg. A. C. Rankin, 88th Ill. Discharged December 27, 1863.
105	Scoggins, R. W., Pt., F, 1st Florida Cav'ry, age 19.	May 6, Aug. 30, 1865.	Left; circular. A. A. Surg. R. W. Coale. Discharged December 5, 1865. *Spec.* 1599.
106	Scott, F., Pt., K, 26th Pennsylvania.	Aug. 28, Oct. —, 1862.	Left; circular. A. A. Surg. C. B. King. Disch'd October 3, 1863.
107	Servis, B., Pt., K, 96th Illinois, age 21.	May 9, July 12, 1864.	Right; flap. Surg. M. Goldsmith, U. S. V. Discharged October 26, 1864.
108	*Shannon, W.*, Pt., C, 11th Georgia, age 25.	July 2, Au. 8, '63.	Right. Paroled November 12, 1863.
109	*Shelton, J. L.*, Pt., F, 11th Georgia, age 35.	July 2, Aug. 3, 1863.	Left. Surg. T. A. Means, C. S. A. Retired December 14, 1863.
110	Sherman, M., Pt., A, 1st Minnesota, age 42.	Aug. 14, Sept. 24, 1864.	Left; circular. Surg. A. F. Sheldon, U. S. V. Discharged July 24, 1865. *Spec.* 3258.
111	Shouls, D. L., Pt., E, 1st New York Cavalry, age 22.	Nov. 25, 1864, Feb. 6, '65.	Left; lateral flap. Discharged May 28, 1865.
112	Slater, J. A., Pt., H, 6th Infantry, age 23.	July 2, Aug. 4, 1863.	Left; flap. Ass't Surgeon W. T. Okie, U. S. A. Discharged October 17, 1864.
113	Smith, A. J., Serg't, I, 72d New York, age 33.	July 2, Aug. 21, 1863.	Right. A. A. Surg. F. Hinkle. Discharged July 3, 1864.
114	Smith, C. W., Pt., A, 10th N. Hampshire, age 20.	Se. 29, '64, Nov. 17, 1865.	Right; flap. A. A. Surg. A. H. Crosby. Discharged May 18, 1865. Died Nov. 11, 1870.
115	*Smith, H. M.*, Pt., K, 13th South Carolina.	May 3, Au. 3, '63.	——. Recovery.
116	Smith, M., Pt., H, 7th Wisconsin, age 25.	May 5, July 12, 1864.	Right; circular. Surg. E. Bentley, U. S. V. Discharged January 19, 1865. *Spec.* 3341.
117	Starkey, E., Serg't, H, 1st Michigan, age 21.	June 27, July 28, 1862.	Left. Ass't Surg. R. Bartholow, U. S. A. Necrosis. October 25, 1863, re-amputat'n. Discharged December 28, 1864.
118	Stearns, J. P., Lieut., K, 22d Massachusetts.	July 1, Oct. 1, '62.	Left; flap. To Veteran Reserve Corps.
119	Streubel, W., Pt., K, 11th New York.	July 21, 1861, J'e 20, '62.	Left; circular. Surg. A. B. Mott, U. S. V. Disch'd April 6, 1863.
120	Taft, L., Pt., E, 34th N. York, age 41.	Se. 17, '62, Feb. 16, 1863.	Right; flap. Surg. W. T. Humphrey, 149th Penn. Discharged June 30, 1863.
121	*Thomas, E. O.*, Serg't, E, 14th South Carolina.	July 1, Aug. 3, 1863.	Right; flap. A. A. Surg. J. L. Whittaker. Exchanged March 17, 1864. *Spec.* 2054.
122	*Thompson, A. J.*, Capt., G, 7th Mississippi, age 27.	Nov. 30, 1864, Ja. 20, '65.	Left; circular. Surg. — Doyer, C. S. A. To Provost Marshal March 21, 1865.
123	Thorn, F., Pt., D, 63d Pennsylvania, age 28.	May 5, Aug. 17, 1864.	Left; flap. Dr. R. Faulkner, Erie, Penn. (Gangrene. May 26, exc. lower 3d fib.) Disch'd March 18, 1865. *Spec.* 2362.
124	Truel, E. M., Pt., E, 12th Wisconsin, age 23.	July 21, Sept. 8, 1864.	Right; circular. Surg. J. G. Miller, 11th Iowa. Disch'd August 31, 1865.
125	Tuttle, B., Pt., F, 1st Michigan, age 24.	Aug. 30, 1862, Ja. 22, '63.	Right; circular. A. A. Surg. T. H. Allison. Discharged April 10, 1863.
126	Walters, M., Pt., K, 120th New York, age 20.	July 2, Oct. 26, 1863.	Left; circular. A. A. Surg. A. W. Colburn. (Hæmorrhage.) Discharged October 14, 1864.
127	*Warmack, J. W.*, Pt., H, 44th Tennessee.	De. 31, '62, Feb. 5, 1863.	Left. Surg. M. P. Scott, P.A.C.S. Recovery.
128	Webb, M., Pt., A, 114th New York.	June 25, Aug. 18, 1863.	Right; lateral flap. Ass't Surg. W. S. Webster, 150th N. York. Recovery.
129	Welsch, J. M., Pt., B, 8th Maine, age 21.	May 20, 1864, Mar. 26, 1865.	Right; flap. Surg. G. Derby, 23d Mass. (Necrosis.) Hæmorrh. April 12, 1865, amputat'n thigh. Discharged August 25, 1865.
130	Wells, G. W., Pt., K, 4th New Hampshire, age 24.	Aug. 16, 1864, Jan. 16, 1865.	Right; ant. posterior flap. A. A. Surg. J. C. Morton. (Oct. 22, 1864, Syme's amputation foot.) Discharged January 11, 1865.

[1] Smith (S.), *Amputations at the Ankle Joint in Military Surgery*, in *U. S. Sanitary Commission Memoirs*, New York, 1871, Surg. Vol. II, p. 136.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
131	West, J. G., Corp'l, H, 62d Pennsylvania, age 19.	July 2, Aug. 14, 1863.	Right; flap. A. A. Surg. B. B. Miles. (Gangrene.) Discharged December 16, 1863. *Spec.* 1669.
132	Westfall, H., Pt., D, 9th New York, age 28.	Sept. 17, Oct. 21, 1862.	Right; anterior post. flap. Surg. T. H. Squire, 89th N.Y. Disch'd April 8, 1863. *Spec.* 275.
133	*Wheaterly, J. M.*, Pt., I, 13th Mississippi.	Sept. —, De.13,'62.	Right. Surg. — Gilmore, C. S.A. Recovery.
134	Whilty, J., Pt., A, 6th Wisconsin, age 22.	May5,'64, Feb. 8, 1865.	Left; circular. Surg. H. Culbertson. U. S. V. (May 31, 1864, Syme's amputation ankle joint.) Discharged June 26, 1865.
135	*White, M.*, Pt., I, 60th Virginia, age 34.	Sept. 19, Nov. 12, 1864.	Left; circular. Surg. J.W. Lawson, P. A. C. S. Exchanged February 16, 1865.
136	White, R. H., Pt., D, 9th N. York State Militia.	Dec. 13, 1862, Feb.5,'63.	Right; circular. May 24, 1864, re-amputation. Disch'd April 24, 1863.
137	Wright, J.L., Pt.,G, 97th Ohio, age 24.	Nov. 30, 1864, Jan.8,'65.	Left; circular. Surg. R. R. Taylor, U. S. V. Discharged June 10, 1865.
138	Bennett, C., Pt., D, 9th N. Hampshire, age 19.	May 19, Aug. 19, 1864.	Right; circular. A. A. Surg. M. Lampen. (Gang.; sloughing.) Died August 28, 1864; pyæmia. *Spec.* 3637.
139	Brackett, W. H., Corp'l, B, 21st Massachusetts.	Mar. 14, May 5, 1862.	Left; circular. A. A. Surg. J. B. Upham. Died May 16, 1862; exhaustion.
140	Bussler, D., Pt., K, 93d Pennsylvania, age 19.	Mar. 25, May 6, 1865.	Left; circular. A. A. Surg. H. Craft. (Spicula rem.; gangrene.) Died May 15, 1865; pyæmia. *Spec.* 195.
141	Cannel, J., Serg't, A, 124th Ohio, age 27.	May 9, June 11, 1864.	Right; circular. A. A. Surg. H. C. May. Died October 4, 1864; exhaustion. *Spec.* 3359.
142	Carl, P. S., Corp'l, K, 20th New York State Militia.	Aug 29, 1862.	——. Died October 7, 1862.
143	Clellar, J. A., Pt., A, 15th Infantry.	April 7, 1862.	——. (Removal of fragments.) Died May 12, 1862; pyæmia.
144	Deyer, J., Pt., Chicago Battery, age 27.	June 21, July 25, 1864.	Left; circ. Surg. S. E. Fuller, U. S. V. Died August 2, 1864; chronic diarrhœa.
145	Fern, R., Pt., C, 21st Iowa.	May 17, June 23, 1863.	Right. Died June 26, 1863; chronic diarrhœa.
146	Garland, I., Pt., C, 1st Maine Heavy Artillery.	June 18, Aug. 6, 1864.	Left. (Gangrenous.) Died August 10, 1864; pyæmia.
147	Gillmore, L., Pt., K, 111th Pennsylvania.	June 3, July 8, 1864.	Left; anterior post. flap. Surg. E. Bentley, U. S.V. (Necrosis.) Died July 16, 1864; pyæmia. *Spec.* 3352.
148	Gregg, R., Pt., C, 1st Maine Heavy Artillery, age 37.	June 18, July 28, 1864.	Right; circ. A. A. Surg. O. W. Peck. (July 12, Syme's amp. ankle joint.) Died Sept. 30, '64.
149	*Hathaway, W. H.*, Pt.,G, 33d Alabama, age 44.	Nov. 29, Dec. 31, 1864.	Left; circular. A. A. Surg. C. H. Fisher. Died January 31, 1865.
150	Ingram, S., Pt., A, 161st New York, age 18.	April 8, Aug. 14, 1864.	Right; flap. A. A. Surg. H. Latham. Died August 29, 1864.
151	Jennings, J. T., Corp'l, K, 56th Pennsylvania, age 48.	Feb. 6, Mar. 9, 1865.	Left; lat. oval skin flap. A. A. Surg. E. G. Waters. (Necrosis.) Died March 22, 1865; pyæmia.
152	Johnston, W., Pt., E, 26th Pennsylvania.	Aug. 29, 1862.	Right. Died November 5, 1862.
153	Kelly, J. A., Pt., C, 21st Michigan.	De.31,'62, Mar, 19, 1863.	Left. Died March 23, 1863.
154	Loyd, D., Capt., E, 121st Ohio, age 33.	June 27, July 28, 1864.	Left; flap. A. A. Surg. J. A. Hall. Died August 7, 1864; pyæmia.
155	*Martin, M. V.*, Pt., C, 11th Tennessee, age 22.	Nov. 25, 1863, Mar. 10, 1864.	Right. A. A. Surg. G. P. Hachenberg. (Necrosed.) March 21, gangrene. Died March 25, '64; pneumonia. *Spec.* 2203.
156	McRae, C., Pt., A, 27th Michigan, age 34.	May 6, June 10, 1864.	Right; anterior post. flap. Surg. R. B. Bontecou, U. S. V. Died July 18, 1864. *Spec.* 3069.
157	Mickee, J., Pt., I, 88th Illinois.	May 18, July 18, 1864.	Right. Died July 24, 1864.
158	Miller, J., Pt., H, 26th Ohio, age 18.	June 27, Aug. 7, 1864.	Left; circular. A. A. Surg. J. W. Digby. Died August 31, 1864; exhaustion.
159	Mitchell, J., Pt., I, 1st Maine Heavy Artillery, age 45.	May 16, July 6, 1864.	Right; circular. A. A. Surg. J. P. Arthur. Died July 9, 1864.
160	*Morron, J. A.*, Pt., D, 4th Alabama Cavalry.	Feb. 3, Mar. 13, 1863.	Right. Died March 31, 1863. *Spec.* 1036.
161	Nichols, J. B., Pt., A, 24th New York Cavalry, age 18.	June 17, Aug. 24, 1864.	Right; circular. A. A. Surg. W. P. Moon. Died Sept. 7, 1864.
162	O'Brien, J., Pt., F, 19th Infantry.	Sept. 20, 1863, Jan.8,'64.	Right. A. Surg. W. E. Whitehead, U. S. A. Died January 26, 1864. *Spec.* 2034.
163	Penny, W., Pt., G, 2d Maryland, age 22.	July 4, Sep.1,'64.	Right; post. flap. A. A. Surg. J. Tyson. Died September 29, 1864; exhaustion.
164	Pero, P., Pt., C, 2d New York Cavalry, age 22.	May 5, June 20, 1864.	Right. A. A. Surg. F. Hassenberg. (May 7, excis. met. and fragm'ts; hæm.) Died July 15, 1864; chronic diarrhœa.
165	*Rhodus, B. B.*, Pt., F, 4th North Carolina.	———	Right; circular.
166	Schmid, J. C., Serg't, F, 1st Rhode Island Art'y, age 26.	Aug. 10, Sept. 22, 1864.	Left; circular. Died October 7, 1864; gangrene. *Spec.* 3647.
167	Shoemaker, H. E., Pt., C, 52d Pennsylvania.	May 31, July 1, 1862.	Left. Ass't Surg. W. Thomson, U. S. A. Died October 9, 1862; gangrene. *Spec.* 4956.
168	Smith, H. W., Serg't, K, 111th N. York, age 20.	July 3, Aug. 4, 1863.	Left. Ass't Surg. D. C. Peters, U. S. A. Died August 8, 1863. *Spec.* 1607.
169	*Spinkler, J. H.*, Pt., I, 18th North Carolina, age 30.	May 3, Aug. 31, 1863.	Right; circular. Died September 3, 1863; effects (amputation last resort).
170	Stead, J. W., Pt., K, 3d N. Hampshire, age 24.	May 15, June 21, 1864.	Left; flap. A. A. Surg. H. B. White. Died July 16, 1864; irritative fever.
171	Stout, L., Corp'l, C, 79th Ohio, age 26.	July 20, Sept. 10, 1864.	Left; circular. A. A. Surg. F. C. Leber. Gangrene. Died September 12, 1864.
172	*Troxler, G. S.*, Pt., A, 59th North Carolina, age 41.	Mar. 25, April 29, 1865.	Left; circular. A. A. Surgeon J. Morris. Died May 5, 1865; erysipelas.
173	Wickson, D. D., Pt., I, 59th New York.	Sept. 17, Dec. 1, 1862.	Left; anterior post. flap. Ass't Surgeon J. B. Brinton, U. S. A. Died Dec. 16, 1862. *Spec.* 797.
174	Young, W., Pt., G, 8th Illinois Cavalry.	June 9, July 10, 1863.	Right. Died July 20, 1863. *Spec.* 1345.

Secondary Amputations in the Lower Third of the Leg for Shot Injury.—The number of secondary operations in the lower third of the leg is one hundred and twenty-one; eighty-six patients survived the operation and thirty-five, or 28.9 per cent., succumbed. The right limb was amputated in fifty-five, and the left in sixty-two instances; in four cases the side was not specified.

Recoveries after Secondary Amputations in the Lower Third of the Leg.—Of the eighty-six operations of this group nine were performed on Confederate and seventy-seven on Union soldiers. The latter were pensioned, and one only has died since the date of discharge from the service.

Case 800.—Private W. Nash, Co. C, 187th Pennsylvania, aged 19 years, was wounded in the right foot, before Petersburg, June 18, 1864. Surgeon C. N. Chamberlain, U. S. V., reported his admission to the field hospital of the 4th division, Fifth Corps, with "severe injury to the bones of the foot, caused by a minié ball." From the field hospital the wounded man passed to City Point, thence to hospital at Alexandria, and subsequently to Philadelphia. Assistant Surgeon T. C. Brainerd, U. S. A., in charge of Broad and Cherry Streets Hospital, described the injury as "a compound fracture of the tarsus, followed

by necrosis of bone, pain in the foot, and free discharge, for which the leg was amputated at the lower third by circular method, on May 8th, by Acting Assistant Surgeon H. M. Bellows. At the time of the operation the patient had become much exhausted from the profuse and continued discharges from the wound. He reacted promptly, ether having been used as an anæsthetic. Dry dressings were applied." The operator subsequently communicated that the stump only required three weeks to heal perfectly. The patient afterwards passed through various hospitals, and was ultimately mustered out at the expiration of his time of service, August 3, 1865, and pensioned. Several years later, when seen and examined by the operator, the pensioner was found in general good health and with a good, round, and entirely healed stump, he being able to walk satisfactorily with the aid of an artificial limb. In his application for commutation, in 1870, the pensioner described the stump as being "not in the best condition;" but in his subsequent statements, five and ten years later, he reported its condition as "good." The pensioner was paid September 4, 1880.

CASE 801.—Private D. Dietz, Co. B, 48th Pennsylvania, aged 21 years, was wounded in the left ankle joint, at Spottsylvania, May 12, 1864. He remained at a field hospital for two weeks and was then conveyed to Washington, where he was admitted to Campbell Hospital. Surgeon A. F. Sheldon, U. S. V., contributed the pathological specimen, No. 4052, represented in the annexed wood-cut (FIG. 324), with the following history of the injury: "A musket ball entered the left foot posteriorly, passed forward between the astragalus and tibia, and emerged anteriorly, opposite the point of entrance, fracturing the articulating surfaces of both bones. Circular amputation through the inferior third of the leg was performed by Assistant Surgeon A. Delany, U. S. V., on November 10th, two ligatures being applied and anæsthesia produced by chloroform. At the time of the operation the foot and ankle were enlarged, with numerous openings discharging sanguinolent pus. Hectic irritation, pain, and loss of appetite were rapidly overcoming what little vitality remained. The patient bore the operation well." The patient was subsequently transferred to Judiciary Square Hospital for the purpose of being fitted with an artificial limb, and on May 19, 1865, he was discharged from service and pensioned. In his application for commutation, dated 1870, he described the stump as "healed and well," and subsequently he reported it as being in "good condition." The pensioner was paid June 4, 1880. The specimen consists of the bones comprising the ankle of the amputated leg, and shows that large quantities of spongy new bone were thrown out around the tibia, but the bodies of the bones were destroyed by suppuration.

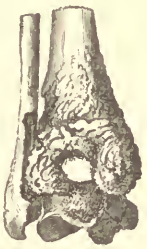

FIG. 324.—Bones of the left ankle six months after injury. *Spec.* 4052.

CASE 802.—Private C. W. Fox, Co. I, 111th New York, aged 18 years, was wounded in the right foot during the engagement at the South Side Railroad, March 31, 1865. He was admitted to Harewood Hospital, Washington, five days afterwards, where amputation was performed by Surgeon R. B. Bontecou, U. S. V., who made the following report: "The metatarsal bone of the big toe was fractured and the os calcis severely injured. When admitted the patient appeared to be considerably debilitated; the condition of the injured parts, however, was tolerably good. The parts subsequently became gangrenous, with disorganization of the ankle joint, sloughing of soft parts, and necrosis of bone. Sinuses formed and extended up the leg. The limb was amputated at the lower third by the circular method on May 3d. The patient did well after the operation under simple dressings, aided by a supporting and nourishing diet throughout. The parts had nearly healed when he was transferred to Armory Square Hospital July 20th." About one month later he was transferred to Stanton Hospital, where a second operation became necessary and was performed by Surgeon B. B. Wilson, U. S. V., who describes it as follows: "The first amputation had been performed about one inch above the ankle joint. At the time of the patient's admission to Stanton Hospital the stump had entirely healed, but it was swollen and painful and presented evidence of suppurative inflammation within. Poultices were applied and abscesses soon pointed in two or three places, one in or near the cicatrix of the operation and the others along the lower part of the shaft of the tibia, which, on rupturing, discharged a bloody and ill-conditioned pus pretty freely. Upon examination with a probe the existence of necrosed bone was detected, and at the earnest request of the patient, who desired to get rid of his trouble as quickly and fully as possible, it was determined to re-amputate the stump as far as the sequestrum extended. The operation was performed on September 6th, three inches of the bones being removed by the ordinary circular method and the sequestrum found to extend quite up to the point severed by the saw. The integument was brought together laterally and secured by interrupted sutures and adhesive straps. The patient did well and the healing process progressed rapidly. At the closing of Stanton Hospital, on September 19th, he was sent to Douglas Hospital, where I saw him two weeks afterwards, when the stump was almost entirely healed and looked admirably." In October, 1865, the patient was discharged from service, to date from September 6th, and pensioned, having been previously supplied with an artificial leg. In his applications for commutation he described the stump as being in "sound" and "good condition." His pension was paid September 4, 1880. The bones removed at the second amputation were contributed to the Museum by the operator and constitute specimen 2454 of the Surgical Section, exhibiting the fibula in a state of caries and a large spongy involucrum surrounding a small sequestrum of the tibia.

Fatal Secondary Amputations in the Lower Third of the Leg for Shot Injury.—In the thirty-five cases of this class pyæmia was noted in ten, gangrene in ten, erysipelas in two, and secondary hæmorrhage in one instance. Nine of the patients were Confederate and twenty-six Union soldiers:

CASE 803.—Private *W. J. Craps*, Co. D, 24th South Carolina, aged 33 years, was wounded at Franklin, November 30, 1864, by a musket ball, which entered the external lateral aspect of the left ankle immediately over the malleolus, passed inward, and emerged at the internal aspect in front of the internal malleolus, fracturing the inferior end of the fibula and opening the ankle joint. The man was taken prisoner and admitted to hospital No. 1, at Nashville, four weeks after receiving the injury. The tissues about the ankle joint and dorsum of foot became swollen and infiltrated, which was followed by profuse discharge of carious pus from three fistulous openings. On February 17, 1865, the leg was amputated at the lower third by Surgeon B. B. Breed, U. S. V. The operation was performed by bi-lateral skin flaps and circular section of muscles, two ounces of blood

being lost and three ligatures applied. Chloroform was used and was followed by prompt reaction. At the time of the operation the patient was much exhausted and suffering from obstinate diarrhœa. Disinfectant dressings were used, also tonics, stimulants, and supporting diet. The patient died of exhaustion March 11, 1865. The tarsal and metatarsal bones of the amputated limb, contributed with the history by the operator, constitute specimen 4217 of the Surgical Section of the Museum. The internal and middle cuneiform bones are wanting in the specimen, and the first metatarsal is obliquely fractured.

FIG. 325.—The bones of the right ankle eight months after injury.—*Spec.* 4248.

CASE 804.—Private S. B. Dudley, Co. B, 97th Indiana, aged 24 years, was wounded at Kenesaw Mountain, June 27, 1864. Surgeon J. M. Woodworth, 1st Illinois Light Artillery, reported his admission to the field hospital of the 4th division, Fifteenth Corps, with "shot fracture of right ankle joint." From the field the wounded man was successively transferred to hospitals at Rome, Chattanooga, and Nashville, and lastly, on November 29th, he entered Crittenden Hospital at Louisville, where the injured limb was amputated by Surgeon R. R. Taylor, U. S. V., who made the following report: "The wound was caused by a minié ball, which perforated the joint anteriorly. The injury resulted in anchylosis and inflammation of the ankle joint, and fistulous openings formed around the joint leading to carious bone. The disease, enkindled in the articulation and adjacent parts, became so extensive that amputation had to be performed through the lower third of the leg on February 18, 1865. Chloroform was used and the operation was done by the circular method, the patient being in good general health at the time. Simple dressings were applied, and for a time the case promised well; but in a few weeks the patient was seized with traumatic erysipelas, which rapidly extended over the entire leg and thigh, and in spite of an energetic supporting treatment he sank rapidly. His death occurred February 28, 1865." The bones comprising the injured ankle joint, *Spec.* 4248, were contributed to the Museum by the operator and are represented in the wood-cut (FIG. 325), showing the articulation in a state of anchylosis and exhibiting marked periosteal disturbance in the shafts of the tibia and fibula for several inches. The specimen also reveals the outer border of the calcaneum to have been grooved and the posterior portion of the astragalus to have been carried away.

CASE 805.—Private L. Ordway, Co. A, 19th Maine, aged 33 years, was wounded before Petersburg, June 22, 1864, and entered Broad and Cherry Streets Hospital, Philadelphia, eight days afterwards. Assistant Surgeon T. C. Brainerd, U. S. A., reported: "The injury consisted of a gunshot fracture of the left ankle joint, the ball entering directly over the internal malleolus, fracturing it and a portion of the upper and inner articulating edge of the astragalus. The wound sloughed very badly and the patient became very much emaciated. Amputation was deemed necessary, and was performed by the circular method, at the lower third of the leg, on July 23d, by Acting Assistant Surgeon F. H. Getchell. Chloroform was used. The patient reacted well for one so weak as he was, and the stump looked healthy for two days, after which sloughing set in. Dry dressings were applied and beef-tea, tonics, and stimulants were administered. The patient continued to sink, and died of exhaustion July 28, 1864." The amputated bones of the ankle, carious and showing no attempt at repair, were contributed to the Museum by the operator and constitute specimen 3663 of the Surgical Section.

TABLE LXXVIII.

Summary of One Hundred and Twenty-one Cases of Secondary Amputations in the Lower Third of the Leg for Shot Injury.

[Recoveries, 1—86; Deaths, 87—121.]

NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.	NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	Allhands, F. M., Lieut., E, 35th Illinois, age 32.	May 11, July 18, 1864.	Right; flap. A. A. Surg. J. H. Green. (Synovitis and erysip.) Discharged January 2, 1865.	10	*Burnett*, W.....	July 4, De.24,'63.	Left (necrosis). Discharged February 7, 1864.
2	*Arnett*, W. W., Pt., I, 14th Miss., age 38.	Dec. 15, 1864, Jan. 20, 1865.	Right; flap. To Provost Marshal May 31, 1865.	11	Burns, C. E., Pt., D, 12th Massachusetts, age 24.	Aug. 29, 1862, April 23, 1863.	Right; double flap. Surg. J. H. Baxter, U. S. V. (Sept. 13, '62, Syme's amputation ankle joint.) Disch'd July 11, 1863.
3	Bailey, D., Pt., G, 3d Iowa Cavalry, age 26.	June 10, 1864, Feb.–,'65.	Right. Dr. J. C. Hughes,—— (Sloughing; ligation plantar.) Discharged Sept. 11, 1865.	12	Burrows, E., Pt., 19th N. Y. Battery, age 31.	May 1, Aug. 25, 1864.	Right; flap. A. A. Surg. E. L. Duer. (May 14, amput'n toe.) Discharged September 23, 1865.
4	Bisbee, N., Serg't, K, 89th New York.	June 18, 1864, Ap. 3, '65.	Right; flap. Surg. A. H. Thurston, U. S. V. (Amputat'n toes.) Discharged May 25, 1865.	13	Burt, F. P., Pt., C, 22d Massachusetts, age 19.	May 8, June 8, 1864.	Right; circular. A. A. Surg. H. B. Knowles. Discharged September 17, 1864.
5	[1]Bralier, H. H., Pt., E, 11th Pennsylvania.	Aug. 30, Oct. 5,'62.	Right; Teale's method (circular). Ass't Surg. C. A. McCall, U. S. A. Oct. 13, re-amputation. Disch'd September 14, 1863. *Spec.* 167.	14	Childers, F., Pt., G, 8th Illinois.	April 6, May7,'62.	Right., Surgeon — Fish. Discharged August 23, 1862.
6	Brinson, J., Pt., G, 38th Indiana, age 42.	Dec.1,'62, Feb. 24, 1863.	Right; flap. Ass't Surg. A. T. Barnes, 98th Illinois. Disch'd May 21, 1863.	15	[2]Connors, J., Pt., F, 76th Pennsylvania, age 25.	July 11, Sept. 27, 1863.	Right; antero-post. flap. A. A. Surgeon J. M. Fulton. (Syme's amp. ankle joint.) Discharged August 28, 1865.
7	Bromley, H., Pt., I, 14th Pennsylvania Cavalry, age 28.	May 28, July 12, 1864.	Right; flap. Discharged January 27, 1865.	16	[3]Covell, E. R., Pt., C, 52d New York, age 38.	May 18, 1864, May5,'69.	Left; flap. Dr. R. Millar, R. I. Hospital. (May 18, '64, Syme's amputation ankle.) *Spec.* 4369.
8	Brouchard, A., Pt., A, 5th New Hampshire, age 31.	April 7, May 15, 1865.	Left; circ. A. A. Surgeon J. M. Downs. (April 17, excision met. bones.) Disch'd Aug. 12, 1865. 1866, amp. knee j't; amp. thigh.	17	Crouse, J., Serg't, I, 1st New York Light Artillery, age 24.	July 2, Aug. 2, 1863.	Left. Discharged May 21, 1864. *Spec.* 1651.
9	Brown, R., Pt., G, 28th New York, age 19.	Aug. 9, Sept. 27, 1862.	Right; circular. A. A. Surg. S. E. Fuller. Disch'd October 23, 1862. *Spec.* 326.	18	Detwiler, M. L., Serg't, A, 30th Illinois, age 24.	Feb. 5, Mar. 22, 1864.	Right; flap. A. A. Surgeon A. Sterling. Discharged August 30, 1864.
				19	Dietz, D., Pt., B, 48th Pennsylvania, age 21.	May 12, Nov. 10, 1864.	Left; circ. Ass't Surg. A. Delany, U. S. V. Discharged May 19, 1865. *Spec.* 4052.

[1] COUES (E.), *Report of some Cases of Amputations and Resections from Gunshot Wounds, etc.*, in *Med. and Surg. Reporter*, 1862–3, Vol. IX, p. 196.
[2] SMITH (S.), *Amputations at the Ankle Joint in Military Surgery*, in *U. S. Sanitary Commission Memoirs*, New York, 1871, Surg. Vol. II, p. 138.
[3] SMITH (S.), *Loc. cit.*, p. 136.

NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
20	Donahue, M.C., Seaman, U. S. Gunboat "Baron DeKalb."	Jan. 11, Feb. 11, 1863.	Right. A. A. Surg. G. Bigsby. Discharged April 30, 1863.
21	Eastman, J. E., Serg't, L, 1st Mass. Heavy Artillery, age 39.	May 19, July 8, 1864.	Right; skin flap. A. A. Surg. G. O. Moody. Discharged July 12, 1865.
22	Egan, O., Pt., E, 17th Massachusetts, age 27.	Feb. 1, May 14, 1864.	Left; circular. A. A. Surg. J. B. Cutter. Gangrene. Discharged August 3, 1864.
23	Evans, C., Pt., E, 120th New York.	May 3, J'y —,'63.	Left. Discharged November 16, 1863. *Spec.* 1346.
24	Evans, J., Pt., I, 19th Michigan, age 40.	May 15, June 15, 1864.	Left; circular. Discharged September 13, 1865.
25	Farren, B., Pt., A, 82d Pennsylvania, age 49.	April 8, Oct. 25, 1865.	Right; circular. A. A. Surg. J. B. Roe. Recovered February 22, 1866.
26	Finegan, P., Pt., H, 16th Infantry, age 34.	Dec. 31, 1862, Feb. —, 1866.	Right. Dr. J. H. Armsby. (Discharged Feb. 21, 1865; chronic erysipelas of foot. 27th, partial amputation of foot.)
27	Foster, T. J., Pt., H, 140th Penn., age 21.	May 12, June 24, 1864.	Left; circular. A. A. Surg. A. F. A. King. Discharged September 28, 1864.
28	Fox, C. W., Pt, I, 111th New York, age 18.	Mar. 31, May 3, 1865.	Right; circ. Surg. R. B. Bontecou, U. S. V. Sept. 7, re-amp. Disch'd Sept. 6, '65. *Spec.* 2454.
29	Francis, F., Pt., C, 5th New York Heavy Artillery, age 17	July 18, Aug. 20, 1864.	Right; long post. flap. Surg. — Miller, C. S. A. March 30, 1865, re-amp. Discharged August 11, 1865. *Specs.* 4301, 4327.
30	Fulmer, S. D., Pt., F, 105th Penn., age 21.	July 2, Aug. 21, 1863.	Right; circular. A. A. Surg. F. Hinkle. Discharged Aug. 27, 1864. *Spec.* 1667.
31	*Gallaher, J.*, Pt., C, 10th Louisiana, age 37.	July 2, Aug. 24, 1863.	Left. Exchanged October 2, '63. *Spec.* 2050.
32	Gardiner, A., Pt., D, 93d New York, age 19.	May 5, June 21, 1864.	Right. Surg. N. R. Moseley, U. S.V. June 26, gangrene. Sept. 4, necro. bone rem'd. Disch'd May 11, 1865. *Spec.* 2251.
33	*Gibbons, J. S.*, Pt., K, 30th Virginia.	Sept. 16, 1862, June 18, 1864.	——. Surgeon — Jett, C. S. A. Retired February 15, 1865.
34	Good, J. P., Pt., K, 203d Pennsylvania, age 31.	Jan. 15, Feb. 15, 1865.	Left; circular. Mustered out May 24, 1865.
35	*Grantham, J. W.*, Corp'l, A, 7th Florida, age 26.	Nov. 30, 1864, Jan. 24, 1865.	Right; antero-posterior flap. A. A. Surg. R. McNeilly. Provost Marshal May 6, 1865.
36	Grover, L. G., Corp'l, G, 30th Maine, age 21.	April 23, Aug. 13, 1864.	Left; flap. Dr. George Collins, Bethel, Maine. Disch'd January 8, 1865.
37	Haslam, J., Pt., H, 129th Pennsylvania, age 30.	Dec. 13, 1862, Nov. 17, 1867.	Right; flap. Dr. A. H. Halberstadt, Pottsville, Penn. (Discharged May 18, 1863; amp. toes.) 1868, caries; necrosis. June 25, 1868, re-amputation.
38	Hawley, W. S., Corp'l, E, 51st New York, age 30.	May 19, Oct. 15, 1864.	Left; flap. A. A. Surgeon J. H. Thompson. (May 19, amput'n meta.) Disch'd May 21, 1865.
39	Hayden, I., Pt., K, 14th Ohio, age 20.	Sept. 19, 1863, June 13, 1864.	Left; antero-posterior flap. A. A. Surg. J. H. Drury. Erysipelas. Disch'd August 11, 1864.
40	Hefferman, P., Pt., H, 14th Infantry, age 22.	Aug. 29, 1862, Oct. 8, 1863.	Left; antero-posterior flap. A. A. Surg. R. J. Levis. (September 9, 1863, Chopart's amputation.) Disch'd May 17, 1864.
41	Henderson, D. B., Lieut., C, 12th Iowa.	Oct. 4,'62, Jan. 26, 1863.	Left; flap. Resigned February 16, 1863.
42	Hoffrichter, H., Corp'l, G, 46th Ohio, age 23.	Mar. 20, April 20, 1865.	Left; flap. Surg. B. N. Fish, 27th Mass. Discharged August 12, 1865.
43	Holden, W. G., Pt., B, 30th Mass., age 29.	Aug. 19, Oct. 19, 1864.	Left; antero-posterior flap. Discharged June 9, 1865.
44	Hunt, E. W., Pt., I, 57th Massachusetts.	May 13, Sep.2,'64.	Right. Dr. Gage, Worcester. Gang. Sept. 24, re-amputation. Discharged June 30, 1865.
45	Johnson, A. W., Pt., E, 64th New York, age 23.	Dec. 13, 1862, Oct. 9,'63.	Left; flap. (December 20, 1862, Syme's amputat'n. Discharged January 29, 1863.)
46	Johnson, S., Pt., C, 24th Missouri, age 25.	Feb. 1, Mar. 17, 1863.	Left; flap (caries). Discharged May 5, 1863.
47	*Jones, W.*, Pt., G, 5th Texas, age 22.	July 2, Aug. 5, 1863.	Left. Surg. C. H. Mastin, C. S. A. October 18, bone removed. Exchanged March 17, 1864.
48	Keefer, H., Pt., K, 74th Indiana.	Feb. 23, Ap. 7,'63.	Right; flap. Discharged April 26, 1865.
49	[1]Keen, G., Pt., A, 8th Indiana.	May 23, July 9, 1863.	Left; circular. Surg. W. Watson, U. S. V. Erysipelas. Disch'd September 15, 1863.
50	Kelsey, A., Pt., D, 53d Illinois, age 21.	July 12, Sept. 19, 1863.	Right; flap. Surg. J. T. Randolph, U. S. A. Discharged May 25, 1865.
51	Kock, W., Serg't, A, 1st Virginia Artillery, age 28.	May 15, Sept. 25, 1864.	Right; anterior flap. Ass't Surg. G. B. Parker, U. S. V. Disch'd May 19, 1865.
52	Lee, D., Pt., B, 37th Illinois.	Mar. 7, June 22, 1862.	Right; flap. Surg. E. A. Clark, U. S. V. Discharged August 23, 1862.
53	Lillibridge, F. W., Pt., B, 2d N. Y. Mounted Rifles.	June 18, 1864.	Right. (June 18, Chopart's amp. foot.) Disch'd August 10, 1865. Circular amput'n leg afterward.
54	Long, J., Pt., F, 8th Indiana.	May 22, June 23, 1863.	Right; flap. Discharged September 8, 1863.
55	*Martin, T. B.*, Pt., A, 24th Virginia.	July 3, Aug. 14, 1863.	Left; circular. Surg. — Gillett, C. S. A. (Hæmorrhage.) Recovery.
56	May, M., Pt., A, 9th New York, age 22.	Sept. 17, 1862, Ap. —, '63.	Left; lateral flap. (Primary amp. ankle joint. Disch'd Jan. 16, 1863.) 1870, stump sound.
57	*McDermott, M.*, Corp'l, 1st Virginia Cavalry.	Dec. 13, 1862, ——, '64.	Left. *Specimen* 263, A. M. M.
58	Nash, W., Pt., C, 187th Pennsylvania, age 19.	June 18, 1864, May8,'65.	Right; circular. A. A. Surg. H. M. Bellows. Discharged Aug. 3, 1865.
59	Newman, L., Pt., A, 149th New York.	July 20, Sept. 21, 1864.	Right; circular. A. A. Surg. R. McNulty. Discharged 1865. Re-amputation 1867.
60	Nutter, S. A., Pt., I, 1st Maine Cavalry.	June 7, Sept. 13, 1864.	Left; flap. Drs. A. Towle and J. Sawyer, Biddeford, Maine. Discharged July 27, 1865.
61	Oyler, A., Pt., D, 55th Pennsylvania, age 30.	Se.29,'64, Jan. 18, 1865.	Right; flap. Surg. W. Watson, 105th Penn. (Gangrene.) Discharged May 25, 1865.
62	Pendleton, E., Pt., G, 27th Mass., age 21.	Mar. 8, April 18, 1865.	Left; circular. Ass't Surg. E. F. Hendrick, 15th Connecticut. Discharged Nov. 23, 1865.
63	Perkins, H., Pt., G, 44th Colored Troops, age 18.	Dec.1,'64, Feb. —, 1865.	Left. A. A. Surg. J. S. Giltner. Discharged January 16, 1866.
64	Peters, H., Pt., A, 59th New York, age 33.	May 17, Aug. 17, 1864.	Left; antero-post. flap. March 26, 1865, re-amputat'n. Disch'd June 6, 1865. *Spec.* 4335.
65	Pisher, J. H., Pt., C, 38th Wisconsin, age 30.	July 12, Aug. 15, 1864.	Left; flap. Ass't Surg. H. Allen, U. S. A. Discharged April 8, 1865.
66	Powers, J. W., Pt., C, 29th Wisconsin, age 21.	May 16, Sept. 18, 1863.	Left; flap. Discharged December 19, 1864.
67	Price, S. B., Serg't, A, 2d Ohio, age 22.	May 15, June 15, 1864.	Left; circular. Surg. R. L. Stanford, U. S. V. (May 15, Syme's amp. ankle joint; gangrene.) Discharged October 10, 1864.
68	Pyle, G., Pt., D, 15th Infantry, age 19.	July 3, Aug. 30, 1864.	Left; circular. A. A. Surg. C. H. Fisher. Disch'd July 11, 1865. Died March 27, 1870.
69	Quinn, J., Serg't, K, 169th New York, age 21.	May 16, Aug. 19, 1864.	Left; circular. A. A. Surg. J. H. Thompson. Discharged May 3, 1865. *Spec.* 3102.
70	Reizler, C., Pt., B, 7th New York Heavy Artillery, age 47.	June 3, July 21, 1864.	Left; lateral skin flap. A. A. Surg. F. E. Marsh. Discharged March 31, 1865.
71	*Renfro, H.*, Pt., C, 3d Missouri.	May 20, 1863, Feb.1,'64.	Right. Ass't Surg. R. B. Maury, P. A. C. S. Recovery.
72	Robinson, T., Pt., H, 81st Pennsylvania.	June 3, Dec. 7, 1864.	Left; flap. (Discharged November 9, 1864.)
73	Schneider, G., Pt., E, 4th Pennsylvania.	Sept. 14, Dec. 16, 1862.	Left; flap. Discharged October 14, 1863.
74	Schroeder, J., Pt., C, 2d Missouri.	Oct. 8, Nov. —, 1862.	Left. Surg. J. G. Hatchitt, U. S. V. Discharged February 19, 1863.
75	Siddall, J., Pt., A, 90th Pennsylvania, age 20.	Aug. 30, Oct. 3,'62.	Left; flap. Ass't Surg. W. E. Waters, U. S. A. Discharged February 17, 1864.
76	Snyder, A., Pt., H, 75th New York.	May 27, J'y —, '63.	Right; circular. Discharged August 29, 1863.
77	Spielman, T., Pt., F, 95th Ohio, age 23.	Aug. 30, 1862, July 10, 1864.	Right; circular. A. A. Surg. C. E. Boyle. (Rem. of os calcis.) (Discharged February 4, 1864.)
78	Stackpole, F. A. H., Pt., A, 6th Maine, age 21.	May 3, Nov. 24, 1863.	Left; circular. Surg. J. A. Lidell, U. S. V. Discharged June 18, 1864. *Spec.* 1847.
79	Taylor, J. L., Pt., F, 7th Wisconsin, age 39.	May 5, June 5, 1864.	Left; circular. Surg. — Tucker, C. S. A. Dec. 26, rem. of seq. Disch'd May 26, '65. *Spec.* 3697.

[1] BRYAN (J.), *Seventeen Additional Cases of Amputations from the Armies of the Southwest*, in *American Medical Times*, 1863, Vol. VII, p. 287.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
80	Thomas, T. M., Pt., E. 155th Penn., age 23.	May 24, Aug.5,'64.	Left; lateral skin flap. A. A. Surg. F. E. Marsh. Discharged March 31, 1865.
81	Tuttle, J. B., Pt., F, 14th New Hampshire, age 44.	Sept. 19, 1864, Jan. 4,'65.	Right; lateral flap. A. A. Surg. J. Neff. Discharged July 10, 1865.
82	Verdon, J., Pt., A, 17th Infantry.	July 4, Aug.6,'63.	Left; flap. A.A.Surg.W.L.Hays. To Regiment Sept. 28, 1863.
83	Von Schirach, F. C., Lieut., E, 54th New York.	Aug. 29, Nov. 28, 1862.	Right; flap. Resigned April 26, 1863.
84	White, A. H., Pt., D. 22d Illinois.	Oct. 2,'62, Feb. 16, 1863.	Right; flap. A. A. Surg. W. A. Johnson. Discharged May —, 1863.
85	Williamson, J., Pt., B, 26th Pennsylvania, age 28.	May 2, June 2, 1863.	Left; flap. Surg. J. H. Baxter, U. S. V. Discharged June 18, 1864. *Spec.* 1187.
86	Wilt, Z., Pt., A, 166th Pennsylvania, age 22.	April 18, June 11, 1863.	Left; flap. Discharged July 28, 1863.
87	Ambrose, H., Pt., H. 20th Indiana, age 24.	July 2, Aug. 14, 1863.	Left. Died September 8, 1863; pyæmia.
88	*Ballard, J. H.*, Pt., E, 28th North Carolina, age 30.	July 2, Aug. 20, 1863.	Right. Died September 20, 1863; pyæmia. *Spec.* 2062.
89	Barrett, J. B., Corp'l, C, 116th Ohio.	June 5, J'y 8, '64.	Left. Died July 10, 1864.
90	Beecher, E., Pt., E, 36th Illinois, age 20.	Oct. 8, —, '62.	Right. Died November 14, 1862.
91	*Blackwalt, C. C.*, Col., 23d N. Carolina, age 30.	Sept. 19, Nov. 10, 1864.	——: circular. Surg.W. S. Love, P. A. C. S. Died November 13, 1864; exhaustion.
92	*Craps, W. J.*, Pt., D. 24th South Carolina, age 33.	Nov. 30, 1864, Fe.17,'65.	Left; circular. Surg. B. B. Breed, U. S. V. Died March 11, 1865; exhaustion. *Spec.* 4217.
93	Dudley, S. B., Pt., B, 97th Indiana, age 24.	June 27, 1864. Feb. 18, 1865.	Right; circular. Surg. R. R. Taylor, U. S. V. Died February 28, 1865; erysipelas. *Spec.* 4248.
94	French, C. H., Pt., G, 2d Indiana Cavalry, age 20.	May 9, June 14, 1864.	Right; circular. A. A. Surg. M. L. Herr. Died September 30, 1864.
95	Geffney, T., Pt., D. 74th New York, age 42.	June 3, J'y 9, '64.	Right; circular. A. A. Surg. A. Ansell. Died August 2, 1864; pyæmia.
96	Gibson, J., Pt., H, 46th New York, age 22.	May 5, June 11, 1864.	Left; circular. Surg. A. F. Sheldon, U. S. V. Died June 18, 1864; exhaustion.
97	Goodwin, S. M., Serg't, I, 19th Indiana, age 39.	May 23, July 19, 1864.	Left; posterior flap. A. A. Surg. E. Seyffarth. (June 8, rem'd carious bone.) Died November 5, 1864; exhaustion.
98	Herman, C., Pt., E, 33d Massachusetts.	May 25, June 26, 1864.	Right; circular; gangrene. Died August 22, 1864; pyæmia. *Spec.* 3356.
99	Hill, T. J., Corp'l, I, 83d Pennsylvania.	June 27, July 30, 1862.	Left. Ass't Surg. R. Bartholow, U. S. A. Died August 6, 1862. *Spec.* 817.
100	Juda, G., Corp'l, F, 8th Pennsylvania Res., age 23.	May 8, June 13, 1864.	Right; circular. A. A. Surg. C. W. Carrier. Died June 25, '64; pyæmia.
101	Kaufman, C. E., Pt., H, 1st Pennsylvania Res.	Aug. 30, —, '62.	——. Died October 9, 1862.
102	*Keneily, A. F.*, Pt., K, Hampton's South Carolina Legion.	Sept. 17, Dec.2,'62.	Right; necrosis. Died December 13, 1862. *Spec.* 1097.
103	McHale, J., Pt., D, 15th Infantry, age 21.	Nov. 25, 1863, Feb.6,'64.	Left; double flap. Died March 6, 1864; chronic diarrhœa.
104	McMullen, W., Pt., B, 24th New York.	Aug. 29, —, '62.	——. Died October 13, 1862.
105	Nevin, G. M., Pt., F, 140th Penn., age 20.	May 12, June 29, 1864.	Right; circular. A. A. Surg. W. B. Morrison. Died July 11, '64; typhoid fever.
106	Ordway, L., Pt., A, 19th Maine, age 33.	June 22, July 23, 1864.	Left; circular. A. A. Surg. F. H. Getchell. Died July 28, 1864; exhaustion. *Spec.* 3663.
107	*Owens, H. J.*, Serg't, I, 14th Tennessee.	Sept. 17, Oct. 21, 1862.	Right. Ass't Surg. C. Bacon, U. S. A. Died October 30, 1862. *Spec.* 364.
108	Palmer, S. H. A., Pt., I, 2d New Hamp., age 35.	July 3, Aug. 10, —, '63.	Left (also fracture of ulna); gangrene. Died August 14, 1863; pyæmia.
109	Paugh, J. W., Pt., E, 3d W. Virginia Cavalry.	April 3, 1863.	Right; posterior flap. Died April 16, 1863. *Spec.* 4276.
110	Pepper, G. W., Pt., C, 2d Pennsylvania H'vy Artillery, age 30.	June 25, Aug. 14, 1864.	Left; flap. Surg. N. R. Moseley, U. S. V. Gangrene. Died August 25, 1864 *Spec.* 3127.
111	Perkins, J. C., Pt., B, 81st New York, age 27.	June 3, July 7, 1864.	Left; circ. Surg. R. B. Bontecou, U. S.V. (Also fract. right ankle joint; excised.) Died July 17, 1864; exhaustion. *Spec.* 3035.
112	*Pollard, J. H.*, Pt., F, 12th Virginia, age 26.	Oct. 27, Nov. 29, 1864.	Left; lateral flaps. Surg. T. R. Crosby, U. S. V. Died December 2, 1864; exhaustion.
113	*Reynolds, H. G.*, Pt., K, 7th Mississippi, age 23.	Dec. 15, 1864, M'h 1,'65.	Left; lateral skin flap. Surg. B. B. Breed, U. S. V. Died March 11, 1865; exhaust'n. *Spec.* 4216.
114	Ricker, B. J., Pt., A, 32d Maine.	May 18, June 28, 1864.	Left. A. A. Surg. W. H. Triplett. July 8, re-amp.; gang.; diarrh. Died July 11, 1864; pyæmia.
115	Seawright, W., Pt., I, 116th Penn., age 19.	May 12, June 14, 1864.	Right; double skin flap. Surg. J. A. Lidell, U. S.V. Died July 19, 1864; pyæmia.
116	[1]Shroeder, C., Corp'l, I, 127th Illinois.	May 13, June —, 1863.	Right; antero-post. flaps. Protruding bone removed. Died September 26, 1863.
117	[2]*Street, J. W.*, —, E, 66th Georgia.	Aug. 31, Oct. 20, 1864.	Left; circular. Ass't Surg. P. H. Wright, P. A. C. S. Died October 28, 1864; pyæmia.
118	Sullivan, J., Pt., C, 56th Massachusetts, age 19.	May 6, June 20, 1864.	Right; circular. A. A. Surg. D. J. Evans. Died August 7, 1864.
119	*Taylor, S. J.*, Pt., E, 30th Alabama, age 21.	Dec. 16, 1864, Jan. 20, 1865.	Left; circular. A. A. Surg. W. M. Rodman. (Necrosis.) Died April 8, 1865; chronic diarrhœa.
120	Wiards, W. C., Corp'l, D, 80th Ohio.	Oct. 4, No. 7,'62.	Left. Died November 13, 1862; pyæmia. *Spec.* 1034.
121	Williams, J., Pt., E, 5th New Jersey, age 27.	June 18, July 26, 1864.	Right; circular. A. A. Surg. F. H. Getchell. (Gang.; hæmorr.) Died Aug. 19, 1864. *Spec.* 3661.

Secondary Amputations in the Continuity of the Leg, Third not indicated.—In sixteen of the secondary amputations in the leg the seat of the operation was not specified; eight proved successful and eight were fatal. The right limb was removed in seven, the left in five cases; in four the side was not indicated.

Successful Secondary Amputations in the Leg, Third not indicated.—The eight operations of this group were performed on Confederate soldiers. Meagre histories of the cases are found on the hospital reports:

Case 806.—Lieutenant *A. Ward*, Co. C, 9th Tennessee, was wounded in the right lower extremity at the battle of Chaplin Hills, October 8, 1862. He was taken prisoner and conveyed to the General Hospital at Perryville, whence Surgeon J. G. Hatchitt, U. S. V., reported the following: "On November 25th I amputated the right leg on account of gangrene of the foot resulting from gunshot wound of the ankle. The operation was performed by the circular method. The integuments where the incision was made were infiltrated with greenish serum. The patient was much exhausted from diarrhœa. He recovered." The records of Perryville Hospital show that the patient was transferred to Danville as a convalescent.

Fatal Cases of Secondary Amputations in the Leg, Third not indicated.—Eight operations performed on seven patients belong to this sub-division; five were Union and two

[1] Bryan (J.), *Seventeen Additional Cases of Amputations from the Armies of the Southwest*, in *American Medical Times*, 1863, Vol. VII, p. 288.

[2] Jones (J.), *Pyæmia Supervening upon Hospital Gangrene*, in *U. S. Sanitary Commission Memoirs*, New York, 1871, Surgical Volume II, p. 444.

Confederate soldiers. Pyæmia, secondary hæmorrhage, exhaustion, irritative fever, and phthisis were reported as the causes of death:

CASE 807.—Sergeant J. Evans, Co. I, 29th Colored Troops, aged 33 years, was wounded during the engagement near Richmond, October 12, 1864. Surgeon J. J. Craven, U. S. V., reported his admission to the field hospital of the 3d division, Tenth Corps, with "shot wound of left ankle." Assistant Surgeon E. McClellan, U. S. A., reported the following result of the injury: "The patient was admitted to hospital at Fort Monroe three days after being wounded. His injury consisted of a wound of the foot involving the ankle joint. There was free suppuration and copious discharge of unhealthy pus. The leg was amputated by flap method, on November 17th, by Acting Assistant Surgeon H. B. White. At the time of the operation the patient was in a very weak condition. He died of exhaustion November 19, 1864."

TABLE LXXIX.

Summary of Sixteen Secondary Amputations in the Leg for Shot Injury, Point of Ablation not specified.

[Recoveries, 1—8; Deaths, 9—16.]

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.	No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1	[1]*A. B*——, —, age 24.	Nov. 25, 1863, Feb.—,'64.	Left. Dr. R. H. Taylor, of Memphis. (Nov. —, Pirogoff's amp. ankle; gang.; caries.) Recov'y.	8	*Wright, J. L.*, Corp'l, B, 15th Alabama.	Aug. 22, Nov. 21, 1862.	Right. Ass't Surg. E. A. Drewry, C. S. A. Recovery.
2	*Bentley, C.*, Pt., A, 8th Louisiana.	June 27, July 28, 1862.	Left. Recovery.	9	Cain, W. H., Serg't, G, 115th N. York, age 23.	Aug. 16, Sept. 17, 1864.	Left. Sept. 25, hæmorrh. Died Sept. 26, 1864; hæmorrhage.
3	*Harler, J. E.*, Pt., C, 1st South Carolina, age 25.	Dec. 13, 1862, April 17, 1863.	——; flap. Recovery.	10	*Calhair, J.*, Pt., G, 12th Mississippi.	——— 1862.	Right. Died September 24, 1862.
4	*McDaniel, F. H.*, Pt., C, 26th North Carolina.	July 1, Oct. 2, 1863.	——. A. A. Surg. B. H. Washington, C. S. A. Recovery.	11 & 12	*Daniel, J. P.*, Corp'l, H, 11th Virginia.	July —, ——— 1863.	Both; irritative fever. Died September 30, 1863.
5	*McIntire, B. S.*, Pt., K, 10th Tennessee Cav'ry.	Jan. 29, June 29, 1864.	——. Surg. — Reagan, C. S. A. Recovery.	13	Evans, J., Serg't, I, 29th Colored Troops, age 33.	Oct. 12, Nov. 17, 1864.	Left; flap. A. A. Surgeon H. B. White. Died November 19,'64; exhaustion.
6	*Ward, A.*, Lieut., C, 9th Tennessee.	Oct. 8, Nov. 25, 1862.	Right; circular. Surg. J. G. Hatchitt, U. S. V. Gangrene. Recovered February 12, 1863.	14	Hillebrand, M., Pt., D, 1st Ohio.	Sept. 19, —, '63.	Right. Died November 2, 1863; pyæmia.
7	*Ward, P. H.*, Pt., B, 6th Louisiana.	June 27, Oct. 6,'62.	Right. Recovery.	15	Keach, H., Pt., I, 164th New York, age 22.	June 3, J'y 5,'64.	Right; flap. A. Surg. — Gibbs, P. A. C. S. Died Aug. 9, 1864.
				16	Waters, W. W., Pt., D, 22d Indiana.	——— Aug. 29, 1862.	——; erysipelas. Died August 31, 1862; phthisis pulmonalis.

AMPUTATIONS IN THE CONTINUITY OF THE LEG OF UNCERTAIN DATE.

The intervals between the dates of the injuries and operations could not be ascertained in five hundred and seventy cases, either one or the other of the dates and sometimes both having been omitted in the reports. The operations were performed in the upper third in fifty-one, in the middle in forty-seven, and in the lower third in fifty-one instances; in four hundred and twenty-one cases the point of ablation was not recorded.

Amputations in the Upper Third of the Leg of Uncertain Date.—Of fifty-one operations of this group thirty-three proved successful and eighteen were fatal; forty-five were performed on Confederate and six on Union soldiers. The side injured was not specified in fifteen cases; in twenty the right, and in sixteen the left leg was amputated.

TABLE LXXX.

Summary of Fifty-one Amputations in the Upper Third of the Leg, time of Ablation not specified.

[Recoveries, 1—33; Deaths, 34—51.]

No	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.	No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1	*Allen, D.*, Pt., K, 40th N. C. Artillery, age 32.	Jan. 13, —, '65.	Right. Released June 28, 1865.	5	*Canady, J.*, Pt., B, 24th North Carolina, age 25.	Dec. 13, '62, —.	Right. Retired February 17, '65.
2	*Ballard, J. N.*, Pt., A, Mosby's Cavalry.	June 22, —, '63.	Right. Discharged October 17, 1863.	6	*Coppage, K.*, Pt., I, 30th Virginia.	April —, 1865.	Right. Recovery.
3	*Beadle, W. S.*, Lieut., A, 12th Ga. Bat'y, age 24.	July 9, —, '64.	Left. To prison September 21, 1864.	7	*Cox, H. B.*, Serg't, D, 48th North Carolina.	Dec. 10, '64, —.	Left. Retired February 17, 1865.
4	*Brown, M.*, Lieut., C, Cobb's Ga. Legion.	Aug. 16, —, '64.	Left. To Provost Marshal May 31, 1865.	8	*Crites, P. L.*, Pt., F, 21st Georgia, age 34.	Aug. 21, —, '64.	Right. To Provost Marshal April 1, 1865.

[1] HOLLOWAY (J. M.), *Comparative Advantages of* PIROGOFF'S, SYME'S, *and* CHOPART'S *Amputations, etc.*, in *Am. Jour. of Med. Sciences*, 1866, Vol. LI, p. 85, and SMITH (S.), *Amputations at the Ankle Joint in Military Surgery*, in *U. S. San. Comm. Mem.*, New York, 1871, Surg. Vol. II, p. 116.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.	No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
9	*Fletcher, R. J.*, Major, 11th Alabama	July 2, —, '63.	Right. Furloughed 1864.	30	*Tapp, C. T.*, Pt., C, 60th Georgia.	Nov. 27, 1863.	Right. Furloughed.
10	*Fravel, J.*, Pt., F, 10th Virginia, age 21.	May 2, —, '63.	Right. Retired January 16, 1865.	31	*Tay, S. L.*, Serg't, E, 49th North Carolina, age 35.	July 9, —, '64.	Right. Retired February 21, '65.
11	*Freeman, W. D.*, Pt., E, 46th North Carolina.	——— 1862.	——. Recovery.	32	*Watkins, R. H.*, Serg't, H, 46th Va., age 23.	June 18, —, '64.	Right. To prison September 23, 1864.
12	*Green, W. R.*, Pt., I, 53d North Carolina, age 19.	July 14, —, '63.	Left. Exchanged March 3, 1864.	33	*Wilson, S.*, Adj't, 10th Va. Battery, age 26.	April 6, —, '65.	Left; anterior skin flap. To Baltimore May 10, 1865.
13	*Harrington, J. R.*, Pt., C, 41st Miss., age 23.	Aug. 31, 1864.	Right. Retired January 12, 1865.	34	Apperson, J. R., Serg't, D, 123d Illinois.	Oct. 8, —, '62.	——. Died October 17, 1862.
14	*Howard, D. R.*, Pt., A, 2d Maryland.	Aug. 19, —, '64.	Right. Furloughed October 28, 1864.	35	Ault, C., Pt., B, 69th Ohio.	May 9, —, '64.	Left. Died July 7, 1864.
15	*Isbell, W. H.*, Pt., K, 47th Virginia.	July 3, —, '63.	Left. Gangrene. Discharged October 8, 1864.	36	*Bailey, R. M.*, Pt., D, 31st Mississippi.	———	Left. Died September 26, 1864.
16	*Langley, J. P.*, Pt., C, 3d North Carolina.	July —, 1863.	Right. Exchanged March 17, 1864.	37	*Bowens, G. B.*, Pt., F, 13th Georgia.	——— 1862.	——. Died July 13, 1862; pyæmia.
17	*Ledyard, W. N.*, Lieut., A, 3d Alabama, age 28.	July —, —, '63.	Right; circular. Exchanged January 29, 1864.	38	*Brown, E.*, Pt., E, 49th Georgia.	———	——. Died May 29, 1864.
18	*Lemay, L. A.*, Pt., H, 40th Alabama, age 48.	May 22, —, '63.	Left. Retired.	39	*Corbin, I. D.*, Pt., 1st South Carolina.	——— 1862.	——; circular. Died December 31, 1862.
19	*McCall, C. S.*, Pt., F, 21st Georgia.	Sept. 22, 1864.	Right. Furloughed November 26, 1864.	40	*Davis, U.*, Corp'l, K, 62d Virginia.	———	——. Died June 8, 1864.
20	*McCarthy, W. E.*, Pt., K, 5th Alabama.	Sept. 17, —, '62.	Right. Furloughed.	41	Davis, W. W., Pt., C, 1st Ohio Cavalry, age 19.	——— 1863.	——. Died March 3, 1864; small pox.
21	*McDaniel, J. J.*, Pt., F, 35th Georgia, age 32.	Dec. 13, —, '62.	Left. Retired March 15, 1865.	42	*Foster, B. C.*, Lieut., I, 5th Alabama, age 40.	—— May 31, '64.	——; posterior flap. Gangrene. Died June 10, 1864.
22	*Miller, J. L.*, Pt., C, 30th North Carolina.	July —, 1863.	Right. Exchanged March 3, '64.	43	Gillman, H. T., Pt., H, 8th Michigan.	Aug. 31, 1862.	——. Died September 25, 1862.
23	*Parker, G. W.*, Lieut., D, 44th North Carolina.	Sept. 30, 1864.	Left. Furloughed.	44	*Hancock, J. B.*, Pt., C, 61st Georgia.	——— 1862.	——; flap. Died December 10, 1862.
24	*Raders, J. P.*, Pt., A, 37th Virginia.	Oct. 19, 1864.	Right. Retired March 8, 1865.	45	*Hoover, W. P.*, Pt., G, 1st Texas, age 25.	June 18, 1864.	——; posterior flap; gangrene. Died July 20, 1864.
25	*Rickard, J.*.....	———	Amputation of right leg. Discharged.	46	Love, W., Pt., G, 16th Maine, age 16.	May 10, —, '64.	Left; sloughing. Died May 25, 1864; pyæmia.
26	*Roberts, J. P.*, Pt., H, 7th Texas, age 20.	Dec. 16, 1864.	Left; circular. Surg. — Roberts, C. S. A. To Provost Marshal March 7, 1865.	47	*Lynch, J.*, Pt., A, 1st Louisiana.	——— 1863.	Right. Died May 31, 1863.
27	*Rossou, W. B.*, Pt., K, 49th Virginia.	Aug. 2, 1864.	Left. Retired February 6, 1865.	48	*Oaks, J. A.*, Pt., B, 58th Virginia.	July 3, —, '63.	——. Died July 15, 1863.
28	*Spindle, J. C.*, Pt., D, 17th Virginia, age 24.	——— May 16, 1864.	——; antero-post. flap. June 4, 8, hæmorrhages. Disch'd January 16, 1865.	49	*Reid, M. J.*, Corp'l, F, 19th Georgia, age 25.	May 16, 1864.	——; circular. Died June 16, 1864.
29	*Swartz, J. S.*, Pt., K, 5th Virginia, age 24.	Aug. 19, '62, —.	Left. Retired January 30, 1865.	50	*Scales, R. E.*, Pt., C, 2d Mississippi, age 21.	——— 1862.	Left; erysipelas. Died September 23, 1862; diarrhœa.
				51	Sell, J. M., Capt., I, 83d Pennsylvania.	July —, 1863.	——. Died July —, 1863.

Amputations in the Middle Third of the Leg of Uncertain Date.—Forty-seven cases belong to this sub-division; thirty-nine were successful and eight fatal. Forty-one of the patients were Confederate and six Union soldiers. The right leg was amputated in twenty-six, the left in nineteen instances; in two the side was not indicated.

Table LXXXI.

Summary of Forty-seven Amputations in the Middle Third of the Leg, time of Operation unspecified.

[Recoveries, 1—39; Deaths, 40—47.]

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.	No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1	*Acree, W. W.*, Serg't, C, 30th Georgia.	——— 1863.	Left. Furloughed November 13, 1863.	14	*Hansbrough, J. W.*, Pt., K, 17th Virginia.	——— 1861.	Right. Surg. — Lewis, C. S. A. Recovery.
2	*Barnett, W. C. D.*, Corp'l, A, 16th Georgia.	Nov. 30, '64, —.	Right. Recovery.	15	*Harbison, N. J.*, Pt., D, 11th North Carolina.	June 2, —, '64.	Right. Furloughed.
3	*Barrim, I.*, Pt., F, 11th North Carolina, age 22.	July 3, —, '63.	Left. Exchanged March 17, '64.	16	*Hill, W.*, Pt., C, Reeves's Ark. Cavalry, age 35.	Sept. 27, 1864.	Left; flap. Oath of allegiance July 7, 1865.
4	*Carr, T. A.*, Pt., G, 3d Georgia.	May 10, '64, —.	Right. Furloughed.	17	*Hunt, F. N.*, Pt., G, 47th North Carolina, age 30.	July 3, —, '63.	Left. Exchanged March 17, '64.
5	*Cherry, M. G. L.*, Pt., E, 55th North Carolina.	July 1, —, '63.	Right. Furloughed.	18	*Lipscombe, P. E.*, Pt., F, 9th Virginia Cavalry.	———	Right. Retired November 7, '64.
6	*Cline, M. W.*, Pt., D, 48th Alabama, age 38.	Aug. 17, 1864.	Left; gang. Furloughed September 25, 1864.	19	*Mathias, —*, Pt., C, 42d Virginia, age 19.	Sept. 17, —, '62.	Right; flap. Recovery.
7	*Cox, E.*, Pt., I, 15th Alabama, age 35.	Nov. 27, '63, —.	Left. Released July 17, 1865.	20	*Mayer, S. E.*, Pt., B, 6th S. C. Cavalry, age 25.	June 12, —, '64.	Right. Retired December 30, '64.
8	*Dalton, R.*, Pt., H, 38th Virginia.	May 16, —, '64.	Right. Furloughed.	21	*McAfee, J. T.*, Pt., D, 59th Georgia, age 39.	July 3, 1863.	Right. Exchanged March 17, '64.
9	*Downs, I. S.*, Pt., G, 26th North Carolina.	June 2, —, '64.	Right. Furloughed.	22	*McDaniel, H.*, Pt., E, 45th Georgia, age 23.	———	Right. Retired December 21, '64.
10	*Egan, J. A.*, Pt., E, 3d Missouri.	Oct. 5, —, '64.	——. Retired February 6, 1865.	23	*McIlmunay, J.*, Pt., ——	Oct. 25, 1864.	Left. To prison March 3, 1865.
11	*Garner, M. C.*, Pt., B, 11th Mississippi.	——— 1865.	Left. Transferred April 9, 1865.	24	*Mitchell, F. M.*, Serg't, G, 61st N. Carolina.	May 14, —, '64.	Right. Furloughed.
12	*Hains, J. M.*, Pt., D, 37th Virginia, age 23.	July 3, —, '63.	Right. Exchanged March 3, '64.	25	*Monzan, I. P.*, Pt., I, 4th S. C. Cavalry, age 30.	June 24, '64, —.	Right. Retired January 10, 1865.
13	*Halliburton, C.*, Pt., E, 11th Tennessee, age 24.	Nov. 30, —, '64.	Left; circular. To Provost Marshal March 7, 1865.	26	*Moore, C.*, Pt., F, 5th Louisiana.	July —, 1863.	Left. Retired January 30, 1865.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.	No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
27	*O'Neal, J. J.*, Pt., G, 18th Virginia.	April —, 1865.	Right. Recovery.	38	*Whiteside, J. L.*, Pt., B, 34th N. C., age 45.	Mar. 25, —, '65.	Right. Released June 28, 1865.
28	*Phillmore, E. K.*, Pt., A, 27th North Carolina.	Oct. —, 14, '63.	Left. Furloughed.	39	*Williams, N.*, Pt., G, 60th North Carolina, age 38.	Nov. 29, —, '64.	Right; antero-posterior flap. To Provost Marshal March 7, 1865.
29	*Poole, F.*, Pt., E, 20th S. Carolina.	Aug. 27, 1863.	Right. Retired February 7, 1865.	40	*Coupe, I.*, Lieut., C, 20th Georgia, age 31.	———	Left. Died December 31, 1864.
30	*Pressley, I.*, Pt., I, 60th North Carolina, age 44.	Nov. 30, 1864.	Right; antero-posterior flap. To Provost Marshal April 6, 1865.	41	Edmonds, J. W., Pt., H, 1st Ohio Lt. Artillery.	July 2, —, '63.	Left. Died July 16, 1863.
31	*Roche, F. T.*, Pt., A, 32d Virginia, age 21.	Sept. 24, 1864.	Right. Retired March 4, 1865.	42	Green, S. R., Pt., A, 5th New Hampshire.	July 2, —, '63.	——. Surg. C. S. Wood, 66th New York. Died July 30, 1863.
32	Rodarmel, W. L., Pt., D, 5th Mo. S. M. Cavalry.	Aug. 8, 1862.	Right. Discharged March 30, '65.	43	Honrie, L., Pt., D, 29th Pennsylvania, age 22.	May 15, 1864.	Right; circular. Died August 23, 1864; typhoid pneumonia.
33	*Shelton, J. A.*, Pt., A, 23d Mississippi, age 23.	Nov. 30, 1864.	Left; circular. To Provost Marshal.	44	*Houser, I.*, Pt., H, 1st N. Carolina Cavalry.	July 1, —, '63.	Left. Surg. J. P. Carroll, C. S. A. Died April 2, 1864. *Spec.* 3155.
34	*Smoot, R. W.*, Pt., A, 1st Va. Battery, age 34.	———	Left. Retired April 1, 1865.	45	Stockton, J. R., Pt., I, 71st Pennsylvania.	July —, —, '63.	Left. Died July 12, 1863.
35	*Talbert, M. S.*, Pt., H, 7th S. C. Battery, age 25.	—— May 16, '64.	——; circular. Furloughed August 15, 1864.	46	*Storall, J. B.*, Serg't, F, 15th Georgia.	———	Left. Died May 29, 1864; pyæmia.
36	*Warren, S.*. Pt., A, 47th North Carolina.	June 3, '64, —.	Left. Furloughed.	47	West, P., Pt., K, 42d N. York, age 24.	July 2, —, '63.	Right. Died July 23, 1863.
37	[1] *Whitaker, J. F.*, Pt., K, 8th Tennessee, age 26.	June 12, 1864.	Right; gangrene. Recovered.				

Amputations in the Lower Third of the Leg of Uncertain Date.—Fifty-one operations—thirty-four successful and seventeen fatal—were performed on forty-four Confederate and seven Union soldiers. The right limb was amputated in twenty-two, the left in twenty-five cases; in four instances the side was not indicated. Gangrene was noted in three, pyæmia and erysipelas in one instance each.

Table LXXXII.

Summary of Fifty-one Amputations in the Lower Third of the Leg, time of Operation unspecified.

[Recoveries, 1—34; Deaths, 35—51.]

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.	No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1	*Beeman, H. C.*, Lieut., H, 43d North Carolina.	May 30, —, '64.	Right. Furloughed.	21	*Long, J. F.*, Corp'l, G, 41st Georgia.	Oct. 8, '62.	Right. Transferred February 11, 1863.
2	*Bland, C. C.*, Pt., K, 36th N. C. Artillery, age 18.	Jan. 13, —, '65.	Left; circular. To Provost Marshal April 8, 1865.	22	*Longshore, E. C.*, Pt., B, 3d South Carolina.	——— 1864.	Left. Furloughed March 14, '65.
3	*Bradley, J. H.*, Pt., H, 2d Mississippi, age 29.	July 1, —, '63.	Left; circ. Exchanged March 3, 1864.	23	*Mott, D. W.*, Pt., D, 13th N. C. Artillery, age 39.	Jan. 13, —, '65.	Left; flap. To Provost Marshal April 1, 1865.
4	*Bradley, J. H.*, Pt., G, 16th North Carolina.	July 1, —, '63.	Left. Exchanged March 17, '64.	24	*Mulley, W.*, Pt., E, 2d Virginia Cavalry.	Aug. 30, —, '62.	Right. Retired February 7, 1865.
5	*Burke, M.*, Pt., Breatherd's Battery.	——— Oc. 19, '63.	——. Surg. — Murray, C. S. A. Recovery.	25	*Patterson, E.*, Pt., H, 1st Alabama, age 27.	Nov. 30, —, '64.	Right; oval flap. To Provost Marshal April 6, 1865.
6	*Calahan, J.*, Pt., C, 10th Louisiana.	———	Left. Exchanged March 3, 1864.	26	*Patton, J. M.*, Pt., E, 16th North Carolina, age 17.	Sept. 20, —, '63.	Right. Retired February 7, '65.
7	*Caldor, P.*, Pt., E, 4th North Carolina.	——— 1862.	Left. Furloughed December 9, 1862.	27	Remey, S., Pt., H, 55th New York, age 19.	May 31, —, '62.	Right; circular. Disch'd July 8, 1863.
8	*Cheatham, T. B.*, Pt., H, 59th Alabama.	——— 1862.	Left. Furloughed December 23, 1862.	28	*Rowls, S. H.*, Pt., D, 11th Alabama.	———	Right. Transferred May 1, 1865.
9	*Clarke, N. B.*, Pt., I, 16th Georgia.	Sept. 14, —, '62.	——. Discharged December 19, 1862.	29	*Taylor, J. E.*, Lieut., E, 66th North Carolina.	July 6, —, '64.	Right. Furloughed.
10	*Dyer, S.*, Lieut.-Col., 3d Mississippi, age 32.	Nov. 30, —, '64.	Right; circ. To Provost Marshal March 27, 1865.	30	*Thompson, J. M.*, Corp'l, B, 55th Ala., age 20.	Nov. 30, —, '64.	Right; antero-posterior flap. To Provost Marshal Feb. 24, 1865.
11	*Finley, J. W.*, Pt., I, 41st Alabama.	——— 1862.	Right. Furloughed December 1, 1862.	31	[2] *Underwood, E. E.*, Pt., D, 30th Georgia, age 24.	Dec. 13, —, '62.	——; gangrene. To Provost Marshal May 4, 1863.
12	*Gildart, J. B.*, Pt., K, 10th Mississippi, age 21.	Sept. 28, —, '64	Left. Retired February 11, 1865.	32	*Washburne, J. N.*, Pt., H, 11th North Carolina.	———	Right. Furloughed.
13	*Goods, D. C.*, Pt., E, 12th North Carolina, age 18.	Mar. 25, —, '65.	Left. Released June 28, 1865.	33	*White, J. R.*, Pt., C, 3d N. C. Artillery, age 26.	Jan. 13, 1865.	Right. Released June 28, 1865.
14	*Hannah, S. H.*, Pt., K, 15th Miss., age 25.	Nov. 30, —, '64.	Left; circular. To Provost Marshal May 2, 1865.	34	*Williams, J.*, Pt., F, 5th Arkansas.	Oct. 8, —, '62.	Left. Transferred March 11, '63.
15	*Henderson, A. R.*, Pt., B, 12th North Carolina.	Feb. 6, —, '65.	Right. Furloughed March 31, 1865.	35	*Brown, G. W.*, Pt., D, 16th Georgia.	——— 1862.	Left. Died December 1, 1862.
16	*Ireland, R. S.*, Pt., H, 7th South Carolina.	——— Je 29, '64.	Left. Surg. S. S. Satchell, C.S.A. Recovery.	36	*Edison, E.*, Pt., C, 39th Alabama, age 26.	De 31, '62, —, '63.	Left. Died May 16, 1864.
17	*Jones, M. M.*, Pt., G, 14th Alabama.	Sept. 17, —, '62.	Left. Discharged October 17, 1863.	37	*Estus, B. E.*, Pt., Price's Virginia Battery, age 28.	April 2, —, '65.	Right. Died May 14, 1865.
18	*Koonce, H. C.*, Lieut., K, 61st North Carolina.	Sept. 30, —, '64.	Left. Furloughed.	38	*Forsyth, D. R.*, Pt., G, 8th Virginia, age 32.	Mar. 31, —, '65.	Right. Died May 19, 1865; pyæmia.
19	*Larkins, J. P.*, Pt., B, Cobb's Georgia Legion.	Oct. 27, 1864.	Right. Released July 17, 1865.	39	*Hardgrove, W. H.*, Pt., A, 19th Virginia.	——— No. 18, '64.	Left; circular. Died December 11, 1864; gangrene.
20	*Leffler, C.*, Serg't, D, 28th North Carolina, age 22.	Mar. 22, —, '65.	Right. Released June 28, 1865.	40	Hoare, M., Corp'l, B, 131st New York.	May 27, —, '63.	Right. Died July 3, 1863.

[1] O'Keefe (D. C.), *Surgical Cases of Interest treated at Institute Hospital, Atlanta, Georgia, May and June*, 1864, in *Confederate States Medical and Surgical Journal*, 1865, Volume II, p. 28.

[2] Thomson (W.), *Report of Cases of Hospital Gangrene treated in Douglas Hospital, Washington, D. C.*, in *American Journal of Medical Science*, Vol. XLVII, p. 382.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
41	*Jones, McG.*, Pt., G, 67th North Carolina.	——— 1865.	Right. Died April 5, 1865.
42	*McCleary, J. L.*, Serg't, C, 25th S. Carolina.	——— 1862.	Left. Died September 5, 1862.
43	Moore, D. T., Pt., H, 100th Illinois.	Sept. 19, —, '63.	Left. Died December 17, 1863; small-pox.
44	*Prince, E.S.*, Pt., C, 45th Alabama, age 35.	Nov. 29, —, '64.	Left. Died February 2, 1865.
45	*Richmond, W.G.*, Pt., D, 57th N C., age 22.	———	Left. Died January 8, 1863.
46	*Smith, W.R.*, Pt., B, 44th Alabama.	Oct. 8, 1864.	Right; circular. Died October 21, 1864; gangrene.
47	Stewart, J., Corp'l, F, 23d Iowa.	May 17, —, '63.	——. Died July 21, 1863.
48	Wadsworth, W., Pt., I, 4th Massachusetts.	June 14, —, '63.	Left. Died July 24, 1863.
49	Wieenga, V., Pt., F, 37th New York.	May 3, —, '63.	Left. Died May 27, 1863.
50	*Woolsey, J. B.*, Pt., A, 7th South Carolina.	——— 1862.	Right. Died December 1, 1862.
51	Young, G. W., Pt., C, 95th New York.	May 12, —, '64.	Left. Died May 27, 1864.

Amputations in the Continuity of the Leg of Uncertain Date and without Indication of the Seat of Operation.—In four hundred and twenty-one cases of amputations in the leg neither the interval between the injury and the operation nor the precise seat of the operation was reported. The operations were performed on four hundred and eighteen patients, in three instances both legs having been amputated. Ninety-six were Union and three hundred and twenty-two Confederate soldiers. One hundred and thirty-nine operations resulted successfully, and one hundred and ninety-seven fatally, while the termination of eighty-five cases was not ascertained. The rate of mortality of the cases in which the results were determined was therefore 58.6 per cent. The right limb was removed in one hundred and forty-three, the left in one hundred and fifty-three cases; in one hundred and twenty-five reports the side was not mentioned. As will be seen from the subjoined table, the reports of the cases are very incomplete.

Table LXXXIII.

Summary of Four Hundred and Twenty-one Cases of Amputations in the Leg of Uncertain Date and Seat of Operation.

[Recoveries, 1—139; Deaths, 140—336; Results unknown, 337—421.]

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1	*Abernathy, M. J.*, Lieut., E, 1st Arkansas.	———	——. Transferred June 26, 1865.
2	*Adair, R.*, Corp'l, D, 8th Georgia.	July —, 1863.	Left. Paroled November 12, '63.
3	*Akridge, A. W.*, Pt., H, 3d Florida.	———	Right. Furloughed April 21, '63.
4	*Allen, W. A.*, Pt., Reed's Bat. Artillery.	———	Right. Retired October 30, 1864.
5	*Angling, A. G.*, Pt., G, 24th Tennessee.	——— 1863.	Left. Furloughed January 1, '64.
6	*Arent, J. M.*, Pt., H, 12th North Carolina.	——— 1864.	Right. Retired February 3, '65.
7 8	*Barham, W. R.*, Pt, F, 1st North Carolina.	Sept. 17, —, '62.	Both. Furloughed September 23, 1864.
9	*Bellany, L. V.*, Pt., B, 19th Virginia.	——— Mar. 9, '63.	Left. Recovery.
10	*Bleavin, C.*, Pt., A, 36th North Carolina.	Feb. 5, —, '65.	Right. Furloughed.
11	*Bobo, D. P.*, Pt., D, 11th Mississippi.	——— 1862.	——. Discharged October 20, '62.
12	*Bossier, S.*, Pt., I, 9th Louisiana.	——— 1862.	——. Discharged November 5, 1862.
13	*Bowen, B.*, Pt., G, Orr's Rifles.	——— 1864.	Right. Furloughed December 11, 1864.
14	*Brock, M. C.*, Pt., C, 48th Mississippi.	July 3, —, '63.	Left. To be exchanged October 28, 1863.
15	*Brown, H. C.*, Serg't, B, Cobb's Legion.	———	Left. Furloughed February 16, 1863.
16	*Brown, P. W.*, Pt., I, 15th Virginia.	Sept. —, 1862.	Left (also amputation arm). Recovery, November 18, 1864.
17	*Brown, W. J.*, Serg't, I, 21st South Carolina.	——— 1863.	Left. Recovery.
18	Carroll, W., Pt., I, 3d Pennsylvania.	——— 1862.	———.
19	*Cashan, T.*, Pt., B, 21st Georgia.	——— 1862.	Right. Furloughed December 19, 1862.
20	*Chaney, M. M.*, Lieut., Hart's Regiment.	——— 1863.	Right. To prison April 22, 1864.
21	*Clayton, W. B.*, Pt., B, 3d Mississippi.	——— 1862.	Left. Furloughed February 20, 1863.
22	*Connor, D. O.*, Pt., C, Cobb's Legion.	Sept. 23, 1863.	Left. Recovery.
23	*Cooper, W. T. L.*, Pt., G, 5th Texas.	——— 1862.	Left. Discharged October 21, '62.
24	*Currie, D. J.*, Pt., D, 51st North Carolina.	———	——. Furloughed August 16, 1864.
25	*Davis, J.*, Pt., L, 2d S. Carolina.	——— 1862.	——. Discharged August 6, '62.
26	*Davis, J. L.*, Serg't, G, 46th North Carolina.	Aug. 25, —, '64.	Left. Retired January 20, 1865.
27	*Davis, T.*, Pt., H, 21st South Carolina.	——— 1862.	Right. Furloughed July 27, '62.
28	*Donahoe, A.*, Pt., McGregor's Battery.	———	Right. Retired October 13, 1864.
29	*Donavan, J.*, Pt., 10th Tennessee.	———	——. Recovery.
30	*Dougherty, J. N.*, Pt., D, 8th Alabama.	——— 1862.	Left. Discharged February 2, 1863.
31	*Drum, E. J.*, Pt., C, 28th North Carolina.	Au. 25, '64, ———	Right. Retired February 3, '65.
32	*Duclos, M.*, Pt., C, 2d Louisiana.	——— 1862.	Right. Discharged November 30, 1862.
33	*Dzune, B. L.*, Pt., A, 5th Texas.	——— 1863.	——. Discharged December 7, 1863.
34	*Ellis, P. F.*, Pt., I, 13th Mississippi.	——— 1862.	Right. Discharged September 9, 1862.
35	*Exter, T. C.*, Pt., H, 8th Georgia.	——— 1862.	——. Discharged October 31, 1862.
36	*Fagan, J. B.*, Lieut.-Colonel, 15th Alabama.	July 1, —, '63.	Right. To duty March 10, 1864.
37	*Farthram, A. S.*, Capt., ———.	Sept. 19, —, '64.	——. Transferred October 11, 1864.
38	*Feltz, C. R.*, Pt., A, 2d Tennessee.	Dec. 7, '64, ———	Right. To Pro. Marshal March 18, 1865.
39	*Finley, A.*, Serg't, D, 5th Arkansas.	——— 1863.	Left. Furloughed April 28, 1863.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
40	*Fisher, E. D.*, Corp'l, G, 16th Louisiana.	——— 1862.	Left. Furloughed April 28, 1863.
41	*Flavell, R. H.*, Serg't, F, 7th Missouri, age 22.	May 12, —, '63.	Left. Discharged August 8, '63.
42	*Fowler, L.*, Pt., I, 34th N. Carolina, age 34.	June 13, —, '64.	Right. Retired February 22, '65.
43	*Fulkard, D. A.*, Serg't, K, 50th Georgia.	——— 1862.	Left. Furloughed February 21, 1863.
44	Garvey, J., Pt., C, 18th New York.	June 27, —, '62.	Right. Discharged March 24, 1863.
45	*Goddin, T.*, Pt., B, 8th Florida.	July 2, 1863.	Left. Paroled August 22, 1863.
46	*Godfrey, J.*, Pt., E, 1st South Carolina.	——— 1862.	Right. Furloughed December 19, 1862.
47	*Gooding, W. B.*, Capt., K, 23d North Carolina.	July 3, —, '63.	Left. Surgeon P. G. Robinson, C. S. A. Recovery.
48	*Goodman, J.*, Pt., E, 9th Alabama, age 21.	——— 1862.	——; circular. Furloughed September 25, 1862.
49	*Grant, J. M.*, Pt., I, 1st Louisiana.	——— 1862.	——. Exchanged January 11, 1863.
50	Griffin, J., Pt., K, 7th Michigan.	Sept. 7, —, '62.	Right. Discharged February 6, 1863. Died March 6, 1870.
51	*Gulick, D. P.*, Pt., D, 8th Virginia.	——— 1865.	Right. Recovery, June 3, 1865.
52	*Hall, J.*, Pt., H, 14th N. Carolina, age 26.	May 3, —, '63.	Right. Retired February 23, '65.
53	*Hanks, A. G.*, Serg't, F, 1st Texas.	Sept. 17, 1862.	Right. Transferred December 5, 1862.
54	Hartman, L., Pt., G, unassigned, age 23.	——— 1865.	Right. Transferred July 31, '65.
55	Hawkins, W., Landsman, U. S. Navy.	Mar. 14, 1863.	Left. Discharged March 10, '64.
56	*Hegler, C.*, Pt., F, 7th North Carolina.	——— 1862.	Right. Exchanged March 26, 1863.
57	*Heim, W.*, Pt., I, 7th Virginia.	July 3, 1863.	Left. Transferred July 26, 1863.
58	*Heister, F.*, Pt., A, 2d Maryland.	Sept. 13, —, '64.	Right. Furloughed.
59	*Henderson, J. T.*, Pt., K, 7th South Carolina.	July —, 1863.	Right. Paroled November 12, 1863.
60	*Hendricks, M. S.*, Pt., D, 6th Cavalry.	June 11, —, '64.	Left. Retired January 18, 1865.
61	*Herment, I. A.*, Capt., C, 12th South Carolina.	July —, 1863.	Left. Paroled October 24, 1863.
62	*Hicks, J. V.*, Pt., A, 56th Georgia.	Nov. —, 1863.	Right. Exchanged February 14, 1864.
63	*Hinson, W.*, Pt., F, 17th Tennessee.	———	Left. Retired January 13, 1865.
64	*Humphreys, B. F.*, S'g't, G, 12th Arkansas.	——— 1863.	Right. Transferred on parole.
65	*Hunter, J. B.*, Corp'l, G, 1st South Carolina.	——— 1862.	——. Discharged October 14, 1862.
66	*Hutchinson, J. W.*, Pt., B, 15th Alabama.	——— 1862.	Left. Discharged November 21, 1862.
67	*Ingram, T.*, Pt., D, 45th Alabama.	——— 1862.	Left. Furloughed June 12, 1862.
68	*Jackson, B. F.*, Pt., Ketchum's Ala. Battery.	——— 1862.	Right. Furloughed June 12, '62.
69	*Jackson, E. M.*, Pt., C, 24th Georgia.	May 11, '64, —.	Left. Recovery.
70	*James, W. F.*, Serg't, G, 24th Alabama.	——— 1862.	Right. Furloughed August 19, 1862.
71	*Jennings, G. W.*, Pt., K, 30th North Carolina.	——— 1862.	——. Discharged September 28, 1862.
72	*Jennings, H. J.*, Pt., B, 14th South Carolina.	July —, 1863.	Right. Paroled September 5, '63.
73	*Johnson, H. L. W.*, Capt., C, 12th Arkansas.	——— 1863.	Left. Transferred on parole.
74	*Jones, J. J.*, Pt., D, 4th Alabama.	——— 1861.	——. Discharged October 11,
75	*Jones, W. C.*, Serg't, H, 21st Georgia.	——— 1862.	Left. Discharged November 30, 1862.
76	*Justice, J. G.*, Lieut. and A. D. C.	Aug. 16, 1864.	Right. Retired February 28, '65.
77	*King, T. L.*, Pt., E, 55th Virginia.	———	Left. Retired November 3, 1864.
78	*Lanier, C.*, Serg't, L, 2d Florida.	——— 1862.	Left. Discharged November 14, 1862.
79	*Lemmons, A.*, Serg't, D, 40th Alabama.	——— 1863.	Left. Exchanged February 14, 1864.
80	*Lierum, C. T.*, Captain, Engineer Corps.	——— Mar. 2, '61.	Left. Surgeon — Holt, C. S. A. Recovery.
81	*Lipsey, R. C.*, Pt., A, 11th Mississippi.	——— 1862.	——. Discharged November 3, 1862.
82	*Luck, J. W.*, Pt., Nelson's Artillery.	———	Left. Retired October 27, 1864.
83	*McCann, J. F.*, Corp'l, H, 9th Georgia.	July 22, —, '64.	Right. Recovery.
84	*McCarthy, T.*, Serg't, K, 57th Texas, age 29.	May 31, —, '62.	Right. Discharged June 22, '63.
85	*Manyfield, Q. M.*, Pt., F, 4th Texas.	——— 1862.	Right. Discharged November 12, 1862.
86	*Miller, H. C.*, Pt., G, 8th South Carolina.	———	Left. Furloughed March 16, '65.
87	*Milling, J. H.*, Pt., K, 2d Louisiana.	——— 1862.	Right. Discharged September 18, 1862.
88	*Minter, T. F.*, Pt., D, 26th Virginia.	——— 1865.	Right. Transferred April 9, '65.
89	*Myers, J. F.*, Pt., C, 38th North Carolina, age 24.	Dec. 13, '62, —	Left. Retired January 25, 1865.
90	*Nichols, M.*, Pt., E, 27th North Carolina.	Oct. 14, 1863.	Right. Furloughed.
91	*Nix, T.*, Pt., H, 2d Georgia.	July —, —, '63.	——. Paroled September 12, '63.
92	*Page, M. W.*, Pt., B, 5th Alabama.	——— 1862.	Right. Furloughed February 3, 1863.
93	*Parker, M.*, Pt., H, 35th Georgia.	July —, 1863.	Left. Paroled September 5, 1863.
94	*Patterson, W.*, Pt., A, 20th South Carolina.	——— 1864.	Right. Furloughed January 9, 1865.
95	*Peace, J. Y.*, Pt., E, 23d North Carolina.	May 12, —, '64.	Right. Retired January 28, 1865.
96	*Perry, W. A.*, Pt., F, 48th Virginia.	——— 1862.	——. Discharged August 6, '62.
97	*Pickels, J. P.*, Pt., K, 5th Texas.	July 3, —, '63.	Right. Transferred September 25, 1863.
98	*Pleger, J. M.*, Pt., K, 9th Alabama.	——— 1862.	Right. Furloughed December 19, 1862.
99	*Plummer, J. B.*, Pt., K, 37th North Carolina.	———	Left. Discharged December 4, 1863.
100	*Price, J. S.*, Pt., D, 52d Virginia.	———	Right. Transferred April 8, '65.
101	*Proctor, W. H.*, Capt., F, 13th Virginia Cavalry.	May 31, 1864.	——. Retired.
102	*Puckett, H.*, Pt., A, 28th North Carolina.	May 27, —, '62.	Right. Discharged September 10, 1862.
103	*Ray, J. S.*, Lieut., K, 38th N. Carolina, age 36.	July 3, —, '63.	Right. To prison September 28, 1863.
104	*Rhom, R.*, Pt., A, 49th North Carolina.	——— 1862.	Left. Furloughed August 13, 1862.
105	*Richardson, H. H.*, Pt., F, 1st Tennessee.	——— 1862.	Left. Transferred February 14, 1863.
106	*Riley, J.*, Pt., D, 50th North Carolina.	——— 1862.	Left. Furloughed September 29, 1862.
107	*Riley, J. O.*, Pt., G, 6th Louisiana.	——— 1862.	——. Discharged December 20, 1862.
108	*Ritzell, H. G.*, Pt., A, 12th North Carolina.	Aug. 19, —, '64.	Left. Retired February 3, 1865.
109	*Robinson, D.*, Pt., —, 5th North Carolina.	July 2, —, '63.	Left. Transferred July 18, 1863.
110	Roland, J., Pt., I, 124th Colored Troops, age 35.	June —, —, '65.	Right. Recovery, February 19, 1866.
111	*Ross, J. M.*, Pt., A, 3d South Carolina.	———	——. Exchanged February 3, 1865.
112	*Sample, W. P.*, Serg't, F, 9th Louisiana.	——— 1862.	Left. Discharged December 2, 1862.
113	*Semmons, W. J.*, Pt., A, 9th Louisiana.	——— 1862.	——. Discharged November 7, 1862.
114	*Shifflett, J.*, Pt., C, 4th Georgia, age 29.	Sept 19, —, '63.	Right. Retired January 9, 1865.
115	*Sholer, G. W.*, Pt., A, 7th Confed. States Cav'lry.	1863, ———	Right. Duty May 13, 1864.
116	*Simmons, A. A.*, Pt., C, 40th Alabama, age 31.	Nov. 25, 1863.	Left. Retired November 19, '64.
117	*Smith, R. H.*, Pt., F, 3d North Carolina.	Sept. 17, —, '62.	Right. Recovery.
118	*Smith, W. M.*, Pt., A, 41st Georgia.	——— 1862.	Left. Furloughed February 21, 1863.
119	*Snider, T. L.*, Serg't, C, 25th North Carolina.	———	Left. Furloughed September 19, 1862.
120	*Stanson, B.*, Pt., D, 18th North Carolina.	——— 1862.	——. Paroled August 16, 1862.
121	*Starr, J. T.*, Pt., I, 11th Georgia.	——— 1862.	——. Discharged October 21, 1862.
122	*Stephens, E.*, Pt., A, Holcomb's Legion.	——— 1862.	Left. Discharged October 12, 1862.
123	*Stockdell, J.*, Pt., F, 13th Virginia.	——— 1862.	Right. Discharged August 29, 1862.
124	*Switzer, B. W.*, Pt., C, 27th Mississippi.	Oct. 8, —, '62.	Left. To Provost Marshal April 1, 1863.
125	*Thompson, L.*, Corp'l, C, 16th North Carolina.	July —, —, '63.	Left. Paroled September 12, '63.
126	Tiveman, D., Pt., E, 42d New York, age 36.	Sept. 17, —, '62.	Left. Discharged March 3, 1863. Died February 26, 1864.
127	*Trahan, I.*, Pt., K, 10th Louisiana.	May 3, —, '63.	Left. Transferred.
128	*Warford, B.*, Pt., A, 7th Tennessee.	———	Left. Furloughed April 18, 1863.
129	*Wassum, P. M.*, Pt., F, 16th Tennessee.	———	Right. Furloughed April 18, '63.
130	*Watson, J. A.*, Pt., A, 4th South Carolina.	——— 1863.	Right. Duty June 20, 1863.
131	*Watson, L. S.*, Pt., K, 28th Virginia.	———	Left. Exchanged June 5, 1865.
132	*Wells, J. J.*, Pt., E, 27th Mississippi.	Oct. 8, —, '62.	——. To Danville February 12, 1863.
133	*Westmoreland, J.*, Pt., H, 2d Mississippi.	——— 1862.	——. Discharged October 17, '62.
134	*Wilder, F. W.*, Pt., A, 59th Georgia.	July 5, —, '63.	Right. Recovery, October 8, '64.
135	*Williams, L.*, Pt., B, 41st Alabama.	——— 1862.	Left. Paroled June 17, 1865.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
136	*Wilson, C. H.*, Lieut., F, 16th Mississippi.	1862.	Left. Furloughed December 18, 1862.
137	*Wilt, G. W.*, Pt., Brownuer's Virginia Cavalry.	1863.	Left. Furloughed July 10, 1863.
138	*Wood, W. T.*, Pt., D, 29th Georgia.	1862.	Left. Furloughed April 18, 1863.
139	*Yawn, N.*, Pt., H, 5th Florida.	1862.	—. Discharged December 20, 1862.
140	Abner, J., Pt., I, 30th Illinois.	1863.	Right. Died October 12, 1863.
141	*Alderman, C.*, Pt., I, 9th Georgia.	July 3, —, '63.	Left. Died July 19, 1863.
142	Alley, W., Pt., A, 34th Indiana.	May 16, —, '63.	Right. Died June 14, 1863.
143	Alliger, J., Pt., G, 102d New York.	Sept. 17, —, '62.	Right. Died November 19, 1862.
144	*Alloway, S.*, Pt., G, 1st South Carolina.	July 2, —, '63.	Right. Died August 10, 1863.
145	*Amos, W.*, Pt., Peyton's Battery.	1862.	—. Died August 8, 1862.
146	*Anderson, I. R.*, Pt., I, 17th Mississippi.	———	—. Died June 3, 1863.
147	Angel, J. Q., Pt., I, 21st Iowa.	May 17, —, '63.	Right. Died June 30, 1863; diarrhœa and fever.
148	Armstrong, J. W., Pt., E, 5th Ohio.	Sept. 17, —, '62.	Left. Died October 24, 1862.
149	Arthur, R., Serg't, B, 22d Iowa.	May 22, —, '63.	—. Died June 2, 1863.
150	*Averitt, A. D.*, Pt., G, 50th Georgia.	———	—. Died October 20, 1864.
151	Baker, J., Pt., A, 10th Iowa.	May 22, —, '63.	Left. Died June 6, 1863.
152	*Barrett, J. M.*, Pt., G, 51st Alabama.	———	Right. Died August 28, 1864.
153	Bartholomew, T. K., Pt., G, 22d Iowa.	———	—. Died August 7, 1863.
154	*Beaver, A. D.*, Pt., A, 57th North Carolina.	———	—. Died October 20, 1864.
155	*Bendall, B. F.*, Pt., F, 53d Virginia.	July —, —, '63.	Right. (Also amp. left forearm.) Died August 6, 1863.
156	Benham, J., Pt., H, 19th Illinois.	Dec. 31, —, '62.	—. Died March 7, 1863.
157	Birch, N., Pt., F, 5th N. Jersey, age 33.	1862.	—. Died June 22, 1862; pyæmia.
158	*Bolling, H.*, Capt., Gen. Chambliss' staff.	———	Left. Died October 18, 1864.
159	*Bowman, J. T.*, Pt., I, 16th North Carolina.	July —, —, '63.	Left. Died October 22, 1863.
160	*Boyd, J.*, Pt., E, 7th Louisiana.	———	—. Died October 20, 1864.
161	*Brock, J. H.*, Pt., I, 43d Alabama.	———	Left. Died June 2, 1864.
162	Brockett, W., Pt., K, 35th Illinois.	Mar. 7, —, '62.	Right. Died April 14, 1862.
163	Brown, R., Pt., E, 88th Indiana.	Dec. 31, —, '62.	—. Died January 11, 1863.
164	Brown, S. H., Pt., C, 81st Illinois.	1863.	Left. Died June 4, 1863.
165	*Buckingham, M. D.*, Pt., H, 1st Virginia.	July 2, —, '63.	Right. Died August 1, 1863.
166	Buttrich, P. W., Pt., B, 32d Massachusetts.	July 2, —, '63.	—. Died August 5, 1863.
167	*Calvert, W. J.*, Pt., I, 1st South Carolina.	1862.	—. Died September 23, 1862.
168	*Camp, G. T.*, Pt., Graham's Virginia Bat'ry.	———	Left. Died July 16, 1863.
169	*Campbell, J. R.*, Serg't, D, 13th S. Carolina.	———	Left. Died June 11, 1864.
170	*Campbell, W. W.*, Pt., I, 8th Florida.	———	Left. Died November 16, 1863.
171	Cantwell, I., Pt., C, 7th Ohio.	1863.	Left. Died August 23, 1863.
172	*Carrington, W. W.*, Pt., A, 2d Texas.	April 6, —, '62.	Right. Died May 13, 1862.
173	*Chaplain, W. E.*, Lieut., I, 1st South Carolina.	———	Left. Died.
174	*Coe, W. W.*, Pt., M, 21st North Carolina.	July —, —, '63.	Right. Died September 17, 1863; chronic diarrhœa.
175	Connelly, B. C., Corp'l, B, 18th Infantry.	Oct. 8, —, '62.	—. Died November 19, 1862.
176	Coons, A., Pt., H, 49th Ohio.	———	Right. Died February 14, 1863.
177	*Cooper, G.*, Lieut., B, 24th Virginia.	July —, —, '63.	Left. Died July 27, 1863.
178	Coppick, J., Pt., D, 74th Ohio.	Dec. 31, '62, —.	—. Died January 18, 1863.
179	Couch, H., Pt., F, 89th Illinois.	———	—. Died January 27, 1863.
180	Daum, C., Pt., K, 25th Ohio.	1862.	—. Died June 30, 1862.
181	*Davidson, B. R.*, Pt., H, 60th Alabama.	———	Left. Died May 31, 1864.
182	Davis, J. K., Pt., B, 10th Iowa.	May 16, —, '63.	—. Died June 8, 1863.
183	*Dixon, W.*, Pt., G, 5th North Carolina.	July 3, —, '63.	Right. Died July 19, 1863.
184	*Dodds, J.*, Pt., G, 11th Alabama.	1862.	—. Died June 30, 1862.
185	Dunham, Z., Serg't, A, 18th Infantry.	Dec. 31, '62, —.	—. Died February 17, 1863.
186	*Earp, W. R.*, Pt., E, 7th North Carolina.	———	—. Died January 5, 1863.
187	*Easters, E.*, Pt., D, 5th South Carolina.	———	Right. Died October 19, 1864.
188	*Eldin, T.*, Pt., K, 1st S. Carolina Rifles.	1862.	—. Died September 13, 1862.
189	Ellis, D., Pt., F, 7th N. York Cavalry, age 24.	1864.	Right. Died May 16, 1864.
190	*Epzell, E. J.*, Pt., B, 51st North Carolina.	———	—. Died June 5, 1864; tetanus.
191	Etmeir, W., Pt., G, 73d Indiana.	Dec. 31, '62, —.	—. Died March 23, 1863.
192	Fair, R. H., Serg't, B, 10th Penn. Reserves.	June 27, 1862.	—. Died.
193	*Fenton, P.*, Lieut., B, 19th Georgia.	———	Right. Died January 13, 1863.
194	*Ferguson, F. F.*, Pt., G, 6th Virginia.	———	Left. Died June 1, 1864.
195	*Finley, A. M.*, Serg't, E, 55th Alabama.	———	Right. Died August 16, 1864.
196	*Floyd, C. J.*, Pt., H, 18th Alabama.	———	Right. Died August 14, 1864.
197	*Foosler, J.*, Pt., F, 2d South Carolina.	July 3, '63, —.	—. Died.
198	*Fowler, H. L.*, Pt., E, Hampton's Legion.	———	—. Died September 30, 1862.
199	Fox, J. O., Pt., K, 115th New York.	———	Right. Died June 1, 1864.
200	Frazier, W., Pt., F, 5th New Jersey.	Aug. 31, —, '62.	—. Died September 11, 1862.
201	*Garlick, A. J.*, Pt., B, 4th Virginia.	———	—. Died March 8, 1864.
202	Gavitt, E. D., Pt., D, 4th Rhode Island.	Mar. 14, —, '62.	Right. Died June 11, 1862.
203	Gee, J., Pt., G, 137th New York.	July 2, —, '63.	Left. Died July 27, 1863.
204	Gifford, L. S., Corp'l, B, 22d Illinois.	Sept. 19, —, '63.	Left. Died October 8, 1863.
205	*Greenwell, J. R.*, Pt., 4th Virginia.	1862.	—. Died September 8, 1862; gangrene and pyæmia.
206	*Gregory, J. T.*, Serg't, C, 27th Georgia.	———	Left. Died June 28, 1864.
207	*Good, A. H.*, Lieut., I, 7th Virginia, age 19.	1863.	Left. Died August 29, 1863.
208	Gottbrecht, A., Pt., B, 16th Iowa.	June 15, —, '64.	Left. Died September 5, 1864.
209	*Hamm, J. D.*, Pt., C, 42d Mississippi.	———	—. Died June 16, 1864; pyæmia.
210	Hammond, J., Corp'l, B, 3d Delaware.	June —, —, '62.	—. Died June 29, 1862.
211	Handly, P., Corp'l, K, 48th Pennsylvania.	1862.	Right. Died October 25, 1862.
212	*Harris, J. P. D.*, Pt., H, 27th Georgia.	1862.	Left. Died June 8, 1862.
213	*Harrold, J. J.*, Pt., A, 59th Georgia.	July 3, —, '63.	Left. Died September 6, 1863.
214	*Hawille, J. C.*, Pt., K, 13th North Carolina.	———	—. Died June 28, 1863.
215	Hay, W., Pt., E, 16th New York.	June 27, —, '62.	Right. Died July 18, 1862.
216	Helmick, J., Pt., G, 19th Iowa.	Dec. 7, 1862.	Right. Died January 10, 1863.
217	Heyer, W., Pt., E, 41st Illinois.	Feb. 15, 1862.	—. Died March 8, 1862.
218	*Higgins, M. P.*, Pt., F, 8th Georgia.	July 3, —, '63.	Left. Died September 9, 1863.
219	Hittle, G. W., Pt., G, 75th Illinois.	Oct. 8, —, '62.	—. Died November 12, 1862.
220	*Hodge, R.*, Pt., F, 1st Tennessee.	Oct. 8, —, '62.	—. Died October 25, 1862.
221	*Howlett, J.*, Pt., D, 20th Virginia.	———	Left. Died May 24, 1863.
222	*Huggeons, J.*, Pt., E, 11th Virginia.	———	—. Died September 5, 1862.
223	*Jackson, J. C.*, Pt., I, 47th North Carolina.	1862.	Right. Died September 2, 1862.
224	*James, W. A.*, Serg't, K, 14th Alabama.	———	—. Died September 8, 1862.
225	*Jenkins, J. S. P.*, Pt., C, 12th Virginia Cavalry.	———	—. Died June 23, 1864; pneumonia.
226	*Jones, G. W.*, Pt., I, 13th N. Carolina, age 30.	1863.	Left. Died August 22, 1863.
227	*Jones, R.*, Pt., D, 5th North Carolina.	May 5, 1862.	—. Died June 9, 1862; pyæmia.
228	Kelley, E., Pt., E, 76th New York.	Aug. 30, —, '62.	—. Died September 16, 1862.
229	*Kellis, J.*, Pt., E, 47th North Carolina.	July 2, —, '63.	—. Died July 25, 1863.
230	*Kelly, W. M.*, Pt., E, 13th Alabama.	July 3, —, '63.	Right. Died July 25, 1863.
231	*Kelsoe, J. G.*, Pt., G, 1st Tennessee.	———	—. Died June 15, 1863.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
232	Kenney, J., Pt., I, 157th New York.	April 9, —, '65.	Left. Died September 26, 1865; exhaustion.
233	*Kirk, W. S.*, Pt., C, 4th Texas.	———	——. Died October 5, 1862.
234	*Knecht, A. M.*, Serg't, K, 12th South Carolina.	Aug. 16, —, '64.	Right. Died September 9, 1864.
235	Laffith, J., Serg't, D, 104th New York.	July 2, —, '63.	Left. Died September 6, 1863.
236	*Lamfard, P.*, Pt., G, 3d South Carolina.	———	——. Died December 24, 1862.
237	*Lemon, W.*, Pt., K, 57th Virginia.	July —, —, '63.	Left. Died August 24, 1863.
238	Lillibridge, D. N., Pt., F, 12th Iowa.	April 6, —, '62.	——. Died October 13, 1862; erysipelas.
239	Linsley, S., Pt., C, 100th Col'd Troops, age 24.	———	Left. Died March 10, 1865; phthisis pulmonalis.
240	Lohmann, C., Lieut., D, 20th New York.	Sept. 17, —, '62.	Right. Died October 9, 1862.
241	*Lumsford, H. E.*, Pt., K, 8th Georgia.	——— 1861.	——. Died September 1, 1861.
242	Mack, H., Pt., B, 36th Wisconsin.	——— 1864.	Right. Died June 8, 1864.
243	Maltbie, E. P., Pt., F, 2d Conn. Artil'ry, age 57.	June 1, —, '64.	Right. Died July 2, 1864.
244	*Martin, M. W.*, Pt., G, 7th Virginia.	Sept. 17, —, '62.	——. Died October 14, 1862.
245	Martinson, C., Pt., H, 9th Iowa.	Mar. 7, —, '62.	——. Died March 15, 1862.
246	Mason, A., Corp'l, K, 93d Illinois.	——— 1863.	Right. Died July 30, 1863.
247	*McCauley*, —, Pt., E, 47th Alabama, age 45.	July —, —, '63.	——. Died September 8, 1864.
248	McClellan, C. H., Pt., A, 7th Michigan.	Sept. 17, —, '62.	Right. Died October 7, 1862.
249	McCloud, D., Pt., I, 55th Pennsylvania, age 27.	June 18, —, '64.	Left. Died July 9, 1864.
250	*McCuny, G. S.*, Pt., I, 14th South Carolina.	July — —, '63.	Right. Died September 12, 1863.
251	*McLaughlin, S.*, Pt., N, 6th South Carolina.	———	Left. Died December 28, 1864.
252	McMichael, C., Pt., H, 17th Iowa.	May 16, —, '63.	——. Died July 2, 1863.
253	McMurrin, H. S., Pt., K, 2d New York.	Sept. 17, —, '62.	Right. Died October 26, 1862.
254	*McMurry, W. B.*, Lieut., K, 11th Mississippi.	———	Left. Died May 29, 1864.
255	Miller, F., Serg't, G, 3d Iowa Cavalry.	July 11, —, '64.	——. Died February 25, 1865.
256	Miller, J. A., Corp'l, F, 93d Illinois.	——— 1863.	Left. Died July 13, 1863.
257	Moon, R., Pt., C, 2d New York.	Sept. 17, —, '62.	Left. Died November 10, 1862.
258	*Morrow, J.*, Pt., K, 18th Georgia.	———	——. Died September 17, 1862.
259	Morton, F., Pt., D, 72d Pennsylvania.	Sept. 17, —, '62.	Right. Died October 14, 1863.
260	Mullen, P., Pt., E, 81st New York.	——— 1862.	——. Died June 9, 1862.
261	Mumford, S., Pt., E, 1st Delaware.	Sept. 17, —, '62.	Left. Died October 18, 1862.
262	*Munroe, T. M.*, Pt., K, 18th North Carolina.	———	——. Died December 27, 1862.
263	Neal, J. E., Pt., A, 13th Iowa.	April 6, —, '62.	Left. Died May 4, 1862; hæmorrhage.
264	*Oliver, J. J.*, Serg't, K, 61st North Carolina.	——— 1864.	——. Died October 29, 1864.
265	*Oxford, J. M.*, Pt., A, 33d Mississippi.	———	Right. Died August 18, 1864.
266	*Passinger, H. M.*, Pt., C, 3d South Carolina.	July 2, —, '63.	Right. Died September 5, 1863.
267	Plummer, C. H., Corp'l, F, 18th Wisconsin.	Oct. 4, —, '62.	Right. Died November 29, 1862.
268	*Praither, L.*, Pt., B, 13th North Carolina.	May 5, —, '62.	——. Died May 24, 1862.
269	*Price, R. M.*, Pt., B, 34th North Carolina.	———	Left. Died July 5, 1862.
270	*Quack, W.*, Pt., E, 27th Mississippi.	Oct. 8, —, '62.	Right. Died December 6, 1862.
271	*Rash, R. A.*, Pt., F, 52d North Carolina.	———	Both. Died January 8, 1863.
272			
273	*Reiche, L. J.*, Pt., D, 57th North Carolina.	———	Left. Died December 18, 1862.
274	Rhoads, W., Pt., A, 53d Pennsylvania.	Sept. 17, —, '62.	Left. Died October 9, 1862.
275	Roach, T. P., Corp'l, K, 6th Maine.	May 3, —, '63.	Right. Died May 28, 1863.
276	*Robbins, J. P.*, Pt., 53d Virginia.	July 3, —, '63.	——. Died July 20, 1863.
277	Robinson, J. W., Pt., H, 10th Ohio Artillery.	——— 1864.	Left. Died June 26, 1864.
278	Robinson, T. R., Pt., H, 41st Illinois.	April 6, —, '62.	Left. Died May 10, 1862.
279	*Rogan, J. L.*, Pt., E, 4th Texas.	———	——. Died October 2, 1862.
280	*Rosin, W.*, Pt., C, 11th Mississippi.	——— 1862.	——. Died September 24, 1862.
281	*Rugg, A. J.*, Pt., McIntosh's Battery.	———	——. Died June 1, 1863.
282	*Sanchez, S. J.*, Pt., B, 2d Florida.	July 2, —, '63.	——. Died July 17, 1863.
283	*Saunders, H.*, Pt., C, 4th Virginia.	July 21, —, '61.	——. Died September 8, 1861.
284	*Sawyer W. F.*, Pt., B, 37th Tennessee.	Oct. 8, —, '62.	——. Died November 14 862.
285	*Scott, J. B.*, Pt., G, 4th Texas.	——— 1862.	——. Died July 5, 1862.
286	*Scott, J.*, Pt., H, 47th North Carolina.	———	Left. Died September 19, 1862.
287	Senor, F. H., Corp'l, B, 79th Pennsylvania.	Oct. 8, —, '62.	Left. Died October 26, 1862.
288	Shelter, D., Pt., F, 46th Ohio.	April 6, —, '62.	Right. Died April 20, 1862; pyæmia.
289	Sherwood, G. W., Pt., E, 21st Illinois.	Sept. 19, —, '63.	Left. Died October 16, 1863.
290	Shilling, J., Pt., B, 20th Massachusetts.	Sept. 17, —, '62.	Right. Died November 13, 1862.
291	*Shrelas, A.*, Pt., E, 26th North Carolina.	July 2, —, '63.	Right. Died July 29, 1863; exhaustion.
292	Simpson, G., Pt., 21st Wisconsin.	Oct. 8, —, '62.	——. Died October 20, 1862.
293	*Sims, G. T.*, Pt., I, 12th South Carolina.	———	Left. Died September 6, 1864.
294	Singlebush, J. W., Pt., G, 73d New York.	July 2, —, '63.	——. Died July 29, 1863.
295	*Sink, J.*, Pt., F, 5th Virginia.	———	——. Died July 1, 1863.
296	Smith, J., Pt., H, 3d Delaware.	June —, —, '62.	——. Died June 29, 1862.
297	Smith, J. C., Pt., C, 112th Illinois.	——— 1864.	Left. Died June 24, 1864.
298	Smith, J., Pt., I, 86th New York.	Aug. 30, —, '62.	——. Died September 10, 1862.
299	*Smith, L. B.*, Pt., B, 11th Mississippi.	———	——. Died October 1, 1862.
300	*Smith, R.*, Corp'l, B, 30th Virginia.	———	Right. Died June 9, 1864.
301	*Snider, W.*, Pt., G, 2d N. C. Battery.	July 2, —, '63.	——. Died July 17, 1863.
302	*Spradlin, W.*, Pt., H, 26th Alabama.	———	——. Died June 4, 1863.
303	*Steele, R. C.*, Pt., I, 7th North Carolina, age 30.	July 3, —, '63.	Right. Died August 29, 1863.
304	Stevens, A. G., Pt., D, 22d Illinois.	Dec. 31, '62, —.	——. Died January 15, 1863.
305	*Stevens, B. F.*, Pt., K, 38th Virginia.	———	Left. Died June 1, 1864.
306	Stever, W. R., Pt., E, 2d Wisconsin.	Aug. 31, —, '62.	——. Died September 30, 1862.
307	*Stewart, J. S.*, Pt, G, 1st South Carolina.	———	Left. Died September 16, 1864.
308	Stribley, W., Serg't, A, 30th Indiana.	De.31,'62, ———	——. Died January 11, 1863.
309	Summers, W., Pt., D, 17th Iowa.	June 26, —, '63.	——. Died July 6, 1863.
310	Tarleton, L. V., Pt., G, 47th Missouri.	Sept. 27, —, '64.	Left. Died November 1, 1864.
311	*Tate, E. R.*, Pt., C, 15th Georgia.	July —, —, '63.	——. Died August 5, 1863.
312	*Thew, S. B.*, Serg't, F, 11th Georgia.	July —, —, '63.	——. Died August 8, 1863.
313	*Thomason, W. A.*, Serg't, E, 2d S. Carolina.	———	Right. Died June 1, 1863.
314	Tomlinson, D., Pt., E, 42d Indiana.	Oct. 8, —, '62.	——. Died November 24, 1862.
315	*Traville, J.*, Pt., D, Holcomb's Legion.	———	——. Died May 9, 1865.
316	*Truesdale, J. C.*, Pt., I, 12th South Carolina.	———	Right. Died June 20, 1864.
317	Tullis, A., Pt., G, 28th Iowa.	May 16, —, '63.	Right. Died July 9, 1863; gangrene.
318	*Tyler, H.*, Pt., C, 25th South Carolina.	———	Right. Died June 20, 1864.
319	*Vanderfard, A. A.*, Lt., D, 21st S. Carolina.	———	Left. Died February 28, 1863.
320	Van Kuren, J., Serg't, H, 21st Iowa.	May 1, —, '63.	Left. Died June 18, 1863.
321	*Vaughn, G. W.*, Pt., B, 1st Tennessee.	———	——. Died September 6, 1862; pyæmia.
322	*Walker, J. A.*, Pt., K, 45th Georgia.	———	Left. Died May 26, 1864; pyæmia.
323	Walker, N. A., Pt., I, 9th Iowa.	Mar. 7, —, '62.	Right. Died April 2, 1862.
324	Walter, L., Pt., A, 13th Ohio.	De.30,'62, ——, '63.	Left. Died January 19, 1863.
325	Waltz, A., Pt., K, 7th New York.	——— 1862.	Left. Died December 28, 1862.
326	Weber, G., Pt., E, 3d Wisconsin.	Sept. 17, —, '62.	Right. Died November 2, 1862.
327	*West, O. K.*, Lieut., K, 40th Virginia.	———	Left. Died July 23, 1863.
328	*Wheatley, F. M.*, Pt., 2d Maryland.	———	Right. Died October 28, 1864.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
329	*Wilkerson, E.*, Pt., B, 11th Georgia.	July —, —, '63.	Right. Died July 22, 1863.
330	*Williver, J.*, Serg't, H, 44th North Carolina.	———	——. Died December 1, 1863; chronic diarrhœa.
331	*Winecoff, H. D.*, Pt., H, 7th North Carolina.	———	Right. Died February 14, 1863; pyæmia and hectic fever.
332	*Withington, M.*, Pt., D, 50th Georgia.	July 3, —, '63.	Right. Died October 17, 1863.
333	*Wood, A.*, Pt., K, 1st Mississippi.	———	Left. Died September 2, 1863.
334	*Woodall, R.*, Pt., B, 12th Georgia.	———	Left. Died May 25, 1864.
335	*Wright, L. M.*, Pt., E, 59th Alabama.	———	Left. Died May 24, 1864.
336	*Wynn, P. A.*, Corp'l, I, 3d Georgia.	———	——. Died June 5, 1864.
337	Aikins, H. O., Pt., D, 13th Col'd Troops.	Dec. 16, '64, '—.	Left.
338	*Andrews, J. P.*, Pt., D, 13th Mississippi.	July 3, '63, —.	Right.
339	*Bailey, H. P.*, Pt., 1st Washington Artillery.	———	——.
340	*Beaufort, J. L.*, Pt., F, 15th Mississippi.	——— 1865.	Right.
341	*Bell, J. J.*, Pt., C, 13th Mississippi.	July 3, '63, —.	Right.
342	*Bennett, W. F.*, Pt., D, 6th Georgia.	——— 1865.	Right.
343	*Bon, F. L.*, Pt., A, 17th Mississippi.	July 3, —, '63.	Right.
344	*Bridges, J. M.*, Pt., I, 38th North Carolina.	——— 1864.	Right.
345	*Brockington, W. J.*, Pt., A, 7th S. C. Cavalry.	——— 1864.	Right.
346	*Brown, R. D.*, Serg't, H, 45th Georgia.	——— 1864.	——.
347	*Bruce, J. B.*, Pt., I, 1st Tennessee.	———	——; flap.
348	*Brumfield, J. F.*, Pt., C, 46th Virginia.	——— 1862.	Right.
349	*Bugg, J.*, Pt., C, 28th Georgia.	——— 1864.	Right.
350	*Butts, W. J.*, Pt., B, 60th Georgia.	———	Left.
351	*Camble, T.*, Pt., D, 7th Mississippi.	April 6, '62, —.	——.
352	*Cameron, J. W.*, Pt., I, 26th South Carolina.	——— 1864.	Left.
353 354	*Carpenter, P. J.*, Pt., D, 13th Virginia.	——— 1862.	Both.
355	*Chamberlain, W. D.*, Pt., I, 14th S. Carolina.	———	Left.
356	*Chapman, R. F.*, Lieut., E, 9th Virginia.	July 3, '63, —.	Right.
357	*Chestnut, F. M.*, Pt., F, 8th Arkansas.	——— 1865.	Left.
358	*Clakly, J. T.*, Pt., A, 10th Georgia.	——— 1864.	Right.
359	*Cone, L.*, Serg't, D, 8th Georgia.	——— 1864.	Right.
360	*Conner, J.*, Pt., G, 7th Louisiana.	———	——.
361	*Cox, J. T.*, Serg't, D, 28th South Carolina.	———	Left.
362	*Craft, J. I.*, Pt., H, 33d North Carolina.	———	——; circular.
363	*Creale, G. D.*, Pt., E, 27th Georgia.	——— 1864.	Right.
364	*Davis, G. W.*, Lieut., H, 6th Virginia.	———	——.
365	*Davis, J. W.*, Pt., K, 37th South Carolina.	———	——.
366	*Duncan, W. F.*, Pt., K, 44th Tennessee.	Oct. 8, '62, —.	Left.
367	*Edwards, A. D.*, Pt., C, 28th North Carolina.	——— 1864.	Left.
368	*Evans, W. O.*, Corp'l, E, 18th South Carolina.	——— 1864.	Right.
369	*Foderfield, N.*, Pt., B, 16th Georgia.	———	Left.
370	*George, W.*, Pt., K, 7th Louisiana.	Sept. 19, 1864.	——.
371	*Green, A. J.*, Pt., D, 29th Georgia.	———	Left.
372	*Groce, L.*, Pt., A, 20th Georgia.	——— 1864.	Left.
373	*Gunn, R. G.*, Pt., A, 17th Mississippi.	July 3, '63, —.	Right.
374	Harback, C. B., Pt., K, 21st Iowa.	———	——.
375	*Harder, T. D.*, Capt., H, 9th Georgia.	——— 1864.	Right.
376	*Harris, E. H.*, Pt., F, 7th Georgia.	——— 1864.	Right.
377	*Harrison, N. C.*, Pt., F, 44th Georgia.	——— 1864.	Right.
378	*Henson, S. C.*, Corp'l, F, 4th Georgia, age 24.	———	Right.
379	*How, M. D.*, Pt., E, 20th Georgia.	——— 1864.	Left.
380	*Jackson, N.*, Pt., D, 35th Georgia.	———	Right.
381	*Jacobs, W. I.*, Pt., F, 13th Georgia.	——— 1864.	Left.
382	*Jones, J.*, Pt., H, 6th Georgia.	——— 1864.	Left.
383	*Jones, W. R.*, Serg't, A, 13th South Carolina.	Aug. 16, 1864.	Right.
384	*Koone, G. W.*, Serg't, D, 16th North Carolina.	——— 1862.	Left.
385	*Langdon, J. J.*, Pt., E, 48th Georgia.	——— 1864.	Left.
386	*Lewis, A.*, Pt., I, 49th Georgia.	———	Left.
387	*Lewis, J. T.*, Pt., B, 7th South Carolina.	——— 1864.	Left.
388	*Loeb, H.*, Pt., A, 22d Mississippi.	——— 1865.	Right.
389	*Mags, W. J.*, Pt., K, 3d South Carolina.	———	——; flap.
390	*Mallony, M. M.*, Pt., C, 15th Tennessee.	——— An. 25, '64.	Left; circular.
391	*McCrary, W.*, Pt., B, 26th North Carolina.	——— 1864.	Left.
392	*Melton, B. W.*, Pt., H, 11th Georgia.	———	Left.
393	*Mercer, M.*, Pt., D, 35th Georgia.	——— 1864.	Right.
394	*Miller, W. N.*, Capt., H, 31st Georgia.	——— 1865.	Left.
395	*Mizells, J. S.*, Pt., B, 11th South Carolina.	——— 1864.	Left.
396	*Murray, W. B.*, Corp'l, D, 5th S. C. Cavalry.	——— 1864.	Left.
397	*Myers, T.*, Pt., A, 45th Georgia.	———	Right.
398	*Neal, H. R.*, Pt., G, Palmetto S. S. S. Carolina.	——— 1862.	Right.
399	*Neely, I.*, Pt., D, 1st Tennessee.	Oct. 8, '62, —.	——.
400	*Newman, W. A.*, Pt., C, 28th Georgia.	——— 1864.	Left.
401	*Peables, J. C.*, Pt., H, 28th Alabama.	——— 1865.	Right.
402	*Price, W. K.*, Pt., K, 44th Tennessee.	Oct. 8, —. '62.	Left.
403	*Reese, T. B.*, Pt., E, Phil. Legion.	——— 1864.	Left.
404	*Robbins, C. C.*	Oct. 8, 1862.	——.
405	*Ruleau, F.*, Pt., Washington Artillery.	July 2, —, '63.	Left.
406	*Sair, A.*, —, G, 57th N. Carolina, age 31.	——— 1863.	Left.
407	*Sawyer, H. A.*, Capt., C, 2d N. Carolina, age 24.	——— 1862.	Left.
408	*Shuler, P. H. B.*, Lieut., A, 2d South Carolina.	July —, —, '63.	——.
409	*Smith, I. B.*, Pt., A, 32d Mississippi.	Oct. 8, 1862.	Left.
410	*Smith, M. B.*, Pt., F, 2d South Carolina.	Sept. 30, '64, —.	Right.
411	*Stanfill, J. W.*, Pt., A, 20th Georgia.	——— 1864.	Right.
412	*Stewart, A.*, Pt, D, 1st Tennessee.	———	——; circular.
413	*Strane, G. L.*, Pt., D, Holcomb's Legion Cav'y.	———	Right.
414	*Truett, J. D.*, Pt., C, 38th Georgia.	April —, 1865.	Left.
415	*Turner, P. S.*, Pt., A, 44th Georgia.	April —, 1865.	Right.
416	*Vause, W. A.*, Pt., I, 28th Georgia.	——— 1864.	Left.
417	*Watkins, W. H.*, Corp'l, C, 20th Georgia.	——— 1864.	Left.
418	*Welch, J.*, Pt., F, 61st Georgia.	———	Right.
419	*Whitefield, W. H.*, Pt., C, 14th Georgia.	———	Left.
420	*Willis, R. M.*, Pt., C, 15th Georgia.	——— 1865.	Right.
421	*Winstead, L.*, Serg't, D, 1st Tennessee.	Oct. 8, —, '62.	——.

In one instance (Case 16, p. 558) the arm, and in a second instance (No. 155, p. 560) the forearm, was amputated at the time of the removal of the leg. This is the last cate-

gory of the five thousand four hundred and fifty-two amputations in the leg for shot injury performed during the American civil war.

RECAPITULATION.—In thirty-nine instances, with nineteen recoveries, nineteen deaths, and one unknown result, both legs were amputated. The five thousand four hundred and fifty-two (5452) operations were therefore performed on five thousand four hundred and thirteen (5413) soldiers, of whom three thousand nine hundred and seventy-four (3974) belonged to the Union and one thousand four hundred and thirty-nine (1439) to the Confederate armies. Of the operations on the Union soldiers the results were recorded in all but fifteen cases. Two thousand five hundred and seventy-nine (2579) recovered, and one thousand three hundred and eighty (1380), or 34.8 per cent., died. Of the Confederate soldiers the results in one hundred and twenty-two cases remain undetermined; nine hundred and sixty-three survived, and three hundred and fifty-four, or 26.8 per cent., perished. This favorable percentage of mortality among the Confederates, however, would probably be materially affected had it been practicable to ascertain the results in the one hundred and twenty-two undetermined cases. In fifteen of the five thousand four hundred and fifty-two cases of amputations in the leg, the opposite limb was amputated in one instance at the hip,[1] in seven in the thigh,[2] in two at the ankle joint, and in five through the foot; re-amputations in the leg for diseased stumps or hæmorrhage were performed in one hundred and forty-four cases. In six instances the amputation in the leg was followed by disarticulation at the knee, and in seventy-one by ablation in the thigh. The right leg was involved in two thousand three hundred and sixty-nine cases, the left in two thousand five hundred and forty-four, and in five hundred and thirty-nine the side was not recorded.

CONCLUDING OBSERVATIONS ON SHOT FRACTURES OF THE BONES OF THE LEG.—As already stated, the shot fractures of the bones of the leg number eight thousand nine hundred and eighty-eight (8,988). They form the most numerous group of shot fractures of the long bones of the extremities, comprising nearly one-third of the twenty-nine thousand and three (29,003) cases of this nature recorded during the American civil war, as follows: Shot fractures of the humerus (*Second Surgical Volume*, TABLE LV, p. 666) eight thousand two hundred and forty-five (8,245), or 28.4 per cent.; shot fractures of the radius and ulna (*Second Surgical Volume*, TABLE CXXIV, p. 922) five thousand one hundred and ninety-four (5,194), or 17.9 per cent.; shot fractures of the femur (TABLE XX, p. 175, *ante*) six thousand five hundred and seventy-six (6,576), or 22.6 per cent.; and shot fractures of the bones of the leg (TABLE LXI, p. 432, *ante*) eight thousand nine hundred and eighty-eight (8,988), or 31.0 per cent. It will be borne in mind that cases involving the articulations in the upper as well as in the lower extremities are not included in these tabular statements.

It has been shown in TABLE LXI, page 432, *ante*, that of eight thousand nine hundred and eighty-eight (8988) cases of shot fractures of the bones of the leg the bone injured was specified in five thousand and seventy-two (5072) instances; one thousand and thirty-three (1033) were fractures of the fibula, two thousand five hundred and eighty-eight (2588)

[1] Case of Private W. Waters, Co. K, 123d New York. CASE 286, page 135, and No. 24, TABLE XV, page 138, *ante*.

[2] Cases of: Pt. H. Brown, Co. K, 22d Colored Troops, secondary operation, lower third left thigh; recovered; TABLE XL, No. 15, page 320, *ante*.—Pt. C. L. Johnson, Co. B, 1st Tennessee, primary operation, lower third left thigh; fatal; TABLE XXXII, No. 1402, page 261, *ante*.—Pt. *J. R. Lewis*, Co. H, 53d Georgia, primary operation, lower third left thigh; fatal; TABLE XXXII, No. 1469, page 262, *ante*.—Pt. S. Banks, Co. C, 43d Colored Troops, primary operation, middle third right thigh; fatal; TABLE XXXI, No. 706, page 235, *ante*.—Pt. L. O. Lamphere, Co. G, 21st Connecticut, primary operation, lower third left thigh; fatal; TABLE XXXII, No. 1445, page 262, *ante*.—Sergeant J. Foss, Co. C, 59th N. Y., primary amputation thigh; fatal; TABLE XXXIII, No. 116, page 269, *ante*.—Cook H. Houseley, Co. F, 33d Wisconsin, intermediary operation, lower third right thigh; recovery; TABLE XXXVI, No. 91, page 294, *ante*.

of the tibia, and one thousand four hundred and fifty-one (1451) of both tibia and fibula. Of the one thousand and thirty-three fractures of the fibula, fifty, or 4.8 per cent., of the two thousand five hundred and eighty-eight cases of fracture of the tibia, four hundred and forty-two, or 17.0 per cent., and of the one thousand four hundred and fifty-one fractures of both bones, one thousand and forty-two, or 71.8 per cent., were amputated.

Three thousand nine hundred and thirty-eight (3938), or less than one half of the eight thousand nine hundred and eighty-eight (8988), shot fractures of the bones of the

TABLE LXXXIV.

Results of Shot Fractures of the Bones of the Leg treated by Conservation on the Occasions named and from the Authorities quoted.

OCCASIONS AND AUTHORITIES.	CASES.				FRACTURES.											
					Tibia.			Fibula.			Tibia and Fibula.			Bone not Specified.		
	Total.	Recoveries.	Fatal.	Result Undeterm'd.	Recoveries.	Fatal.	Result Undeterm'd.	Recoveries.	Fatal.	Result Undeterm'd.	Recoveries.	Fatal.	Result Undeterm'd.	Recoveries.	Fatal.	Result Undeterm'd.
Thirty Years' War, 1618–1648 (SCHMIDT[1])	7	5	2	....	....	....	....	....	....	....	....	....	....	5	2	....
Franco-German War, 1671–1678 (PURMANN[2])	5	5	....	....	3	....	....	....	....	....	1	....	....	1	....	....
Siege of Douay, 1710 (CANNAC[3])	1	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....
Battle of Molwitz, 1741 (SCHMUCKER[4])	3	3	....	....	2	....	....	....	....	....	1	....	....	....	....	....
Dettingen, Fontenoy, and Tournay, 1743, 1745, etc. (RAVATON,[5] BOUCHER,[6] BORDENAVE,[7] BAGIEU[8])	7	6	1	....	3	....	....	....	1	....	2	....	....	1	....	....
Seven Years' War, 1756–1763 (MÉHÉE,[9] BILGUER,[10] BOURIENNE[11])	33	33	....	....	4	....	....	....	....	....	21	....	....	8	....	....
Napoleonic Wars, 1791–1815 (LAURENT,[12] LARRY,[13] HUTIN,[14] GUTHRIE,[15] FENECH,[16] HENNEN[17])	13	10	3	....	2	1	....	2	....	....	5	2	....	1	....	....
Revolution in Paris, 1830 (ARNAL,[18] JOBERT DE LAMBALLE,[19] MÉNIÈRE,[20] LARREY[21])	54	26	11	17	6	....	2	5	....	8	4	1	7	11	10	....
French in Algeria, 1830–36 (BAUDENS,[22] BAGRÉ[23])	12	9	3	....	6	3	....	2	....	....	1	....	....	....	....	....
Spanish Peninsular War, 1836–1837 (ALCOCK[24])	47	28	19	....	....	....	....	....	....	....	....	....	....	28	19	....
Mexican War, 1845–48 (PORTER[25])	1	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....
Revolution in Milan, 1848 (RESTELLI[26])	8	6	2	....	1	1	....	4	....	....	1	1	....	....	....	....
Revolution in Paris, 1848 (MALGAIGNE,[27] GOSSELIN,[28] HUGUIER,[29] JOBERT,[30] BAUDENS[31])	49	27	20	2	2	....	....	1	2	....	2	4	....	22	14	2
Schleswig-Holstein War, 1848–50 (STROMEYER[32])	58	52	6	....	25	2	....	20	3	....	7	1	....	....	....	....
British in India, 1857–58 (WILLIAMSON[33])	19	18	1	....	12	1	....	4	....	....	2	....	....	....	....	....
Crimean War, 1854–57 (MATTHEW,[34] CHENU[35])	598	429	169	....	20	6	....	14	3	....	31	28	....	364	132	....
Italian War, 1859 (CHENU,[36] DEMME[37])	508	424	84	....	101	8	....	62	2	....	....	....	....	261	74	....
New Zealand War, 1863–65 (MOUAT[38])	3	3	....	....	....	....	....	....	....	....	....	....	....	3	....	....
Danish War, 1864 (LUECKE,[39] HEINE,[40] OCHWADT[41])	31	31	....	....	8	....	....	6	....	....	5	....	....	12	....	....
French in Mexico, 1864 (BINTOT[42])	1	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....
Austro-Prussian War, 1866 (BECK,[43] BIEFEL,[44] FISCHER (K.),[45] MAAS,[46] STROMEYER[47])	296	225	37	34	19	2	....	4	1	....	9	3	....	193	31	34
U. S. Army, 1865–1870 (OTIS[48])	7	7	....	....	5	....	....	1	....	....	1	....	....	....	....	....
Franco-German War, 1870–71 (GERMANS[49])	1,030	855	114	61	285	26	35	61	6	6	188	34	20	321	48	....
Franco-German War, 1870–71 (FRENCH[50])	186	125	59	2	9	4	1	4	3	....	6	2	....	106	50	1
Russo-Turkish War, 1876–77 (TILING[51])	12	9	3	....	6	1	....	3	2	....	....	....	....	....	....	....
Aggregates	2,989	2,339	534	116	521	55	38	194	23	14	287	76	27	1,337	380	37
	Mortality Rate 18.5 per ct.				614			231			390			1,754		

leg treated without operative interference give a mortality rate of 13.8 per cent. From the above table (TABLE LXXXIV), in which an attempt has been made to collect as far as

[1] SCHMIDT (JOSEPH) (*Speculum Chirurgicum oder Spiegel der Artzney*, Augspurg, 1656, pp. 155, *et seq.*) details seven cases of shot fractures of the bones of the leg treated conservatively; five recovered and two proved fatal: Steffan, shot fracture left leg, February 20, 1641; recovery. H. Bernet, dragoon, shot fracture left leg, May 6, 1648; pieces of bone removed; recovery. Lieut. Rossmann, fracture upper third left leg, May 21, 1648; recovery. Lieut. L. Kytzinger, aged 60, shot fracture upper third right leg, May 18, 1648; fatal. M. Zorn, shot fracture left leg; recovery. H. J. Buchrer, shot fracture tibia with great loss of soft parts; recovery. F. T. Marin, shot wound of right leg; fatal. [2] PURMANN (M. G.) (*Funfftzig Sonder-und Wunderbahre Schusswunden Curen*, Leipzig, 1721) details five successful cases of shot fractures of the bones of the leg: *Obs.* IV, p. 53, D. Griesing, wounded during Siege of Stettin, August, 1677; fracture of both bones of leg; recovery. *Obs.* XIII, p. 113, H. Rother, shot fracture tibia, Anckam, 1676; recovery. *Obs.* XIII, p. 115, C. Wutke, wounded at Stettin, in 1677; shot fracture left tibia; recovery. *Obs.* XXIX, p. 222, J. Fischer, shot fracture left leg and left

practicable the cases of shot fractures of the bones of the leg recorded by military surgeons of other campaigns, it will be seen that the mortality rate of these cases is 18.5 per cent., or 4.7 per cent. in excess of those of the American civil war. Examining the remote effects

arm at Stettin, in 1676; recovery. *Obs.* XXXIIX, p. 282, H. II——, shot fracture left fibula and right tibia, Anecklam, 1678; recovery. [3]CANNAC (*Sur une jambe écrasée par un obus, ou petite bombe,* in *Mém. de l'Acad. Roy. de Chir.*, 1753, T. II, p. 494) cites the case of an officer wounded at the siege of Douay, in 1710; shot fracture middle third of tibia, removal of spiculæ; recovery. [4]SCHMUCKER (J. L.) (*Chirurgische Wahrnehmungen*, Berlin und Stettin, 1774, B. II, pp. 503, *et seq.*) records three cases of recovery after shot fractures of the bones of the leg: Cadet von Sasse, fracture lower third of tibia, Molwitz, April 10, 1741; spiculæ removed; recovery, with curvature of leg—upper part of fibula movable while walking. Captain Graf le Mede, fracture of tibia, Leuthen, December 5, 1757; recovery, with curvature. Major von Ruitz, fracture of both legs, one in middle and the other in the lower third, Schweidnitz, May 16, 1762; splinters removed; recovery. [5]RAVATON (*Chirurgie d'armée ou traité des plaies d'armes à feu*, Paris, 1768) records three cases: *Obs.* XCII, p. 369, Corp'l La Joie, Regiment Condé, fracture of middle third of left tibia and fibula, July 29, 1743; long incisions, removal of splinters; recovery. *Obs.* XCVI, p. 376, Grenadier A. Riant, fracture of middle third tibia, Nov. 20, 1759; recovery. *Obs.* CI, p. 387, F. D'Amour, shot fracture upper third left tibia, Warbourg, August 7, 1760; removal of splinters; recovery, with shortening. [6]BOUCHER (*Sur des playes d'armes à feu compliquées sur-tout de fracas des os*, in *Mém. de l'Acad. Roy. de Chir.*, Paris, 1753, T. II) records, at p. 463, the case of an English voluuteer, wounded at Fontenoy, April 30, 1745; shot fractures of head of humerus and middle third of leg; amputation at shoulder joint; recovery; and at p. 474, the case of a soldier of the regiment de la Couronne, wounded at Tournay, in 1745; fracture of middle third of fibula; fatal. [7]BORDENAVE (*Précis de plusieurs observations sur les playes d'armes à feu en différentes parties*, in *Mém. de l'Acad. Roy. de Chir.*, 1753, T. II, p. 528) cites a case observed by M. TURSAN of shot fracture of upper third of tibia; the patient recovered. [8]BAGIEU (*Examen de plusieurs parties de la Chirurgie*, Paris, 1756, p. 132): Engineer, shot fracture middle third right leg; recovery. [9]MÉHÉE (J.) (*Traité des plaies d'armes à feu*, Paris, an VIII, pp. 133, 143) records three cases of recovery following shot fractures of the bones of the leg treated conservatively: Cavalier of the regiment Saint-Jal, shot fracture of both bones of right leg, middle third, Rosbach, November 5, 1757; recovered. A soldier of the regiment of Cuirassiers of Gessler, shot fracture of bones of leg; recovery. M. de Alvensleben, Ensign of the Guards, received a shot fracture of the bones of the leg at Torgau, in 1760; recovery. [10]BILGUER (J. U.) (*Chirurgische Wahrnehmungen, etc.*, Berlin, 1763, Abth. IV, pp. 460, *et seq.*, *Obs.* 30, 31, 34, 37, 42, 44, 45, 49, 50, 55, 56, 58, 59, 61, 62, 65, 66, 67, 68, 72, 73, 75, 81, 84, 85, 90, 93, 96, 110): 29 cases of recoveries occurring during the Seven Years' War, 1756–63; in 4 of the cases the tibia was fractured, in 17 both tibia and fibula, and in 8 cases the location of the fracture was not indicated. [11]BOURIENNE (*Obs. sur les grands fracas d'os à la suite des plaies d'armes à feu*, in DEHORNE'S *Journal de Méd. Mil.*, Paris, 1782, T. I, p. 214): Soldier, wounded July 10, 1760; shot fracture of tibia and fibula in upper third; recovery in six weeks. [12]LAURENT (*Mémoire clinique sur le tétanos chez les blessés*, Strasbourg, an V [1796], p. 61): Lefranc, Sergeant of Grenadiers, shot comminution of leg, 1791(?), tetanus 13 days after injury; recovery. [13]LARREY (D. J.) (*Mémoires de Chirurgie Militaire et Campagnes*, Paris, 1812, T. II, p. 261): General Baudot, shot fracture of bones of leg, Aboukir, March 8, 1801; gangrene; death. [14]HUTIN (F.) (*Mémoire sur la nécessité d'extraire les corps étrangers et les esquilles, dans le traitement des plaies par armes à feu*, in *Mém. de l'Acad. Nat. de Méd.*, Paris, 1852, T. XVI, p. 446): *Obs.* 14, 15, 21, 24, 25, 28, relates six cases of recovery after shot fractures of the bones of the leg during the years 1793 to 1813. In one case (*Obs.* 15) fragments of bone continued to be discharged for 33 years. In one the tibia, in one the fibula, and in four both bones were fractured. [15]GUTHRIE (G. J.) (*A Treatise on Gunshot Wounds*, London, 1827, 3d ed., p. 398): Soldier, wounded at the battle of Rolica, Portugal, August 17, 1808; both bones shattered in two places: recovery [16]FENECH (E.) (*Observations recueillies à l'armée d'Espagne sur les plaies d'armes à feu aux extrémités*, Paris, 1813, Thèse No. 22, *Obs.* VII, p. 10, and *Obs.* XIX, p. 16): Soldier, 31st Infantry, shot fracture of right tibia, before Almeida, May 5, 1811; simple fracture of fibula; fatal. Roques, Lieutenant, 70th regiment, shot in left leg, August 21, 1808, in Portugal; both bones were fractured in the lower third; fatal. [17]HENNEN (J.) (*Principles of Military Surgery*, London, 1829, 3d ed., pp. 131, 190): French soldier, wounded in 1814; left tibia fractured, fragment extracted; recovery. Lieut.-Col. H——, musket ball partially fractured fibula, Bergen-op-Zoom, March 8, 1814; recovered; limb completely varicosed. [18]ARNAL (*Mémoire sur quelques particularités des plaies par armes à feu*, in *Jour. univ. et hebd. de méd. et de chir.*, Paris, 1831, T. III, p. 35) records 17 cases of shot fractures of the bones of the leg treated conservatively; in 8 cases the fibula, in 2 the tibia, and in 7 both bones were fractured; no results are given. [19]JOBERT (DE LAMBALLE) (*Plaies d'armes à feu*, Paris, 1833, pp. 285, *et seq.*) cites 18 cases, with 1 fatal result; in 5 the fibula was interested, in 6 the tibia, in 5 (1 fatal) both bones, and in 2 cases the bone injured was not specified. [20]MÉNIÈRE (P.) (*L'Hotel-Dieu de Paris en Juillet et Août* 1830, Paris, 1830, p. 312); 17 cases (7 recoveries, 10 fatal). [21]LARREY (H.) (*Relation Chirurgicale des événemens du Juillet* 1830, Paris, 1831, p. 119); 2 cases; recoveries. [22]BAUDENS (L.) (*Clinique des plaies d'armes à feu*, Paris, 1836, pp. 483, *et seq.*); 10 cases; 8 of the tibia (5 recoveries, 3 fatal); 2 of the fibula (recoveries). [23]BAGRÉ (*Obs. de Chir., recueillies a l'hôpital Turc, a Alger;* in *Rec. de Mém. de Méd. de Chir. et de Phar. Mil.*, Paris, 1831, T. XXXI, pp. 156, 157, 159): Fracture of tibia 1 (recovery), of tibia and fibula 1 (recovery). [24]ALCOCK (R.) (*Notes on the Med. Hist. and Stat. of the British Legion of Spain*, London, 1838, p. 53); 47 cases (28 recoveries, 19 fatal). [25]PORTER (J. B.) (*Medical and Surgical Notes of Campaignes in the War with Mexico during the years* 1845–46–47–48, in *Am. Jour. Med. Sci.*, 1852, Vol. XXIII, N. S., p. 32); 1 case of fracture of tibia; recovery. [26]RESTELLI (A.) (*Note et Osservazioni eliniche di chirurgia militare*, in *Annali Universali di Medicina*, 1849, Vol. CXXX, p. 265); 8 cases; fractures of both bones in 2 (1 recovery, 1 fatal), of fibula in 4 (all recovered), of the tibia in 2 (1 recovery, 1 fatal). [27]*Des plaies d'armes à feu; Communications faites a l'Académie Nationale de Médecine*, Paris, 1849, par MM. MALGAIGNE, p. 45, 11 cases (5 recoveries, 6 deaths); [28]GOSSELIN, *ibid.*, p. 46, 3 cases (1 undetermined, 2 fatal); [29]HUGUIER, *ibid.*, p. 131, 9 cases (7 recoveries, 2 fatal); [30]JOBERT (DE LAMBALLE), *ibid.*, p. 154, 16 cases (6 recoveries, 10 fatal); [31]BAUDENS, *ibid.*, p. 232, *et seq.*, 10 cases (9 recoveries, 1 undetermined). [32]STROMEYER (L.) (*Maximen der Kriegsheilkunst*, Hannover, 1855, p. 756), 58 cases: Fractures of both bones in 8 cases (7 recoveries, 1 fatal), of tibia in 27 cases (25 recoveries, 2 fatal), of fibula in 23 cases (20 recoveries, 3 fatal). [33]WILLIAMSON (G.) (*Military Surgery*, London, 1863, p. XXVI), 19 cases: Fractures of both bones in 2 cases (recoveries), of the tibia in 13 cases (12 recoveries, 1 fatal), of the fibula in 4 cases (recoveries). [34]MATTHEW (T. P.) (*Med. and Surg. History of the British Army, etc.*, London, 1858, Vol. II, pp. 355, *et seq.*), 102 cases: Fractures of both bones in 59 cases (31 recoveries, 28 fatal), of tibia in 26 cases (20 recoveries, 6 fatal), of fibula in 17 cases (14 recoveries, 3 fatal). [35]CHENU (J. C.) (*Rapport Médico-Chirurgical sur la Campagne d'Orient*, Paris, 1865, p. 417); 496 cases (364 recoveries, 132 fatal). [36]CHENU (J. C.) (*Stat. Méd.-Chir. de la Campagne d'Italie en* 1859 *et* 1860, Paris, 1869, T. II, p. 781), 410 cases: Fractures of tibia, 109 (101 recoveries, 8 fatal); of fibula, 64 (62 recoveries, 2 fatal); bone not specified, 237 (184 recoveries, 53 fatal). [37]DEMME (H.) (*Militär-Chirurgische Studien*, Würzburg, 1861, Zweite Abth., p. 278); 98 cases (77 recoveries, 21 fatal). [38]MOUAT (*The New Zealand War of* 1863–64–65, in *Stat. San. and Med. Reports*, Vol. VII for the year 1865, London, 1867, p. 503); 3 recoveries. [39]LUECKE (A.) (*Kriegschirurgische Aphorismen aus dem zweiten Schleswig-holsteinischen Kriege im Jahre* 1864, in *Archiv für Klin. Chir.*, Berlin, 1866, B. VII, pp. 50, *et seq.*); 5 recoveries: Tibia and fibula fractured in 1 case, tibia in 3, fibula in 1. [40]HEINE (C.) (*Die Schusverletzungen der unteren Extremitäten*, Berlin, 1866, p. 294, *et seq.*); 14 recoveries: Fracture of both bones in 4, of the tibia in 5, of the fibula in 5. [41]OCHWADT (A.) (*Kriegschirurgische Erfahrungen*, Berlin, 1865, p. 314); 12 recoveries. [42]BINTOT (*Observations de blessures de guerre*, in *Rec. de Mém. de Méd. de Chir. de Phar. Mil.*, Paris, 1866, T. XVI, III sér., p. 240); 1 fracture of fibula; recovery. [43]BECK (B.) (*Kriegschirurgische Erfahrungen während des Feldzuges* 1866, Freiburg 1. Br. 1867, pp. 308, *et seq.*); 4 cases: Fracture of both bones 1 recovery, of tibia 2 recoveries, 1 fatal. [44]BIEFEL (R.) (*Im Reserve-Lazareth*, in *Archiv für Klin. Chir.*, Berlin, 1869, pp. 461, *et seq.*); 25 cases: Fractures of both bones in 11 (8 recoveries, 3 fatal), of tibia in 14 (13 recoveries, 1 fatal). [45]FISCHER (K.) (*Militairärztliche Skizzen aus Süddeutschland und Böhmen*, Aarau, 1867, p. 96); 170 cases (122 recoveries, 14 fatal, 34 unknown results). [46]MAAS (H.) (*Kriegschirurgische Beiträge aus dem Jahre* 1866, Breslau, 1870, pp. 54, *et seq.*); 23 cases: Fractures not specified, 14 cases (11 recoveries, 3 fatal); of tibia, 4 recoveries; of fibula, 5 cases (4 recoveries, 1 fatal). [47]STROMEYER (L.) (*Erfahrungen über Schusswunden im Jahre* 1866, Hannover, 1867, p. 59); 74 cases (60 recoveries, 14 fatal). [48]OTIS (G. A.) (*Circular No.* 3, War Department, S. G. O., 1871, pp. 80–82); 7 recoveries: Fractures of tibia and fibula, 1 case; of tibia, 5 cases; of fibula, 1 case. [49]BECK (B.) (*Chirurgie der Schussverletzungen*, Freiburg, i. Br. 1872, p. 717); 102 cases (85 recoveries, 17 deaths). BILLROTH (T.) (*Chirurgische Briefe aus den Kriegs-Lazarethen* in *Weissenburg und Mannheim* 1870, Berlin, 1872, pp. 234, *et seq.*); 12 cases: Fractures of both bones in 8 cases (7 recoveries, 1 fatal), of the tibia in 4 cases (3 recoveries, 1

of the cases treated conservatively, it must be admitted, with Guthrie,[1] that the results ought to have been more successful. The reports of the Pension Examiners regarding the conditions of the preserved limb, even at the present time (1881), are replete with accounts of extensive caries and necrosis with continued discharge, enlargement of the limb, irritable ulcers, overlapping with projection of fractured ends, outward or inward curvature, anchylosis of the knee or ankle or of both, contraction of the toes, outward turning of the foot giving the ankle the appearance of being dislocated, extensive and adherent cicatrices, atrophy and weakness, and inability to sustain the weight of the body.[2] Pseudarthrosis was noted only in seven of the three thousand two hundred and ninety-six survivors of shot fractures of the bones of the leg treated without operative interference.

The difficulties in prescribing rules for the proper mode of treating shot fractures of the bones of the leg seem to have been recognized by writers on military surgery, some advocating immediate operation with many restrictions in favor of conservative treatment; others inclining to conservatism, but citing many exceptions in which they consider imme-

fatal). CZERNY (V.) (*Bericht über die im College Stanislaus in Weissenburg behandelten Verwundeten*, in *Wiener Med. Wochenschrift*, 1870, p. 1357); 3 cases: Fractures of both bones, 1 recovery; of tibia, 1 recovery; 1 result unknown. FISCHER (G.) (*Dorf Floing und Schloss Versailles*, in *Deutsche Zeitschrift für Chirurgie*, Leipzig, 1872, B. I, p. 250); 61 cases: Fractures of both bones in 42 cases (28 recoveries, 14 deaths), of tibia in 10 cases (9 recoveries, 1 death), of fibula in 2 cases (recoveries); in 7 cases with unknown results the bone fractured was not specified. FISCHER (H.) (*Kriegschirurgische Erfahrungen*, Erlangen, 1872, p. 198); 33 cases (28 recoveries, 5 fatal). GOLTDAMMER (*Bericht über die Thätigkeit des Reserve-Lazaretts des Berliner Hilfsvereins in der Garde-Ulanen-Kaserne zu Moabit*, in *Berliner Klin. Wochenschrift*, 1871, VIII Jahrg., p. 151); 14 cases (recoveries). GRAF (E.) (*Die Königlichen Reserve-Lazarethe zu Düsseldorf während des Krieges* 1870–71, Elberfeld, 1872, p. 71); 20 cases (15 recoveries, 5 fatal). GUTEKUNST (*Bericht über die während des vorigen Jahrs in den Vereinsspital Ludwigsburg (Kinderheilanstalt) aufgenommenen Schussverletzungen und ihre Behandlung*, in *Zeitschrift für Wundärzte und Geburtshelfer*, Stuttgart, 1871, p. 145); 1 fracture of tibia; recovery. KIRCHNER (C.) (*Aerztlicher Bericht über das Königlich Preussische Feld-Lazareth*, u. s. w., Erlangen, 1872, pp. 67, 68); 82 cases (71 recoveries, 8 fatal). KOCH (W.) (*Notizen über Schussverletzungen, nach eigenen im Feldzuge* 1870–71 *gemachten Erfahrungen*, in *Archiv für Klin. Chir.*, Berlin, 1872, p. 526); 20 cases (19 recoveries, 1 fatal). KUECHLER (H.) (*Analecten aus der Kriegsgeschichte*, in *Memorabilien*, Heilbronn, 1871, Jahrg. XVI, p. 164); 1 fracture of tibia; recovery. LOSSEN (H.) (*Kriegschirurgische Erfahrungen aus den Barackenlazarethen zu Mannheim, Heidelberg und Karlsruhe* 1870 *und* 1871, in *Deutsche Zeitschrift für Chirurgie*, Leipzig, 1873, B. II, pp. 138, *et seq.*); 14 cases (recoveries): 6 fractures of fibula, 8 bone not specified. MAYER (L.) (*Kriegschirurgische Mittheilungen aus den Jahren* 1870–71, in *Deutsche Zeitschrift für Chirurgie*, Leipzig, 1873, B. III, pp. 50, 52); 9 cases: Fractures of both bones in 5 cases (recoveries), of the tibia in 2 cases (1 recovery, 1 fatal), of the fibula in 2 cases (1 recovery, 1 fatal). MOSETIG (*Erinnerungen aus dem deutsch-französischen Kriege*, in *Der Militaerarzt*, with *Wiener Med. Wochenschrift*, 1872, pp. 11, 22); 8 cases (7 recoveries, 1 fatal). OTT (E.), OESTERLEN und ROMBERG (*Kriegschirurgische Mittheilungen aus dem Ludwigsburger Reserve-Spital*, Stuttgart, 1871, pp. 45, 47); 10 cases (9 recoveries, 1 fatal). RUPPRECHT (L.) (*Militärärztliche Erfahrungen*, u. s. w., Würzburg, 1871, p. 10); 13 cases: Fractures of both bones in 9 cases (6 recoveries, 3 fatal), of tibia in 2 (1 recovery, 1 fatal), of fibula in 2 (1 recovery, 1 fatal). SALZMANN (*Mittheilungen aus dem Vereinsspital in Esslingen*, in *Med. Correspondenz-Blatt des Württembergischen ärztlichen Vereins*, 1871, B. XLI, p. 161); 6 recoveries: Fractures of both bones in 3 cases, of tibia in 1, of fibula in 2. SCHINZINGER (A.) (*Das Reserve-Lazareth Schwetzingen im Kriege* 1870 *und* 1871, Freiburg, i. Br., 1873, pp. 81, *et seq.*); 46 cases (41 recoveries, 5 fatal). SCHÜLLER (M.) (*Kriegschirurgische Skizzen aus dem deutsch-französischen Kriege* 1870–71, p. 16); 1 recovery. SEEGER (W.) (*Die Leistungen der Vereinsspitäler Kleinkinderschule und Diakonenhaus in Ludwigsburg im Jahr* 1870–71, in *Zeit. für Wundärzte und Geburtshelfer*, Stuttgart, 1870, B. XXIV, pp. 113, *et seq.*); 3 cases: Fracture of both bones (1 recovery), of tibia (1 recovery, 1 fatal). SOCIN (A.) (*Kriegschirurgische Erfahrungen*, Leipzig, 1872, pp. 140, *et seq.*); 33 cases: Fractures of both bones in 9 (recoveries), of tibia in 14 (11 recoveries, 3 fatal), of fibula in 10 (8 recoveries, 2 fatal). STEINBERG (*Die Kriegslazarethe und Baracken von Berlin*, Berlin, 1872, p. 147); 520 cases: Fractures of both bones in 164 (128 recoveries, 16 fatal, 20 unknown results), of tibia in 307 (255 recoveries, 18 fatal, 34 unknown results), of fibula in 49 (41 recoveries, 2 fatal, 6 undetermined results). STOLL (*Bericht aus dem Königlich Württembergischen* 4 *Feldspital von* 1870–71, in *Deutsche Militairärztliche Zeitschrift*, 1874, 3. Jahrg. p. 208); 13 cases (9 recoveries, 4 fatal). STUMPF (L.) (*Bericht über das Kriegs-Spital des St. Georg-Ritter-Ordens zu Neuberghausen im Jahre* 1870–71, in *Aerztliches Intelligenz-Blatt*, München, 1872, No. 50, p. 657); 5 cases (4 recoveries, 1 fatal). [50] CHIPAULT (A.) (*Fractures par armes à feu*, Paris, 1872, pp. 7, *et seq.*); 17 cases: Fractures of both bones in 5 cases (3 recoveries, 2 fatal), of tibia in 5 cases (recoveries), of fibula in 5 cases (4 recoveries, 1 fatal), bone not specified in 2 cases (recoveries). CHRISTIAN (J.) (*Relation sur les plaies de guerre observées à l'ambulance de Bischwiller*, 1870–71, in *Gaz. Méd. de Strasbourg*, 1872, No. 24, p. 281); 39 cases (33 recoveries, 6 fatal). COUSIN (A.) (*Histoire chirurgicale de l'ambulance de l'école des ponts et chaussées*, in *L'Union Médicale*, 1872, T. XIII, p. 114); 11 cases (3 recoveries, 8 fatal). DESPRES (A.) (*Rapport sur les travaux de la* 7*e ambulance a l'armée du Rhin, etc.*, Paris, 1871, pp. 46, *et seq.*); 46 cases (38 recoveries, 17 fatal, 1 unknown result). FELTZ ET GROLLEMUND (*Relation clinique sur les ambulances de Haguenau*, in *Gaz. Méd. de Strasbourg*, 1871, p. 202); 5 cases: Fractures of both bones in 2 (recoveries), of tibia in 3 (1 recovery, 1 fatal, 1 result unknown). HEYFELDER (O.) (*Bericht über meine Wirksamkeit am Rhein und in Frankreich während des deutsch-französischen Krieges*, in *St. Petersburger Medicinische Zeitschrift*, 1871, B. II, N. S., p. 59); 1 fracture of tibia; recovery. JOESSEL (*Ambulances de Haguenau*, in *Gaz. M d. de Strasbourg*, 1871, No. 2, p. 21); 10 cases (9 recoveries, 1 fatal). MACCORMAC (W.) (*Notes and Recollections of an Ambulance Surgeon*, London, 1871, p. 118); 43 cases (29 recoveries, 14 fatal). PANAS (F.) (*Mémoire sur le traitement des blessures de guerre par la méthode antiphlogistique*, in *Gaz. Hebd. de Méd. et de Chir.*, 1872, T. IX, p. 390); 3 cases (1 recovery, 2 fatal). PONCET (F.) (*Contribution à la Relation médicale de la guerre de* 1870–71, in *Montpellier Médical*, 1872, T. XXVIII, p. 41); 3 cases (1 recovery, 2 fatal). VASLIN (L.) *Étude sur les plaies par armes à feu*, Paris, 1872, pp. 136, *et seq.*); 8 cases: Fractures of both bones in 1 (recovery), of tibia in 5 (2 recoveries, 3 fatal), of fibula in 2 (fatal). [51] TILING (G.) (*Bericht über* 124 *im Serbisch-türkischen Kriege im Baracken-Lazareth des Dorpater Sanitäts-Trains zu Swilainatz behandelte Schussverletzungen*, Dorpat, 1877, pp. 63, *et seq.*); 12 cases (9 recoveries, 3 fatal).

[1] GUTHRIE (G. J.) (*Commentaries on the Surgery of the War, etc.*, London, 1855, p. 647): "The treatment of gun-shot fractures of the leg ought to have been more successful than it has been, even when both bones were broken; the want of success may be in part attributed to the remissness which has taken place in supplying the necessary, nay, the essential appliances, by means of which much suffering might have been alleviated, perhaps prevented, even if cures could not have been effected."

[2] BERTHOLD (*Statistik der durch den Feldzug* 1870–71, *invalide gewordenen Mannschaften des* 10 *Armee-Corps*, in *Deutsche Militairärztliche Zeitschrift*, 1872, Jahrg. 1, p. 505) notices the frequency of anchylosis of the knee or ankle joints in fractures of the upper and lower thirds of the tibia, and on page 569 remarks, of the cures of fractures in both bones, that "the results were, in general very unfavorable, and a higher average of disability shows itself than in fractures of the femur."

diate amputation indispensable. Thomson, after the battle of Waterloo in 1815, gives four classes[1] of injuries of the leg in which he considers amputation proper; but adds that "it may be doubted whether the practice of immediate amputation would be proper or necessary in all these cases, could the wounded be conveyed directly into convenient hospitals." Jobert de Lamballe declares conservative treatment and excision alike ineffective in oblique fractures of both bones of the leg in the lower third.[2] Beck, after the European revolutions in 1848,[3] and Schwartz after the Schleswig-Holstein War, 1848–50,[4] advised conservative measures in transverse or slightly oblique fractures of the tibia only, but counselled the removal of the limb in fractures of both bones; but after his experience in the Franco-German War, 1870–71, Generalarzt Beck greatly restricted the number of cases in which he considered amputation justifiable.[5] The conservative views of Guthrie regarding shot fractures of the leg have already been adverted to on page 460, *ante*. Demme[6] asserts that Guthrie has "too far extended the limits of conservative treatment." Stromeyer,[7] Sédillot,[8] Legouest,[9] and Hamilton[10] agree that in extensive comminution of the tibia, or of both bones of the leg, especially near the knee or ankle joints, it is prudent to amputate. Gross[11] declares that in shot fractures of both bones, "unless the patient is peculiarly fortu-

[1] THOMSON (J.) (*Report of Observations in the British Military Hospitals in Belgium, after the Battle of Waterloo*, Edinburgh, 1816, p. 240): "1st, In cases in which both bones of the leg have been broken; 2d, in cases in which the bullets have passed through the ends of the tibia and have fractured this bone near to the knee or ankle joints; 3d, in cases in which a bullet is lodged deep in the tibia; and 4thly, in fractures of the tibia, with wounds of the arteries in the leg."

[2] JOBERT (DE LAMBALLE) (*Plaies d'armes à feu*, Paris, 1833, p. 288): "Toutes les fois qu'une fracture oblique a eu lieu, vers la région inférieure du membre, chez un homme dont les forces musculaires sont, puissantes, malgré l'appareil le plus convenable, malgré la demi-flexion, malgré la résection des deux extrémités de l'os, pratiquée dans le but de ne pas laisser les parties molles irritées par leurs aspérites, toujours, ou presque toujours, la mort est survenue après une série de symptômes formidables, d'inflammation, de suppuration, d'érysipèle et de gangrène, et dans quelques chances que l'on a appelées heureuses, les malades ne se sont sauvés qu 'après avoir été cent fois au bord de la tombe, et en conservant un membre déformé."

[3] BECK (B.) (*Die Schusswunden*, Heidelberg, 1850, p. 263): "Is the tibia fractured, and is there only a transverse or slightly oblique fracture, the injury is to be treated as a simple one; but when there is great splintering, or when the fracture is considerable, or the bone injured in several parts, or when the soft parts are much implicated, amputation must be performed; when both bones are fractured the wound generally is a serious one, the fracture is more comminuted, and the limb must be removed; simple fractures only give promise of complete recovery of the extremity."

[4] SCHWARTZ (H.) (*Beiträge zur Lehre von den Schusswunden*, Schleswig, 1854, p. 184): "Extensive comminuted fractures in the upper or lower thirds of the tibia always require primary amputation. . . Is the fracture in the middle third, as a rule primary amputation is also to be performed; very favorable circumstances only, as good constitution of the patient, easy transportation, excellent hospital accommodations, large and free wounds of the soft parts, defined limits of comminution, etc., can justify the attempt at conservation;" and on p. 186: "Fractures of both bones, with extensive comminution of both bones or of the tibia alone, require primary amputation. . . Isolated cases of this class, it is true, have been treated; yet such attempts will only succeed in a few instances, and will, in the majority of cases, result in death, and even in cases of recovery, imperfectly useful limbs will be obtained."

[5] BECK (B.) (*Chirurgie der Schussverletzungen*, Freiburg i. Br., 1872, p. 718): "Since the location of the bones, particularly the tibia, is a very superficial one, since all changes can easily be recognized and operated for, since phlegmon and abscesses are accessible to observation and to the knife from the first moment, and since no particular obstacles are to be met with in the extraction of splinters and dead pieces of bone.—there is a large and fruitful field opened to the expectant conservative treatment of shot fractures of this limb."

[6] DEMME (H.) (*Militär-Chirurgische Studien*, Würzburg, 1861, Abth. II, p. 275): "GUTHRIE has too far extended the limits of conservative treatment. The experiences of the last wars have only too frequently led to the conviction that by sacrificing the limb at the proper time, life may be saved. Here also holds good the general rule according to which especially the comminutions and the extensive lacerations of the soft parts indicate primary amputation. The laceration of the principal blood vessels of the leg come next."

[7] STROMEYER (L.) (*Maximen der Kriegsheilkunst*, Hannover, 1855, p. 287): "8. Tibia and fibula are fractured by a ball, with extensive splintering. Under favorable circumstances the leg may here be preserved. For example, if only one of the bones was struck by the ball and the other was broken by the weight of the body in falling, or when the fissuring is limited. 9. The tibia alone is splintered to a large extent. Here also the preservation of the leg is possible, but not probable;" and at p. 742: "Shot injuries of the fibula alone, however extensive, never indicate amputation, providing the tibio-tarsal joint is not implicated. . . Extensive comminutions of the tibia alone, and of the tibia and fibula together, do not *per se* necessitate amputation, as they do not destroy the vitality of the limb. Experience, however, teaches that in the attempt to save the limb, very readily the life of the patient is lost, especially through pyæmia, and that in cases in which the limb was preserved it was of less use than a wooden leg."

[8] SÉDILLOT (*Du traitement des fractures des membres par armes de guerre*, in *Archiv Gén. de Méd.*, Paris, 1871, T. XVII, VI^e sér., p. 451): "L'amputation immédiate paraît, indiquée lorsque les deux os sont brises près du genou en fragments volumineaux, avec ou sans complication d'hémorrhagie et de paralysie, circonstances qui ajoutent encore à la nécessité de l'operation. . . Les fractures complètes des deux os de la jambe au tiers moyen et au tiers inférieur guérissent sans doute, mais se consolident difficilement et après beaucoup d'accidents. Il semble donc prudent quand les éclats osseux sont considerables, les pertes de substance étendues, les parties molles violemment déchirées e contuses, de se decider à l'amputation, soit au tiers supérieur soit jusque dans les condyles du tibia, opération moins sûre, pensons-nous, qu'au lieu d'élection, mais infiniment préférable au sacrificé de la cuisse."

[9] LEGOUEST (L.) (*Traité de Chirurgie d'Armée*, Paris, 1872, 2d ed., p. 531): "Les amputations sont très-souvent indiquées dans les blessures de la jambe: elles sont indispensables lorsque les deux os de la jambe sont fracturés dans une grande étendue; lorsque le tibia seul est fracturé avec éclats volumineux ex perte de substance osseuse considérable."

[10] HAMILTON (F. H.) (*A Practical Treatise on Fractures and Dislocations*, Philadelphia, 5th ed., 1875, p. 512): "Gunshot fractures of the shafts of both tibia and fibula demand amputation where the comminution is extensive, or the pulsation of the posterior tibial artery is lost, or the foot is cold and insensible. We do not mean to say that some limbs thus situated have not been saved, but only that the attempt to save such limbs greatly endangers the life of the patient, while amputation at or below the knee is relatively safe."

[11] GROSS (S. D.) (*A System of Surgery*, Philadelphia, 1872, 5th ed., Vol. II, p. 1012): "Gunshot fractures of both bones of the leg are also, generally speaking, bad accidents; great swelling followed by diffuse abscess, usually rapidly sets in and unless the patient is peculiarly fortunate he will

nate he will be very apt to sink under the effects of erysipelas, pyæmia, osteomyelitis, or hectic irritation;" while Heine[1] and Ochwadt[2] contend that by proper conservative treatment happy results may be achieved in many of these cases.

In conservative treatment of cases of shot fracture of one or of both bones of the leg all loose spiculæ were removed, the fractured ends coaptated, and the leg placed in an easy position or secured in a fracture box or in splints. Among the latter, many of the appliances referred to on pp. 343–349, *ante*, as used in fractures of the femur, were also employed in fractures of the leg; but Smith's anterior splint and Hodgen's cradle splint seem to have been largely preferred to all others. Of the fracture boxes, that of Petit[3] (Fig. 326), so highly recommended by the practical Heister,[4] and later by Stromeyer[5] and Esmarch,[6] was extensively used. In the register of the Nineteenth Army Corps Depot Field Hospital at Winchester, under the charge of Surgeon L. P. Wagner, 114th New York Volunteers, is found a drawing of a fracture box used at that hospital, a copy of which is shown in the annexed wood-cut (Fig. 327). The bottom of the box was filled with earth, and the heel was kept somewhat raised by strips of adhesive plaster (*a a*) fastened around the foot and over the foot board, as indicated in the drawing. Extension and counter-extension were rarely applied. Generally shot fractures of the tibia or of both bones healed very slowly. Of the nineteen examples cited on pp. 433 to 444, the wounds did not close in two until fifteen, and in one until twelve, years after the injury. In a fourth case (Case 690, p. 439, *ante*) a large sequestrum was removed eight months after the injury; the wound closed but broke out again, and the discharge of pus continued for eleven years, and when the wound finally closed the patient's health declined rapidly and he died in about six months. It should be added that in two of these four cases (Cases 680 of Colonel W. F. Lynch and 692 of Major A. J. Bolar) the missile or a portion thereof had never been removed from the leg. The remaining fifteen patients recovered—one in one month, three in three months, one in five months, one in six, one in eight, two in ten, three in twelve, one in eighteen, and two in twenty-four months, or at an average, in about ten months.[7]

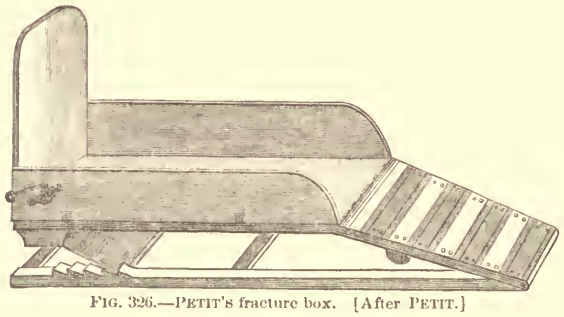

Fig. 326.—Petit's fracture box. [After Petit.]

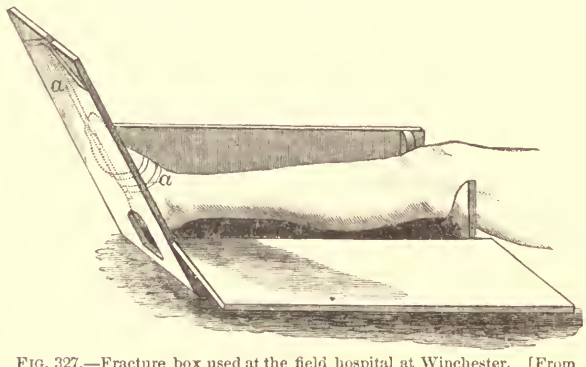

Fig. 327.—Fracture box used at the field hospital at Winchester. [From a pen-sketch.]

be very apt to sink under the effects of erysipelas, pyæmia, osteomyelitis, or hectic irritation, not to say anything of the danger of mortification, which is often very great, especially when the bones are comminuted at the same time that severe injury has been sustained by the soft parts. Gunshot fracture of the fibula alone is usually much less serious than similar injury of the tibia."

[1] Heine (C.), *Die Schussverletzungen der unteren Extremitäten*, Berlin, 1866, p. 300.

[2] Ochwadt (A.), *Kriegschirurgische Erfahrungen*, Berlin, 1865, p. 312.

[3] Petit (Jean Louis), *Traité des malodies des os*, Paris, 1736, T. II, p. 279. The box is figured on p. 285.

[4] Heister (D. L.) *Institutiones Chirurgicæ in quibus quicquid ad rem chirurgicam pertinet, etc.*, Amstelædami, 1739, T. I, p. 215, and Table IX.

[5] Stromeyer (L.) *Erfahrungen über Schusswunden im Jahre* 1866, Hannover, 1867, p. 50.

[6] Esmarch (Friedrich), *Handbuch der Kriegschirurgischen Technik*, Hannover, 1877, p. 88.

[7] Surgeon-Major Gaujot, in his report from the hospitals at Montechiaro (J.-C. Chenu, *Stat. Méd.-Chir. de la Camp. d'Italie en* 1859 *et* 1860, Paris, 1869, T. II, p. 778), states that according to his experience comminuted fractures of the leg heal slower than those of the thigh: "Il est à remarquer que, lors de notre départ, les fractures de la jambe étaient beaucoup moins avancées vers la guérison que celles de la cuisse. Dans aucun cas 'il n'y avait encore trace de formation du cal, mais, au contraire, une suppuration abondante, des fusées purulentes provoquées par des esquilles nombreuses, s' éliminant difficilement. Nous n'osons avancer que les désordres occasionnés dans les cas de fracture comminutive de la jambe par coup de feu, sont plus

Of the three thousand nine hundred and thirty-eight (3938) patients with fracture of the bones of the leg treated without operative interference, three thousand four hundred and eighty-four (3484) were Union and four hundred and fifty-four (454) Confederate soldiers. Of the former, two thousand nine hundred and fifty-six (2956) recovered, four hundred and forty-six (446) died, and eighty-two (82) results were not ascertained, a fatality of 13.1 per cent. Of the latter, three hundred and forty (340) recovered, eighty-two (82) died, and in thirty-two (32) cases the results remained undetermined, a mortality rate of 19.4 per cent. One thousand five hundred and fifty-five (1555) injuries, with one thousand three hundred and thirty-five (1335) recoveries, one hundred and eighty-nine (189) deaths, and thirty-one (31) undetermined results, were on the right side; one thousand seven hundred and seventy-two (1772), with one thousand five hundred and twenty-nine (1529) recoveries, two hundred and nineteen (219) deaths, and twenty-four (24) unknown results, on the left side; in six hundred and eleven (611) cases the side was not indicated.

Detached splinters and fragments of bone are reported to have been removed in three hundred and forty-seven instances with two hundred and ninety-nine recoveries, forty-two deaths, and six undetermined results. Of the grave complications, pyæmia was noted in eighty-one cases, seventy-five of which terminated fatally; two cases of recovery from tetanus, and twenty-two fatal cases are reported. Of seventy cases of gangrene, thirty had fatal results. There were sixty-five cases of secondary hæmorrhage; twenty-four of the patients recovered, the hæmorrhage having been controlled in twelve instances by compression and styptics, and in twelve instances by ligation; forty-one of the patients died, twenty-seven after treatment by compression, and fourteen after ligation. The femoral artery was ligated in five cases with three deaths, the posterior tibial in nine with four deaths, the anterior tibial in six with three deaths, the popliteal in five with three deaths, and the anterior and posterior tibials in one instance, which terminated fatally. In nine cases the bleeding vessels were secured in the wound, and in thirteen at a distance from the injury. Four of the former and nine of the latter ended in death.

Excisions in the Continuity of the Bones of the Leg.—An examination of the reported examples of excision in the bones of the leg, whether in the tibia or in the fibula, or in both bones, shows conclusively that in a large proportion of the cases the operation was injudicious. Not only does the percentage of fatality after excision exceed that of the cases treated by conservation, but the remote results in the cases of recovery in the former were even less satisfactory in regard to usefulness of the limb than those in the latter. The fatality of the conservatively treated fractures of the tibia was 10.3, of the fibula 9.7, and of both bones 20.2 per cent., while that of the corresponding excisions was 25.6, 27.2, and 61.1 per cent., respectively. Excisions in both bones were rarely performed, only eighteen cases of this nature being reported, and the large mortality (61.1 per cent.) following this operation would seem to justify its banishment from military surgery.[1] The excisions per-

diffeiles à conjurer que ceux que présentent les fractures de la cuisse, et cependant cette remarque ressort des faits observés par nous. Le tibia est souvent fendu en éclats dans une grande partie de sa longueur; ses esquilles se détachent lentement; son tissu spongieux et le canal médullaire suppurent aisément et la réparation est extrêmement lente." BILLROTH (TH.) (*Chirurgische Briefe aus den Kriegs-Lazarethen in Weissenburg und Mannheim* 1870, Berlin, 1872, p. 272) notes the tedious process of separation of sequestra in shot fractures of the leg. HANNOVER (A.) (*Die Dänischen Invaliden aus dem Kriege* 1864, Berlin, 1870, p. 27) observes that "the separation of necrosed bone frequently was of long duration with persistent fistulæ."

[1] STROMEYER (L.) (*Maximen der Kriegsheilkunst*, Hannover, 1855, p. 743) remarks of the fractures of the bones of the leg that "the hopes built upon excision in the continuity were found delusive, as well in regard to preservation of life as in regard to usefulness of the limbs preserved by exeision." DEMME (H.) (*Militär-Chirurgische Studien*, Würzburg, 1861, B. II, p. 276): "Resection of the diaphysis of both bones of the leg was performed several times in Italy. I have to mention four cases of this kind in the hospitals of Brescia, which all proved fatal from continued suppuration and pyæmia. The subperiosteal method was here also tried by LARGHI, but, for the reasons already stated, had no better results. I believe, therefore, that I must join STROMEYER and the majority of the military surgeons in condemning the operation." PITHA (F. R. VON) (*Krankheiten der Extremitäten*, Erlangen, 1868): "For resection the leg offers an unfavorable field: the operation is, therefore, seldom and with great reserve performed." BECK (B.) (*Chirurgie*

formed in the tibia exceeded those in the fibula, the former being one hundred and eighty-five, the latter one hundred and eighty-two, with the percentage of fatality slightly in favor of the excisions in the tibia. The results of this operation in European war surgery as exhibited in the following table have been still less satisfactory; of one hundred and fifty-two cases, one hundred and six, or 69.7 per cent., had fatal terminations:

TABLE LXXXV.

Results of Shot Fractures of the Bones of the Leg treated by Excision on the Occasions named and from the Authorities quoted.

OCCASIONS.	CASES.				TIBIA.		FIBULA.		TIBIA AND FIBULA.		BONE NOT SPECIFIED.	
	Total.	Recoveries.	Deaths.	Mortality of Det. Cases.	Recoveries.	Deaths.	Recoveries.	Deaths.	Recoveries.	Deaths.	Recoveries.	Deaths.
Revolution in Lombardy, 1848 (BECK[1])	1	.....	1	100.0	.....	.....	.....	.....	.....	1	.....	.....
Schleswig-Holstein War, 1848–50 (ESMARCH,[2] STROMEYER[3])	13	6	7	53.8	3	4	2	1	1	2	.....	.....
Campagnes de Kabylie, 1854 (BERTHERAND[4])	1	1	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
Crimean War, 1854–56 (MATTHEW,[5] CHENU[6])	2	2	.....	.....	1	.....	1	.....	.....	.....	.....	.....
Italian War, 1859–60 (DEMME,[7] CHENU[8])	16	4	12	75.0	.....	.....	1	1	1	4	2	7
Danish War, 1864 (LANGENBECK,[9] LÜCKE,[10] HEINE[11])	3	3	.....	.....	2	.....	.....	.....	1	.....	.....	.....
Austro-Prussian War, 1866 (BECK,[12] FISCHER,[13] BIEFEL[14])	4	3	1	25.0	3	.....	.....	.....	.....	1	.....	.....
United States Army, 1865–70 (OTIS[15])	2	1	1	50.0	1	.....	.....	1	.....	.....	.....	.....
Franco-German War, 1870–71 (GERMANS[16])	11	8	3	27.2	2	3	4	.....	1	.....	1	.....
Franco-German War, 1870–71 (FRENCH[17])	97	17	80	82.4	13	63	4	17	.....	.....	.....	.....
Turko-Russian War, 1876 (TILING,[18] KADE[19])	2	1	1	50.0	.....	1	1	.....	.....	.....	.....	.....
Aggregates	152	46	106	69.7	25	71	14	20	4	8	3	7

der Schussverletzungen, Freiburg, i. Br., 1872, p. 721): "To saw through the diaphysis in its entire thickness before the necrosed portion has yet demarcated and separated itself completely, I cannot approve of, because, on the one hand, too much is often taken away unnecessarily, thereby giving occasion to too great a loss of substance, to a colossal defect in the bone, and, in consequence thereof, to pseudarthrosis; and, on the other hand, infectious processes with fatal results are readily caused by again laying open the bony cavity. One may, therefore, quietly wait until sequestrotomy can be performed under more favorable circumstances."

Excision for shot fracture in the continuity of the bones of the leg, in military surgery, does not seem to have been practised before 1848. In that year [1] B. BECK (*Die Schuss-Wunden*, Heidelberg, 1850, p. 338) excised portions of both tibiæ and a portion of the fibula in an Austrian soldier of the Kaiser Franz Josef Regiment, wounded in 1848, near Vienna, by a grape shot. The missile entered the right and passed through the left leg, fracturing both tibiæ just below the knee. Amputation of both thighs was advised but not allowed by the patient. A few days later the fractured ends of both tibiæ were excised, and splints applied; extensive infiltration, fever, and diarrhœa followed, and the patient died on the 7th day after the injury. [2] F. ESMARCH (*Ueber Resectionen nach Schusswunden*, Kiel, 1851, p. 28) and [3] L. STROMEYER (*Maximen der Kriegsheilkunst*, Hannover, 1855, p. 756) tabulate 13 cases of excision in the shafts of the bones of the leg, with 6 recoveries and 7 deaths. Portions of the tibia were excised in 7 (3 recoveries, 4 fatal), of the fibula in 3 (2 recoveries, 1 fatal), and of both bones in 3 (1 recovery, 2 fatal). Detailed accounts of several of these cases are found in ROSS (G.) (*Militairärztliches aus dem ersten Schleswigschen Feldzuge im Sommer* 1848, Altona, 1850, pp. 30, 53, 60, 61, and 62): Prussian volunteer J——, fracture of head of right fibula with grazing of tibia, Bilschau, April 24, 1848; resection of upper end of fibula by ROSS; pyæmia, death. Prussian Captain v. K——, Düppel, June 5, 1848; ball penetrated the upper third of right tibia; excision of a triangular piece of bone by ROSS; death June 19, 1848, of pyæmia. J. H. K——, Oldenburg Infantry, wounded May 28, 1848; comminution of left fibula; excision of 3 inches by KUHN, June 11; recovery. H. G——, 31st Prussian Infantry, Düppel, June 5, 1848; fracture of right fibula; June 6, excision of 6 inches by LANGENBECK; June 25, ligation of the crural artery; recovery; no formation of new bone; limb useless. Captain J. C——, Hochtrup, June 7, 1848; comminution of right tibia; June 8, excision of several inches of tibia by LANGENBECK; June 22, ligation of femoral; June 24, amputation of leg; death June 24, 1848. Lieutenant H——, Schlesswig-Holsteinischen Dragoons, fracture of both bones of leg June 12, 1848; excision of over 3 inches of both bones by LANGENBECK, June 14; death from tetanus June 22, 1848. In another instance a considerable portion of the upper third of the tibia was excised; recovery with flexed knee; leg useless. [4] BERTHERAND (A.) (*Campagnes de Kabylie*, Paris, 1862, p. 109): C——, 11th Infantry; comminuted fracture of right fibula; excision of sharp points of fibula; recovery in less than 6 weeks. [5] MATTHEW (T. P.) (*Med. and Surg. Hist. of the British Army, etc., in the years* 1854–55–56, London, 1858, Vol. II, p. 368) tabulates a successful case of excision of lower end of fibula, but gives no details. [6] CHENU (J. C.) (*Rapport, etc., de la Campagne d'Orient*, Paris, 1865, p. 505): Th. Duval, 86th line; shot fracture of left leg August 16, 1855; resection of tibia; recovery with flexion of leg upon the thigh. [7] DEMME (H.) (*Mil.-Chir. Studien*, Würzburg, 1861, B. II, p. 278) tabulates 7 (2 successful and 5 fatal) cases; in 4 of the fatal cases both bones were excised. [8] CHENU (J.-C.) (*Stat. Med.-Chir. de la Camp. d'Italie en* 1859 *et* 1860, Paris, 1869, T. II, p. 820), 8 cases (1 recovery and 7 fatal). On pp. 819, 820, he gives details of two of the cases: P. Godin, 76th line, aged 24, received at Solferino, June 24, 1859, a shot fracture of the left fibula in its upper third. He was taken to the hospital at St. Mandrier, where, on October 14, Dr. BEISSON excised the upper third of the fibula; osteomyelitis supervened and death ensued October 18. J. Camboulives, 74th line, shot fracture of lower third of left leg, Montebello, May 20, 1859; resection of 5 centimetres of the fibula; anchylosis of the tibio-tarsal articulation, with rigidity of the toes. CHENU further relates (*loc. cit.*, p. 819) that a resection of both bones of the leg was successfully performed at Brescia on a Garibaldian volunteer by A. BERTANI, chief surgeon of Garibaldi's corps. [9] LANGENBECK (B. v.) (*Ueber Resection des Fussgelenks be Schussfracturen desselben*, in *Berliner Klin. Wochenschrift*, 1865, Jahrgang II, p. 31): Corporal Reiss, 60th Infantry, shot fracture of middle third of left tibia and fibula, April 18, 1864; extensive infiltration; subperiosteal excision of 4 inches of tibia and 1 inch of fibula by LANGENBECK. Recovery with 1¾ inches shortening. The deficiency of bone has been supplied by a voluminous new formation of bone exceeding in thickness the normal size of the tibia. [10] LÜCKE (A.) (*Kriegschirurgische Aphorismen aus dem zweiten Schlesswig-holsteinschen Kriege im Jahre* 1864, in *Archiv für Klin Chir.*, Berlin, 1866, B VII, p. 126). Heerde, 25th Infantry, shot comminution of right tibia and fracture of fibula, 1½ inches

The amount of bone excised varied from one-half inch to twelve inches,[1] and in one instance the entire fibula, with the exception of about one inch of the external malleolus, was removed (CASE 720, page 457, *ante*). Forty-nine, or 12.6 per cent., of the three hundred and eighty-seven excisions in the bones of the leg were subsequently followed by ablation of the limb, viz: twenty-one by amputation in the leg, five by exarticulation at the knee joint, and twenty-three by amputation in the thigh. Considering the usefulness of the limb, especially after excision in the tibia or in both bones of the leg, the results must be regarded as unsatisfactory. In the case of Private J. Hogan, 127th Pennsylvania

above ankle joint, in April, 1864. A fenestrated gypsum bandage was applied. Excision of 2 inches of the tibia a month after the injury by Dr. LÜCKE; recovery. In November, 1864, the patient walked well, extensive new formation of bone, exceeding in thickness the normal tibia. [11] HEINE (C.) (*Die Schussverletzungen der unteren Extremitäten*, Berlin, 1866, p. 311): A Prussian officer, Lieut. R——, shot wound of right leg, April 18, 1864, fracturing tibia and fibula in the middle third, and extensively lacerating the soft parts; free incisions and application of gypsum bandage. June 8, excision of 1 inch of tibia by Dr. LANGENBECK; recovery, with ¼ inch shortening; according to the latest account no union of bone had taken place. [12] BECK (B.) (*Kriegschirurgische Erfahrungen während des Feldzuges* 1866, Freiburg, i. Br., p. 343) twice successfully excised portions of the tibia, retaining as much as possible of the periosteum. Both patients recovered in a short time, and the deficiency in the bone was supplied by nature in a few weeks. [13] FISCHER (K.) (*Militairärztliche Skizzen aus Süddeutschland und Böhmen*, Aarau, 1867, p. 98) states that he saw an excision of the diaphysis of the tibia performed by TEXTOR for shot fracture just above the ankle joint, four days after the injury. The lower extremity of the tibia was saved; the patient did well. [14] BIEFEL (R.) (*Im Reserve-Lazareth. Kriegschirurgische Aphorismen von* 1866, in *Archiv für Klin. Chir.*, Berlin, 1869, B. XI, p. 468): Joh. Drost, shot comminution of tibia and fibula of right leg, June 27, 1866, by canister shot; enormous infiltration; excision of about 4 inches of both bones August 7, 1866; periosteum preserved; death August 27, 1866. [15] OTIS (G. A.) (*Circular* No. 3, War Department, S. G. O., Washington, 1871, pp. 227, 228): Pt. W. Hostler, D, 38th Infantry, shot comminution of left fibula, Fort Bayard, New Mexico, July 10, 1868; excision of about 3½ inches of fibula and ligation of peroneal artery above and below wound on same day by Acting Assistant Surgeon J. Le Carpentier; death July 12, 1868. Pt. J. Shaw, D, 3d Cavalry, shot wound of right tibia, received in fight with Indians October 17, 1867; necrosis; excision of necrosed portion by Assistant Surgeon W. M. AUSTIN, U. S. A., February 2, 1868; recovered and returned to duty. [16] BECK (B.) (*Chirurgie der Schussverletzungen*, Freiburg i. Br., 1872, p. 900): G——, artilleryman, fracture of left leg in lower third from canister shot; immediately after the injury excision of portions of the injured bone was performed; subsequent amputation of the leg; recovery. IDEM (*loc. cit.*, pp. 907, 909, 910) also reports, from hospitals at Rastatt and Strassburg, 5 instances of excisions in the bones of the leg; 3 were excisions in the fibula and proved successful; 2 excisions in the tibia were fatal. FISCHER (G.) (*Dorf Floing und Schloss Versailles*, in *Deutsche Zeitschrift für Chirurgie*, Leipzig, 1872, B. I, p. 253): Unknown, shot fracture of both bones in middle third; 21 days after injury 1 inch was excised from the upper and 2 from the lower ends; also removal of splinter 3 inches long; patient doing well at the end of six weeks. In another case in which the tibia was extensively splintered a fragment of the bone was extracted on the 12th and 1½ inches were excised on the 21st day after the injury; death 15 days after the operation. RUPPRECHT (L.) (*Militärärztliche Erfahrungen während des deutsch-französischen Krieges im Jahre* 1870–71, Würzburg, 1871, p. 86) cites a successful secondary excision in the fibula performed at the Bavarian hospital No. VIII. at Antony and Massy. SOCIN (A.) (*Kriegschirurgische Erfahrungen gesammelt in Carlsruhe* 1870 *und* 1871, Leipzig, 1872, p. 141) details 2 cases: H. Scherf, shot fracture of tibia and fibula of right leg in middle third, Toul, August 16, 1870; removal of splinters; resection of protruding portion of tibia September 15, 1870; recovery, with 8 centimeters shortening; large callus but no union of bone. Ferdinand Schwand, shot fracture of both bones of right leg, Wörth, August 6, 1870; excision of 3 centimetres of tibia August 17; recovery, with very little shortening and consolidation of bone. [17] CHENU (J.-C.) (*Aperçu Hist. Stat. et Clin., etc., pendant la Guerre de* 1870–1871, Paris, 1874, B. I, p. 493) tabulates 97 cases of excisions in the continuity of the bones of the leg, in the French army, of which 76, with 13 recoveries and 63 deaths, were in the tibia, and 21, with 4 recoveries and 17 deaths, in the fibula. In the alphabetical enumeration of pensioners after amputations, disarticulations, and resections, in the second volume of Dr. CHENU'S work, the following cases of excision in the bones of the leg are mentioned: J.-B. Bourguignon (p. 21), 11th Chasseurs, shot fracture of left fibula, Villorceaux, Dec. 9, 1870; excision of fibula; gangrene; recovery with anchylosis of ankle joint. J.-B. Millot, 23d line (p. 106), comminuted fracture of left leg at Tertre, January 11, 1871; resection; recovery with considerable shortening. P.-A. Originaire (p. 114), 12th Cuirassiers, shot comminution of leg at Gravelotte; resection of portion of tibia; incomplete consolidation. C.-V. Ridel (p. 128), 82d line, comminuted shot fracture of left tibia, Villorceaux, Dec. 8, 1870; resection; atrophy of limb. This case is detailed by CHIPAULT, (A.) (*Fractures par armes à feu*, Paris, 1872, p. 157), who states that the operation was performed on May 22, 1871, and that 18 centimetres of the tibia were excised. There is regeneration of bone and no apparent shortening of the limb. E.-I. Schneider (p. 136), shell wound of right leg, received at Villiers-sur-Marne; resection of considerable portion of tibia. A.-J.-B. Soviche (p. 139), 11th line, comminuted shot fractures of left forearm and right leg, Sedan; excision in lower third of tibia; atrophy of leg. L.-M.-A. Vedel (p. 147), 76th line, shell fracture of right leg, Strassbourg, September 17, 1870; excision of 4 centimetres of both bones; recovery. Besides the cases mentioned by CHENU, the editor has been able to gather from the sources indicated particulars of the following instances of excision in the continuity of the bones of the leg practised on French soldiers during the Franco-German War, 1870–1871, not detailed by CHENU: F. Delalande (CHIPAULT) (A.) (*Fractures par armes à feu*, Paris, 1872, p. 173), wounded at Orleans. December 4, 1870, in the lower part of the left leg; no consolidation on December 31, 1870; resection of 9 centimetres of the fibula; recovery without shortening. The space between the sawn ends of the bone is filled with a firm substance. Joseph G—— (A. COUSIN, *Histoire Chirurgicale de l'ambulance de l'école des ponts et chaussees*, in *L'Union Médicale*, 1872, T. XIII, p. 158), shell fracture of left leg, November 29, 1870; erysipelas; gangrene; excision of about 6 centimetres of tibia; death December 22, 1870. F. Albertini (O. HEYFELDER, *Bericht über meine Wirksamkeit am Rhein und in Frankreich während des Deutsch-französischen Krieges*, in *St. Petersburger Med. Zeitschrift*, 1871, B. II, N. F., p. 59). 3d Voltigeurs, shot fracture of bones of leg, Landonchamp, October 7, 1870; excision of the fractured portion of the tibia November 18; recovery without deformity and with new formation of bone. E. Terrier (O. HEYFELDER, *loc. cit.*, p. 59). 62d line, shot fracture of tibia received at Gravelotte; secondary excision of 4 centimetres of the tibia; recovery. M. Maze (T. BILLROTH, *Chirurgische Briefe aus den Kriegs-Lazarethen in Weissenburg und Mannheim* 1870. Berlin, 1872, p. 234, No. 47, and H. LOSSEN, *Kriegschirurgische Erfahrungen aus den Barackenlazarethen, etc.*, in *Deutsche Zeitschrift für Chirurgie*, 1873, B. II, p. 140), ——, 48th Infantry, shot fracture of both bones of right leg August 4, 1870; ends of tibia excised on the field; loss of 1½ to 2 inches of bone; in March, 1871, the wounds had healed but the parts had not consolidated. [18] TILING (G.) (*Bericht über* 124 *im Serbisch-türkischen Kriege im Baracken-Lazareth des Dorpater Sanitats-Trains zu Swilainatz behandelte Schussverletzungen*, Dorpat, 1877, p. 72): Simeon Raschitsch, aged 40, shot fracture of left tibia, August, 1876; excision of 12 centimetres of tibia, September 7, 1876; amputation in lower third of thigh September 15; death September 16, 1876. [19] KADE (E.) (*Das temporüre Kriegslazareth des Ressorts der Anstalten der Kaiserin Maria im Kloster Mariahimmelfahrt bei Sistowa*, in *St. Petersburger Medicinische Wochenschrift*, 1877, B. II, p. 385) states that a successful excision in the diaphysis of the fibula was performed in the hospital near Sistowa under his charge.

[1] In the 185 excisions in the tibia, 1½ inches were removed in 5, 2 inches in 23, 2½ inches in 8, 3 inches in 26, 3½ inches in 7, 4 inches in 14, 4½ inches in 5, 5 inches in 7, 5½ inches in 2, 6 inches in 7, and 7, 8, and 8½ inches in 1 instance each, and in 78 the length of bone removed was not indicated. Of the 182 fractures of the fibula, ½-inch was removed in 3 instances, 1 inch in 2, 1½ inches in 6, 2 inches in 22, 2½ inches in 10, 3 inches in 33, 3½ inches in 7, 4 inches in 20, 5 inches in 7, 6 inches in 3, 6½ inches in 3, 7 inches in 1, 8 inches in 2, 12 inches in 1, and in 1 instance nearly the entire fibula; in 61 fractures of the fibula the amount excised was not stated. In the 18 instances of excisions in both bones of the leg the amount removed varied, according to the nature of the injury in each bone, from 2 to 5 inches in the tibia and from 2 to 8 inches in the fibula; in 3 instances neither the bone implicated nor the amount excised was indicated

Volunteers (CASE 703, page 445, *ante*), Assistant Surgeon W. Thomson, U. S. A., states that "the leg was perfectly helpless, a hiatus of nine or ten inches existing in the tibia, with no hope of any improvement from the lapse of time," and remarks: "no more useless or unphilosophical operation could be devised than the one done in this case." Colonel W. F. Fitch, 29th Ohio Volunteers (CASE 705, page 446, *ante*), who visited the Army Medical Museum in 1870, six years after the operation, greatly regretted that amputation had not been performed. Three inches of the tibia had been excised and the bone remained ununited; the calf of the leg was atrophied, and the foot swollen and useless. In the case of Lieutenant O. R. Fyler (CASE 704, page 446, *ante*), 2d Connecticut Heavy Artillery, Examining Surgeon H. E. Gates reported, in 1877, that "the whole leg and thigh is atrophied. The fibula is bowed outward, and there is partial dislocation of its head. The leg bends easily at the seat of the injury and no weight can be borne upon it. I have no doubt the fibula would instantly give way if the applicant should stand upon it. There is great tenderness at the head of the fibula from stretching of the ligaments, the line of support from the bending of the leg being thrown outward toward this articulation. The pensioner wears an appliance weighing seven pounds, which incases the limb and gives the only support. The disability is progressive on account of displacement and bending of fibula, etc. I consider his present condition worse than if he had amputation above the knee; locomotion is very painful indeed." Pseudarthrosis, rarely noted in the cases treated without operative interference, was recorded in at least twenty-eight of the cases of recovery after excision in the bones of the leg.[1] In the case of Private J. Lagro, 10th Vermont Volunteers (CASE 719, page 457, *ante*), Examiner O. F. Fassett reports that "the bones have never united except by ligament, so that a false joint now exists;" and the same examiner, in 1877, thirteen years after the injury, states: "The wound is still an open, suppurating, and discharging sore, the bone being extensively diseased. The disease is so near the joint that amputation must be above the knee. His condition now is worse than with loss of the leg above the knee. The leg is bent into a curve and greatly deformed." In the cases in which the excision was performed in the continuity of the fibula useful limbs were preserved in several instances, but as a rule the foot could not be planted even, as it would turn outward from the want of fibular support.

Amputations in the Leg.—At the time of the publication of the preliminary report of 1865,[2] the results of two thousand three hundred and forty-eight (2348) amputations in the leg, giving a mortality rate of 26.02 per cent., had been ascertained. Further examination of the returns has augmented the number to five thousand four hundred and fifty-two (5452) and has increased the rate of mortality from 26.02 per cent. to 32.9 per cent.; yet the final results, as reported in the preceding pages, compare favorably with the results of amputations in the leg obtained in other wars, as exhibited in TABLE LXXXVI on the opposite page. Of the seven thousand six hundred and thirty-seven cases cited in this table, the final results were ascertained in seven thousand and thirty-eight. One thousand eight hundred and thirty-nine (1839) were successful and five thousand one hundred and ninety-nine (5199) fatal, giving a death rate of 73.8 per cent. This excessive rate of

[1] HEINE (C.) (*Die Schussverletzungen der unteren Extremitäten*, Berlin, 1866, p. 319), who considers the fracture in the bones of the leg the most favorable field for excision, "as here the reproductive powers of the bony substance, as well as of the periosteum, seem to be especially active and fruitful," admits, on page 331, that "when the strength of the patient has not suffered too much, it is unquestionably preferable to await the separative process to be performed by nature, as a resection, in every instance, adds a new wound to the old one with new dangers, and finally a condition not too rarely resulting, but which we have as yet not mentioned, must not be overlooked, viz: the supervening of pseudarthrosis."

[2] *Circular* No. 6, War Department, Surgeon General's Office, Washington, November 1, 1865, p. 47.

mortality is principally due to the deplorable fatality attending the operations among the French troops in the Crimean, Italian, and Franco-Prussian Wars.

TABLE LXXXVI.

Summary of Seven Thousand Six Hundred and Thirty-seven Amputations in the Leg for Shot Injuries on the Occasions named and from the Authorities quoted.

OCCASIONS AND AUTHORITIES.	CASES.	RECOVERIES.	DEATHS.	UNDETERMINED.
PARÉ[1]	1	1		
Thirty-Years' War, 1618–1648 (SCHMIDT)[2]	4	2	1	1
French Wars, 1740–1756 (BOUCHER, DE GARENGEOT, FAURE)[3]	12	7	5	
Seven Years' War, 1756–1763 (SCHMUCKER)[4]	1		1	
Napoleonic Wars, 1791-1815 (LARREY, CHAVANE, KLEIN, HENNEN, GUTHRIE)[5]	159	117	33	9
Fort Erie, 1814 (TROWBRIDGE)[6]	2	2		
Revolution in Paris, 1830 (LARREY, MÉNIÈRE, ARNAL, ROUX, JOBERT)[7]	19	8	8	3
Siege of Antwerp, 1832 (LARREY)[8]	22	17	5	
French in Algiers, 1830–1836 (BAUDENS, BAGRÉ)[9]	2	2		
Campaign of Constantine, 1837 (SÉDILLOT)[10]	5	2	3	
Spanish Peninsular War, 1837–1838 (ALCOCK)[11]	12	11	1	
War in Mexico, 1845–1848 (PORTER)[12]	3	1	2	
Revolution in Paris, 1848 (ROUX, MALGAIGNE, HUGUIER, JOBERT, BAUDENS)[13]	8	7	1	
Revolution in Milan, 1848 (RESTELLI)[14]	4	2	2	
War in Schleswig-Holstein, 1848–1850 (DJÖRUP, STROMEYER)[15]	94	57	37	
Revolution in Baden, 1849 (BECK)[16]	3	2	1	
Bombardment of Sveaborg, 1855 (HEYFELDER)[17]	10	2	8	
Crimean War, 1854–1856 (CHENU, HUBBENET, MATTHEW)[18]	2, 698	506	1, 617	575
British in India, 1857–1858 (WILLIAMSON)[19]	21	21		
Italian War, 1859–1860 (CHENU, DEMME, GHERINI)[20]	466	188	278	
New Zealand War, 1863–1865 (MOUAT)[21]	2	2		
Danish War, 1864 (HEINE, OCHWADT)[22]	12	8	4	
French in Mexico, 1864 (BINTOT)[23]	1	1		
Austro-Prussian War, 1866 (BECK, BIEFEL, FISCHER, MAAS, STROMEYER)[24]	93	61	32	
United States Army, 1865–1870 (OTIS)[25]	9	6	3	
Franco-German War, 1870–1871 (GERMANS) (BECK, BILLROTH, CZERNY, etc.)[26]	267	150	106	11
Franco-German War, 1870–1871 (FRENCH) (CHENU)[27]	3, 704	654	3, 050	
Turco-Russian War, 1876 (KADE, STEINER, TILING)[28]	3	2	1	
Aggregates	7, 637	1, 839	5, 199	599
	Rate of mortality, 73. 8 per cent.			

As a rule the surgeons of the American civil war amputated in every part of the leg regardless of the point of election, sacrificing as little as possible of the sound portions of

An early, and probably the earliest recorded example of amputation in the leg following shot wound is that reported by PARÉ (A.) (*Œuvres de*, Paris, 1599, p. 408, Chap. XXII): Captain François Le Clerc had his foot carried away just above the ankle by a cannon ball. The wound healed, but the leg became troublesome, and the patient had the limb amputated the width of five fingers below the knee. He recovered with a serviceable stump.—Four examples of amputation in the leg are recorded by [2] SCHMIDT (JOSEPH) (*Speculum Chirurgicum oder Spiegel der Artzney*, Augspurg, 1656, pp. 153, 156, 157): 2 were successful, 1 fatal, and 1 result unknown: B. Lundlaw, of the regiment Wallenstein, received, November 22, 1663, a shot fracture of both bones of the left leg; amputation of leg; death November 16, 1663. H. Braunmüller, Oheim's regiment, shot in the left leg May 23, 1663; amputation of leg; result not recorded. Cavalryman G. Burger, Caselcki's regiment; left leg carried away above the ankle; amputation higher up; recovery. A corporal of von Oelter's Bavarian regiment; left foot torn away; amputation in leg; recovery.—[3] BOUCHER (*Obs. sur des Playes d'armes à feu compliquées sur tout de fracas des os*, in *Mém. de l'Acad. de Roy. de Chir.*, Paris, 1753, T. II, p. 470) cites five amputations in the leg for wounds received at Fontenoy, April 30, 1745: A captain of Hainaut's regiment had the leg amputated in the field; recovered October 26, 1745. In the case of a lieutenant of the regiment Clare, the limb was successfully amputated 6 days after the injury. Of the remaining three, one died from hæmorrhage 11 hours after amputation, and the other two survived the operation 16 and 20 days respectively. DE GARENGEOT (*Moyens de rendre plus simple et plus sûre l'amputation à lambeau*, in *Mém. de l'Acad. Roy. de Chir.*, 1753, T. II, p. 262): A soldier of the King's regiment received a shell wound of the right foot with fracture of both bones of the leg; amputation 8 days after the injury; healed in 27 days. FAURE (*L'amputation étant absolument nécessaire dans les plaies compliquées de fracas des os, etc.*, in *Prix de l'Acad. Roy. de Chir.*, Paris, 1819, T. III, pp. 339, 340) details 3 cases of secondary amputations in the leg, the operation being performed, one on the 46th and two on the 47th days after the injury; all recovered. BAGIEU (*Examen de plusieurs parties de la Chirurgie*, Paris, 1756, p. 97): Shot fracture of tibia and fibula; primary amputation of leg; fatal. RAVATON (*Chirurgie d'armée ou traité des plaies d'armes à feu*, Paris, 1768, p. 372): Shot wound of left leg; amputation 6 weeks after injury; fatal. IDEM (*loc. cit.*, p. 404): Fray, of Schomberg's regiment, shot fracture of left foot in September, 1755; primary amputation; recovery.—[4] SCHMUCKER (J. L.) (*Vermischte Chirurgische Schriften*, Berlin und Stettin, 1785, B. I): Captain von Wedel, shot fracture of ankle joint, August 11, 1760; amputation of leg at upper third; fatal.—[5] LARREY (D. J.) (*Mém. de Chir. Mil. et Camp.*, Paris, 1812, pp. 265, 269): Lieut. Bonichon, 21st Light Infantry, shot wound of left foot, October 7, 1798; tetanus; amputation in upper third; recovery. Another amputation for tetanus following shot wound was performed by LARREY on March 21, 1801; tetanus subsided, but the patient died 13 days after the operation. IDEM (*loc. cit.*, T. II, p. 195): Captain M——, wounded at the second battle of Aboukir, in 1801; amputation immediately below the knee; recovery. IDEM (*loc. cit.*, T. III, pp. 56, 83, 156, 389, 391, and 378) refers to 16 cases of amputation in the leg: Han-

the bones of the limb. One thousand five hundred and nine (1509) of the five thousand four hundred and fifty-two (5452) amputations were performed in the upper third, one thousand four hundred and eighty-one (1481) in the middle, one thousand four hundred and seven (1407) in the lower third, and in one thousand and fifty-five (1055) instances the seat

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nequin, fracture of leg in upper third, Eylau, February 8, 1807; amputation through tuberosity of tibia; recovery. During the same campaign LARREY performed 3 similar operations through the tuberosity of the tibia; the patients recovered. At Ulm, in October, 1805, an officer received a shot through the ankle; gangrene and fever; amputation below the point of election; recovery. In Egypt, in 1799, LARREY twice successfully amputated close to the knee joint, and nearly on a level with the head of the fibula, and at Wagram and Esslingen, in 1809, 9 similar operations were performed by him; but the results are not indicated. Of 3 cases of amputation of both legs performed after Wagram, 1 performed immediately after the reception of the injury proved successful; 2 others were fatal. IDEM (*loc. cit.*, T. IV, pp. 56, 69, 156, and 164) details 4 cases of amputation in the leg during the Russian campaign 1812–13: 3 were successful and 1 proved fatal. LARREY (D. J.) (*Clinique Chirurgicale*, Paris, 1829, T. III, pp. 651, 652, 662, 664, and 665) cites the cases of Dosmenil, wounded at Wagram, in 1809; amputation in middle third; recovery. Lambels, wounded in the Russian campaign, 1812, amputation in upper third; recovery. General Laferrière, wounded at Craonne in 1814; amputation in middle third; recovery. An officer, wounded at Moscow in 1812; amputation in upper third; recovery. General Chémineau, wounded at Lutzen in 1813; amputation in upper third; recovery. Robsomen, wounded at Hanau in 1813; amputation in upper third; recovery. IDEM (*loc. cit.*, T. IV, pp. 279, 282): Gault, an officer of dragoons; shot fracture of upper third of right leg; amputation below the knee; recovery. Colonel d'Esclignac, amputation of leg; recovery. CHAVANE (X.) (*Considérations theo.-prat. sur l'amputation à faire à la suite des fractures comminutives de la jambe, etc.*, Paris, 1814, Thèse No. 99, pp. 7, 9, 10) details 3 successful amputations in the leg. KLEIN (D. C.) (*Practische Ansichten der bedeutendsten chirurgischen Operationen*, Stuttgart, 1815, p. 31) relates a successful case of amputation at the ankle and subsequent ablation in the leg. HENNEN (J.) (*Principles of Military Surgery*, 3d ed., London, 1829, pp. 275, 277): Chatelot, wounded in 1815, amputation leg; death. M——, 3d guards, amputation of leg July 11, 1815; death August 3, 1815. GUTHRIE (G. J.) (*Commentaries, etc.*, 6th ed., London, 1855, p. 158) tabulates 93 cases with 23 deaths, after the battle of Waterloo, in 1815; 43, with 7 deaths, were primary, and 50, with 16 deaths, were secondary operations. GUTHRIE (G. J.) (*A Treatise on Gunshot Wounds, etc.*, 3d ed., London, 1827, p. 308) reports 28 amputations in the leg performed near New Orleans, from January 8 to April 24, 1815; 26, with 3 deaths and 23 recoveries, were primary operations, and 2, both fatal, were secondary operations.—[6] TROWBRIDGE (A.) (*Gunshot Wounds*, in *Boston Med. and Surg. Jour.*, 1838, Vol. XVIII, p. 342) cites 1 case of amputation of leg and 1 of both legs from the siege of Fort Erie, in 1814; both patients recovered.—[7] LARREY (H.) (*Rel. Chir. des Evénemens de Juillet* 1830, Paris, 1831, p. 122): 6 amputations in the leg (3 successful, 3 fatal). MÉNIÈRE (P.) (*L'Hotel-Dieu de Paris en Juillet et Aout* 1830, p. 325): 3 amputations in the leg; fatal. ARNAL (*Mém. sur quelques particularités des plaies par armes à feu*, in *Jour. Univ. et Hebd. de Méd. et de Chir. Prat.*, Paris, 1831, T. III, p. 35): 1 amputation of leg; recovery. ROUX (*Plaies d'armes à feu. Communications, etc.*, Paris, 1849, pp. 37, 38): 6 amputations of leg (4 recoveries, 2 fatal). JOBERT (DE LAMBALLE) (*Plaies d'armes à feu*, Paris, 1833, pp. 303–305) cites 3 amputations in the leg (no results).—[8] LARREY (H.) (*Hist. Chir. du Siége de la citadel le d'Anvers*, Paris, 1833, p. 334): 22 cases; 20 primary (16 recoveries, 4 deaths), 2 secondary (1 recovery, 1 fatal.—[9] BAUDENS (L.) (*Clinique des plaies d'armes à feu*, Paris, 1836, p. 540): 1 amputation of left leg; recovery. BAGRÉ (*Obs. de Chir., recueillies a l'hôpital Turc, a Alger*, in *Rec. de Mém. de Méd. de Chir. et de Phar. Mil.*, Paris, 1831, T. XXXI, p. 168): 1 amputation; recovery.—[10] SÉDILLOT (C.) (*Camp. de Constantine de* 1837, Paris, 1838, p. 266): 5 amputations in the leg (2 recoveries, 3 fatal).—[11] ALCOCK (R.) (*Notes on the Med. Hist. and Stat. of the British Legion in Spain*, London, 1838, p. 95): 12 amputations in the leg (11 recovered, 1 fatal); 3 with 2 recoveries primary, and 9 recoveries were secondary operations.—[12] PORTER (J. B.) (*Med. and Surg. Notes of Campaigns in the War with Mexico, during the years* 1845–1848, in *Am. Jour. Med. Sci.*, 1852, Vol. XXIII, N. S., pp. 31, 32): 3 amputations in the leg (1 recovery, 2 fatal).—[13] *Des plaies d'armes à feu Communications, etc.*, Paris, 1849, par MM. ROUX (p. 11), 2 amputations (1 recovery, 1 fatal); MALGAIGNE (p. 46), 2 amputations (recoveries); HUGUIER (p. 143), 2 amputations (recoveries); JOBERT (p. 154), 1 amputation (recovery); BAUDENS (p. 233), 1 amputation (recovery).—[14] RESTELLI (A.) (*Note ed Osservazioni cliniche di chirurgia militare*, in *Annali Universali di Medicina*, 1849, Vol. CXXX, pp. 243, 244): 4 cases (2 recoveries, 2 fatal). [15] DJÖRUP (*Bemaerkninger over de i Krigen* 1848–50 *forelagne Amputationer i Forbindelse med en Statistik over dem*, in *Hospitals-Meddelelser*, Kjöbenhavn, 1852, B. V, p. 106): 48 cases (29 recoveries, 19 fatal). STROMEYER (L.) (*Maximen der Kriegsheilkunst*, Hannover, 1855, pp. 756, 757): 46 cases (28 recoveries, 18 fatal).—[16] BECK (B.) (*Die Schusswunden*, Heidelberg, 1850, Tabella): 3 cases (2 recoveries, 1 fatal).—[17] HEYFELDER (J. F.) (*Die Verwundungen und Operationen in Folge des Bombardements von Sveaborg vom* 9.–11. *Aug.*, in *Deutsche Klinik*, 1855, B. VII, pp. 495 and 575): 10 cases (2 recoveries, 8 fatal).—[18] CHENU (J.-C.) (*Rapport, etc., pendant la Campagne d'Orient en* 1854–'55–'56, Paris, 1865, p. 666): 1,306 cases (368 recoveries, 938 fatal). HÜBBENET (C. v.) (*Die Sanitäts-Verhältnisse der Russischen Verwundeten wahrend des Krimkrieges in den Jahren* 1854–1856, Berlin, 1871, p. 182): 1,286 cases (69 recoveries, 642 deaths, 575 undetermined). MATTHEW (T. P.) (*Med. and Surg. Hist. of the British Army, etc., in the years* 1854–'55–'56, London, 1858, Vol. II, pp. 368, 369): 106 cases (69 recoveries, 37 fatal).—[19] WILLIAMSON (G.) (*Military Surgery*, London, 1863, p. XXVII): 21 cases (recoveries).—[20] CHENU (J.-C.) (*Stat. Med.-Chir. de Camp. d'Italie en* 1859 *et* 1860, Paris, 1869, T. II, p. 809): 347 cases (116 recoveries, 231 fatal). DEMME (H.) (*Militär-Chirurgische Studien*, Würzburg, 1861, B. II, p. 278): 113 cases (69 recoveries, 44 fatal). GHERINI (A.) (*Rel. chir. dell'Ospedale mil. provisorio di S. Filippo*, in *Annali Univ. di Med.*, Milano, 1860, Vol. CLXXIII, pp. 419, 420): 6 cases (3 recoveries, 3 fatal).—[21] MOUAT (*The New Zealand War of* 1863–64–65, in *Stat. San. and Med. Reports*, Vol. VII, for the year 1865, London, 1867, p. 514): 2 cases (recoveries).—[22] HEINE (C.) (*Die Schussverletzungen der unteren Extremitäten*, Berlin, 1866, p. 294): 3 cases (2 recoveries, 1 fatal). OCHWADT (A.) (*Kriegschirurgische Erfahrungen*, Berlin, 1865, tabular statement): 9 cases (6 recoveries, 3 fatal.—[23] BINTOT (*Obs. de blessures de guerre*, in *Rec. de Mém. de Méd. de Chir. et de Phar. Mil.*, Paris, 1866, T. XVI, p. 237): 1 case (recovery.)—[24] BECK (B.) (*Kriegs.-Chir. Erfahrungen während des Feldzuges* 1866, Freiburg, i. Br. 1867, p. 331): 43 cases (26 recoveries, 17 fatal). BIEFEL (R.) (*Im Reserve-Lazareth*, in *Archiv für Klin. Chir.*, Berlin, 1869, B. XI, pp. 465, 474): 4 cases (2 recoveries, 2 fatal). FISCHER (K.) (*Militairärztliche Skizzen*, Aarau, 1867, p. 97): 26 cases (22 recoveries, 4 fatal). MAAS (H.) (*Kriegschirurgische Beiträge aus dem Jahre* 1866, Breslau, 1870, p. 73): 3 cases (2 recoveries, 1 fatal). STROMEYER (L.) (*Erfahrungen über Schusswunden im Jahre* 1866, Hannover, 1867, p. 59): 17 cases (9 recoveries, 8 fatal).—[25] OTIS (G. A.) (*Circular* No. 3, War Department, S. G. O., Washington, 1871, pp. 196–202): 9 cases (6 recoveries, 3 fatal).—[26] BECK (B.) (*Chirurgie der Schussverletzungen*, Freiburg, i. Br., 1872, pp. 800, *et seq.*): 152 cases (91 recoveries, 58 fatal, 3 undetermined). BILLROTH (T.) (*Chir. Briefe aus den Kriegs-Lazarethen in Weissenburg und Mannheim* 1870, Berlin, 1872, pp. 232, *et seq.*): 7 cases (4 recoveries, 3 fatal). CZERNY (V.) (*Bericht über die im Collège Stanislaus in Weissenburg behandelten Verwundeten*, in *Wiener Med. Wochenschrift*, 1870, pp. 1355–56): 3 cases (1 recovery, 1 fatal, 1 unknown). FISCHER (G.) (*Dorf Floing und Schloss Versailles*, in *Deutsche Zeitschrift für Chirurgie*, 1872, B. I, p. 187): 19 cases (14 recoveries, 5 fatal). FISCHER (H.) (*Kriegschirurgische Erfahrungen*, Erlangen, 1872, p. 213): 8 cases (5 recoveries, 3 fatal). GOLTDAMMER (*Bericht über die Thatigkeit des Reserve-Lazaretts des Berliner Hilfsvereins in der Garde-Ulanen-Kaserne zu Moabit*, in *Berliner Klin. Wochenschrift*, 1871, Jahrg. VIII, p. 152): 2 cases (1 recovery, 1 fatal). GRAF (E.) (*Die Königlichen Reserve-Lazarethe zu Dusseldorf während des Krieges* 1870–71, Elberfeld, 1872, pp. 31, 49): 9 cases (4 recoveries, 5 fatal). KIRCHNER (C.) (*Aerztlicher Bericht über das Königlich Preussische Feld-Lazareth im Palast zu Versailles*, Erlangen, 1872, pp. 88, 89): 9 cases (6 recoveries, 3 fatal). KOCH (W.) (*Notizen über Schussverletzungen*, in *Archiv für Klin. Chir.*, Berlin, 1872, B. XIII, p. 574): 12 cases (9 recoveries, 3 fatal). LOSSEN (H.) (*Kriegschirurgische Erfahrungen aus den Barackenlazarethen zu Mannheim, etc.*, in *Deutsche Zeitschrift für Chir.*, 1873, B. II, pp. 138–148): 4 cases (4 fatal). MAYER (L.) (*Kriegschirurgische Mittheilungen aus den Jahren* 1870–71, in *Deutsche Zeitschrift für Chirurgie*, 1873, B. III, pp. 50, 52): 2 recoveries. RUPPRECHT (L.) (*Militärärztliche Erfahrungen während des Deutsch-Französischen Krieges im Jahre* 1870–71, Würzburg, 1871, p. 15): 5 cases (2 recoveries, 3 fatal). SCHINZINGER (A.) (*Das Reserve-Lazareth Schwetzingen im Kriege* 1870 *und* 1871, Freiburg, i. Br., 1873, pp. 84, 88): 5 cases (4 recoveries, 1 fatal). SEEGER (W. v.) (*Die Leistungen der Vereinsspitäler Kleinkinderschule und Diakonenhaus in Ludwigsburg im Jahr* 1870–71, in *Zeitschrift für Wundärzte und Geburtshelfer*, Stuttgart, 1871, B. XXIV, p. 117): 1 case, fatal. SOCIN (A.) (*Kriegschirurgische Erfahrungen gesammelt in Carlsruhe* 1870 *und* 1871, Leipzig, 1872, pp. 144, 187): 4 cases, fatal. STEINBERG (*Die Kriegslazarethe und Baracken*

of operation was not indicated. The fatality of the operations in the upper third was 27.0, in the middle third 20.6, and in the lower third 27.6 per cent.[1] Here as well as in the amputations of the thigh (*see* TABLE XXIX, p. 213, *ante*) and in the ablations of the fore-arm and arm (*see* TABLE CXXXII, p. 967), and of amputations in the arm (Recapitulation, pp. 805, 806 of the *Second Surgical Volume*), the operations in the middle third of the limb were less fatal than those in the upper or lower thirds. It will also be noted that the mortality of the amputations in the lower third slightly exceeded that in the upper third,[2] a result which appears to argue against the operations in the lower third immediately above the malleoli, advocated and practised by Ravaton[3] and White,[4] and later by Lenoir, Goyrand, and others.[5] Furthermore, of the two hundred and twenty cases of re-amputations in the leg, knee joint, or thigh, the amputations had originally been performed in the lower third of the leg in one hundred and two, in the middle third in seventy-five, in the upper third in forty, while in three the seat of the first operation was not indicated; showing that ablations in the lower third contributed nearly one-half of all the cases of re-amputation. The considerations of greater safety of life, as evinced in the results of amputations of the middle third, and the excellent prothetic apparatus furnished at Government expense to the maimed soldiers, outweigh the objections raised by surgeons to the inconvenience of a projecting limb, necessitated by the use of a peg leg, as well as the question of the greater cost of such apparatus.

From the returns it would appear that of the modes of operation the flap method was most frequently employed—one thousand six hundred and ninety-eight (1698) instances of this procedure being reported, against one thousand two hundred and six (1206) by the circular, twenty-two (22) by the circular flap, and a few by Teale's[6] and Hey's[7] methods; but in at least two thousand five hundred (2500) cases the mode of operation was not indicated. Assistant Surgeon J. T. Calhoun, U. S. A., in his narrative of service at the 4th

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von Berlin, Berlin, 1872, p. 148): 13 cases (3 recoveries, 6 fatal, 4 undetermined). STOLL (*Bericht aus dem Königlich Württembergischen 4. Feldspital von 1870–71*, in *Deutsche Militairärztliche Zeitschrift*, 1874, 3d Jahrg., p. 218): 9 cases (4 recoveries, 5 fatal). STUMPF (L.) (*Bericht über das Kriegs-Spital des St. Georg-Ritter-Ordens zu Neuberghausen im Jahre 1870–71*, in *Aerztliches Intelligenz-Blatt*, München, 1872, No. 50, p. 657): 3 cases, undetermined.—[27] CHENU (J.-C.) (*Aperçu hist., stat., et clin., etc., pendant la guerre de 1870–71*, Paris, 1874, T. I, p. 493): 3,704 cases (654 recoveries, 3,050 fatal). [28] KADE (E.) (*Das temporäre Kriegslazareth des Ressorts der Anstalten der Kaiserin Maria im Kloster Mariahimmelfahrt bei Sistowa*, in *St. Petersburger Med. Wochenschrift*, 1877, B. II, p. 384): 1 case, recovery. STEINER (F.) (*Aus dem Tagebuche eines deutschen Arztes*, in *Wiener Med. Wochenschrift*, 1877, B. XXVII, p. 426): 1 case, recovery. TILING (G.) (*Bericht über 124 im serbisch-türkischen Kriege im Baracken-Lazareth des Dorpater Sanitäts-Trains zu Swilainatz behandelte Schussverletzungen*, Dorpat, 1877, p. 77, No. 82): 1 case, fatal.

[1] The precise figures are: Upper third 1,509 cases, viz: 1,094 recoveries, 406 deaths, 9 unknown results, mortality 27 0 per cent. Middle third, 1,481 cases, viz: 1,170 recoveries, 305 deaths, 6 unknown results, mortality 20.6 per cent. Lower third, 1,407 cases, viz: 1,011 recoveries, 387 deaths, 9 unknown results, mortality 27.6 per cent. *See* TABLE LXVII, p. 461, *ante*.

[2] Staffsurgeon GROSSHEIM (*Ueber die Schussverletzungen des Fussgelenks während des letzten Krieges und die Resultate ihrer Behandlung unter Benutzung officieller Quellen*, in *Deutsche Militairärztliche Zeitschrift*, 1876, Jahrgang V, p. 223, note *) remarks: "The supra-malleolar amputation has given very unfavorable results during the war 1870–71," and, on page 252, gives the percentage of fatality of the amputations in the lower third of the leg as 53.9 per cent., and adds: "The results of the amputations of the leg in the upper and middle thirds are incomparably better than those in the lower third, their percentages of fatality being only 38.5 and 36.0 per cent. respectively."

[3] RAVATON, *Sur l'utilité de l'amputation faite près des malléoles dans les maladies du pied, et sur une bottine de nouvelle invention*, in *Recuil périodique d'observations de Médicine, Chirurgie, Pharmacie, etc.*, Paris, 1757, T. VI, p. 130.

[4] WHITE (C.), *An Account of a new Method of amputating the Leg a little above the Ankle Joint, with a Description of a Machine particularly adapted to the Stump*, in *Medical Observations and Inquiries by a Society of Physicians in London*, London, 1771, Vol. IV, p. 168.

[5] LENOIR (A.), *Quels sont les cas et quels sont les lieux, ou il convient d'amputer la jambe*, Paris, 1835; *ibid*, *Note sur une modification de la méthode circulaire appliquée a l'amputation de la jambe. au dessus des malléoles*, in *Archives Générales de Médecine*, Paris, 1840, 3e sér., T. VIII, p. 257. GOYRAND (G.), *De l'amputation de la jambe, partiquée loin du genou; nouvel appareil de sustentation*, in *Journal Hebdomadaire des Progrès des Sciences et Institutions Médicales*, Paris, 1835, T. II, p. 161. LARREY, *Amputation Sus-Malléolaire*, in *Bulletin de l'Académie Royale de Médecine*, Paris, 1841–42, T. VII, p. 211. ARNAL *et* MARTIN, *Mémoire sur l'amputation sus-malléolaire*, in *Annales de la Chirurgie Française et Étrangère*, 1841, T. III, p. 129. ARNAL (L.), *Mémoire sur l'amputation sus-malléolaire*, in *Mémoires de l'Academie Royale de Médecine*, 1843, T. X, p. 59. ROZE (M. A.), *De l'amputation sus-malléolaire*, in *Gazette Médicale de Paris*, 1847, 3ème sér., T. II, p. 987. COOTE (H.), *Amputation at the inferior third of the Leg*, in the *London Lancet*, 1847, Vol. I, p. 274. BARNETT (C. V.), *Supra-malleolar Amputation. Its relative value*, in *Transactions of the Medical Society of the State of New York*, 1857, p. 169. LABORIE, *Communication sur l'amputation sus-malléolaire*, in *Bulletin de la Société de Chirurgie de Paris*, Paris, 1859, T. IX, p. 198; *ibid.*, in *Bulletin de la Société impériale de Chirurgie de Paris pendant l'armée 1866*, Paris, 1867, p. 63. GUYON, *Amputation sus-malléolaire par un procédé nouveau*, in *Bulletin de la Société impériale de Chirurgie de Paris*, 1869, 2e série, p. 334. CHAUVEL, *Amputation sus-malléolaire*, in *Mem. de la Soc. de Chir. de Paris*, Paris, 1873, T. VII, p. 366. GAYRAUD (E.), *De l'amputation sus-malléolaire*, in *Montpellier Médical*, 1877, T. XXXVIII, p. 120.

[6] TEALE (T. P.), *On amputation by a long and short rectangular flap*, London, 1858.

[7] HEY (WILLIAM), *Practical Observations in Surgery, illustrated by cases*, 3d ed., London, 1814, p. 542.

division, Second Corps hospital, April 1, 1864, prefers the "long posterior flap with a small crescentic anterior flap, and after sawing the bones always removes the sharp projecting angle of the spine of the tibia." Surgeon Burt G. Wilder, 55th Massachusetts Volunteers, in his observations of cases at Judiciary Square Hospital, prefers the circular method in amputations in the lower third. "Here at least, the circular method is superior to the flap, that is, results in the best stump, both in appearance and for an artificial limb; * * it is evidently the best method where the patient is obliged to undergo any subsequent transportation. The large inferior flap formed from the calf constitutes a very thick cushion at the end of the stump, but the superior edge of the tibia is always thinly covered."

Protrusion of the tibia or fibula or both, frequently noted, especially in cases in which the crest of the tibia had not been removed at the time of the operation, was followed by secondary hæmorrhage, sloughing, and exfoliation. Surgeon B. G. Wilder, 55th Massachusetts Volunteers, remarks of twenty-seven cases of amputations in the leg, observed at the Judiciary Square Hospital at Washington in 1863: "The crest of the tibia was removed at the time of the operation in four cases, and in none of these did the bone afterwards protrude. In three cases sloughing followed a previous secondary hæmorrhage. In eleven cases the tibia or fibula or both protruded through the flap and exfoliation usually followed. Secondary hæmorrhage and sloughing occurred in two, indicating rather a constitutional than a local cause. Omitting these two, there remains nine cases—five of them in the middle third of the leg—in which the crest of the tibia exfoliated to a greater or less extent for no other evident cause than its non-removal at the time of operation. The exfoliations took place at various periods—during the second, third, fourth, sixth, tenth, thirteenth weeks, and in one instance during the fifth month."

To prevent as much as possible the protrusion of the bones, which the great weight of the soft parts forming the calf tended to aggravate, Dr. Frank P. Foster, of the New York Hospital, applied with good advantage an apparatus shown in the appended wood-cut (Fig. 329). A piece of adhesive plaster was cut in the shape shown in Fig. 328; the two limbs were cut through at C C, the surfaces of the end pieces B B reversed, and the pieces joined together again at C C with pins. The adhesive surface of the middle portion A was then applied to the posterior surface of the stump and the ends secured to the outside of an ordinary fracture box, as shown in Fig. 329. Traction downward on the fracture box was effected by means of a weight and pulley.

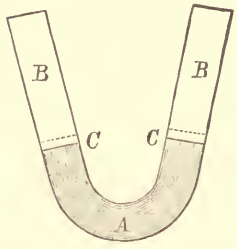

Fig. 328.—Adhesive plaster with reversed ends.

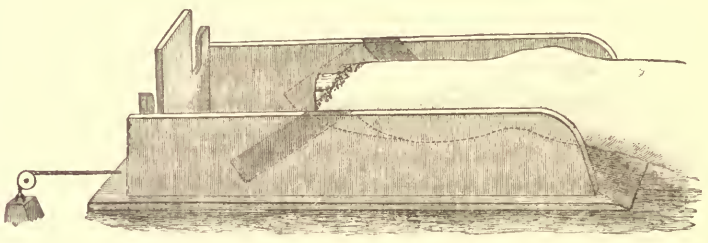
Fig. 329.—Fracture box with stump supported by adhesive plaster.

SECTION VI.

WOUNDS AND OPERATIONS AT THE ANKLE JOINT.

The cases to be considered in this Section are restricted to injuries, by weapons of war, of the bones forming the tibio-tarsal articulation, viz: the lower extremities of the tibia, the fibula, or the astragalus. Injuries of the os calcis and other adjoining bones, unless the ends of the tibia and fibula and the astragalus are likewise involved, are reserved for the next section. Seventeen hundred and twenty-two injuries of the bones forming this articulation were found on the field and hospital returns. All were caused by shot; eleven were contusions, and seventeen hundred and eleven fractures.

SHOT CONTUSIONS OF THE ANKLE JOINT.—Of eleven shot contusions of the bones of the ankle joint indicated on the records, seven were treated throughout without operative interference; four were followed by amputation in the leg. The latter cases have already been cited in the tables of amputations in the leg,[1] and it remains only to give brief details of the cases treated by conservation.

Shot Contusions of the Bones of the Ankle Joint treated by Conservation.—The injuries in the seven cases of this group were confined to the malleoli, in three instances the internal and in four the external malleoli being involved. All resulted in recovery.

CASE 808.—Private *J. G. Clayton*, Co. I, 24th Regiment (Confederate). aged 22 years, was wounded in the left ankle, at Drury's Bluff, May 16, 1864. The missile, a ball, impinged upon the lower end of the tibia, glanced downward and passed through the anterior aspect of the ankle joint, lodging under the skin over the neck of the astragalus, whence it was extracted two days afterwards. One week after the injury the foot and ankle were inflamed and swollen and there was excruciating pain upon the slightest motion, while the grating of the inflamed articular surfaces was distinct. After free incisions to favor the escape of confined pus, which was freely mingled with synovial fluid, and the persistent employment of cold irrigation and anodynes, the local inflammation subsided. In the course of several weeks it entirely ceased and the general condition of the patient became much improved. By the following January the wound had closed and the patient was able to walk with the aid of a cane, though motion of the joint was still imperfect. The history of the case was published[2] by Dr. J. M. Holloway, late Surgeon P. A. C. S.

CASE 809.—Private W. Johnson, Co. B, 147th New York, aged 18 years, was wounded at Hatcher's Run, October 27, 1864, by a minié ball, which grazed the inner malleolus of the left ankle. He entered Lincoln Hospital, Washington, whence he reported to Elmira for muster out May 27, 1865. Not a pensioner.

CASE 810.—Corporal A. Daily, Co. A, 42d Illinois, aged 29 years, was wounded in the right ankle, at Murfreesboro', December 31, 1862, by a musket ball, which took effect upon the external malleolus, touching the bone. He was treated at various hospitals, being assigned to the Veteran Reserve Corps November 25, 1863, and ultimately mustered out and pensioned September 8, 1864. Various examining surgeons certify to weakness of the ankle joint, painfulness, and tendency to inversion of the foot in walking. He was a pensioner in June, 1880.

CASE 811.—Private P. McCabe, Co. G, 87th Pennsylvania, aged 23 years, was wounded in the left ankle, before Petersburg, June 23, 1864, by a musket ball, which contused the external malleolus. He was admitted to Stanton Hospital, Washing-

[1] Cases of Pt. P. Reynolds, K, 5th New Jersey, intermediary amputation, lower third of leg; fatal. *Spec.* 4578, A. M. M. (TABLE LXXIV, No. 300, page 535, *ante*). Pt. W. Sharp, I, 8th New York Heavy Artillery, intermediary amputation, middle third of leg; fatal. *Spec.* 3204, A. M. M. (TABLE LXXIII, No. 349, page 527, *ante*). Pt. J. F. Willetts, B, 1st New Jersey, intermediary amputation, middle third of leg; recovery. (TABLE LXXIII, No. 250, page 526, *ante*). Pt. C. Bennett, D, 9th New Hampshire, secondary amputation, middle third of leg: fatal. *Spec.* 3637 (TABLE LXXVII, No. 138, page 550, *ante*).

[2] HOLLOWAY (J. M.), *Comparative Advantages of* PIROGOFF'S, SYME'S, *and* CHOPART'S *Amputations, and Excision of the Ankle Joint by* HANCOCK'S *Method, after Gunshot Wounds and other Injuries, etc.*, in *American Journal of Medical Sciences*, 1866, Vol. LI, N. S., p. 88.

ton, eleven days after the injury, with the limb greatly swollen and intensely painful. An abscess was opened on July 10th, and three weeks later a thin narrow piece of bone, about one inch long, exfoliated from the external malleolus. Subsequently another small necrosed piece was removed, after which rapid and steady improvement began and the pain disappeared. About September 25th the patient began to walk on crutches.[1] He was mustered out of service October 13, 1864, and pensioned. The Pension Examining Board in September, 1877, report a "tender and adherent cicatrix, complete anchylosis of the ankle joint, and some atrophy of the leg. In walking he cannot bring the heel to the ground, but puts his weight on the front part of the foot." He was paid his pension in June, 1881.

CASE 812.—Private J. Staton, Co. G, 45th Kentucky, aged 17 years, was accidentally wounded, October 24, 1863, by a pistol ball grazing the external malleolus of the right ankle. He was conveyed to the general hospital at Ashland, where simple dressings were applied. The patient was returned to duty December 3, 1863, and mustered out with his command February 4, 1865. Subsequently he made an unsuccessful application for pension.

CASE 813.—Private T. Ingersoll, Co. E, 8th Kansas, aged 20 years, was wounded by a ball striking the internal malleolus of the left ankle, at Chickamauga, September 19, 1863. He passed through several hospitals, and was mustered out of service September 19, 1864, and pensioned. Examining surgeons certify to weakness and slight enlargement of the ankle joint. His pension was paid to June, 1879.

CASE 814.—Sergeant C. Shade, Co. F, 46th Pennsylvania, age 23 years, was wounded, at Peach Tree Creek, July 20, 1864, by a minié ball striking the external malleolus of the left ankle. Simple dressings constituted the treatment. The patient was returned to duty August 13, 1864, and was subsequently promoted to Lieutenant. He ultimately resigned July 1, 1865, and afterwards became a pensioner. Examining surgeons certify that he complains of pain, weakness, and swelling on over-exertion. His pension was paid to December, 1880.

SHOT FRACTURES OF THE BONES OF THE ANKLE JOINT.—Of one thousand seven hundred and eleven instances of shot fractures involving one or more of the bones of the ankle joint, five hundred and eighteen were treated without operative interference; twenty-nine were followed by excision; four by excision at the ankle and subsequent amputation in the leg; fifteen by amputation at the ankle joint; one by amputation at the ankle joint and subsequent amputation in the leg; and one thousand one hundred and forty-four by amputation in the leg, knee joint, or thigh:

TABLE LXXXVII.

Summary of One Thousand Seven Hundred and Eleven Shot Fractures of the Tibio-Tarsal Articulation.

TREATMENT.	CASES.					SHOT FRACTURES OF—																													
						Lower ext. of Tibia.		Lower extremity of Fibula.			Astragalus.		Tibia and Fibula.		Tibia and Astragalus.			Fibula and Astragalus.			Tibia, Fibula, and Astragalus.		Bones not Specified.													
	Total.	Recoveries.	Deaths.	Undeterm'd.	Ratio of Mortality.	Recoveries.	Deaths.	Recoveries.	Deaths.	Undeterm'd	Recoveries.	Deaths.	Recoveries.	Deaths.	Recoveries.	Deaths.	Undeterm'd.	Recoveries.	Deaths.	Undeterm'd.	Recoveries.	Deaths.	Recoveries.	Deaths.	Undeterm'd.	Recoveries.	Deaths.	Undeterm'd.	Recoveries.	Deaths.	Undeterm'd.	Recoveries.	Deaths.	Undeterm'd.	Recoveries.	Deaths.	Undeterm'd.
Treated by Conservation	518	407	99	12	19.5	104	14	69	12	1	52	11	13	3	6	2	1	2	1	..	7	2	154	54	10										
Followed by																																			
Excision at the Ankle Joint	29	19	8	2	29.6	2	..	9	2	..	5	..	....	1	2	2	..	....	2	1	1	1	....	....	1										
Excision at Ankle—Amp. Leg	4	3	1	..	25.0	....	..	2	1	..	....	..	1	..	....	....	..	....	....	..	....	..	....	....	..										
Amputation at Ankle Joint	15	13	1	1	7.1	....	..	....	....	..	7	1	....	..	1	....	..	....	....	..	1	..	4	....	1										
Amputation at Ankle—Amp. in Leg	1	1	....	..	0.0	....	..	....	....	..	....	..	....	..	....	....	..	....	....	..	....	..	1	....	..										
Amputation in the Leg	1,083	772	311	..	28.7	50	29	14	15	..	50	41	69	13	26	19	..	9	6	..	38	20	516	168	..										
Amputation in Leg—Amp. at Knee	2	2	....	..	0.0	....	..	....	....	..	....	..	....	..	....	....	..	....	....	..	1	..	1	....	..										
Amputation in Leg—Amp. in Thigh	19	14	5	..	26.3	1	1	....	....	..	1	..	....	....	....	....	..	....	....	..	....	..	12	4	..										
Amputation at the Knee Joint	11	1	10	..	90.9	....	3	....	3	..	....	1	....	....	....	1	..	1	....	..	....	..	....	2	..										
Amputation in the Thigh	29	7	22	..	75.8	....	3	....	3	..	....	2	1	1	1	1	..	....	2	..	2	..	3	10	..										
Aggregates	1,711	1,239	457	15	26.9	157	50	94	36	1	115	56	84	18	36	25	1	12	11	1	50	23	691	238	12										
						207		131			171		102		62			24			73		941												

It is to be regretted that in nine hundred and forty-one of the one thousand seven hundred and eleven cases the bones injured were not specified. The internal malleolus was interested in two hundred and seven, the external in one hundred and thirty-one, the

[1] LIDELL (J. A.), *On Contusion and Contused Wounds of Bone, with an Account of Thirteen Cases*, in *Am. Jour. Med. Sci's*, 1865, N. S., Vol. L, p. 36.

astragalus in one hundred and seventy-one, the articular ends of the tibia and fibula in one hundred and two, the tibia and astragalus in sixty-two, the fibula and astragalus in twenty-four, and all three bones composing the joint in seventy-three instances.

SHOT FRACTURES OF THE BONES OF THE ANKLE JOINT TREATED BY CONSERVATION.—The fact that of the one thousand seven hundred and eleven cases of shot fractures of the ankle joint five hundred and eighteen only, or less than one third, were treated by expectant conservative measures, would indicate that the surgeons of the American civil war generally adhered to the teachings of the masters of the early part of the present century, Larrey,[1] Thomson,[2] and Guthrie,[3] who considered shot wounds of the ankle joint extremely dangerous and generally requiring amputation. It must be assumed, therefore, that the most propitious cases only were reserved for conservative treatment. Of the five hundred and eighteen cases the results were ascertained in all but twelve; four hundred and seven had successful and ninety-nine fatal terminations, giving a mortality rate of 19.5 per cent.

CASE 815.—Private J. Dullahan, Co. D, 3d Vermont, aged 24 years, was wounded in the right ankle, at the Wilderness, May 5, 1864. Six days after receiving the injury he was admitted to Harewood Hospital, Washington, and one week later the man was transferred to South Street Hospital, Philadelphia. Surgeon S. J. W. Mintzer, U. S. V., in charge of the latter hospital, recorded a wound of the ankle with compound fracture of the inner malleolus by a minié ball, which entered at the inner malleolus and came out just behind the external malleolus. Cold-water dressings were used. On May 23d there was great pain and swelling, and an application of lead water and laudanum was kept wrapped around the limb; morphia, milk punch, and beef essence being administered. Two days afterwards the wounds of exit and entrance were enlarged, after which the foot was again wrapped up in the same application. On May 27th, the pain still continuing, equal parts of tincture of aconite and water were applied, and two days later a plaster of extract of hemlock was made to cover the entire foot. On May 30th quinine pills were prescribed, and another lotion consisting of laudanum and tincture of aconite was ordered to be constantly applied. The entries in the hospital records at this date mention that the patient was evidently sinking. He subsequently mended, however, and became well enough to be transferred to Brattleboro' on June 29th. Several months later he was transferred to Burlington, where he was assigned to the Veteran Reserve Corps February 21, 1865. The patient was ultimately discharged from service at Sloan Hospital, Montpelier, July 25, 1865, and pensioned. Surgeon H. Janes, U. S. V., in charge of the latter, contributed the photograph represented in the adjacent cut (FIG. 330), and reported that, according to the patient's statement, the lower end of the tibia became necrosed and was gouged out twice at Brattleboro' Hospital. At the time of the man's discharge his general health was good and the wound was nearly healed, with ligamentous anchylosis of the joint and very slight contraction of the muscles of the calf of the leg. There was no appearance of caries or necrosis, and he could walk a short distance with a cane, gaining some motion of the joint by exercise. Examiner A. L. Lowell, of Burlington, Vermont, certified, March 26, 1870: "The cicatrix of entrance is adherent to the bone and healthy, but sensitive to pressure. The inner malleolus is considerably thickened by bony deposit and the new growth is operative in limiting the motions of the foot. The tibio-tarsal articulation is obstructed in its function by false anchylosis. In flexion and extension of the foot the toes describe an arc of but two inches. The foot is inverted to such a degree as to throw the weight of the body on the outer margin of the sole." The pensioner was paid June 4, 1880.

FIG. 330.—Appearance of limb one year after shot fracture of right inner malleolus. [From a photograph.]

CASE 816.—Private P. Driscoll, Co. B, 13th Infantry, aged 26 years, was wounded before Vicksburg, May 19, 1863. Surgeon E. O. F. Roler, 55th Illinois, noted his admission to the field hospital of the 2d division, Fifteenth Corps, with "shot wound of right foot." One week after the reception of the injury the wounded man was conveyed to Memphis, where he entered Jefferson Hospital, and six months later was transferred to Marine Hospital, St. Louis. Surgeon A. Hammer, U. S. V., in charge of the latter, described the injury as a "shot fracture of the ankle joint," and reported that the joint being much enlarged and quite painful he lanced the part on June 18, 1864, when several ounces of pus escaped and several spiculæ of bone were extracted. The patient was in good health at the time of the operation. Warm poultices were frequently applied and afterwards tincture of iodine. On August 6, 1864, the patient was discharged from service and pensioned. Examining Surgeon A.

[1] LARREY (D. J.) (*Mém. de Chir. Mil. et Camp.*, Paris, 1812, T. II, p. 468): "Lorsqu'un éclat d'obus, un biscayen ou une balle ont fracassé les extrémités articulaires, surtout celles qui forment l'articulation du pied ou du genou, et que les ligamens qui affermissent cette articulation ont été arrachés ou rompus, l'amputation immédiate devient indispensable. La même indication se présenterait, si le corps étranger s'était perdu dans l'épaisseur d'une des extrémités articulaires, ou se trouvait enclavé dans l'articulation, de manière à ne pouvoir en être extrait par les procédés simples et ordinaires."

[2] THOMSON (J.) (*Report of Obs., etc., after the Battle of Waterloo*, Edinburgh, 1816, p. 238): "Wounds in which musket balls have passed through, or are lodged in the ankle joint, almost all require immediate amputation. These injuries, by giving rise to high degrees of inflammation and symptomatic fever, not unfrequently prove fatal. Among a great number who had survived the fever, we saw but few in whom secondary amputation was not required; and, in the cases requiring it, this operation was far from being so successful as the primary amputation had been."

[3] GUTHRIE (G. J.) (*A Treatise on Gunshot Wounds, etc.*, London, 1827, 3d ed., p. 398): "Wounds of the ankle joint from gun-shot are extremely dangerous, and in general require amputation."

W. Woodhull, of Newark, N. J., certified April 9, 1868: "A conoidal ball fractured the lower extremities of the tibia and fibula, also several of the tarsal bones. The joint is anchylosed and the heel is kept five inches from the ground. The os calcis and astragalus were seriously fractured. Several pieces of bone have been lost and there is extensive deformity of the parts," etc. The Dayton, Ohio, Examining Board in subsequent reports states that the pensioner "walks on the ball of the toes" and requires the use of a cane. The pensioner was paid June 4, 1881.

In the following instance the missile was firmly wedged into the articulation, and was finally removed by the aid of two trephines used simultaneously, one on each side of the ball:

CASE 817.—Chaplain J. W. W. Bolton, 5th West Virginia Cavalry, aged 26 years, was wounded at Cloyd's Mountain, May 9, 1864, by a minié ball, which entered the right ankle near the external malleolus and lodged. He remained under treatment at a field hospital for six weeks and was then transferred to the general hospital at Parkersburg, whence he was reported as having been "returned to duty November 25, 1864." Some weeks afterwards the patient re-entered the hospital, when his case was reported by Assistant Surgeon W. A. Banks, U. S. V., as follows: "From the time of the injury the patient has been subject to formation of abscesses on either side of the ankle joint. The location of the ball was accurately ascertained with a porcelain pointed probe after all other means had failed. On February 3, 1865, chloroform was administered and the missile was extracted. An incision made below the external malleolus, one and a half inches long, exposed the ball lodging in the articulation, its base being one and a half inches from the surface. The missile was so firmly impacted that it could not be removed by any form of bullet forceps, the metal giving away before the teeth of the forceps. It was finally dislodged by means of two trephine elevators, using one on each side of the ball at the same time. The patient was in good general health at the time of the operation. He did well afterwards. Simple dressings were applied. The wound healed and the patient recovered with an immovable joint." He left the hospital three weeks after the operation, his term of service having expired June 14, 1864. Dr. E. D. Safford, pension examiner, and formerly Acting Assistant Surgeon at the Pakersburg Hospital, in June, 1872, contributed the following supplementary description of the injury: "The ball entered through the external malleolus, into and nearly through the astragalus, where it remained embedded until extracted," etc. "The injury produced extensive inflammation, and as a consequence he has nearly complete anchylosis of the joint and one and a half inches shortening." In his original application the pensioner alleged that seventeen pieces of bone were taken out of the wound at different times. Owing to his disability being considered permanent the pensioner has been exempted from further examinations. His pension was paid September 4, 1881.

CASE 818.—Private F. Lape, Co. K, 34th Massachusetts, aged 20 years, was wounded in the right foot, at New Market, May 15, 1864. He was captured by the enemy and conveyed to hospital at Harrisonburg, where he was seen and examined by Surgeon T. B. Reed, U. S. V., who described the injury as a "wound of the ankle joint;" also, that an opening was made and the ball was searched for and that poultices were applied. After remaining a prisoner for six months the man was exchanged and conveyed to Camp Parole Hospital at Annapolis, whence he was permitted to leave for his home, on furlough, October 31st. Drs. O. E. Brewster and W. W. Greene, of Pittsfield, Mass., who attended the patient at his home, certified that they removed a detached portion of the astragalus from the wounded foot on February 7, 1865. The patient subsequently returned to Camp Parole, and was discharged from service for disability March 21, 1865, Surgeon W. D. Stewart, U. S. V., certifying to "gunshot wound by a ball, which entered immediately behind the internal malleolus, passed forward and outward and lodged, fracturing the end of the tibia and implicating the joint." Examining Surgeon H. Eastman, of Pittsfield, Mass., reported November 5, 1873: "From the appearance of the wound of exit I should say that a number of pieces of bone have been removed. The ankle is perfectly anchylosed; the muscles of the calf of the leg are very much atrophied; the limb is more than one-third smaller than the other and is much lower in temperature. The muscles in the calf are so much contracted that when he is standing the heel is one inch above the floor, obliging him to walk on the anterior portion of the foot." The pensioner was paid September 4, 1881.

CASE 819.—Private S. Vansicklen, Co. D, 9th New York State Militia, aged 20 years, was wounded at Fredericksburg, December 13, 1862. Surgeon C. J. Nordquist, 83d New York, reported his admission to the field hospital of the 2d division, First Corps, with "shot wound of left ankle." Acting Assistant Surgeon L. Dorsey contributed the following description of the injury: "A rifle ball penetrated the ankle, outer surface, fracturing the astragalus and tibia. The man was admitted to Harewood Hospital, Washington, ten days after being wounded. On December 27th he was etherized, when the broken bones were removed from the tibia and astragalus. During the progress of the case it became necessary to make several counter openings. Simple dressings were applied and stimulants and tonics were freely given for a considerable length of time. In May, 1863, the wound had entirely healed and the patient was gradually recovering the use of the ankle joint. On June 4, 1863, he was discharged from service, having regained considerable motion of the joint." He subsequently became a pensioner and entered the National Military Home in Ohio, where he was examined at successive intervals by the Dayton Pension Board, who certified to the ball having passed through the ankle, and described the foot and ankle as being in very good condition, but the joint as partially anchylosed and about one-half inch shortened. The pensioner was paid December 4, 1880.

CASE 820.—Private J. H. Noble, Co. A, 20th Massachusetts, aged 32 years, was wounded and captured at the battle of White Oak Swamp, June 30, 1862. He remained a prisoner for three weeks, and was then exchanged and conveyed to Baltimore, where he entered Camden Street Hospital. Acting Assistant Surgeon E. G. Waters reported: "The injury was caused by a musket ball, which entered the flexure of the left ankle joint in the median line of the leg, passed downward and backward and emerged posteriorly, to the left and one inch above the insertion of the tendo-achillis, completely disorganizing the joint. The patient was admitted in a very prostrated condition. An anterior splint and water dressings were applied, it being deemed advisable to attempt to save the foot. On August 21st the necrosed extremity of the tibia and upper surface of the astragalus were removed with a gouge. At this time a finger could be pressed through the joint and no cartilage could be felt in the line of its passage. On October 20th the splint was removed from the leg and poultices were applied to promote exfoliation. On November 1st a part of the calcaneum and astragalus were removed, and a sinus extending downward from the internal malleo-

lus was laid open. The patient subsequently experienced an attack of erysipelas. There was much thickening, but it rapidly yielded to camphor and mercurial ointment. By January 22, 1863, all discharge had ceased and the case promised to leave an anchylosed joint but a serviceable foot. Though not more than three or four such cases have been under treatment, it is deemed proper to state that this is the only attempt that has been made in this hospital to save a foot after gunshot comminution of the joint, and it is gratifying to know that it has resulted successfully." The removed portions of the bone, comprising twenty small necrosed fragments, were contributed to the Museum by Surgeon A. B. Hasson, U. S. A., in charge of the hospital, and constitute specimen 424 of the Surgical Section. The patient was discharged from service March 23, 1863, and pensioned. Examining Surgeon O. S. Root, of Pittsfield, Mass., certified November 27, 1863: "The applicant is walking on crutches, his limb being shortened one and a half inches and the ankle stiff. He cannot get the heel to the ground. The wound has recently broken open and many pieces of bone have come out," etc. The Hartford Examining Board described the injury December 1, 1875, and reported: "The great toe drops and the second and third toes override it. He has no power over the great toe; has a very perceptible limp in walking, and is obliged to use a cane. The ankle is completely anchylosed, the leg much atrophied and two inches smaller than the other. The leg swells and is painful after using it." In September, 1878, the same board reported that the parts "broke out again and discharged last July, confining him to his bed several weeks. The pensioner complains of more or less constant pain in the leg, and if he uses it much it swells and becomes painful so that he is unable to sleep. He still has to use a cane. The leg is worse than useless." The pensioner was paid September 4, 1880.

CASE 821.—Private E. P. Dutton, Co. H, 2d U. S. Sharpshooters (subsequently transferred to the 4th Vermont), aged 18 years, was wounded in the left ankle, before Petersburg, October 13, 1864. He passed through various hospitals, lastly entering Sloan Hospital, Montpelier, on April 30, 1865. Surgeon H. Janes, U. S. V., in charge of the latter, contributed the photograph represented in the annexed cut (FIG. 331), with the following report: "Gunshot wound of ankle joint by a minié ball, which entered two inches posterior to the internal malleolus, wounding the tendo-achillis, passed forward and outward, and lodged (as the field surgeon stated) in the ankle joint. The missile was removed the next day. No fragments of bone came away then or subsequently. For about three months the discharge was profuse, offensive, and at times dark colored, after which it gradually diminished. The original wound healed in about four and a half months. Abscesses formed between the ankle and the tendo-achillis on each side, which continued to discharge after the wound had healed. About January 1, 1865, the parts became gangrenous, which was checked by the use of nitric acid and bromine in the course of a week, the ulcers healing about two months afterwards. When discharged from service, June 14, 1865, the patient was in good health and able to fully extend the foot, but unable to flex it beyond a right angle. He could walk a mile or two without difficulty, but on going too far he felt pain in the joint. There was also some tenderness at the tibio-tarsal articulation." Examiner L. J. Alleman, of Boone, Iowa, certified to the injury and reported: "Contraction of tendo-achillis and flexor muscles of first and second toes, drawing them inward and upward and deforming the first and second joint of the first toe; indolent ulcer below the external malleolus, and another above the inner malleolus starting from the edge of the wound. Inability to walk on injured foot in consequence of said condition, and disability equal to loss of foot." The pensioner was paid June 4, 1880.

FIG. 331.—Appearance of left leg six months after shot wound of ankle joint. [From a photograph.]

CASE 822.—Private G. F. Durkee, Co. B, 9th Vermont, aged 28 years, was wounded in the left ankle during the engagement at Newport Barracks, February 2, 1864, and entered Mansfield Hospital, Moorehead City, four days afterwards. Surgeon J. B. Bellangee, U. S. V., in charge, reported the injury and added that the internal malleolus was fractured; also that he removed the comminuted bone two days after the patient's admission. The patient subsequently passed through various hospitals, and on December 14, 1864, he was assigned to the Veteran Reserve Corps. Surgeon H. Janes, U. S. V., in charge of Sloan Hospital, Montpelier, contributed a photograph of the case (*Card Photographs*, Vol. III, p. 44), with the following history: "The wound was caused by a minié ball, which entered at a point just external and above the internal malleolus, passed directly downward and emerged at the inside of the sole of the foot, fracturing the tibia and opening the ankle joint. The patient stated that a number of pieces of bone were removed at first, and that several necrosed pieces came away afterwards. At the time of the injury he was in excellent health, and his appetite continued pretty good all the time. At first suppuration was profuse; large abscesses formed in the leg and he became much prostrated. Free incisions were made and cold-water dressings were applied. About April 1st the wound began to improve. It gradually but steadily grew better, and finally closed about the middle of July. He was not able to do without crutches until the latter part of September. After being transferred to the Veteran Reserve Corps he never had to be excused from duty on account of ill health or lameness. On September 14, 1865, when discharged from service, he could flex the foot on the leg to a right angle and extend it about ten degrees more. He was able to walk four or five miles a day, but the joint would swell after going any considerable distance. There was also some tenderness on pressure about the joint." Various examining surgeons have certified to the injury and have stated that "the ankle joint is restricted in its motion;" also that there is a depression on the inner side of the foot, and that the leg is atrophied and shows several scars from abscesses. The pensioner was paid September 4, 1880.

CASE 823.—*W. H. H. Shaw*, a Confederate soldier (regiment not recorded), received a shot fracture of the ankle joint, at Chancellorsville, May 3, 1863. He was admitted to the Richmond Confederate general hospital No. 24, from Camp Winder, August 1st. Two weeks later the wound was in a very bad state of gangrene, and nitric acid was used, also disinfectants, turpentine, and coal tar, which were applied to the leg every day. Tonics and stimulants were administered. During the night of August 18th hæmorrhage took place, the patient losing one pint of blood. On the following day the anterior tibial artery was ligated. By September 8th the patient was improving very fast and the wound was healing. On September 15, 1863, when the patient was furloughed, the wound was nearly healed but he had no use of the foot.

CASE 824.—Private *A. B. McDaniel*, Co. I, 7th North Carolina, aged 34 years, was wounded and taken prisoner at Gettysburg, July 3, 1863. He was admitted to Chester Hospital two weeks after the reception of the injury, where the nature of the wound was not recorded. Three months afterwards the patient was transferred to Point Lookout Hospital, whence Acting Assistant Surgeon R. N. Wright made the following report: "The patient was admitted to this hospital with gunshot wound of left ankle joint. The wound was inflicted by a minié ball, which shattered the joint to a considerable extent, entering just above the external malleolus, passing obliquely downward and forward and fracturing the bones. A number of bony fragments have escaped from the openings and there has been considerable purulent discharge. Erysipelas made its appearance before the patient entered this hospital. At the present time, March 2, 1864, the wounds are healed and the patient is doing well but has very little motion in the joint." The man was forwarded to City Point for exchange the following day, March 3, 1864. The man being a Confederate soldier, no further history of the case could be obtained.

In the next two cases the joint became firmly anchylosed, causing, in each case, the heel to be raised several inches and compelling the patient to walk on the toes:

CASE 825.—Sergeant T. B. Sturdivant, Co. B, 21st New York Cavalry, aged 39 years, was wounded in a cavalry skirmish near Halltown, March 24, 1864. Acting Assistant Surgeon J. H. Bartholf reported: "Gunshot fracture of left ankle joint by a rifled pistol ball, which entered the inner side of the leg five inches above the ankle, going downward and outward and emerging one and a half inches below the ankle. The patient was admitted to Frederick from his regimental hospital at Halltown two days after the injury. His general condition was not good; pulse 140. He had much pain in the ankle, which, with the foot, was much swollen and of a glistening surface. Pus, retained superficially on the inner side of the leg, was emptied by slitting down two inches; and a few small bits of bone about the size of peas, which were felt by the finger within the lower wound, were removed. Pressure over the outer ankle evacuated pus mixed with a yellow, clear, glairy fluid from the lower opening. Poultices were applied to the wounds and a general supporting treatment was ordered; milk punch and morphia at night. Two days after his admission the patient was better in all respects, and by March 31st he had still further improved, the treatment being continued and good food given. On April 4th the limb as well as the injured joint and the wounds were in a surprisingly good condition; redness and swelling gone; pain and tenderness of joint nearly gone; suppuration slight; nearly a corresponding improvement in patient's general condition. On April 28th a piece of bone about the size of a bullet, apparently from one of the tarsal bones, was removed, after which the condition of the foot and ankle improved very much. The patient was now able to sit up all day, and from this time he went on exceedingly well, being almost without pain or any trouble in the joint. He walked on crutches up to the time of his furlough on May 25th. When he returned from furlough in July he walked with a cane, the wounds having closed, leaving the ankle joint somewhat stiffened." He was subsequently transferred to Camp Parole, Annapolis, whence he was discharged May 2, 1865, and pensioned, Surgeon W. D. Stewart, U. S. V., certifying to "anchylosis of the ankle joint and extension of the foot" resulting from the wound. Examining Surgeon L. Darling, of Hammond Creek, Pennsylvania, October 7, 1874, certified to contraction of the gastrocnemius muscle and the tipping of the foot upon the toes, and added: "The pensioner's health is very feeble; he is weak and emaciated and has disease of the lungs." Examiner N. Parker, of Wellsborough, Pennsylvania, reported, June 17, 1880: "The injured leg at the calf is three inches smaller than the other; the weight is borne on the anterior part of the foot; pensioner quite lame. He states that nine months ago an ulcer formed at the outer side of the ankle and pieces of bone came out. There is slight inflammation and soreness at the site of the ulcer." The pensioner was paid September 4, 1880.

CASE 826.—Corporal C. B. Davis, Co. F, 9th New Hampshire, aged 23 years, was wounded and taken prisoner at Poplar Grove Church, September 30, 1864. He remained in captivity for nine days and was then paroled and conveyed to hospital at Annapolis, whence Acting Assistant Surgeon J. S. Fulks made the following report: "The patient came into my ward suffering from gunshot wound of the left ankle joint, inflicted by a minié ball passing transversely across and producing compound comminuted fracture. Sloughing commenced and continued until the integument over a considerable space around the wound was destroyed. Strong solutions of nitrate of silver and permanganate of potash failed to arrest the sloughing, but this was successfully accomplished by the application of a concentrated solution of nitric acid. The wound is now (December 31st) progressing favorably and the patient will recover with anchylosis of the joint." The patient was subsequently transferred to Webster Hospital, Manchester, where he was discharged from service May 27, 1865, and pensioned. Examining Surgeon T. Sanborn, of Newport, N. H., certified, August 2, 1865: "The fracture appears to have been a comminution. The tendo-achillis sloughed away and the ankle is anchylosed. The toes point downward and the heel cannot be brought to the ground." Examiner W. W. Sleeper, of Salisbury, N. H., reported, September 5, 1873: "The ankle joint is deformed and stiff, causing the heel to be raised about four inches and obliging the pensioner to walk upon his toes. There is necrosis about the joint, which has discharged several pieces of bone but is now healed. The muscles of the leg are much diminished." The deformity and anchylosis of the joint continued at the time the last payment was made to the pensioner, on June 4, 1881.

Of the ninety-nine fatal cases of shot fractures of the ankle joint treated conservatively, death was ascribed to pyæmia in twenty-five and to tetanus in five instances:

CASE 827.—"Private J. Jiggen, Co. B, 10th Wisconsin, was wounded at Chickamauga, September 19, 1863, by a minié ball, which entered the inner side of the right ankle below the malleolus, passing through the joint and making its exit on the anterior portion of the instep. He was taken prisoner and remained within the enemy's lines until October 2d, when he came through and was admitted into the general field hospital of the 1st division, Fourteenth Corps. The appearance of the wound and limb was then healthy and considered favorable to recovery until October 14th, when the patient was attacked with rigors The limb also commenced to swell about this time, which was accompanied by a cessation of discharge. Poultices were applied to the wound and free incisions were made to favor the exit of pus. A stimulant and tonic treatment was administered and continued up to the time of the patient's death, which occurred on October 20, 1863, with all the symptoms of pyæmia. At the

post-mortem examination of the limb the astragalus was found to be fractured and the three cuneiform bones in a state of comminution. The articulating surfaces of the tibia and fibula together with that of the astragalus were blackened and eroded, and the cuboid and cuneiform bones with the articulating portion of the astragalus were in a complete state of disintegration." The history was reported by Surgeon W. M. Wright, 79th Pennsylvania, in charge of the hospital.

FIG. 332.—Posterior view of the bones of the right ankle. *Spec.* 2188.

CASE 828.—Private J. Conly, Co. A, 90th Illinois, aged 18 years, was wounded in the right leg, at Mission Ridge, November 25, 1863. He remained under treatment at a field hospital for four weeks, and subsequently he was an inmate of the Chattanooga general hospital until the following February, when he was transferred to hospital No. 1, at Nashville. Surgeon C. W. Hornor, U. S. V., in charge of the latter, recorded the following description and result of the injury: "A gunshot fracture of tibia and fibula by a minié ball, which entered three inches above the external malleolus, fracturing the bone, and passing downward and inward. The missile was removed at a point one inch internal to the inner malleolus, its presence being suspected only by the formation of an abscess over the seat of its lodgement a few days before its extraction. The patient died March 7, 1864. At the *post-mortem* examination old and strong pleuritic adhesions were discovered at the apex of the right lung, which contained a few dormant tubercles; the remainder of the lung tissues were healthy. The bronchial mucous membrane was slightly inflamed. The heart was healthy and contained neither light yellow nor blood clots in its cavities, and the blood in the heart as well as in the vessels was remarkable for its fluidity. The liver was healthy and weighed four pounds and one ounce; spleen very soft and puffy and weighing eleven and a half ounces; kidneys healthy, the right one weighing five and a half ounces and the left one six ounces. The stomach and bowels were in a healthy condition. On examining the cranium the vessels were found very much distended with blood. The arachnoid cavity contained serum; the organs otherwise were healthy." The bones of the injured ankle (*Spec.* 2188) were contributed to the Museum by Acting Assistant Surgeon H. C. May, and are represented in the wood-cuts (FIGS. 332, 333), revealing that the tibia was split into the joint and showing the fractured portions of the bones to be carious, the articulation being destroyed by suppuration.

FIG. 333.—Anterior view of the bones of the right ankle. *Spec.* 2188.

CASE 829.—Private W. H. Perry, Co. C, 1st Massachusetts Heavy Artillery, aged 39 years, received a gunshot fracture of the right tibia and fibula, also flesh wounds of both lower extremities, and a wound of the thorax, at Spottsylvania, May 19, 1864. He entered Lincoln Hospital, at Washington, three days afterwards, where he died of pyæmia May 30, 1864. The history, with the pathological specimen (No. 4580), represented in the accompanying cut (FIG. 335), was contributed to the Museum by Assistant Surgeon J. C. McKee, U. S. A. The specimen consists of the greater portion of the bones of the right leg, showing the fibula to be transversely fractured in the lowest fourth and the anterior portion of the tibia shattered into the ankle.

FIG. 335.—Tibia shattered into the right ankle joint.—*Spec.* 4580.

CASE 830.—Corporal M. Martin, Co. D, 28th Massachusetts, aged 27 years, was wounded at Hatcher's Run, March 25, 1865. Surgeon F. M. Hammond, 126th New York, reported his admission to the field hospital of the 1st division, Second Corps, with "shot wound of left foot." Ten days after the reception of the injury the patient was transferred to Douglas Hospital, Washington, whence Assistant Surgeon W. F. Norris, U. S. A., contributed the pathological specimen shown in the annexed wood-cut (FIG. 334), with the following history: "The wound penetrated the ankle joint. The ball entered in front, about midway between the malleoli, and made its exit posteriorly and a little above the external malleolus, comminuting in its course the lower ends of the tibia and fibula. There was marked constitutional disturbance, headache, high fever, rapid pulse, and loss of appetite. But little swelling or inflammation in the joint, however, took place, and not much discharge. The day subsequent to the patient's admission the joint was carefully examined, when both bones were found to be much comminuted and amputation was decided as the only resort giving a fair chance of recovery. The patient, however, positively declined all operative interference. Towards evening he had a slight chill. On April 7th there was nausea and vomiting, and on the following day he had three chills, followed by fever and profuse sweats. Nausea and vomiting continued, the fluid ejected being tinged with bile; the discharge from both wounds, however, retained its healthy appearance. On April 9th, 10th, 11th, and 12th the patient had a chill each day, and on the latter day there was marked yellowness of the face and conjunctivæ; slight cough and delirium. On April 13th there was another chill; pulse 110, respiration 38; severe pleuritic pain in the right side of the chest. Death occurred on April 14, 1865. Rigor mortis was well marked at the autopsy, also the yellow hue of the skin and conjunctivæ. On opening the thoracic cavity nearly a pint of intensely yellow fluid was found in the right pleural cavity. Each lobe of the right lung presented numerous patches varying in size from half an inch to two inches in diameter, most of which on incision gave exit to pus; the left lung contained similar patches in both lobes. The spleen was much softened, being almost semifluid in consistence; liver enlarged but apparently healthy; other thoracic and abdominal viscera normal." The specimen (No. 253) consists of the astragalus and the lower halves of the tibia and fibula of the injured limb, the extremities of both bones of the leg being shattered.

FIG. 334.—Shattered bones of the left ankle joint. *Spec.* 253.

CASE 831.—Private G. Abbott, Co. K, 9th Minnesota, aged 39 years, was wounded in the left foot, at the battle before Nashville, December 15, 1864, and admitted to hospital No. 8 the same day. Two days afterwards the patient was placed under the influence of chloroform, when the wound was examined and ascertained to have been caused by a minié ball, which entered at the outer aspect of the instep, passed inward and upward, and emerged one inch below the inner malleolus, badly fracturing

the cuboid, scaphoid, and head of astragalus, and channelling a large passage through these bones. The patient being a robust man, it was thought advisable to attempt to save the limb and to trust to nature to repair the injury. Irrigation was found serviceable to keep down and control the inflammation, swelling, and pain. The discharge was limited for some days, but profuse towards the last. On December 28th an abscess over the inner malleolus was opened, causing a free evacuation of pus. Two days later suppuration was free from the posterior part of the leg as well as about the foot. Lead wash and tight bandaging was applied. From December 30th the patient commenced to fail. He became very icteric in appearance, his pulse rapid, and the discharge from the wound unhealthy. On January 2d he was delirious, and on the following day, January 3, 1865, he died. At the autopsy all the internal organs were found remarkably healthy. The ankle joint was filled with pus and there were sinuses extending up the leg. The capsular ligament of the ankle joint was found to be nearly destroyed, and the articular extremities and surfaces of the bones were eroded. The history, with the specimen (No. 3755), consisting of the calcaneum, the fractured astragalus, cuboid, and scaphoid bones, was contributed by Acting Assistant Surgeon H. C. May.

In one of the ninety-nine fatal cases of shot fracture of the ankle joint the tibial artery was ligated, in another the femoral:

CASE 832.—Private W. Lazier, Co. M, 5th Artillery, aged 25 years, was wounded in the right ankle joint, at Brandy Station, August 1, 1863, by a bullet, which entered close to the anterior edge of the internal malleolus, slightly comminuting it. On the following day he was conveyed to Douglas Hospital at Washington. The missile was supposed to have lodged, there being no external wound of exit and the patient not being aware of it having been removed. On the next day Assistant Surgeon W. Thomson, U. S. A., in charge of the hospital, etherized the patient and explored for the missile, but it could not be found. The comminution was so slight that it was deemed possible to save the foot with the aid of free incisions should they become necessary. A prescription consisting of two drachms of fluid extract of rhubarb, one scruple of quinine, and three ounces of whiskey was ordered, on August 5th, to be given in teaspoonful doses every four hours. Dead bone having been felt with the probe, and the inflammation becoming so extensive and severe as to render operative interference necessary, two large incisions were made at the sides of the internal malleolus on August 8th, by Acting Assistant Surgeon C. Carvallo, and several loose fragments of bone were extracted. On this day the patient also had a chill of ten minutes' duration, and one-half drachm of quinine dissolved in four ounces of whiskey was prescribed to be taken in tablespoonful doses. On August 11th the inflammation became erysipelatous, involving the leg below the knee, and there was another chill. The quinine and whiskey mixture was then repeated and tincture of iodine was used to the limb, after which a wash consisting of one-half ounce of muriate of ammonia, ten grains of acetate of morphia, two ounces of sulphuric ether, and one pint of water, was applied over it. On August 13th there was still pain, swelling, and redness, and another chill of fifteen minutes' duration took place. Fluctuation was well marked, and incisions were made to give free exit to pus. In addition to the quinine, tablespoonful doses of a mixture of two drachms of muriated tincture of iron, two ounces each of spirit of Mindererus and water, and half an ounce of simple syrup, were administered three times a day. On August 15th, incisions were again required over both malleoli and another on the calf of the leg to allow accumulated pus to discharge. The patient's condition was now too much depressed to allow an amputation. Two days later pleurisy developed, which was treated by counter-irritation of turpentine and alcohol fomentations to the breast, and mustard poultices. On August 18th the limb had grown very red, swollen, and painful as high as the knee, and, fluctuation being felt, another incision was made by Dr. Carvallo, after which the leg was placed in a bran-box, and the wash, with one-half drachm of fluid extract of hyosciamus superadded, was re-applied. Hæmorrhage from one of the incisions in the calf of the leg, and supposed to proceed from one of the muscular branches, came on one-half hour afterwards, when cold water, alum, and compression was applied, and Hoffman's anodyne mixed with brandy and water was given every half hour. Hæmorrhages recurred in the afternoon and evening, being decidedly arterial, and were checked by persulphate of iron applied with charpie. Though active interference was demanded, the undoubted disease of the lungs caused by metastatic abscesses from pyæmia, together with the very rapid and difficult respiration and the collapse of the patient from the loss of six or eight ounces of blood, made amputation impossible. The only other resort being ligation of the femoral, ether was carefully administered and that operation was performed at 9 P. M., at the point of election, by Assistant Surgeon Thomson, the leg being so distended with clotted blood as to make any effort to secure the divided vessels abortive. The clots of blood were removed from the leg by compression, and after the operation the case was treated with the largest doses of stimulants, including aromatic spirits of ammonia and fluid extract of senega. Though he reacted from the low state he was in before the operation, the patient gradually sank during the night and died at 8 A. M. on August 19, 1863. At the autopsy both lungs were found to be filled with metastatic abscesses; there was also effusion of serum in both thoracic cavities. No injured artery could be detected, nor could the missile be found. The detailed notes of the case were furnished by the operators. Dr. Thomson also contributed the bones of the injured ankle (*Spec.* 1682), showing the articular surfaces to be eroded by suppuration and the internal malleolus to be slightly fractured.

CASE 833.—Private W. Coakley, Co. K, 28th Massachusetts, aged 37 years, was wounded before Petersburg, June 18, 1864, and admitted to the field hospital of the 1st division, Second Corps, where Surgeon W. Vosburgh, 111th New York, recorded: "Shot wound of foot." Acting Assistant Surgeon E. C. Manoch reported the following description and result of the injury: "The patient entered the First Division Hospital at Annapolis June 21st. He was wounded by a piece of shell, which struck the inner aspect of the left ankle, fracturing part of the bones forming the joint. When first admitted the wound was doing well. On June 25th he was isolated, at which time he complained of very severe pain over the whole foot, which had become very much distended and increased in temperature. I ordered the parts to be painted with muriatic tincture of iron, also the tincture to be given internally, and whiskey and beef-tea. The next day the pain in the foot had grown very intense and the patient's face presented a very anxious appearance, he having passed a very restless night. On June 27th his general condition was the same; pulse rapid and weak. The skin at the external front of the ankle now presented a purple appearance, being soft and fluctuating on pressure. An incision gave exit to several ounces of foul pus, after which charcoal and yeast poultices were applied. In the evening the discolored part assumed a decidedly gangrenous appearance. The patient sank rapidly notwithstanding the strong stimulation with plenty of beef-essence, and he died early in the morning of June 29, 1864."

CASE 834.—Dr. D. A. Hoffman, pension examining surgeon at Oskaloosa, Iowa, reports that "Brigadier General S. A. Rice, U. S. V., was wounded at the battle of Jenkins's Ferry, April 30, 1864, a ball entering the external malleolus of the right ankle, carrying with it a portion of his spur and strap, and passing through the ankle joint. I learned from the surgeon who accompanied him that previous to his return home he had several attacks of erysipelas On June 1st I examined him and found him suffering with pyæmia and an unhealthy condition of the system generally, and the wound discharging unhealthy pus. On June 15th the patient had another attack of erysipelas in the wound. During the treatment of the case several pieces of bone were removed. Despite all remedies he gradually grew worse, and died July 6, 1864."

EXCISIONS AT THE ANKLE JOINT FOR SHOT INJURY.—During the American civil war thirty-three excisions at the ankle joint for shot injuries were performed.[1] The results in two cases were not ascertained; twenty-two patients survived the operation and nine died, a mortality rate of 29.0 per cent. As indicated in the following table eleven were primary, eight intermediary, and nine secondary operations; in five either the date of injury or operation, or both, could not be ascertained.

TABLE LXXXVIII.

Numerical Statement of Thirty-three Excisions at the Ankle Joint for Shot Injury.

PARTS EXCISED.	OPERATIONS.																	
	CASES.					PRIMARY.				INTERMEDIARY.			SECONDARY.			TIME NOT SPECIFIED.		
	Total.	Recovery.	Death.	Undeterm'd.	Mortality of determined cases.	Cases.	Recovery.	Death.	Undeterm'd.	Cases.	Recovery.	Death.	Cases.	Recovery.	Death.	Cases.	Recovery.	Undeterm'd.
End of the Fibula	12	10	2	....	16.6	5	3	2	....	4	4	....	2	2	....	1	1	....
End of the Tibia	2	2	....	....	.....	2	2	....	....	....	....	....	....	....	....	....	....	....
Ends of the Fibula and Tibia	4	2	2	....	50.0	1	1	....	....	1	....	1	2	1	1	....	....	....
Astragalus	5	5	....	....	.....	1	1	....	....	....	....	....	1	1	....	3	3	....
Portion of the Fibula and Astragalus	2	....	1	1	100.0	....	....	....	....	1	....	1	....	....	....	1	....	1
Portion of the Tibia and Astragalus	2	1	1	....	50.0	....	....	....	....	....	....	....	2	1	1	....	....	....
Portion of the Fibula, Tibia, and Astragalus	5	2	3	....	60.0	1	1	....	....	2	1	1	2	....	2	....	....	....
Bone not specified	1	....	....	1	.....	1	....	....	1	....	....	....	....	....	....	....	....	....
Aggregates	33	22	9	2	29.0	11	8	2	1	8	5	3	9	5	4	5	4	1

It is noticeable that although excision at the ankle joint had been performed in the latter part of the last century by the elder Moreau,[2] and had frequently been repeated, for simple and compound fractures or caries, in the early part of the present century, the operation, prior to the breaking out of the War of the Rebellion in 1861, had only been done three times for shot injuries.[3] The first operation was performed in the English army during the Crimean War; the lower end of the fibula was excised and the case terminated in recovery; no details are recorded.[4] The second was performed, May 30, 1859, by Von Langenbeck on a Russian General wounded at the Alma, September 20, 1854, in the left

[1] From the records it would appear that the first excision of the ankle joint during the American civil war was performed by Assistant Surgeon J. S. BILLINGS, U. S. A., on January 6, 1862, for an axe wound involving the external malleolus and the scaphoid bone. The case will be detailed in the next chapter. The first total excision of the ankle joint for shot injury was performed by Surgeon E. BENTLEY, U. S. V., on October 9, 1862, in the case of Private J. Brennan, 16th West Virginia. Details of the case will be given hereafter.

[2] JEFFRAY (JAMES), *Cases of the Excision of Carious Joints by* H. PARK *and* P. F. MOREAU, *with observations*, Glasgow, 1806, p. 140, Case V. On April 15, 1792, the elder MOREAU excised the ends of the tibia and fibula and the articulating surface of the astragalus for caries in the case of M. Lucot, who walked without any assistance whatever nine months after the operation.

[3] The case related by FAURE (*L'amputation étant absolument nécessaire dans les plaies compliquées de fracas des os, etc.*, in *Prix de l'Académie Royale de Chirurgie*, Paris, 1819, T. III. p. 352) and cited by CULBERTSON (*Excision of the Larger Joints of the Extremities.* Prize Essay. *Trans. Am. Med. Assoc.*, Philadelphia, 1876, Supplement to Vol. XXVII, p. 280) and others as the first instance of excision at the ankle joint, can only be regarded as an instance of expectant conservative surgery. The articular surfaces of the tibia, fibula, and astragalus were fractured by shot at the battle of Fontenoy, May 11, 1745, in a soldier named Charles d'Amiens. Dr. RÉAD examined the wound and proposed to amputate the leg, but desisted at the urgent request of the patient. He then removed the detached portions of the tibia, fibula, and astragalus, placed the foot in proper position and secured it by a suitable apparatus. The patient recovered with good use of limb in about four months.

[4] MATTHEW (T. P.) *Med. and Surg. Hist. of the British Army which served in Turkey and the Crimea, etc.*, London, 1858, Vol. II, in tabular statement on page 368 and brief reference on p. 379.

ankle; the astragalus and the internal malleolus were removed by subperiosteal resection; the patient recovered without shortening of the limb; the joint became anchylosed.[1] The third was performed on a soldier wounded at Solferino, June 24, 1859. J. Neudörfer, several months after the injury, excised the roughened bony surfaces and several osteophytes that impeded the motion of the joint; the patient recovered rapidly with a useful limb.[2]

Primary Excisions at the Ankle Joint.—A complete excision of the ankle joint, in which portions of all the bones forming the articulation were removed, was performed in one only of the eleven primary operations; the patient recovered. The articular end of the fibula was excised in five cases, of the tibia in two, of the tibia and fibula in one, and of the astragalus in one; in the remaining case the portions removed were not indicated. Eight patients recovered, two died; the result in one case could not be ascertained. Details of the cases are subjoined:

CASE 385.—Private T. Bell, Co. H, 60th Illinois, aged 19 years, was wounded in the left ankle during the engagement near Marietta, July 4, 1864, by a minié ball, which fractured the lower end of the fibula. He was conveyed to the field hospital of the 2d division, Fourteenth Corps, where the excision was performed. The patient passed through different field hospitals and subsequently through various general hospitals. Surgeon B. B. Breed, U. S. V., in charge of hospital No. 1, Nashville, in reporting the case described the operation of excision as having involved the removal of three inches of bone from the fibula. Acting Assistant Surgeon W. Sturgis reported that when the patient entered Camp Butler, December 5th, his general health was bad. Erysipelas supervened, which was treated locally by linseed poultice and iodine, and internally by quinine, tincture of chloride of iron, etc. The patient was ultimately discharged from service June 29, 1865, and pensioned. Examining Surgeon J. Robbins, of Quincy, Illinois, certified, June 30, 1865: "A ball passed through the leg antero-posteriorly, just above the external malleolus, shattering the fibula and severing the tendo-achillis. Three inches of the lower extremity of the fibula have been removed, and complete anchylosis as well as the loss of bone and tendon render the limb useless." Numerous subsequent examiners have corroborated Dr. Robbins's certificate. The pensioner was paid September 4, 1880.

CASE 836.—Private B. B. Evitts, Co. I, 11th Connecticut, aged 23 years, was wounded in the left ankle, before Petersburg, June 18, 1864. He was conveyed to hospital at Fort Monroe, thence to McDougall, New York Harbor, and lastly to Brattleboro.' Acting Assistant Surgeon N. G. Brooks, in charge of the latter hospital, reported the man's admission, August 6th, with "shot fracture of tibia, followed by excision of the internal malleolus the day after the injury and favorable progress subsequently." The patient was transferred to the Veteran Reserve Corps February 11, 1865, and five months later he was mustered out of service and pensioned. Examining Surgeon C. B. Maltbie, of Falls Valley, Connecticut, June 28, 1868, certified: "The pensioner was wounded by a minié ball entering the ankle joint from the tibial side and lodging therein, from where it was extracted. The injury rendered the joint stiff and incapacitated the man for manual labor. Use of the limb caused the wound to reopen last season and to discharge freely." No changes were reported at subsequent examinations. This pensioner was killed by falling from a locomotive engine July 19, 1875.

CASE 837.—Private J. W. Bloyd, Co. H, 11th West Virginia, aged 18 years, was wounded in the left ankle during the fight at New Creek, August 4, 1864. He was conveyed to the Post Hospital at New Creek, where partial excision of the joint was performed, on August 5th, by Acting Assistant Surgeon W. B. Crain, who reported the following description of the injury: "A conical ball penetrated the tissues on the outer aspect of the leg, one and a half inches above the external malleolus, fracturing the fibula and burying itself in the ankle joint between the astragalus and the tibia. The articular surface of the astragalus was considerably comminuted, and that portion of the articular surface and cancellated structure of the tibia external to the groove of the flexor longus pollicis was also badly comminuted. The external surface was apparently uninjured. The operation was performed by slightly enlarging the wound on the outer aspect of the leg, where three large spiculæ were removed from the fibula. The ball and all the loose fragments were then extracted, and the rough spiculæ of the fractured portion of the tibia and astragalus were gouged and chiseled out. The constitutional state of the patient at the time of the operation was in every respect favorable, and the limb was but little swollen, but very painful. The patient did well until August 27th, at which time he began to suffer very much from pain, owing to a great accumulation of pus in the joint. To relieve this and to insure a free and constant outlet a large-sized seton was introduced into the wound in the outer aspect of the leg, carried obliquely between the articular surfaces of the tibia and astragalus and passed out in front of the external malleolus. An apparatus similar to Smith's anterior splint was also adjusted to the limb in order to insure greater comfort." After he became convalescent the patient was transferred to hospital at Cumberland, where he was discharged from service May 6, 1865, and pensioned. Dr. J. C. Hupp, of Wheeling, and other examining surgeons have, at successive periods, certified to the injury. In 1873, the injured ankle and also the lower third of the leg was reported as being enlarged, the extensors of the foot as acting imperfectly, etc. Subsequently the mobility of the ankle joint was described as impaired. The pensioner was paid June 4, 1880.

CASE 838.—Captain A. F. Miller, Co. K, 48th New York, aged 38 years, was wounded in the right ankle, at Cold Harbor, June 2, 1864. He was admitted to the field hospital of the 3d division, Sixth Corps, and thence, several days afterwards, to the Seminary Hospital at Georgetown. Surgeon H. W. Ducachet, U. S. V., in charge of the latter hospital, reported that the patient obtained leave of absence on June 13th and proceeded to his home. On January 13, 1865, the patient was discharged

[1] VON LANGENBECK (B.), *Ueber die Schussfracturen der Gelenke und ihre Behandlung*, Berlin, 1868, p. 46, and GURLT (E.), *Die Gelenk-Resectionen nach Schussverletzungen*, Berlin, 1879, p. 133.

[2] NEUDÖRFER (J.), *Die Endresultate der Gelenkresectionen*, in *Wiener Medicinische Presse*, 1871, Jahrgang XII, p. 405.

from service and pensioned. Dr. G. T. Stevens, formerly Surgeon 77th New York Volunteers, subsequently contributed the following description of the injury and resection of the ankle, which he performed: "The wound was caused by a minié ball, which penetrated the ankle, entering just behind the outer malleolus, passing nearly through the bones, and lodging in the inner side of the tarsus. The os calcis and astragalus were badly shattered. Two days after the reception of the injury the patient was brought under the influence of chloroform with intent to amputate; but after carefully inspecting the wound it was decided to attempt to save the foot. The wound was then enlarged by crucial incision, splinters of bone were removed, and the ball, which laid in the inner side of the ankle, was extracted. The shattered fragments of the os calcis and astragalus were then removed by a gouge and bone nippers, the wound was drawn together and water dressings were applied. On June 6th the patient was transferred to White House Landing in an army wagon, where he remained three days. Thence he was taken to Washington, and a week afterwards he went to his home in Brooklyn. Water dressings were continued. Extensive suppuration took place, and several deep incisions were made near the ankle. In about four weeks a considerable piece of dead bone came away, after which improvement was rapid. In injecting fluids into the original wound they passed freely through the ankle, coming out at an opening on the opposite side. In the course of eight weeks the patient was able to walk with crutches and from that time his recovery was rapid. He now (March 9, 1868) walks with little difficulty and there is no anchylosis." The Brooklyn and Boston Examining Boards in 1874, 1875, and 1877, respectively, certified to "anchylosis of the ankle joint, tendons bound down," etc. The pensioner was paid June 4, 1880.

CASE 839.—Private I. Ostheimer, Co. F, 66th New York, aged 31 years, was wounded in the right leg, at Antietam, September 16, 1862, and admitted to a Second Corps field hospital. Surgeon C. S. Wood, 66th New York, reported: "A minié ball struck the tibia anteriorly about four inches above the malleoli, shattering the bone. The fibula and bones of the foot were uninjured. I performed resection of the lower four inches of the tibia, removing the bone from the articulation, after which splints were applied to the leg; case sent to General Hospital." Acting Assistant Surgeon A. V. Cherbonnier recorded the patient's admission to hospital No. 5, at Frederick, where a large sequestrum was removed on November 22d, also that a large portion of the diseased tibia was resected on December 2d. About two weeks afterwards the wound assumed a healthy appearance, and by December 28th it was filling up with healthy granulations, the patient being cheerful and feeling well. On the next day he was transferred to hospital No. 1, where he remained until the following June, when he was sent to Patterson Park (Convalescent) Hospital at Baltimore. On August 10, 1863, the patient was returned to his command for duty, and while in the field he again came under the notice of Surgeon Wood, who made the following supplementary report: "The man laid in hospital for seven months before he could move his leg. Being possessed of a good constitution and no untoward symptoms appearing, at the end of that time he began to walk a little, and now—eleven months after the reception of the injury—he has just been returned to duty. On examination a large cicatrix is found, the bone having refilled its entire length and uniting with the astragalus with a moveable articulation. Although less than usual, the bone is not quite so long as its fellow, allowing the foot to turn slightly inward. Otherwise he has a very useful limb. He cannot endure hard marches as well as formerly, and probably never will. Still the case is one of interest, as not one in twenty saves his limb after the receipt of a like injury." According to information from the Adjutant General, U. S. A., this man has been reported as "missing in action" since the battle of Todd's Tavern, May 8, 1864.

CASE 840.—Private A. C. Rose, Co. H, 10th Illinois, aged 22 years, was wounded at Bentonville, March 21, 1865. Assistant Surgeon J. W. Brewer, U. S. A., reported his admission to the Seventeenth Corps Field Hospital with "shot fracture of left ankle," for which resection of fibula was performed by Surgeon W. A. Gott, 25th Wisconsin. From the field the wounded man was sent to Foster Hospital at New Berne, thence to McDougall Hospital at Fort Schuyler, and lastly, on August 18th, to DeCamp Hospital, David's Island. On September 23, 1865, the patient was discharged from service and pensioned, Assistant Surgeon W. Webster, U. S. A., in charge of the latter hospital, certifying to the disability resulting from fracture of the fibula. Examining Surgeon I. H. Ruden, of Lacon, Illinois, who examined the pensioner periodically, in 1866 described the injury as having been "followed by gangrene in the wound, which caused necrosis of one-third of the bone. Ankle nearly immovable and painful." Some years later he stated that "about two inches of the bone had been removed. The cicatrix is large and firm, so much so that the circulation of the foot is impeded, causing varicose veins; it is also so tender that he cannot wear a boot or high shoe. The ankle joint is not free in its movements, owing to adhesions of the tendo-achillis to the heavy cicatrix, and becomes swollen and painful when used to any considerable extent." The pensioner was paid June 4, 1880.

In the following three cases the limb was subsequently amputated, in two in the middle, in one in the lower third of the leg. Two of the patients recovered, one died:

CASE 841.—Sergeant M. G. Sparks, Co. I, 10th New Jersey, aged 25 years, was wounded in the right ankle, before Petersburg, April 2, 1865. He entered the field hospital of the 1st division, Sixth Corps, where Surgeon R. Sharpe, 15th New Jersey, recorded the injury as a "shot fracture of the fibula and tarsus," also that "resection of the fibula" was performed. The patient was subsequently transferred to the Depot Hospital at City Point, and from there, on April 12th, to Judiciary Square Hospital at Washington. Surgeon E. Griswold, U. S. V., in charge of the latter, reported that when the patient was admitted his constitutional state was not good and the injured parts were in a bad condition, necessitating amputation, which was performed by antero-posterior skin flaps at the middle third of the leg, on April 13th, by Acting Assistant Surgeon Z. P. Dennler. Chloroform and ether constituted the anæsthetic. After the amputation simple dressings were used and stimulants, etc., were administered. Subsequently the patient passed through various hospitals, and on February 2, 1866, he was discharged from service and pensioned. He was paid June 4, 1874, since when he has not been heard from.

CASE 842.—Private S. H. Myers, Co. E, 75th Indiana, aged 20 years, was wounded, before Kenesaw Mountain, June 21, 1864. He was admitted to the field hospital of the 3d division, Fourteenth Corps, where Surgeon F. Lloyd, U. S. V., recorded: "Shot fracture of left ankle; resection of two inches of tibia and fibula." One week afterwards the wounded man was sent to the General Field Hospital at Chattanooga, whence Assistant Surgeon C. C. Byrne, U. S. A., reported that amputation became necessary, and was performed by the circular method at the lower third of the leg by Acting Assistant Surgeon G. E. Stubbs,

on June 30th. The patient's subsequent progress was fair, the treatment consisting of water dressings, tonics, and stimulants. About two weeks after the amputation he was transferred to hospital at Nashville, and lastly he was admitted to Ekin Barracks, Indianapolis, where he was discharged from service March 7, 1865, and pensioned. In his application for commutation he stated that the first operation (meaning that of resection) was performed by Surgeon C. N. Fowler, 105th Ohio, five hours after the reception of the injury. The pensioner died April 12, 1872.

CASE 843.—Private G. W. Velic, Co. C, 24th Michigan, aged 28 years, was wounded at Cold Harbor, June 3, 1864. He entered the field hospital of the 4th division, Fifth Corps, where Surgeon C. N. Chamberlain, U. S. V., recorded: "Severe shell wound of ankle joint; excision of lower end of fibula." Ten days after the date of the injury the wounded man was transferred to Armory Square Hospital, Washington, where Surgeon D. W. Bliss, U. S. V., subsequently amputated the limb and recorded the result of the case as follows: "The injury was a lacerated wound of the right ankle, the outer malleolus being shattered and the joint opened. On June 28th the leg was amputated at the middle third. The circular flap operation was performed, the patient being under the influence of chloroform. On July 3d there was sloughing and sanious discharge from the stump. By July 12th there was hospital gangrene, which rapidly extended to the knee and was treated with nitric acid and yeast poultices. The patient died July 18, 1864."

CASE 844.—Private J. Durst, Co. D, 148th Pennsylvania, aged 24 years, was wounded in the left lower extremity, at Gettysburg, July 2, 1863, and admitted to the field hospital of the 1st division, Second Corps. Surgeon C. S. Wood, 66th New York, reported: "The lower portion of the fibula was shattered by a minié ball, and resection was performed of the articulation of the bone about four inches in length. The tibia remained sound. A splint was applied to the outer portion of the leg, and cold-water dressings. The case continued to do well, with a fair prospect of getting ultimately a very good limb." Three weeks after being wounded the patient was transferred to the Cotton Factory Hospital at Harrisburg, where Acting Assistant Surgeon W. S. Woods noted the case as one of "exsection of the left ankle joint," and recorded the following termination: "The patient, a man of irritable and nervous temperament, was suffering severely from the wound when admitted. There was considerable sloughing of the wound at the time, attended with deep-seated suppuration. Several spiculæ of bone were taken out. For a time the leg was placed in a cushioned box splint and the usual simple cerate and cold-water dressings were applied twice each day. The weather becoming unusually warm it was found necessary to suspend the leg in a cot splint, which proved to be far more comfortable. The same treatment was continued, a tonic course and liberal diet being allowed. By August 13th the wound granulated nicely and the patient was considered as doing well. He improved slowly until September 19th, when he had a severe chill, also pain in the inguinal glands, followed by traumatic erysipelas. For the first two days antiphlogistic remedies were advised, which were followed by quinine and whiskey. The leg was washed with glycerine and iodine. The case resulted fatally on October 6, 1863."

CASE 845.—Private *J. Radford*, Co. F, 14th Virginia, received a gunshot wound of the ankle joint May 9, 1864. Excision of the joint was performed on the following day, and the patient was subsequently transferred to General Hospital. The report of the case was contributed by Dr. H. L. Thomas, late Surgeon P. A. C. S., who obtained the record of the injury and operation from the notes of Confederate Surgeon J. S. Pride, Battle Hospital, Dublin Depot.

Intermediary Excisions at the Ankle Joint.—Of the eight excisions of this group five were successful, three fatal. In one case portions of the astragalus were excised, in one the extremities of the tibia and fibula, in four the extremities of the fibula, and in two the surfaces of the three bones forming the articulation were removed:

CASE 846.—"Private J. Brennan, Co. K, 16th West Virginia, aged 18 years, was admitted to hospital at Alexandria on October 6, 1862, with a wound of the right ankle joint, received accidentally the night previous. On examination it was found that a pistol ball had entered the ankle three-fourths of an inch posterior and inferior to the internal malleolus, passed forward and upward, rupturing the capsular ligaments and cutting its way between the articular surfaces of the tibia and astragalus and lodging within the joint. He was in good health at the time of the injury and evidently suffered no great amount of pain. He was freely purged and a light and nutritious diet enjoined. The question of procedure was exceedingly perplexing. The single small bullet hole and the slight local and constitutional symptoms presented a case apparently well adapted to the performance of resection, while the want of success attending this operation was a serious argument against its performance. It was decided, however, to resect the joint, which was done on October 9th. The patient being under the influence of chloroform, two lateral incisions were made about four inches in length, terminating three-fourths of an inch below the malleoli. The lips being drawn asunder, a chain saw was then applied to the tibia and about one-third of an inch of the extremity removed; the extremity of the fibula, on a level with the tibia, was removed through the opposite opening, and through the same aperture a portion of the articular surface of the astragalus was taken away. By this method the division of the extensor tendons and of the anterior tibial artery was avoided. The posterior tibial was uninjured. The incisions were closed with silver wire sutures, and the bones were held in apposition by means of adhesive strips extending down the sides of the leg and embracing the sole of the foot. Lateral splints of binders' board were applied. The hæmorrhage was trifling, no vessels having to be tied. On the following day there was considerable febrile excitement; pulse 100; skin hot and dry. Small doses of antimony and morphia were administered. On the next day the patient appeared more comfortable but complained of slight pain; pulse diminished in force and frequency. On October 12th the patient was comfortable; skin cool and moist; pulse 80 per minute. Discontinued the medicine. On October 13th suppuration was established and the patient was comfortable; limb suspended by means of Smith's anterior splint; lateral splints retained. From this time the dressings were daily removed. By October 16th the patient was doing well and the wound was discharging freely; diet light, though nutritious. Four days later he began to take solid food. On October 27th the incisions were filled with granulations. The dressings were continued to November 25th, when Smith's splint was removed, the lateral splint being still applied. The patient remained in bed until December 20th, when he

began to move about on crutches. The lateral splints were removed in the early part of February, at which time he moved about freely and with little embarrassment. In dressing, the toes of the injured side were extended so as to be on a line with those of the sound side. The advantage of this is apparent when a shoe with a high heel is worn. The elasticity of the instep thus brought into play compensates in a great measure for the anchylosis." The case is reported by Surgeon E. Bentley, U. S. V. The subsequent records in the case show the patient was mustered out at the expiration of his term of service, June 16, 1863. There is no record of his ever having applied for pension.

CASE 847.—Private N. Lloyd, Co. I, 29th Pennsylvania, aged 38 years, was wounded in the left ankle, at Gettysburg, July 1, 1863. He was admitted to the Twelfth Corps field hospital, where Surgeon H. E. Goodman, 28th Pennsylvania, noted that an excision at the lower third of the fibula was performed on July 12th by Surgeon J. A. Wolf, 29th Pennsylvania. Three weeks after being wounded the patient was transferred to Camp Letterman, several months later to hospital at Baltimore, and subsequently to Philadelphia. Acting Assistant Surgeon W. V. Keating reported his admission to Broad and Cherry Streets Hospital, December 11th, and described the injury as "a compound gunshot fracture of the external malleolus opening the ankle joint, followed, apparently, by resection of a very small portion of the malleolus. The patient apparently did not get along very well. On his admission the tissues around the ankle joint were considerably swollen and there were symptoms of chronic arthritis. A sinus on both the inner and outer side of the ankle connected with the joint, where the cartilages were found eroded and from which a sanious discharge issued. On January 23, 1864, when the patient was transferred to Mower Hospital, the swelling around the joint had somewhat diminished and the sinus on the inner side of the ankle had healed, while the one on the external side still discharged a slight amount of sanious pus." Surgeon J. Hopkinson, U. S. V., in charge of Mower Hospital, reported the result of the case as follows: "At the time of the patient's admission the wound was nearly closed, the joint stiff, the parts swollen, and circulation in the foot very feeble. The cold douche was used to the foot with marked benefit. By February 16th the foot was much better, the patient being able to place it on the floor and bear some weight on it. One month later the foot was rapidly improving and the treatment was discontinued." On April 20, 1864, the patient was discharged from service. Examining Surgeon T. B. Reed, of Philadelphia, February 5, 1866, certified to "compound fracture of left ankle, shattering the outer malleolus and requiring exsection of the same. Permanent anchylosis of ankle. The greatly impaired use of the foot has produced subsequent irritation of the knee joint, with rheumatism. Is obliged to use a cane or crutch constantly. Amputation of the foot and the use of an artificial limb would be a great improvement to his present condition." Subsequent examiners substantially confirm Dr. Reed's report. The pensioner was paid September 4, 1880.

CASE 848.—Private D. Stottlemeyer, Co. K, 66th Ohio, aged 17 years, was wounded in the right ankle joint, at Cedar Mountain, August 9, 1862, and entered Fairfax Seminary Hospital several days afterwards. Surgeon D. P. Smith, U. S. V., reported that the patient was discharged from service October 9, 1862, by reason of "exsection of lower third of fibula, anchylosis of ankle joint," etc. Examiner S. M. Smith, of Columbus, Ohio, certified, December 22, 1862: "He received a wound in the right ankle, a musket ball entering the outer portion of the joint, embedding itself in the bones of the joint and fracturing them. Eleven days afterwards the missile and portions of bone were removed. At present there is great enlargement of the joint and foot, complete anchylosis of the joint, an open wound and necrosis of bone." Examining Surgeon W. S. Constant, of Delaware, Ohio, November 4, 1880, certified to the injury and reported as its result "an occasional suppurating wound of the ankle, partial anchylosis of ankle joint, and shortening of limb from contraction, so that he can walk only on the ball of the foot. The pensioner cannot walk any distance or do much manual labor."

CASE 849.—Sergeant A. M. Wright, Co. C, 80th Indiana, aged 23 years, was wounded in the left ankle, at Resaca, May 14, 1864. Surgeon E. Shippen, U. S. V., reported his admission to the Twenty-third Corps field hospital, whence the wounded man was transferred to hospital at Chattanooga and afterwards to hospital No. 15, Nashville. Surgeon W. M. Chambers, U. S. V., in charge of the latter hospital, described the injury and reported that "the bone was fractured and necrosed," necessitating "excision of two and a half inches of the lower end of the fibula, which was performed on June 13th by Acting Assistant Surgeon J. J. O'Riley. Gangrene ensued the day after the operation, but was stopped by applying bromine. Simple dressings were used and nutritious diet and stimulants were administered." The patient subsequently was transferred to Joe Holt Hospital, and later to Lincoln Hospital, Washington. In the following March he was returned to duty, and on June 22, 1865, he was mustered out of service. Examining Surgeon H. M. Smith, of Vincennes, Indiana, March 31, 1877, certified: "I find on examination that the applicant received a wound in the ankle joint. The ball penetrated the lower part of the external malleolus and passed through the head of the tibia, making its exit on the front part of the ankle, at which point a large cicatrix exists—as if caused by sloughing—resulting in adhesions of the soft parts and partial anchylosis of the joint," etc. The pensioner was paid June 4, 1880.

In the following instance gangrene appeared three months after the excision, and amputation was performed in the middle of the leg:

CASE 850.—Private F. Thorn, Co. D, 63d Pennsylvania, aged 28 years, was wounded in the left lower extremity, at the Wilderness, May 5, 1864. Surgeon O. Evarts, 20th Indiana, reported his admission to the field hospital of the 3d division, Second Corps. Three weeks after the reception of the injury the wounded man entered Emory Hospital, Washington, where he underwent the operation of excision at the hands of Surgeon N. R. Moseley, U. S. V., who reported that "the injury consisted of a gunshot wound of the left ankle, the bones being comminuted and the soft parts lacerated, but in a favorable condition. On May 26th chloroform and ether was administered, and resection of the lower third of the fibula was performed. The parts were kept in coaptation by adhesive straps, and cold-water dressings were used." According to a subsequent report the patient obtained a furlough on July 16th and left the hospital for his home in Erie, Pennsylvania, where "Dr. R. Faulkner amputated the leg at the middle third, on August 17th, by reason of gangrene." Several months later the patient, who had in the meantime been assigned to the 105th Pennsylvania Volunteers, returned, and was transferred to Judiciary Square Hospital. After being supplied with an artificial leg he was discharged from service March 18, 1865, and pensioned. He was paid March 4,

1880. Five small fragments of the fibula, removed at the first operation by Surgeon Moseley, and contributed by him to the Museum, constitute specimen 2362 of the *Surgical Section*.

Three of the eight intermediary excisions at the ankle joint proved fatal—two from pyæmia and one from exhaustion:

CASE 851.—Private J. Davis, Co. L, 1st Michigan Cavalry, aged 18 years, was wounded at Salem Church, May 28, 1864. Surgeon W. H. Rulison, 9th New York Cavalry, reported his admission to the field hospital of the 1st division, Cavalry Corps, "with shot wound of left foot and hip." Surgeon J. A. Lidell, U. S. V., who operated in the case, made the following report: "The patient was admitted to Stanton Hospital, Washington, June 4th, with a gunshot wound of the left tarsus, inflicted by a minié ball, which struck the foot a little below the external malleolus and passed through the tarsus horizontally inward and somewhat backward, escaping a little below and behind the internal malleolus. It occasioned compound comminuted fracture of the calcaneum, astragalus, and posterior edge of the external malleolus. At the time of the operation, June 10th, the ankle and foot were much swollen, inflamed, and very painful; the leg was also swollen. The edges of the orifices of both entrance and exit were pouting and exhibited no tendency to close; discharge thin and scanty. Since the patient came to Stanton Hospital the wound had been treated with ice dressings, but was manifestly growing worse. He now had a good deal of constitutional disturbance; pulse quick and ranging from 110 to 120; skin dry and too warm; countenance pinched and anxious; tongue coated, and appetite poor. He was also restless, got but little sleep, and his general condition was daily getting worse. Wishing to avoid secondary amputation of the leg if possible on account of the great fatality which had lately attended it, resection was performed of the anterior extremity and part of the external side of the calcaneum. Some fragments of the astragalus were also extracted, and a splinter from the posterior edge of the external malleolus. The incisions were made on the external side of the foot, from the orifice of entrance, first, to the base of the metatarsal bone of the little toe; second, to the base of the external malleolus; third, to the point of the heel; and fourth, to the dorsum of the foot, two and a half inches. Sulphuric ether constituted the anæsthetic. There was no shock. Ice-water dressings were continued. On June 11th the patient was cheerful and free from pain and the swelling and irritative fever had abated. He died of pyæmia on June 20, 1864. Autopsy: The ankle joint contained pus; the bones were partially denuded of their cartilage; muscles of leg infiltrated with pus. The left pleural cavity contained a large quantity of dark-colored effusion, and the left lung was compressed against the vertebral column; the inferior lobe contained an abscess about the size of an egg, which was filled with dark-colored and offensive pus. The right lung contained several superficial abscesses and some patches of lobular pneumonia. Thrombi existed in the femoral vein." In his publication[1] of the operation the operator furnished the following supplementary details of the patient's progress, as well as of the autopsy, in addition to his comments on the case: After the operation "the limb was placed upon a wire splint (Smith's) bent to a right angle, which was well padded and applied to the posterior part of the leg and sole of the foot, where it was properly secured by roller bandages for the purpose of keeping the ankle joint in a fixed position. The wound was plugged with lint and a full opiate was given. The constitutional treatment consisted in the administration of nutrients, tonics, and stimulants. On June 12th the patient had a severe pyæmic chill and sweat, and quinine in full doses was added to the treatment. On the next day he was much worse; wound discharging a thin dark-colored pus; chills and sweats increasing in frequency and severity; complexion assumed a bronzed hue; breath bovine; body exhaling a sweet mawkish smell; anorexia; debility; diarrhœa set in. Pneumonic symptoms also appeared, and a large proportion of blood was mingled with the sputa. He sank rapidly. At the autopsy the calcaneum was found to be fractured entirely through and its cancellous structure was gangrenous. The astragalo-scaphoid articulation contained pus and the articulating surface of its bones was entirely denuded of its cartilage. The connective tissue on the front of the leg was infiltrated with pus from the ankle joint upward to the extent of three inches, and the tibia and fibula were denuded of periosteum to the extent of two inches. The liver and spleen were both enlarged and softened, but the kidneys presented a normal appearance. There were clots in both ventricles of the heart. Comments: In this case also osteomyelitis supervened, which was conclusively shown by the gangrenous condition of the cancellous tissue belonging to the calcaneum, or, rather, the gangrenous condition of the medullary tissue which filled the cancelli of that bone. Besides, it is probable that if the interior of the tibia and fibula had been examined the marrow would have been found inflamed at and above the place where those bones were seen to be denuded of periosteum at the *post-mortem* examination. It is also probable that the medullary tissue of the denuded portion of the tibia contained collections of purulent matter which were produced by the suppurative character of the inflammatory process involving that tissue. Furthermore, it is probable that the inflammatory process had extended to the medullary tissue of the tibia prior to the performance of the resection of the tarsus, and if its presence there had then been recognized, it would have contra-indicated that operation and called for amputation far up the limb. The thrombosis of the femoral vein was of recent occurrence. The coagulated blood which filled that vein presented a fresh appearance and had not yet undergone the puriform transformation, nor even become at all softened. It was therefore obvious that the thrombosis had not occasioned the visceral abscesses nor the inflammation of the lungs, since the morbid process in those organs was considerably older than the thrombus of the femoral vein. The thrombosis was a more recent event than the pyæmia. This circumstance is important, because it shows that the pyæmic process in this case could not have had its origin in the thrombosis, and that if any relationship or necessary connection existed between them, the pyæmic process induced the formation of the thrombi. The symptoms of irritative fever (or, speaking properly, the surgical fever of an irritative type), which where so strikingly relieved by the operation, had been produced entirely by local causes, namely, the inflammation of the various structures bordering upon and connected with the gunshot wound, such as the connective, the fibrous, the osseous, and the medullary tissues. The symptoms of the purulent infection did not make their appearance till two days after the operation. They presented a marked contrast to those of the surgical fever which preceded the operation. They denoted the occurrence of a poisoned condition of the blood and the whole system, under which the patient sank rapidly, and died on the eighth day after its advent."

[1] LIDELL (JOHN A), in *U. S. Sanitary Commission Memoirs*, Surgical Volume I, pp. 524–6, and CULBERTSON (H.), *Excision of the Larger Joints of the Extremities*, in *Transactions of the American Med. Association*, Philadelphia, 1876, Supplement to Vol. XXVII, p. 314.

CASE 852.—Private J. F. Geer, Co. F, 112th New York, aged 22 years, was wounded at Cold Harbor, June 2, 1864. Surgeon S. A. Richardson, 13th New Hampshire, recorded his admission to the Eighteenth Corps field hospital with "shot wound of left ankle." Surgeon R. B. Bontecou, U. S. V., contributed the following description of the injury and operation in the case, which he performed: "The patient was admitted to Harewood Hospital, Washington, June 15th, suffering from a wound of the left ankle, the ball passing from the inner to the outer surface, opening the joint. On admission the condition of the injured parts and the constitutional state of the patient was good. On June 25th resection of the injured joint was performed by lateral vertical incisions over the malleoli, exposing the articulation. The ends of the tibia and fibula were cut off by the chain saw, and the upper portion of the astragalus was removed by the cutting forceps. Sulphuric ether was used. Two days after the operation the patient had slight febrile movement and his pulse was a little accelerated. The treatment was supporting; simple dressings were used. Death occurred on July 24, 1864."

CASE 853.—Sergeant W. Roberts, Co I, 7th New York Artillery, aged 35 years, was wounded in the left ankle, at Cold Harbor, June 10, 1864, by a conoidal ball, which passed from before backward, fracturing the external malleolus and opening the ankle joint. He entered Harewood Hospital, Washington, five days afterwards, at which time his constitutional state was very poor, the injured parts were in a very bad condition, and the wound discharged fetid pus. Resection of the ankle joint was performed on June 24th by Surgeon R. B. Bontecou, U. S. V., who exposed the articulation by incisions over the malleoli and excised the lower articular extremities of the tibia and fibula. Sulphuric ether was used. The patient did well up to July 1st. From that period diarrhœa set in and he gradually sank. There were no pyæmic symptoms. He died July 6, 1864, from exhaustion. The history was reported by the operator.

Secondary Excisions at the Ankle Joint.—Of nine secondary operations the articular surfaces of the fibula were excised in two, of the tibia and fibula in two, of the astragalus in one, of the tibia and astragalus in two, and of the tibia, fibula, and astragalus in two instances. Five patients recovered, four died.

CASE 854.—Sergeant C. Barber, Co. E, 88th Pennsylvania, aged 30 years, received a shot fracture of the fibula of the left leg, at Gettysburg, July 1, 1863. From a First Corps field hospital he passed to York and subsequently to Philadelphia. Acting Assistant Surgeon M. K. Knorr recorded the following description of the case at the South Street Hospital, where the patient was admitted August 14th: "The wound was caused by a minié ball passing in above the external malleolus, fracturing the bone, and passing through the interosseous space. About August 20th hospital gangrene set in and the wound filled with large sloughs; patient became very weak. Stimulating poultices of yeast and flaxseed were then used, and pulverized persulphate of iron was applied to the slough. After three applications the patient appeared much better and the slough came off. Poultices were now continued for a while, and afterwards stimulating applications. Still the wound was not healing, the discharge being yet great and the patient's constitutional state extremely low and weak. On examination Surgeon C. N. Chamberlain, U. S. V., found the bone to be necrosed and denuded of periosteum, and concluded to excise the fibula. This operation was accordingly performed on December 19th, it being deemed necessary to remove three-fourths of the length of the bone, including the external malleolus. The patient rallied from the operation and made rapid improvement. Tonics and stimulants were given and simple dressings used." Surgeon H. Janes, U. S. V., subsequently in charge of South Street Hospital, reported, in April, 1864, that the wound had healed with the exception of the upper part, where a small sinus still existed. The patient was afterwards transferred to Filbert Street Hospital, and on September 17, 1864, he was discharged from service and pensioned. Examining Surgeon H. L. Hodge, of Philadelphia, certified, December 21, 1864: "The limb is now much swollen, the ankle is painful and the foot turned outward. He is very lame and the limb is useless." The Philadelphia Examining Board, April 10, 1872, certified to the injury and operation and described the result as follows: "A long cicatrix with musculo-fascial adhesions; a slight varicose condition with tenderness about the ankle joint, and anchylosis of the ankle joint with atrophy of muscles on posterior portion of leg. Increase of pension is recommended on account of increased pain and firmness of anchylosis of the ankle joint."

FIG. 336.—Outer view of left leg 18 years after excision of the lower three-fourths of fibula. [From a photograph.]

FIG. 337.—Anterior view of the same. [From a photograph.]

In a communication dated April 18, 1881, accompanying the photographs represented in the annexed wood-cuts (FIGS. 336, 337), the pensioner stated that "the ankle is very painful at present," and added that his disability had obliged him to give up working at his trade of stone cutter.

CASE 855.—Private W. A. Gavett, Co. K, 141st Pennsylvania, aged 43 years, was wounded in the right ankle during the engagement near Bristoe Station, October 13, 1863, and entered Judiciary Square Hospital, Washington, three days afterwards. Assistant Surgeon A. Ingram, U. S. A., made the following report: "The wound was caused by a minié ball, which entered at the internal malleolus, passed into the ankle joint and lodged. The missile was extracted the next day through the wound of entrance. Partial excision of the ankle joint was performed on February 1, 1864, by Acting Assistant Surgeon J. F. Thompson. An incision two and a half inches in size was made on the outer side of the ankle and several pieces of bone were taken out. Part of the internal malleolus was dissected from the integument and removed through the enlarged wound of entrance, and a portion of the astragalus was taken away with the bone forceps. At the time of the operation the patient's general health was excellent, but considerable inflammation existed around the ankle joint and there was great discharge of pus

from the wound. A collection of pus had also formed on the outer side at the point of the internal incision. The patient did well for about a month after the operation, at which time both sides had healed. A day or two afterwards an abscess was detected in front of the joint, which, on being opened, discharged considerable pus. Carious bone could be felt by the probe, indicating the necessity of another operation." The patient was subsequently transferred to Philadelphia, where he was admitted to Summit House and afterwards to Satterlee Hospital. On May 6, 1865, he was discharged from service and pensioned. Examining Surgeon C. M. Turner, of Towanda, Pennsylvania, December 27, 1865, certified to the injury and added: "Of course anchylosis has taken place and the tendons of the foot and toes are in a degree contracted and rigid." On August 16, 1869, he reported that the pensioner "walks with difficulty and has much pain after exercise. The joint is often inflamed, and abscesses form in the integuments, which discharge pus for many days. I do not think the joint is carious," etc. At subsequent dates the same examiner certified to the heel bone being diminished in size, and to the leg being atrophied up to the knee and shortened two inches. Examiner C. F. Paine, of Troy, Pennsylvania, September 22, 1879, reported "fistulous openings, constantly discharging portions of bone. The pensioner is compelled to use a crutch or cane for locomotion." The pensioner was paid June 4, 1880.

CASE 856.—Sergeant W. H. Gaylord, Co. B, 6th U. S. Colored Artillery, aged 26 years, was wounded at Fort Pillow, April 12, 1864, by a minié ball, which fractured the fibula of the right leg at the lower third. The missile entered above the external malleolus, passed obliquely downward and backward, and emerged below and behind the internal malleolus. Four days after the reception of the injury the wounded man was admitted to Adams Hospital at Memphis, where Surgeon J. G. Keenon, U. S. V., on May 21st, excised the external malleolus, the comminuted fragments of the fibula, and the end of the tibia through a semilunar incision two inches long. Chloroform was used and the hæmorrhage was slight. The patient's physical condition at the time of the operation, though somewhat emaciated, was fair and his spirits were buoyant. The wound, which had been suppurating freely, was closing by healthy granulations, but necrosed bone could be distinctly felt. The patient did well after the operation. He was permitted to leave the hospital and go to his regiment on June 7th, before his cure was complete. The history was reported by the operator. Sergeant Gaylord was subsequently promoted to Lieutenant, and remained in the service until March 28, 1865, when he was discharged, Surgeon G. Perin, U. S. A., as a member of an examining board certifying to the injury, and adding that the "wound is healed and ankle joint partially anchylosed. Cannot walk without a crutch." The Cleveland Pension Examining Board, Drs. G. C. Ashmun and P. Roeder, in 1877, add that there is "slight lateral motion of ankle, constant enlargement," etc. The pensioner was paid September 4, 1880.

FIG. 338.—Excision of right ankle joint. Outer view 17 years after operation. [From a photograph.]

FIG. 339.—Inner view of the same injury.

CASE 857.—Private E. Roberts, 7th Wisconsin Battery, aged 26 years, was wounded in the right foot, at Parker's Cross Roads, December 30, 1862. Surgeon E. D. Kittoe, U. S. V., recorded his admission to hospital at Jackson, and several months afterwards the wounded man was transferred to Jefferson Barracks, whence he was discharged October 6, 1863, and pensioned. Surgeon J. C. Whitehill, U. S. V., subsequently contributed the following report of the case: "Understanding from Surgeon H. W. Davis, 18th Illinois, who was in charge of the General Hospital at Jackson for some time in the early part of 1863, that some doubts had been expressed concerning the removal of the os calcis and astragalus from a patient in that institution, and his recovery with a foot of comparatively good conformation and use of the ankle joint, I desire to set the matter at rest by furnishing a detailed report of the case. In the latter part of March, 1863, while passing through the wards of the General Hospital at Jackson in the discharge of my duties as Medical Director of the district, my attention was called to a case—that of Private Roberts, 7th Wisconsin Battery—supposed to require amputation. He had been wounded in the heel by a rifle ball, which grazed the posterior tuberosity of the os calcis and passed out through the sole of the foot about two inches forward. Under the usual treatment the wound soon healed. The heel, however, remained tender, and the tenderness gradually increased; the integuments became œdematous and glazed; the pain more acute and deep seated; constitutional symptoms supervened; the wound re-opened, and in spite of all treatment the patient's condition gradually grew worse. He had now hectic fever, some bronchial irritation, diarrhœa, and impaired appetite; the foot and ankle were swollen; the integument of the heel was an intense dusky or purplish red, tense, and glistening, and three sinuses over the posterior part of the os calcis, with everted edges, were discharging fetid sanious pus. Through the sinuses the probe readily detected carious or necrosed bone. After a careful examination I determined to make an effort to save the foot by removing the os calcis, to which, judging from the location of the sinuses, I was in hopes the disease was yet confined. On April 1st, in the presence of Surgeon Davis in charge of the hospital, Surgeon H. E. Foote, 22d Ohio, the ward surgeons of the hospital, and several other medical gentlemen, the patient was placed comfortably on his side and anæsthesia was induced, after which I commenced an incision at the margin of the sole immediately behind the plantar artery, carrying it around the heel and along the outer margin of the foot to the tarso-metatarsal articulation, and then keeping the knife close to the bone dissected up the flap thus made and exposed the under surface of the os calcis. There was slight hæmorrhage from a posterior perforating branch of the plantar, but this was readily arrested by torsion of the vessel. A perpendicular incision of about two inches was next made over the heel and along the tendo-achillis, the tendon detached from the os calcis, and the lateral flaps and soft parts carefully dissected up so far as the calcaneo-astragaloid articulation, keeping the edge of the knife close upon the bone to avoid wounding the vessels, and, if possible, to preserve a portion of the periosteum, which was much thickened and in some places thickly studded with minute spiculæ of bone. The articulation was then opened, the interosseous ligaments were divided, and the bone readily removed. The articular surface of the astragalus being diseased, the gouge was used for its removal until, finding the greater portion of its structure involved, I decided to remove the entire bone. Keeping the knife close upon the posterior surface of the bone the dissection was continued to the ankle joint, which was opened, when by using the point of the finger as a lever and at the same time as a guide and sheath for the knife, the

bones were sufficiently separated to allow the ligamentous attachments to be divided by a careful application of the point of the knife. The greatest caution was used on the inner side to avoid wounding the plantar vessels and to preserve the periosteum, which, at this point, like that of portions of the os calcis, was thickly studded with minute spiculæ or corpuscles of bone. After making a careful dissection to free the bone from its remaining attachments the entire astragalus was removed. Finding the other articular surfaces healthy the wound was carefully cleansed, the parts coaptated, light water dressings applied, and the foot and leg fixed in a position by a suitable splint so arranged as to retain them firmly without interfering with the dressings of the wound. No part of the integument was removed, nor did a single vessel require ligation. Surgeons Davis, Foote, and several other medical gentlemen, by attending to the administration of the anæsthetic and affording other assistance, rendered efficient aid during the progress of the operation, which, from the large amount of careful dissection required, was necessarily somewhat tedious. The subsequent treatment consisted in the main of a careful retention of the parts in position, simple water dressings and a generous diet, with wine, ale, and porter. A free suppuration of healthy pus was established; the redness and tumefaction of the integuments subsided; the cavity of the wound gradually filled with healthy florid granulations; and when I last saw the patient, two months afterwards, the wound was healed except at its most dependent portion, from which there was a discharge of laudable pus. The conformation of the foot was well preserved and bore but little evidence that so large a portion of its bony structure had been removed. The following extract from a note concerning the case, and received from Assistant Surgeon T. D. Washburn, 126th Illinois—in charge of one of the wards of the hospital—described the appearance of the foot about that time (June 1st): 'The patient was not in my ward, but as this was an unusual operation I visited him the more frequently to witness its progress. The parts healed kindly and by June 1st were almost completely closed, and no one would have imagined that so formidable an operation had taken place. The appearance of the foot was natural, a new formation having apparently taken the place of the removed bone, leaving the configuration good; besides, he had some motion of the ankle, and it certainly promised to make a very useful as well as ornamental member of the body corporate.' I regret that I had no opportunity of seeing the case at a later date, to ascertain the amount of mobility of the joint retained or the character of the 'new formation,' whether fibrous, osteoid, or osseous. I had hoped by preserving a portion of the periosteum to secure a re-formation—in part at least—of the bony structure, and I have but little doubt, judging from the amount of reparative effort evinced by the ossific formation found in portions of the thickened periosteum, that such a result was actually obtained. The case presents several points of practical and pathological interest. There can be no doubt that the success of the operation was to some extent dependent on the small amount of interference with the circulation of the part, as already stated, not a single vessel requiring ligation. The granulations by which the cavity of the wound was filled presented a striking resemblance to the medulla of young bone. To what extent was the preserved periosteum concerned in the new formation and what was its ultimate character? The thickening proliferation of the periosteum was by far the greatest in the vicinity of the larger vessels, and the osseous spiculæ were most abundant in the same vicinity. The ossific deposits or formation in several places extended some distance into the adjacent soft parts and were sufficiently abundant to produce a grating sensation under the knife. Without entering upon a discussion of the method or methods of the 'pathological new formation of bone,' I will merely add that it does not seem unreasonable to suppose that the 'new formation' in this case was of an ossific character, and that the success attending the case is a strong argument in favor of 'conservative surgery.' In similar cases I should certainly look upon excision as the rational treatment, and amputation as the dernier resort."

FIG. 340.—Excision of os calcis and astragalus. [From a photograph taken 18 years after the operation.]

Various examining surgeons have from time to time certified to the injury and to the disability resulting therefrom. The photograph, represented in the adjacent wood-cut (FIG. 340), was contributed by the pensioner in May, 1881. He states that "the os calcis and astragalus were both removed, which makes the limb two and a half inches shorter. The articulations are now with the tibia, about two inches above the joint."

CASE 858.—Private R. Fuller, Co. I, 45th Illinois, aged 19 years, was wounded during the siege of Vicksburg, June 20, 1863. Surgeon G. R. Weeks, U. S. V., recorded his admission to the Seventeenth Corps hospital with "shot wound of left ankle." Six weeks after the reception of the injury the wounded man was transferred to Jefferson Barracks Hospital, whence Surgeon J. F. Randolph, U. S. A., reported that "gangrene appeared on August 16th, and was treated by application of nitric acid with favorable result," also that "resection of the external malleolus" was performed. The patient was discharged from service April 3, 1864, and pensioned. In the following month Examining Surgeon C. Hershe, of Muscatine, Iowa, certified to the injury involving the loss of the external malleolus, causing anchylosis of the ankle joint and leaving the leg "so painful that he cannot put the foot on the ground without enduring pain." The pensioner subsequently re-enlisted in the army and was assigned to the 42d Infantry, from which organization he was discharged March 31, 1869, when he again resumed his place on the Pension Rolls. Examining Surgeon F. Hooper, of Fall River, certified, November 13, 1869: "The external malleolus is gone, and the astragalus and os calcis are anchylosed to the tibia. A large cicatrix covers the outside of the ankle. There is some motion between the scaphoid and astragalus, but it produces pain in walking." In September, 1877, the Cleveland Examining Board reported "partial lateral displacement of foot outward, with anchylosis of ankle joint and deformity of foot," etc. The pensioner was paid June 4, 1880. The photograph from which the wood-cut (FIG. 341) is copied was furnished by the pensioner in 1881.[1]

FIG. 341.—View of left ankle 18 years after excision of external malleolus. [From a photograph.]

[1] CULBERTSON (H.), *Excision of the Larger Joints of the Extremities*, in *Trans. Am. Med. Association*, 1876, Supplement to Vol. XXVII, p. 314

Four cases of secondary excisions at the ankle joint proved fatal—one from pyæmia, one from gangrene, and two from exhaustion.

CASE 859.—Private T. Lister, Co. B, 26th Michigan, aged 26 years, was wounded at Spottsylvania, May 12, 1864. Surgeon J. E. Pomfret, 7th New York Artillery, reported his admission to the field hospital of the 1st division, Second Corps, with "wound of foot caused by a musket ball." Surgeon R. B. Bontecou, U. S. V., who operated in the case, described the injury as a gunshot wound of the left leg, lower third, the missile fracturing the tibia, entering about one inch above the ankle joint, and lodging in the head of the astragalus. The wounded man was admitted to Harewood Hospital, Washington, May 26th. On July 5th sulphuric ether was administered, and the lower end of the tibia as well as the head of the astragalus, which had become necrosed, were excised. The constitutional state of the patient at the time of the operation was very poor; the tissues had become infiltrated with pus. Five days after the operation the fibula protruded and was somewhat necrosed, the parts otherwise progressing favorably. The treatment was supporting. The result was unfavorable. Death occurred on August 7, 1864.[1]

CASE 860.—Private A. B. McCool, Co. E, 188th Pennsylvania, aged 21 years, was wounded in both lower extremities, at Cold Harbor, June 3, 1864. Surgeon S. A. Richardson, 13th New Hampshire, recorded his entrance into the Eighteenth Corps field hospital. Secondary resection was subsequently performed at Harewood Hospital, Washington, by Surgeon R. B. Bontecou, U. S. V., who reported that "the patient was admitted June 15th, suffering from gunshot wound of the right thigh and of the left leg at the ankle joint, fracturing the external and internal malleolus. At the time of admission the condition of the injured parts was not good, being œdematous and somewhat infiltrated with pus. Subsequently the parts sloughed extensively and the bone became necrosed, the patient's strength failing day by day. On July 12th sulphuric ether was administered and the ankle joint was resected, one inch each of the lower end of the tibia and fibula being removed. A severe and prostrating diarrhœa complicated the case, from the consequent exhaustion of which, together with the excessive suppuration, the patient died July 21, 1864. The treatment consisted of stimulants, sedatives, narcotics, and supporting diet." The excised portions of the tibia and fibula were contributed to the Museum by the operator and constitute specimen 3045 of the *Surgical Section*.[2]

CASE 861.—Private *J. T. McGuiffin*, Co. B, 24th Regiment (Confederate), aged 23 years, received a gunshot wound of the right ankle joint, at Drury's Bluff, May 16, 1864. The missile, a minié ball, entered in front and on a line with the internal malleolus, passed through the astragalus, and made its exit through the external malleolus, carrying with it a number of fragments. The injury was followed by the escape of synovia. There was also another wound of the right foot, fracturing the fourth metatarsal bone. Some days after the reception of the wounds the patient came under the care of Surgeon J. M. Holloway, P. A. C. S., who thought that amputation of the limb, though advisable as a primary operation, was not then admissible. Smith's anterior splint was applied and cold irrigation. Subsequently poultices, cerate dressings, and bandaging was used. Several abscesses formed and numbers of small fragments of bone were removed on different days. Anodynes, stimulants, and nutritious diet were administered as required. After consultation Dr. Holloway excised the ankle joint by Hancock's method, on June 21st, completing the operation without injury to nerve, vein, artery, or tendon. The patient was not removed from the operating table to his bed until the following day. By the second day the wounds had become unhealthy and gangrene of the toes was in progress. The patient died suddenly and unexpectedly on the morning of June 25, 1864, after his condition had encouraged the hope that in a few days it would be favorable for amputation of the limb.[3]

CASE 862.—Private J. C. Perkins, Co. B, 81st New York, aged 27 years, was wounded at Cold Harbor, June 3, 1864. Surgeon W. H. Rice, 81st New York, reported his admission to the field hospital of the 1st division, Eighteenth Corps, with "wound of ankles by a minié ball." Twelve days after the reception of the injury the wounded man was admitted to Harewood Hospital, Washington, where both limbs were operated upon by Surgeon R. B. Bontecou, U. S. V., who made the following report: "The patient was suffering from wounds of the right and left ankle joints, the ball entering above the external malleolus of the right ankle, passing directly through, and entering the internal malleolus of the left ankle. On admission and at the time of the operation the condition of the injured parts was not good. The wounds suppurated freely. There were detached portions of bone in each joint, and necrosed fragments came away from time to time. The constitutional state of the patient was poor. Resection of the right ankle joint and circular amputation of the left leg at the lower third was performed on July 7th, the anæsthetic consisting of sulphuric ether and chloroform. The result of the operation was unfavorable. The stump sloughed and profuse unhealthy suppuration followed the resection, extending in every direction and burrowing up the leg nearly to its middle. The patient became very weak and sank gradually. He died of exhaustion July 17, 1864. The treatment was tonic and supporting throughout." The tarsal bones of the right foot, together with the lower extremity of the tibia, were contributed to the Museum by Surgeon Bontecou and constitute specimen 3035 of the *Surgical Section*.

Excisions at the Ankle Joint, Time between the Injury and Operation unknown.—The five cases of this group would appear to have terminated in recovery, but it has been impracticable to get accurate details of the cases. Two of the operations were performed on Confederate and three on Union soldiers; the names of the latter do not appear on the Pension Rolls. The right ankle joint was excised in two, the left in one instance; in two cases the side was not indicated:

CASE 863.—Private T. Haley, Co. D, 91st New York, was wounded at Port Hudson, May 27, 1863. Surgeon T. B. Reed, U. S. V., reported his admission to a Nineteenth Corps field hospital with "wound of foot." Two days after the recep-

[1] CULBERTSON (H.), *Excision of the Larger Joints of the Extremities*, in *Trans. Am. Med. Association*, 1876, Supplement to Vol. XXVII, p. 312.

[2] CULBERTSON (H.), *Excision of the Larger Joints of the Extremities*, in *Trans. Am. Med. Association*, 1876, Supplement to Vol. XXVII, p. 312.

[3] HALLOWAY (J. M.), *Comparative advantages of* PIROGOFF'S, SYME'S, *and* CHOPART'S *Amputations, and Excision of the Ankle Joint by* HANCOCK'S *Method, after Gunshot Wounds and other Injuries; with Reports of Cases and the Results; and proposing another Method for Excision of the Ankle Joint*, in *American Journal Medical Science*, 1866, Volume LI, p. 90.

tion of the injury the wounded man was transferred to University Hospital, New Orleans, where Assistant Surgeon P. S. Conner, U. S. A., recorded: "Gunshot wound of right foot; resection of astragalus. Patient absent without leave from September 7, 1863." There is no record of this man ever having applied for pension.

CASE 864.—Surgeon E. Andrews, 1st Illinois Artillery, publishes that "J. K——, 40th Illinois," in one of the Western campaigns received a compound shot fracture of the os calcis and astragalus, and that both these bones were excised, the operation being followed by recovery.

CASE 865.—Colonel *Y. M. Moody*, 43d Alabama, received a gunshot wound through the right ankle joint on June 16, 1864. He entered Confederate hospital No. 4, at Richmond, whence he was furloughed August 11, 1864. Excision of the lower end of the fibula was performed; the date of the operation was not recorded. The record of the case was found on the Confederate hospital registers.

CASE 866.—Private H. Gregory, Co. B, 35th U. S. Colored Troops, aged 18 years, was wounded at Olustee, February 20, 1864. He passed through various hospitals at Beaufort, one of which was under charge of Surgeon J. Trenor, jr., U. S. V., who reported the patient's admission, August 27th, with "gunshot wound of left ankle; astragalus excised before admission." Assistant Surgeon J. G. Murphy, U. S. V., reported that the patient was discharged from service June 5, 1865, by reason of "anchylosis of ankle joint" resulting from the wound. There is no record of this man ever having applied for pension.

CASE 867.—"Sergeant *P. R. Wright*, Co. K, 13th North Carolina, was wounded in the engagement near Williamsburg, May 5, 1862. A conical pistol ball entered on the outside of the os calcis near the sole of the foot, and passed up through the outer portion of this bone and through the astragalus, comminuting the lower end of the fibula and lodging between the tibia and fibula, three inches from their lower extremities. The missile was traced to its lodgement with difficulty. A crescentic incision along the course of the peroneus longus and behind the external malleolus was intersected by a straight incision coming up from the heel, and another crescentic incision was found necessary to be made anterior to the external malleolus. By working under the ligaments the loose fragments of bone were removed from the calcaneum and astragalus; the lower comminuted end of the fibula was cut and pulled away by means of the forceps, and the bullet was found in its lodgement between the two bones, about three inches from the joint. While the lateral ligaments were left in position with their superficial connections, their bony attachments were of course disturbed. The granulation and consolidation, which will probably result, must give the joint greater strength against inversion of the foot than it could acquire without them. The opening into the joint was made very free by this operation, which is an advantage. It is now well enough settled that an inflamed and suppurating joint is more likely to result well with a free and external opening than with a limited one." The case was reported by Surgeon D. Prince, U. S. V.; the result was not ascertained.

AMPUTATIONS AT THE ANKLE JOINT.—The number of exarticulations at the ankle recorded during the American civil war is one hundred and sixty-one; one hundred and three were primary, thirty-nine intermediary, and thirteen secondary operations; in six instances the time between the injury and the operation was not indicated.

TABLE LXXXIX.

Numerical Table of One Hundred and Sixty-one Amputations at the Ankle Joint for Shot Injury.

OPERATIONS.	Cases.	Recovery.	Death.	Undetermined.	Ratio of Mortality.	METHOD OF OPERATION.										
						PIROGOFF'S.			SYME'S.				VARIOUS METHODS.			
						Cases.	Recovery.	Death.	Cases.	Recovery.	Death	Undeterm'd.	Cases.	Recovery.	Death.	Undeterm'd.
Primary Operations	103	78	23	2	22.7	26	20	6	57	42	14	1	20	16	3	1
Intermediary Operations	39	25	14	.....	35.9	18	10	8	19	13	6	.....	2	2	.....	.....
Secondary Operations	13	12	1	.....	7.7	4	4	.....	7	6	1	.....	2	2	.....	.....
Period of Operation not specified	6	4	2	.....	33.3	1	1	.....	.....	.....	.....	.....	5	3	2	.....
Aggregates	161	119	40	2	25.1	49	35	14	83	61	21	1	29	23	5	1
						Mortality 28.5 %.			Mortality 25.6 %.				Mortality 17.8 %.			

The results were ascertained in one hundred and fifty-nine instances; one hundred and nineteen had successful, and forty fatal terminations, a mortality rate of 25.1 per cent., or 7.8 per cent. less than the death ratio after amputation in the leg.

Primary Amputations at the Ankle Joint.—In one instance both feet were removed. The one hundred and three operations were therefore performed on one hundred and two

patients; seventy-eight recovered, twenty-three died, and in two cases the results were not ascertained.

Successful Primary Amputations at the Ankle Joint.—Seventy-eight operations performed on seventy-seven patients belong to this group; sixteen were Confederate and sixty-one Union soldiers; the names of the latter were all on the Pension Roll; but six have died since the close of the war in 1865—two of diarrhœa and dysentery, one of apoplexy; in three cases the immediate cause of death is not reported.

CASE 868.—Private O. Leblanc, Co. E, 2d New Hampshire, aged 20 years, was wounded in the right foot, at Cold Harbor, June 1, 1864, by a shell, which fractured the tarsal and metatarsal bones. Assistant Surgeon J. C. McKee, U. S. A., reported that the man was admitted to Lincoln Hospital, Washington, ten days after receiving the injury, also that the wounded foot had been removed by Pirogoff's method, on the field, by Surgeon J. M. Merrow, 2d New Hampshire. The patient subsequently passed through various hospitals, and was ultimately discharged from service June 16, 1865, and pensioned, having been previously fitted with a "Palmer" artificial foot. The cast (*Spec.* 3732), contributed by Acting Assistant Surgeon L. C. Dodge and represented in the adjoining cut (FIG. 342), shows an apparently firm cicatrix, but reveals the stump to be a little irregular and without the appearance of being able to sustain decided weight. The pensioner was paid December 4, 1880.[1]

FIG. 342.—Stump after PIROGOFF'S amputation at left ankle joint. *Spec.* 3732.

CASE 869.—Private J. E. Ayers, Co. E, 8th New York Cavalry, aged 19 years, was wounded in the left foot, at Funkstown, July 10, 1863, and entered the General Hospital at Frederick eight days afterwards. Assistant Surgeon R. F. Weir, U. S. A., reported: "The injury consisted of a compound fracture of the tarsus. Syme's amputation at the ankle joint was performed on the field. During the progress of the case sloughing opened the stump, for which nitric acid wash was applied by injecting. Adhesive straps were used to support the posterior flap, and tonics were given internally; generous diet was allowed. The patient recovered with an excellent stump, and was discharged from service October 5, 1863." After leaving the service he became a pensioner, and subsequently he was an employé in the Quartermaster General's Office, U. S. A., for a number of years. In 1879 he received an appointment in the U. S. Treasury Department. On July 8, 1868, when visiting the Army Medical Museum, the pensioner walked remarkably well on an apparatus furnished by Dr. E. D. Hudson, of New York City, and the stump was found to be in good condition. Since then the pensioner has contracted and suffered for a time from frost bite in the stump, but in 1881 the stump was in excellent condition. The Army Medical Museum possesses a cast of the stump (*Spec.* 6056), represented in FIG. 343. A copy of a photograph of the pensioner, taken in January, 1881, is shown in FIGURE II of PLATE LXXV,[2] on the opposite page.

FIG. 343.—Stump after Syme's amputation at ankle. [From a cast.]

CASE 870.—Private H. W. Clark, Co. H, 100th New York, aged 30 years, was wounded by a shell in both feet, at Drury's Bluff, May 13, 1864. He was admitted to a Tenth Corps field hospital, where the injured limbs were removed. Assistant Surgeon E. McClellan, U. S. A., reported that the wounded man was brought to hospital at Fort Monroe six days after the injury, and that "both feet were amputated" before his admission. About two months afterwards the patient was transferred to McDougall Hospital, and subsequently to Central Park Hospital, New York City. Surgeon B. A. Clements, U. S. A., in charge of the latter, reported that "the right foot was shattered up to the metatarsal articulation, and the left heel with most of the tendo-achillis was carried away. There was no great amount of hæmorrhage. The amputations were performed on the field, while the man was under the influence of chloroform, by Surgeon M. S. Kittinger, 100th New York, the right foot being taken off by Chopart's method. His general condition at the time of the operation was good. At first sutures, bandages, and cold-water dressings were applied, and when the patient arrived at Fort Monroe, adhesive strips and bandages were used. Both stumps healed kindly, the right one in eight weeks and the left one in six weeks. At the time of his admission here, on July 26th, both were entirely well, the tendo-achillis of the right stump being considerably contracted." The patient was discharged from service December 13, 1864, and pensioned, and subsequently he was supplied with artificial feet by Dr. E. D. Hudson of New York City. Plaster casts of the stumps of the legs, contributed by Assistant Surgeon J. W. S. Gouley, U. S. A., constitute specimen 2857 of the *Surgical Section* of the Museum. That of the left limb, showing an excellent Syme's stump, is represented in the annexed wood-cut (FIG. 344). In his first application for commutation, in August, 1870, the pensioner described the stumps as being "sound and healthy;" but later, in 1880, he reported their condition as "poorly." His pension was paid December 4, 1880.[3]

FIG. 344.—Stump after SYME'S amputation at ankle joint. *Spec.* 2857. [From a cast.]

CASE 871.—Private A. K. Russell, Co. H, 1st Massachusetts Heavy Artillery, aged 43 years, was wounded at Spottsylvania, May 19, 1864, and admitted to Emory Hospital, Washington, three days afterwards. Acting Assistant Surgeon J. E. Janvrin reported: "Gunshot wound of left foot, the ball entering the heel posteriorly, passing forward through the os calcis and astragalus, and making its exit anteriorly on the dorsal surface of the foot. The os calcis and astragalus together with the metatarsal bones were comminuted, and, according to the patient's statement, the soft parts were very much lacerated. Chloroform was administered, and Syme's operation was performed on the day of the injury. When admitted to Emory Hospital the sutures had given way and the flap was pendant, with unhealthy discharges and tendency to slough. Adhesive straps and

[1] SMITH (S.), *Amputations at the Ankle Joint in Military Surgery*, in *U. S. San. Com. Memoirs*, New York, 1871, Surgical Volume II, p. 132.

[2] SMITH (S.), *Amputations at the Ankle Joint in Military Surgery*, in *U. S. San. Com. Memoirs*, New York, 1874, Surgical Volume II, p. 138.

[3] SMITH (S.), *Amputations at the Ankle Joint in Military Surgery*, in *U. S. San. Com. Memoirs*, New York, 1871, Surg. Volume II, pp. 110, 140.

T. Sinclair & Son. lith.

PLATE LXXV AMPUTATIONS AT THE ANKLE JOINT

Fig 1. Case of Lieut. W. C. Weeks
Pirogoff's Operation

Fig 2. Case of Pt. J. E. Ayers
Syme's Operation

Fig 3. Case of Pt. J. H. Short
Syme's Operation

Fig 4. Case of Pt. A. K. Russell
Syme's Operation

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cold-water dressings were applied, and subsequently linseed, charcoal, and yeast poultices were used. Alteratives, tonics, and stimulants were administered, the patient being much exhausted and suffering from loss of appetite, with derangement of the system generally. On June 3d the parts were thoroughly cleansed, and a flat padded splint was applied to the anterior surface of the leg, extending beyond the stump, after which adhesive straps were passed from beneath the leg across the flap and carried over the end of the splint and fastened. These were gradually shortened as the healing process went on, thus removing the tension and weight of the flap from the anterior edge of the wound. By July 12th the patient was doing well and the granulations were covering the bone. About August 18th the stump had nearly closed and the patient's general health was good Two weeks afterwards he left for his home on furlough. The success attending this case is attributed in a large measure to the method adopted for supporting the flap." The patient subsequently entered the general hospital at Readville, whence he was discharged from service June 2, 1865, and pensioned. After leaving the service he was furnished with an artificial foot. A photograph of the stump, taken three months after the date of the amputation, and contributed by Surgeon N. R. Mosely, U. S. V., is represented in FIGURE 4 of PLATE LXXV, opposite page 596. The man subsequently underwent a second operation, which was certified to by the Surgeon General of the State of Massachusetts, who communicated the following on January 26, 1871: "The pensioner has sustained re-amputation six inches below the knee, which was performed by Dr. C. N. Chamberlain, of Lawrence, late surgeon U. S. V., assisted by Dr. G. W. Garland, the case being at the time under my observation." In his subsequent application for commutation the pensioner described the stump as being in a good condition. His pension was paid December 4, 1880.

CASE 872.—Private E. R. Covell, Co. C, 52d New York, aged 38 years, was wounded in the left foot, at Spottsylvania, May 18, 1864, and admitted to the field hospital of the 1st division, Second Corps. Surgeon J. W. Wishart, 140th Pennsylvania, described the injury as a "shell wound of the tarsal and metatarsal bones," for which he performed "Syme's amputation at the ankle joint." Ten days after being wounded the patient entered Emory Hospital at Washington, and subsequently he was transferred to Central Park Hospital, New York City. Surgeon B. A. Clements, U. S. A., in charge of the latter, reported the following history of the case: "Considerable hæmorrhage took place at the time of the injury, and the man's general condition was not very good in consequence of his suffering from diarrhœa. Amputation at the ankle joint was performed under chloroform six hours after the reception of the injury, the ends of the tibia and fibula also being removed. Sutures, adhesive strips, and cold water dressings were applied. The parts did not unite by first intention, though there was no sloughing nor necrosis. When the patient was admitted to Central Park Hospital, August 17th, the stump had healed with the exception of a small ulcer in the cicatrix near the external angle of the flaps, and his general condition was pretty good, though he still had diarrhœa. By October 2d the stump was entirely healed and the diarrhœa was much improved." The patient was discharged from service November 3, 1864, and pensioned, having been previously furnished with an artificial foot. A cast of the stump (*Spec.* 4369) was contributed to the Museum by Surgeon J. J. Milhau, U. S. A., and is represented in the adjoining wood-cut (FIG. 345). After leaving the service the stump was re-amputated at the lower third of the leg on May 5, 1869. In his subsequent applications for commutation the pensioner described the condition of the stump as "sound and healthy." His pension was paid September 4, 1881.[1]

FIG. 345.—Stump after SYME'S amputation at ankle joint. *Spec.* 4369. [From a cast.]

CASE 873.—Lieutenant W. C. Weeks,[2] Co. I, 5th Michigan Cavalry, aged 28 years, was wounded at Five Forks, April 1, 1865, by a conoidal musket ball, which passed through the left ankle joint. Assistant Surgeon C. A. Leale, U. S. V., reported: "He was immediately conveyed to hospital at City Point, where Surgeon A. K. St. Clair, 5th Michigan Cavalry, performed Pirogoff's amputation at the ankle joint the same day, removing the articulating surfaces of the tibia and calcaneum and bringing the cut extremities into apposition. On April 16th the patient was transferred to Armory Square Hospital at Washington, where he was admitted in a very feeble condition. Erysipelatous inflammation extended from the stump several inches above the knee joint. Extensive suppuration had taken place, and, although fifteen days had elapsed since the operation, the rough edges of the calcaneum could be rubbed against the denuded end of the tibia, proving that no union existed. The integumentary flap had partially united, thus confining a large quantity of pus in the stump, which prevented the bones from being kept in apposition. Metastatic abscesses had commenced to form along the course of the anterior tibial lymphatic glands, and every symptom prognosticated an unfavorable termination, the only hope being based on the remarkable strong constitution of the patient. The abscess at the stump was freely evacuated, and the metastatic abscesses were freely opened as soon as fluctuation could be detected; the calcaneum and tibia were held in proper position by means of adhesive straps after the limb had been thoroughly cleansed with liquor of chloride of zinc. Large linseed poultices were applied over the lower third of the tibia and lead and opium wash over the remaining part of the limb as far as the erysipelas extended; stimulants and beef tea were administered. The patient gradually improved until April 28th, when he had a chill, which was soon followed by others. Quinine and tincture of chloride of iron was then prescribed and an ounce of brandy was given every two hours. By May 2d the patient had the peculiar sweet odor of breath and the well-marked icteroid hue, especially in the conjunctivæ, which were exceedingly yellow. Several chills occurred each day and were followed by considerable febrile movement and great prostration; but by the frequent administration of stimulants and the constant application of artificial heat the patient rallied, after which beef tea was given in quantities as large as could be tolerated. From May 6th he improved, the chills occurring at longer intervals and with less severity until May 12th, when they ceased. A slight diarrhœa at this time was checked by starch and opium injections, after which the patient convalesced rapidly. By June 26th he had entirely recovered, the os calcis having united to the tibia and the wound having closed, leaving a solid, firm stump." A plaster cast of the stump, Specimen 2298 of

FIG. 346.—Stump after PIROGOFF'S amputation at ankle joint. [From a plaster cast.]

[1] SMITH (S.), *Amputations at the Ankle Joint in Military Surgery*, in *U. S. San. Com. Memoirs*, New York, 1871, Surgical Volume II, p. 136.

[2] *Circular* No. 6, War Department, S. G. O., 1865, p. 47. SMITH (S.), *Amputations at the Ankle Joint in Military Surgery*, in *U. S. Sanitary Commission Memoirs*, New York, 1871, Surgical Volume II, pp. 116, 132.

the Army Medical Museum, is shown in FIG. 346, and a photograph of the patient is copied in FIGURE I of PLATE LXXV, opposite page 596. Lieutenant Weeks was mustered out of service July 20, 1865, and pensioned, after which time he commenced to wear the "Palmer" artificial foot. In a subsequent report, dated June 28, 1866, Dr. Leale furnished the following information in regard to the case: "I have just received a communication from Lieutenant Weeks (residing at Allegan, Michigan), in which he states: 'I am able to do anything that most men can do; my patent foot works like a charm. I am at present engaged in a large flour mill, and my stump has never troubled me but once since I left the hospital, and then it was caused by an accident, which loosened a small splinter of bone. This I had removed at Chicago, since which time it has done well. I adjusted my false foot on October 1, 1865, and never take it off except when I go to sleep. I can easily walk without a cane.'" The pensioner was paid September 4, 1881.

CASE 874.—Private H. Bell, Co. A, 2d New York Artillery, aged 45 years, was wounded in the left foot, at the battle of White Oak Swamp, June 30, 1862. He was conveyed to hospital at Fort Monroe, whence he was transferred to DeCamp Hospital, David's Island, three weeks afterwards. Surgeon J. Simons, U. S. A., in charge of the latter, recorded the patient's admission with "amputation of foot." Assistant Surgeon J. W. S. Gouley, U. S. A., in charge of Central Park Hospital, New York City, contributed the cast (*Spec.* 4218), represented in the annexed wood-cut (FIG. 347), with the following description: "This interesting wax specimen, a cast of Pirogoff's operation, I regret to say has an incomplete history. According to the patient's statement he was wounded by a shell, which tore off the outside of the foot nearly up to the ankle. He was etherized on the field, and when he awoke he found that he had no foot. When admitted to this hospital, on October 28th, the stump was healed and in the condition represented in the cast. The parts were perfectly consolidated, and the heel was firm and capable of sustaining the weight of his whole body without giving rise to pain or tenderness. The limb was about three-fourths of an inch shorter than its fellow. The patient was furnished with an apparatus by Dr. Hudson, which answered admirably, the heel of the artificial limb being made three-fourths of an inch higher, while the ankle joint was lowered. On the whole it was as shapely as the width of the ankle would allow. The patient was discharged from service July 7, 1863. Before he left the hospital he was able to walk without the assistance of a cane and without causing any irritation to the stump." Examining Surgeon W. M. Chamberlain, of New York City, certified to "loss of most of the left foot. Pirogoff's operation has been successfully performed. A small fragment of the heel only is left, and the pensioner wears an artificial foot." The pensioner was paid March 4, 1871, since when he has not been heard from.[1]

FIG. 347.—Stump of left leg after PIROGOFF'S amputation at ankle joint. [From a cast.]

CASE 875.—Captain J. F. Denniston, Commissary of Subsistence, U. S. V., aged 24 years, was wounded in the right foot, during the engagement at the Weldon Railroad, August 25, 1864. Surgeon N. Hayward, 20th Massachusetts, reported his admission to the field hospital of the 2d division, Second Corps, with "fracture of ankle," followed by "Pirogoff's operation, performed by Surgeon G. Chaddock, 7th Michigan." Surgeon D. W. Bliss, U. S. V., who subsequently re-amputated the limb, reported that "the patient entered Armory Square Hospital, Washington, August 28th. On September 6th hæmorrhage ensued, which was controlled by styptics and a compress, but commenced again two days afterwards, when the femoral was held by the attendants for several hours. On September 10th a fresh and copious hæmorrhage set in, when, after a thorough examination of the parts, it was deemed proper to amputate at a point about three inches above the ankle, the patient being in good condition at the time. The entire loss of blood probably amounted to a pint, its source being first the anterior tibial and afterwards the femoral artery. The amputation was performed by the circular method and without much shock to the patient's system. The treatment included tonics, stimulants, and nourishing diet. Simple dressings were used. Three weeks after the operation the patient was doing well." The re-amputated stump, showing the soft tissues and the cut surfaces of the tibia and os calcis softened by suppuration, was forwarded to the Museum by the operator and constitutes specimen 3211 of the *Surgical Section*. In 1881 the soft tissues were removed from the specimen, when it was found that the tibia was fissured to the extent of four inches (FIG. 348). The patient was subsequently transferred to the Seminary Hospital, Georgetown, where he obtained leave of absence November 25th, when he started for his home. He was ultimately mustered out of service January 1, 1867, and pensioned. While serving as an officer of the 70th New York, at the battle of Williamsburg, May 5, 1862, Captain Denniston had also been wounded in the right forearm, for which injury he underwent the operation of resection of the continuity of the bones.[2] After leaving the service he obtained an artificial leg from the Pittsburgh Artificial Limb Manufacturing Co., and since then he has continued to report the stump of his amputated leg as being in a "healthy condition." The pensioner was paid September 4, 1881.

FIG. 348.—Bones of the right ankle joint after PIROGOFF'S amputation. *Spec.* 3211.

Fatal Primary Amputations at the Ankle Joint—The results in twenty-three primary amputations at the ankle joint were fatal. Syme's operation was performed in fourteen, and Pirogoff's in six instances; in three the mode of operation was not indicated. Seventeen of the patients were Union and six Confederate soldiers. In four instances the exarticulations at the joint were followed by amputations in the leg:

CASE 876.—Private H. E. Boynton, Co. L, 1st Massachusetts Heavy Artillery, aged 18 years, received a shot fracture of the left foot and of the right arm, at Spottsylvania, May 19, 1864, and was admitted to the field hospital of the 1st division, Second Corps. Surgeon J. W. Wishart, 140th Pennsylvania, reported that he amputated the foot by Syme's method on the day of the injury. Three days afterwards the wounded man entered Emory Hospital at Washington, where Surgeon N. R. Moseley,

[1] SMITH (S.), *Amputations at the Ankle Joint in Military Surgery*, in *U. S. San. Com. Memoirs*, New York, 1871, Surgical Vol. II, pp. 117, 134.

[2] See *Medical and Surgical History of the War of the Rebellion*, Part II, Volume II, TABLE CXXVIII, p. 957, No. 23.

U. S. V., excised two inches of the middle third of the fractured humerus. The case resulted fatally on June 22, 1864. The excised portion of the humerus (*Spec.* 2322) and most of the bone of the amputated foot (*Spec.* 828) have been contributed to the Museum by the respective operators. The latter specimen consists of the metatarsus, scaphoid, cuboid, and outer two cuneiform bones, and shows a large, battered, conoidal bullet occupying the place of the inner cuneiform, the bones adjacent to it being fractured.

CASE 877.—Private E. P. Hale, Co. I, 1st Minnesota, aged 24 years, was wounded through the left lung and in the left foot, at Gettysburg, July 2, 1863. He was admitted to the field hospital of the 1st division, Second Corps, where amputation was performed by Surgeon C. S. Wood, 66th New York, who described the injury of the foot as follows: "A minié ball entered at the internal malleolus, passed obliquely downward and outward, and emerged about two inches below the external malleolus, comminuting the astragalus and involving the ankle joint. Syme's operation was performed." Five weeks after the reception of the injuries the patient was transferred to Camp Letterman, whence Acting Assistant Surgeon A. B. Shekell reported that the wounds discharged freely and that the patient continued in a weak state, his condition and the stump of the leg improving but slightly, though stimulants, quinine, and iron were freely administered. Simple dressings were applied. On September 2d an abscess was opened on the inner side of the right thigh, which discharged about a pint of pus. The case terminated fatally on September 12, 1863. The lower extremities of the bones of the stump (*Spec.* 1949), showing the articular surfaces to be destroyed by ulceration, were contributed to the Museum.

CASE 878.—Private G. Harfeter, Co. D, 104th Pennsylvania, aged 22 years, was wounded at Morris Island, September 27, 1863, and was conveyed to hospital No. 5, at Beaufort, the following day. Assistant Surgeon J. S. Smith, U. S. A., reported: "The wound was by a fragment of shell in the left foot, which was amputated the next day by Surgeon R. B. Bontecou, U. S. V., on board of the hospital transport Cosmopolitan. Syme's operation was performed. There was also a slight flesh wound of the right hip and right arm. Simple dressings were used and anodynes were given at night. On October 1st slight hæmorrhage occurred, which was easily controlled by slight pressure, about an ounce of blood being lost. Two days afterwards a profuse hæmorrhage took place, reducing the patient's vitality to an alarming extent. The stump was then opened for the purpose of securing the bleeding vessel, but it could not be found, and the anterior tibial was ligated two inches above the seat of the hæmorrhage. The bleeding did not recur, but the patient gradually sank. He died October 12, 1863."

CASE 879.—Private F. M. Bland, Co. D, 23d Iowa, aged 22 years, was wounded in the left foot during the engagement at the Black River, May 19, 1863, and entered Adams Hospital, Memphis, several weeks afterwards. Acting Assistant Surgeon B. J. Bristol reported: "Syme's operation at the ankle had been performed the same evening the injury was received. At the time of the patient's admission to Adams Hospital, June 13th, nearly the entire flap had sloughed off and the bones were exposed to view. An abscess had also formed at the middle of the lower third of the leg, and there was periostitis of the tibia and fibula at the same point. The general condition of the patient was low, he having had diarrhœa for four months. He was put upon iron, quinine, stimulants, and astringents. On June 17th his general condition was somewhat improved, the diarrhœa checked, and it was decided to operate. Amputation of the leg was accordingly performed at the junction of the middle and upper third by Acting Assistant Surgeon J. Thompson. I saw the patient for the first time the next day, when, though in a low condition, he seemed to be rallying from the shock of the operation. I administered tonics, stimulants, and beef tea freely, and had water dressings applied to the stump, under which course the general condition of the patient gradually improved. The stump then appeared to do well, but before many days it began to discharge a thin ichorous-looking pus. About June 26th the flaps gaped open, no adhesions having formed in any part of the stump. The flaps soon commenced sloughing, and it was decided that the only chance for the patient laid in another amputation. Accordingly on July 2d the thigh was taken off at the middle of the lower third, which operation the patient seemed to bear well. The tonic and supporting treatment was continued, and as before the patient seemed at first to be doing well; but the stump soon became gangrenous. An abscess also formed below the clavicle, the edges of which sloughed away, laying bare the thyroid axis, the branches of it too sloughing off. On July 13th the patient was removed to my ward in a rapidly sinking condition. He died three days afterwards—on July 16, 1863." The Syme stump (*Spec.* 1706), removed at the first re-amputation and contributed to the Museum by Surgeon J. G. Keenon, U. S. V., shows the extremities to be necrosed and an absence of reparative action.

TABLE XC.

Summary of One Hundred and Three Cases of Primary Amputation at the Ankle Joint for Shot Injury.

[Recoveries, 1—78; Deaths, 79—101; Results undetermined, 102–103.]

NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATE OF INJURY.	NATURE OF INJURY.	DATE OF OPERATION.	OPERATION AND OPERATOR.	RESULT AND REMARKS.
1	[1]Ayres, J. E., Pt., E, 8th N. York Cavalry, age 19.	July 10, 1863.	Conoidal ball comminuted left tarsus.	July 10, 1863.	Syme's amputat'n at left ankle joint.	Sloughing. Discharged October 5, 1863; pensioned. *Spec.* 6056, A. M. M. Stump in good condition in 1881.
2	Baal, M., Pt., E, 21st Iowa, age 20.	May 17, 1863.	Shot fracture of right foot.	May 17, 1863.	Pirogoff's amputation at right ankle joint.	Discharged Sept 26, 1863; pensioned. Stump perfectly healed.
3	Barnett, J. B., Pt., E, 19lst Pennsylvania, age 33.	Mar. 31, 1865.	Conoidal ball comminuted tarsal and metatarsal bones of left foot.	April 1, 1865.	Syme's amputation at left ankle joint. Surg. A. A. White, 8th Maryland.	April 8, amputation in low. third of leg. Discharged June 28, 1865, and pensioned.
4	[2]Bell, H., Pt., Battery A, 2d New York Artillery, age 45.	June 30, 1862.	Shell fracture of tarso-metatarsal bones of left foot.	June 30, 1862.	Pirogoff's amputation at left ankle joint; lower portion of tibia and anterior portion of calcaneum exscted.	Discharged July 7, 1863; stump finely formed; pensioned. Able to walk without aid of cane; portion of calcaneum useless. *Spec.* 4218, A. M. M.

[1] SMITH (S.), *Amp at the Ankle Joint in Mil. Surg.*, in *U. S. San. Com. Mem.*, N. Y., 1871, Surg. Vol. II, p. 138. [2] SMITH (S.), *loc. cit.*, pp. 117, 134.

No.	Name, Military Description, and Age.	Date of Injury.	Nature of Injury.	Date of Operation.	Operation and Operator.	Result and Remarks.
5	Blake, H., Pt., I, 37th Mass., age 36.	June 13, 1864.	Shot fracture of right tarsus.	June 13, 1864.	Pirogoff's amputation at right ankle joint.	Discharged December 16, 1864; pensioned. Stump well healed.
6	Blakeman, M. A., Pt., D, 36th Ohio, age 36.	Sept. 22, 1864.	Conoidal ball fractured the right ankle joint.	Sept. 22, 1864.	Amputat'n at right ankle joint by Syme's method.	Discharged May 8, 1865, and pensioned. Stump perfectly healed.
7	*Blankenbecker, G. R.*, Pt., C, 4th Va. Cavalry, age 20.	June 24, 1864.	Conoidal ball fractured metatarsal bones of left foot.	June 24, 1864.	Syme's amputation at ankle joint.	Sloughing of flaps; abscesses. Furloughed October 30, 1864.
8	Bourkney, N., Pt., K, 155th New York, age 32.	June 16, 1864.	Shell fracture of right tarsus.	June 17, 1864.	Amputation at ankle joint by circular incision. Surgeon N. Hayward, 20th Mass.	Discharged March 15, 1865, and pensioned.
9	Brewster, J., Pt., I, 29th Conn. (colored), age 22.	Sept. 29, 1864.	Grapeshot wound of left foot, fracturing metatarsal bones.	Sept. 29, 1864.	Syme's amputation at ankle joint.	Discharged July 22, 1865, and pensioned. Sound stump.
10	Brink, S. S., Pt., B, 36th Wisconsin, age 28.	June 18, 1864.	Conoidal ball fractured left foot.	June 18, 1864.	Flap amputation at ankle joint. Surgeon N. Hayward, 20th Massachusetts.	Discharged April 25, 1865; pensioned. Stump unsound: bone diseased.
11	Bunting, J. R., Corp'l, I, 8th Michigan, age 28.	April 16, 1862.	Shot comminution of astragalus and calcaneum.	April 18, 1862.	Syme's amputation at left ankle joint. Ass't Surgeon C. A. McCall, U. S. A.	Discharged June 27, 1862; pensioned. Stump healthy and useful.
12	[1] Clark, H. W., Pt., H, 100th New York, age 30.	May 13, 1864.	Solid shot fractured bones of both feet.	May 13, 1864.	Syme's amputation at left ankle joint; Chopart's amputation right foot. Surg. M. S. Kittinger, 100th New York.	Discharged December 13, 1864. *Spec.* 2857, A. M. M.
13	*Collins, W.*, Pt., F, 3d Mississippi Battery, age 28.	July 22, 1864.	Conoidal ball fractured the arch of the left foot.	July 23, 1864.	Syme's amputation at ankle joint.	Recovered.
14	[2] Connors, J., Pt., F, 76th Pennsylvania, age 25.	July 11, 1863.	Musket ball comminuted the right tarsus.	July 12, 1863.	Syme's antero-post. flap amputation at right ankle joint.	Necrosis of tibia. Sept. 27, amp. lower third leg. Disch'd Aug. 28, 1865; pensioned.
15	[3] Covell, E. R., Pt., C, 52d New York, age 38.	May 18, 1864.	Shell wound, carrying away a large portion of left foot; considerable hæmorrhage.	May 18, 1864.	Syme's amput'n at ankle joint, end of tibia and fibula rem'd. Surgeon J. W. Wishart, 140th Pennsylvania.	Discharged Nov. 3, 1864; pensioned. May 5, 1869, amput'n lower third leg. *Spec.* 4369, A. M. M.
16	[4] Denniston, J. F., Commissary of Subsistence, U. S. V., age 24.	Aug. 25, 1864.	Conoidal ball fractur'd the right ankle.	Aug. 25, 1864.	Pirogoff's amputation at ankle joint.	Hæm. from ant. tib. and femoral arteries. Sept. 10, amp. lower third leg. Disch'd Jan. 1, 1867, and pensioned. *Spec.* 3211.
17	[5] Dresser, E. E., Pt., A, 20th Massachusetts, age 21.	June 24, 1864.	Shell fragm't extensively lacerated foot and injured tarsal and metatarsal bones.	June 24, 1864.	Syme's amp. at ankle. Surg. N. Hayward, 20th Mass. Soft parts so much destroyed that flaps were made from sides of ankle and foot and exter. sole.	Fragments of necrosed bone removed. Discharged Dec. 12, 1864. Died Nov. 14, 1870, from ulceration of bowels.
18	Dudley, E. H., Pt., K, 16th Vermont, age 20.	July 3, 1863.	Shell fracture and laceration of tarsal bones of left foot.	July 4, 1863.	Syme's amputation at ankle. Ass't Surgeon C. H. Richmond, 104th New York.	Inflammation; sloughing. July 18, amp. lower third leg. M. O. Aug. 10, 1863. Amp. up. third leg Dec. 21, 1863; pensioned.
19	[6] Duffy, T., Pt., I, 70th New York, age 21.	June 1, 1862.	Musket ball fractured tarsal and metatarsal bones of left foot.	June 2, 1862.	Syme's amputat'n at left ankle joint.	Sloughing of flaps. Nov. 6, amp. middle third leg. Nov. 28, sequestra removed. Disch'd July 11, 1863; pensioned. Healthy stump. *Spec.* 4312.
20	*Foreman, J. M.*, Pt., B, 7th Louisiana.	May 4, 1863.	Gunshot wound	May 5, 1863.	Amput'n at ankle joint. Surg. J. B. Davis, C. S. A.	Furloughed June 23, 1863.
21	Freeman, J. C., Pt., A, 9th New York, age 26.	Sept. 17, 1862.	Shot fracture of left foot	Sept. 18, 1862.	Syme's amp. at left ankle. Surg. G. C. Humphreys, 9th N. Y.	Discharged December 30, 1862; pensioned. Stump healed.
22, 23	Hicks, H. F., Pt., A, 1st R. Island Artillery.	Dec. 13, 1862.	Shot wound of both feet	Dec. 14, 1862.	Syme's amput'n at right ankle, and Pirogoff's at left ankle.	Discharged September 14, 1863; pensioned.
24	[7] *Holland, R. H.*, Corp'l B, 44th Virginia.	May 3, 1863.	Shot fracture of tarsus	May 4, 1863.	Pirogoff's amputation at ankle joint. Surg. B. F. Whitehead, C. S. A.	Recovery. 1864, unable to walk without crutches. Parts still swollen and œdematous; heel drawn upward.
25	*Holmes, A. W.*, Pt., K, 20th Georgia.	June 19, 1864.	Shot wound of right foot	June 19, 1864.	Amputat'n at right ankle joint. Surgeon C. Cord, C. S. A.	Discharged August 25, 1864.
26	Hosington, G., Pt., A, 123d Ohio, age 36.	June 13, 1863.	Wound of left foot by conoidal ball.	June 14, 1863.	Amputation at ankle joint by Confederate surgeon.	June 21, amp. leg 3 ins. above ankle joint. Sept. 17, re-amp. in middle third leg. Disch'd May 16, 1865; stump entirely healed; pensioned. Died Dec. 16, 1866.
27	*Humble, T.*, Pt., G, 24th Texas.	May 13, 1864.	Shot wound of right foot	May 13, 1864.	Amputat'n at right ankle joint. Surg. G. W. Lawrence, C.S.A.	Retired March 2, 1865.
28	Hunt, J., Pt., C, 19th Indiana, age 38.	June 18, 1864.	Conoidal ball injured right foot.	June 18, 1864.	Syme's amput'n at right ankle joint. Surgeon J. Ebersole, 19th Indiana.	Discharged May 20, 1865, and pens'd. Stump perfectly healed. Declares, in 1875, that his leg is slowly getting weaker.
29	Hunter, A., Pt., F, 140th Pennsylvania, age 33.	May 8, 1864.	Shell fracture of all metatarsal bones in right foot.	May 9, 1864.	Syme's flap amputation at right ankle joint. Surgeon J. W. Wishart, 140th Pennsylvania.	Discharged June 14, 1865; pensioned.
30	Isham, D. E., Pt., E, 154th New York, age 19.	May 3, 1863.	Shell wound, shattering and carrying away most of left foot.	May 4, 1863.	Chopart's amp. attempted, but finding astragalus and cuneiform injured, Syme's operat'n was performed. Surg. C. S. Wood, 66th New York.	Discharged January 22, 1864, and pensioned.
31	Jackson, F., Pt., E, 86th Colored Troops, age 32.	April 3, 1865.	Compound fracture right foot by fragment of shell.	April 3, 1865.	Syme's amput'n at right ankle joint. Surgeon H. Osborne, 51st Colored Troops.	Discharged Aug. 7, 1865. Stump perfectly healed.
32	[8] Johnson, F., Capt., K, 26th Michigan, age 22.	May 12, 1864.	Conoidal ball comminuted left tarsus.	May 12, 1864.	Syme's amputation, left ankle joint. Surg. J. W. Wishart, 140th Pennsylvania.	Discharged Nov. 30, 1864; pensioned. 3½ ins. shortening; flaps retracted. Not heard from since September 4, 1870.
33	Johnson, J. M., Pt., C, 3d Delaware, age 31.	June 3, 1864.	Shell wounds of left foot and right leg.	June 3, 1864.	Syme's amputation at left ankle joint; also amp. in mid. third right leg. Surg. G. W. Metcalf, 76th New York.	Discharged June 8, 1865; pensioned. Small ulcer on stump in 1874.

[1] Smith (S.), *loc. cit.*, pp. 110, 140. [2] Smith (S.), *loc. cit.*, p. 138. [3] Smith (S.), *loc. cit.*, p. 136.

[4] Capt. Denniston had received a shot fracture of the bones of the forearm, at Williamsburg, May 5, 1862, for which excision was performed. See *Second Surgical Volume*, Table CXXVIII, p. 957, No. 23. [5] Smith (S.), *loc. cit.*, pp. 109, 140. [6] Smith (S.), *loc. cit.*, p. 138.

[7] Holloway (J. M.), *Comp. Advantages of* Pirogoff's, Syme's, *and* Chopart's *Amp., etc.*, in *Am. Jour. Med. Sci.*, 1866, N. S., Vol. LI, p. 85, and Smith (S.), *Amp. at the Ankle Joint in Mil. Surg.*, in *U. S. San. Com. Mem.*, New York, 1871, Surg. Vol. II, p. 134. [8] Smith (S.), *loc. cit.*, p. 138.

No.	Name, Military Description, and Age.	Date of Injury.	Nature of Injury.	Date of Operation.	Operation and Operator.	Result and Remarks
34	June, J., Pt., E, 43d New York, age 25.	May 10, 1864.	Conoidal ball fractured tarsal bones, left foot.	May 12, 1864.	Flap amputation at ankle joint by Confederate surgeon.	Discharged March 15, 1865; good stump. Pensioned.
35	Kilborn, M., Pt., F, 14th Infantry, age 29.	Nov. 3, 1862.	Shell wound right foot.....	Nov. 3, 1862.	Syme's amputation, right ankle joint.	Discharged September 18, 1863; pensioned.
36	Kiag, C., Pt., B, 82d Ohio, age 19.	Mar. 19, 1865.	Left foot badly shattered by shot.	Mar. 19, 1865.	Syme's amputat'n at left ankle joint. Surgeon J. Chapman, 123d New York.	Discharged August 15, 1865, and pensioned.
37	[1] *Le Blanc, L. D.*, Pt., Donaldsonville Artillery.	——— 1862.	Shot wound of left foot.	On field.	Disarticulation at ankle joint...	Recovery.
38	[2] Le Blanc, O., Pt., E, 2d N. Hampshire, age 20.	June 1, 1864.	Shell fracture tarsal and metatarsal bones, right foot; great laceration.	June 1, 1864.	Pirogoff's amputation at ankle joint. Surgeon J. M. Merron, 2d New Hampshire.	Discharged June 16, 1865, and pensioned. Stump healed.
39	Leigh, G., Pt., C, 3d Artillery, age 19.	Sept. 24, 1863.	Shell carried away portion of right foot.	Sept. 24, 1863.	Syme's amputation at right ankle joint.	Flaps sloughed; March 29, 1864, amp. lower third leg. Disch'd Sept. 17, 1864. Died Sept. 13, 1871. *Spec.* 2165, A. M. M.
40	Luyster, T., Pt., B, 10th N. York, age 19.	May 10, 1864.	Conoidal ball comminuted the right os calcis.	May 10, 1864.	Circular amputation at right ankle joint. Surg. M. Rizer, 72d Pennsylvania.	Discharged April 24, 1865; pensioned.
41	Lynn, S., Serg't, C, 104th Illinois, age 28.	Nov. 25, 1863.	Conoidal ball fracturing right foot.	Nov. 25, 1863.	Pirogoff's modificat'n of Syme's amputat'n at right ankle joint. Surg. C. H. Miller, 125th Ill.	Discharged February 23, 1864, and pensioned. Fine round stump.
42	[3] Lyon, B., Pt., C, 12th Massachusetts, age 19.	Sept. 17, 1862.	Solid shot shattered left tarsus and carried away phalanges and metatarsus.	Sept. 17, 1862.	Syme's amputat'n at left ankle joint. Surgeon J. McL. Hayward, 12th Massachusetts.	Discharged Oct. 23, 1863. Stump highly serviceable; 3 inches shortening.
43	McConihe, L. A., Pt., F, 3d New Hampshire, age 20.	Aug. 26, 1863.	Shell wound of left foot.....	Aug. 26, 1863.	Syme's amp., left ankle joint. Surg. A. J. H. Buzzell, 3d N.H.	Discharged Nov. 5, 1863; pensioned. Stump healed.
44	McIntire, E. P., Pt., K, 2d Infantry, age 30.	May 1, 1863.	Conoidal ball injured left foot..	May 2, 1863.	Amputation at left ankle joint. Surg. G. R. C. Todd, C. S. A.	Discharged July 24, 1863; pensioned.
45	McIntyre, N., Pt., F, 10th Missouri, age 22.	May 14, 1863.	Conoidal ball comminuted the left tarsus and splintered the astragalus.	May 15, 1863.	Syme's amputation at left ankle joint. Surgeon H. S. Hewit, U. S. V.	Discharged January 21, 1864, and pensioned.
46	Maddox, T., Pt., E, 19th Kentucky, age 23.	May 22, 1863.	Wound of left foot by conoidal ball.	May 23, 1863.	Amp. at left ankle joint. Surg. W. K. Sadler, 19th Ky.	Discharged October 5, 1863; pensioned.
47	*Marsh, B. F.*, Pt., K, 12th Alabama.	Oct. 19, 1864.	Gunshot wound.....	Oct. 19, 1864.	Amputation at ankle joint by Surgeon — Scott.	Discharged February 1, 1865.
48	May, M., Pt., H, 9th New York, age 22.	Sept. 17, 1862.	Solid shot comminuted the left foot.	Sept. 18, 1862.	Syme's amputat'n at left ankle joint. Surgeon G. C. Humphreys. 9th New York.	Disch'd January 16, 1863; pensioned. April, 1863, amputation lower third leg.
49	Mentaldo, P., Pt., K, 6th Ohio, age 33.	Jan. 2, 1863.	Conoidal ball fractured metatarsal bones, right foot.	Jan. 2, 1863.	Pirogoff's amputation at the right ankle joint.	Discharged June 22, 1864, and pensioned. Stump healed.
50	Munger, M., Pt., H, 8th Michigan, age 19.	May 6, 1864.	Comp. fracture left foot, just below joint, by conoidal ball.	May 6, 1864.	Syme's amp. at left ankle joint. Surg. B. Rohrer, 10th Pa. Res.	Discharged January 27, 1865, and pensioned.
51	*Newell, T. F.*, Lieut., G, 45th Georgia, age 24.	July 2, 1863.	Fracture of right foot by a fragment of shell.	July 2, 1863.	Pirogoff's amputation at right ankle joint.	Transferred for exchange Sept. 27, 1863. *Spec.* 6688, A. M. M.
52	[4] O'Reilly, C., Pt., F, 164th New York, age 23.	May 18, 1864.	Shell wound of right foot	May 18, 1864.	Syme's amputat'n, right ankle. Surg. G. W. Briggs, C. S. A.	February 12, 1865, amp. of leg at junc. of lower third. Disch'd May 31, 1865, and pensioned.
53	Patton, A. G., Pt., I, 139th Pennsylvania, age 23.	May 12, 1864.	Wound of left foot by conoidal ball.	May 13, 1864.	Pirogoff's amputation at ankle joint. Surgeon S. F. Chapin, 139th Pennsylvania.	Disch'd March 16, 1865, and pensioned. Stump healed soundly.
54	*Polley, J. B.*, Corp'l, F, 4th Texas, age 24.	Oct. 7, 1864.	Shot wound of right foot.....	Oct. 7, 1864.	Syme's amputation at right ankle joint.	Retired January 25, 1865.
55	Porter, A., Pt., K, 106th Pennsylvania, age 22.	July 6, 1862.	Shot wound left foot, destroying tarsus.	July 7, 1862.	Pirogoff's amputation at left ankle joint. Ass't Surgeon P. Leidy, 106th Penn.	Discharged September 5, 1862; pensioned. Died July 10, 1864.
56	Price, S. B., Serg't, A, 2d Ohio, age 22.	May 15, 1864.	Conoidal ball fractured left foot.	May 15, 1864.	Syme's amputat'n at left ankle. Surgeon B. F. Miller, 2d Ohio.	Gangrene of stump. June 15, amp. leg at lower third. Discharged Oct. 10, 1864; pens'd.
57	Ross, J., Pt., I, 2d New York Heavy Artillery, age 34.	May 19, 1864.	Conoidal ball passed through metatarsus from dorsal to plantar surface.	May 19, 1864.	Syme's amputation at ankle joint. Surg. J. W. Wishart, 140th Pennsylvania.	Secondary amput'n of leg, upper third. Disch'd March 15, 1865. Died Jan. 8, 1877; apoplexy and hemiplegia.
58	Russell, A. K., Pt., H, 1st Massachusetts Heavy Artillery, age 43.	May 19, 1864.	Conoid. ball lacerated soft parts of left foot and com. os calcis, astragalus, and metatarsals.	May 19, 1864.	Syme's amputation at ankle joint; sloughing.	Discharged June 2, 1865. Amputation leg at mid. third. *Card Photo's*, Vol. I, p. 45.
59	Smith, G. W., Pt., H, 6th Illinois Cavalry, age 21.	Sept. 15, 1864.	Shot wound of right foot.....	Sept. 15, 1864.	Pirogoff's amputation at right ankle joint; portion of heel bone retained. Surg. G. P. Christy, 9th Illinois Cavalry.	Discharged October 17, 1864; pensioned.
60	Smith, S. B., Lieut., D, 3d Michigan, age 26.	May 2, 1863.	Four of left tarsal bones shattered and soft parts extensively destroyed.	May 2, 1863.	Syme's amputation at left ankle joint. Surgeon C. S. Wood, 66th New York.	Transferred to V. R. C. July 2, 1863. Disch'd January 1, 1868; pensioned. Stump sound and healthy.
61	Smith, T. A., Pt., H, 11th Penn. Reserves, age 18.	Dec. 13, 1862.	Wound of right foot by conoidal ball.	Dec. 15, 1862.	Pirogoff's amputation at right ankle joint.	March 14, 1863, gangrene. Discharged Sept. 11, 1863; pensioned. 1878, stump tender; cannot wear artificial limb.
62	*Smyser, J. W.*, Pt., A, 27th South Carolina, age 25.	June 24, 1864.	Shot wound of right foot.....	June 24, 1864.	Syme's amputation at right ankle joint.	Furloughed August 6, 1864.
63	Snyder, L., Corp'l, F, 71st Penn., age 24.	Dec. 15, 1862.	Fracture of left foot by conoidal ball.	Dec. 16, 1862.	Pirogoff's amputation at left ankle joint.	Discharged May 17, 1864; pensioned. Stump perfectly healed.
64	*Spearman, R. F.*, Pt., D, 25th South Carolina.	May 30, 1864.	Conoidal ball fractured tarsus.	May 31, 1864.	Amput'n at ankle joint. Surg. C. B. Gibson, C. S. A.	Transferred.
65	[5] Stetson, A. L., Pt., G, 20th Massachusetts, age 26.	May 2, 1863.	Spiral case shot perforated left ank. joint, destroying articulation and soft parts about heel.	May 2, 1863.	Double lat. flap amp. (Syme's modified) at left ankle. Surg. N. Hayward, 20th Mass.	Discharged Dec. 29, 1863; pensioned. Cicatrization perfect; 2¼ inches shortening.
66	[6] Stockwell, W. S., Serg't, B, 57th New York, age 23.	May 3, 1863.	Unexploded shell comminuted phalanges, metatarsal bones, and port'n of tarsus, right foot.	May 4, 1863.	Syme's amput'n at right ankle joint. Surgeon C. S. Wood, 66th New York.	Discharged Aug. 24, 1863; pensioned. Very creditable stump.
67	*Thornton, F. C.*, Pt., K, 34th Virginia.	July 30, 1864.	Greater port'n of right foot torn away by fragment of shell.	July 30, 1864.	Pirogoff's amputation at right ankle joint.	Healed by first intention. Furloughed October 23, 1864.

[1] Formento (F., jr.), *Notes and Observations on Army Surgery, etc.*, New Orleans, 1863, p. 27. [2] Smith (S.), *loc. cit.*, p. 132.
[3] Smith (S.), *loc. cit.*, p. 138. [4] Smith (S.), *loc. cit.*, p. 136. [5] Smith (S.), *loc. cit.*, pp. 110, 140. [6] Smith (S.), *loc. cit.*, p. 138.

No.	Name, Military Description, and Age.	Date of Injury.	Nature of Injury.	Date of Operation.	Operation and Operator.	Result and Remarks.
68	Townsend, W., Pt., I, 92d Ohio age 21.	Sept. 1, 1864.	Conoidal ball fractured left foot.	Sept. 1, 1864.	Pirogoff's modificat'n of Syme's amputation at left ankle joint.	Discharged June 16, 1865; pensioned. In 1867, alleged that retained portion of heel was an annoying encumbrance.
69	Treadway, W., Pt., H, 13th Tennessee Cavalry, age 20.	April 4, 1865.	Wound of left foot by conoidal ball.	April 5, 1865.	Syme's amput'n at ankle joint. Surg R.D.Hamilton,P.A.C.S.	Discharged October 23, 1865; pensioned. Sound stump.
70	*Unknown*, Pt., ——.....	Nov. 26, 1863.	Shot wound ,involving tarsus..	Nov. 28, 1863.	Pirogoff's amp. at ankle joint. Surg. R. K. Taylor, P.A.C.S.	1865, recovery; apparently little inconvenienced by loss of foot.
71	Wallace, T. C., Pt., B, 1st West Virginia Cavalry, age 20.	Aug. 7, 1864.	Conoidal ball perforated tarsal bones, left foot.	Aug. 9, 1864.	Pirogoff's modificat'n of Syme's amputat'n at left ankle. Surg. P. Gardner, 1st W. Va. Cav.	Discharged May 29, 1865; pensioned. An open ulcer extended to the rear of the ext. malleolus.
72	[1] Weeks, W. C., Lieut., I, 5th Michigan Cavalry, age 28.	April 1, 1865.	Conoidal ball perforated left ankle joint.	April 1, 1865.	Pirogoff's amput'n at left ankle joint. Surg. A. K. St. Clair, 5th Michigan Cavalry.	Discharged July 20, 1865. Good solid stump. 1866, small portion of bone removed. *Spec.* 2298.
73	Welsh, M., Pt., H, 47th New York, age 26.	Oct. 7, 1864.	Fracture of left ankle joint by conoidal ball.	Oct. 8, 1864.	Syme's amputat'n at left ankle joint.	Disch'd May 31, 1865; pensioned. Died Jan. 17, '76; chr. dysentery
74	Wilson, R., Pt., E, 72d Pennsylvania, age 22.	June 3, 1864.	Shell wound of left foot.....	June 3, 1864.	Disarticulat'n at left ankle joint. Surg. M. Rizer, 72d Penn.	Discharged May 5, 1865, and pensioned.
75	Wincel, P., Pt., B, 36th Wisconsin, age 22.	June 2, 1864.	Conoidal ball fractured bones of left foot.	June 3. 1864.	Antero-posterior flap amputat'n at left ankle joint.	Gangrene. Discharged October 7, 1864, and pensioned.
76	Winters, C. H., Corp'l, F, 110th Ohio, age 30.	May 12, 1864.	Wound of right foot by fragment of shell.	May 12, 1864.	Syme's amputation at right ankle joint.	Discharged December 14, 1864, and pensioned.
77	*Womack, J. K.*, Pt., H, 14th Virginia, age 21.	July 3, 1863.	Shot fracture of left foot.....	July 4, 1863.	Syme's amputat'n at left ankle joint.	Paroled Sept. 25, 1863. Stump sound and good.
78	*Yount, J. M.*, Pt., G, 52d Virginia.	June 8, 1862.	Shot wound.....	June 8, 1862.	Amputation at ankle joint by Surg. J. M. Hayes, C. S. A.	Recovered.
79	Birmingham, A., Lieut., A, 69th New York, age 20.	Dec. 13, 1862.	Wound of left foot by conoidal ball; also wound right thigh.	Dec. 13, 1862.	Pirogoff's amp. at left ankle j't; also amputat'n of right thigh.	Died December 17, 1862.
80	Bland, F. M., Pt., D, 23d Iowa, age 22.	May 19, 1863.	Shot fracture of left foot.....	May 19, 1863.	Syme's amput'n at ankle joint; sloughing. June 17, amp. leg at junc. upper thirds. July 2, amp. thigh, lower third.	Gangrene of thigh stump. Died July 16, 1863. *Spec.* 1706, A. M. M.
81	Boynton, H. E., Pt., L, 1st Mass. Artillery, age 18.	May 19, 1864.	Conoidal ball fractured left tarsal and metatarsal bones; also fracture of right humerus.	May 19, 1864.	Syme's amp. at left ankle joint. Surgeon J. W. Wishart, 140th Pennsylvania.	Two inches of middle third of humerus excised May 22d. Died June 22, 1864. *Spec.* 828, A.M.M.
82	Bradshaw, G., Pt., D, 19th Ohio.	Jan. 1, 1863.	Shot wound of left foot.	Jan. 1, 1863.	Pirogoff's amputation at left ankle joint.	Died February 4, 1863.
83	*Cecil, R.*, Lieut., K, 1st Virginia Cavalry.	May 24, 1864.	Shot wound of left tarsus.....	May 24, 1864.	Pirogoff's modificat'n of Syme's amputation at left ankle joint.	Sphacelus, necessitating intermediary amp. leg in upper third. Died June 22, 1864.
84	Colbert, E., Pt., K, 170th N. York, age 34.	May 23, 1864.	Conoidal ball fractured left foot.	May 25, 1864.	Pirogoff's amputation at left ankle joint. Surgeon M. F. Regan, 164th New York.	Died June 9, 1864, of tetanus.
85	Davis, J., Steamer Memphis.	Nov. 7, 1861.	Shot wound of right foot.....	Nov. 9, 1861.	Syme's amput'n at ankle joint.	Died February 26, 1862, of pneumonia.
86	Frank, A. B., Pt., L, 2d N. York Artillery, age 30.	June 16, 1864.	Conoidal ball fractured tarsal and metatarsal bones of right foot.	June 16, 1864.	Syme's amput'n at right ankle joint. Surg. J. W. Wishart, 140th Pennsylvania.	Sloughing of flaps. Died July 28, 1864.
87	Hale, E. P., Pt., I, 1st Minnesota, age 24.	July 2, 1863.	Conoid. ball entered at internal malleolus and emerged 2 ins. below ext. malleolus; astragalus comminuted.	July 2, 1863.	Syme's amputat'n at left ankle joint. Surgeon C. S. Wood, 66th New York.	Died September 12, 1863. *Spec.* 1949, A. M. M.
88	Harfeter, G., Pt., D, 104th Pennsylvania, age 22.	Sept. 27, 1863.	Shell wound of left foot; also slight wounds of hip and arm.	Sept. 28, 1863.	Syme's amputat'n at left ankle joint. Surg. R. B. Bontecou, U. S. V.	Oct. 1, 3, hæmorrhage; ligation of anterior tibial. Died October 12, 1863.
89	Lour, B. F., Pt., A, 140th Pennsylvania.	July 2, 1863.	Conoidal ball shattered bones of right foot.	July 2, 1863.	Syme's amput'n at right ankle joint. Surgeon C. S. Wood, 66th New York.	Died August 2, 1863.
90	Morgan, T., Pt., I, 29th Pennsylvania.	July 20, 1864.	Shell fracture of right foot	July 20, 1864.	Amputat'n at right ankle joint. Surg. J.V.Kendall, 149th N.Y.	Died September 11, 1864.
91	Oppelt, M., Pt., K, 36th Wisconsin, age 30.	June 6, 1864.	Conoidal ball fractured the right foot.	June 6, 1864.	Amputat'n at right ankle joint. Surg. S. H. Plumb, 59th N. Y.	Died July 11, 1864.
92	*Pope, J.*, Pt., C, 37th Mississippi, age 22.	Oct. 8, 1862.	Shot fracture of bones of right foot.	Oct. —, 1862.	Primary amput'n at right ankle joint by Syme's method.	Died Nov. 6, 1862, of pyæmia.
93	Porter, G. H., Pt., D, 3d Indiana Cavalry, age 31.	May 5, 1864.	Conoidal ball fractured the right foot.	May 5, 1864.	Syme's amput'n at right ankle joint.	May 17, amput'n lower third leg. Died June 4, 1864, of pyæmia.
94	Shoemaker, J., Pt., H, 57th Ohio, age 33.	Jan. 11, 1863.	Conoidal ball fractured tarsal bones of left foot.	Jan. 11, 1863.	Syme's amputat'n at left ankle joint. Surgeon J. B. Sparks, 19th Kentucky.	Jan. 31, amp. leg, lower third. March 8, re-amp. leg, mid. third. Died Mar. 19, '63; gang. of stump.
95	Smith, H., Pt., G, 12th Missouri.	Nov. 9, 1863.	Shot fracture of left foot.....	———	Primary amputation at ankle joint by Syme's method.	Died December 1, 1863.
96	*Smith*, —, —, E, 53d Georgia, age 27.	———	All the bones of left foot badly com'nuted by shell fragment.	On field.	Syme's amput'n at ankle joint. Surg. J. J. Knott, 53d Ga.	Re-amputation. Died.
97	Thurston, L., Pt., H, 2d N. York Heavy Artillery, age 25.	June 16, 1864.	Conoidal ball shattered the tarsal bones of left foot.	June 17, 1864.	Syme's amputat'n at left ankle joint. Surg. J. W. Wishart, 140th Pennsylvania.	Died June 28, 1864, of hospital gangrene.
98	[2] *Unknown*	———	Shot wound.....	On field	Pirogoff's amp. at ankle joint. Surg. J. T. Gilmore, C. S. A.	Also amputation of other leg by Lenoir's method. Died.
99	*Unknown (A. B.)*, Confederate.	Feb. 16, 1862.	Tarsal bones of left foot comminuted; soft parts lacerated.	Feb. 18, 1862.	Pirogoff's amputation at left ankle joint.	Died Feb. 22, 1864, of double pneumonia.
100	*Watts, W. T.*, Pt., G, 4th Virginia, age 27.	July 3, 1863.	Shot fracture left foot, opening ankle joint; also fracture of right os calcis.	July 3, 1863.	Syme's amputation at left ankle joint. Surgeon J. M. Hayes, C. S. A.	Aug. 20, sloughing of right foot. Died Aug. 29, 1863, of pyæmia.
101	Webb, J. D., Corp'l, F, 87th Indiana.	Sept. 19, 1863.	Shot wound of right foot	Sept. 19, 1863.	Amputat'n at right ankle joint.	Died Oct. 18, 1863, of wounds.
102	[3] *I*——, *M.*, —, 45th Georgia.	Mar. 25, 1865.	Rifle ball perforated the ankle joint.	Mar. 26, 1865.	Syme's amputation at ankle joint.	Forty days after operation discharging sinuses indicating dead bone. Result doubtful.
103	Marshall, W. E, col'd cook, K, 2d Michigan.	June 8, 1864.	Wound of right foot by solid shot.	———	Primary amputation in right foot at ankle joint. Surg. H. E. Smith, 27th Michigan.	Result undetermined. Not a pensioner.

[1] An abstract of this case was published in *Circular* No. 6, S. G. O., Washington, 1865, p. 47. See *Photographs of Surgical Cases*, A. M. M., Vol. II, p. 25, and Smith (S.), *Amputations at the Ankle Joint in Military Surgery*, in *U. S. San. Com. Memoirs*, Surgical Volume II, pp. 116, 132.

[2] Holloway (J. M.), *Comparative Advantages of* Pirogoff's, Syme's, *and* Chopart's *Amputations, etc.*, in *Am. Jour. Med. Sci.*, 1866, N. S., Vol. LI, pp. 85, 86.

[3] Smith (S.), *loc. cit.*, pp. 122, 136.

Intermediary Amputations at the Ankle Joint.—This group comprises thirty-nine cases; twenty-five terminated in recovery and fourteen in death, a mortality rate of 35.9 per cent. Thirty-four were Union, and five Confederate soldiers.

Recoveries after Intermediary Amputations at the Ankle Joint.—Of the twenty-five successful intermediary amputations at the ankle joint, ten were performed after Pirogoff's and thirteen after Syme's method; in two cases the mode of operation was not indicated. Of the patients, five were Confederate and twenty Union soldiers. The latter were all pensioned; but one has since died of phthisis. In seven instances re-amputations in the leg became necessary—in two in the lower, in two in the middle, and in two in the upper third; in one the point of re-amputation was not specified.

CASE 880.—Private P. Carter, Co. I, 7th Michigan, aged 22 years, was wounded at Fredericksburg, December 11, 1862. Surgeon G. S. Palmer, U. S. V., recorded his admission to the field hospital of the 2d division, Second Corps, with "shot fracture of right foot. Treatment of simple dressings." Two weeks after the reception of the injury the wounded man was transferred to Lincoln Hospital, Washington, where Syme's amputation at the ankle joint was performed, on December 26th, by Assistant Surgeon G. M. McGill, U. S. A. The patient recovered, and was discharged from service March 2, 1863, and pensioned. Several years afterwards he was fitted with an artificial foot by Dr. E. D. Hudson, of New York City. Dr. A. B. Ranney, of Bronson, Michigan, testified, June 25, 1875: "I have been Carter's family physician for the past three years and have examined him to-day. His right leg from the knee down is withered to the bone. The foot was taken off at the ankle joint, and there was no cushion left for the end of the bone to rest upon. At times the end of the bone is exposed and very painful, and much of the time there is discharge from the stump. I have treated him with poor success at various times during the years 1872, 1873, and 1874, and have advised an amputation of the limb at the knee, as it would, in my opinion, give him less trouble than at present," etc. The pensioner was paid March 4, 1881. A part of the amputated foot (*Spec.* 4859), showing fracture of the calcaneum and cuboid bone by a conoidal ball, was contributed to the Museum by the operator.

CASE 881.—Private W. A. Elderkin, Co. C, 6th Maine, aged 24 years, was wounded at Rappahannock Station, November 7, 1863, by a minié ball, which entered the dorsum of the right foot, fracturing the metatarsal bones, and making its exit at the plantar surface. Two days afterwards he was admitted to Harewood Hospital at Washington, where the wound became gangrenous about November 23d. For this a local treatment of nitric acid and oakum dressing was applied and a constitutional treatment of tonics, stimulants, and beef tea diet was administered. The disease, however, not being arrested and the patient growing weaker, operative interference became necessary, and Pirogoff's amputation was performed on December 6th by Surgeon R. B. Bontecou, U. S. V. After the operation the parts were kept properly adjusted and the supporting treatment was continued. About January 4, 1864, the progress of the case was interrupted by erysipelas making its appearance, followed by sloughing of the soft parts to some extent. Tincture of chloride of iron was then prescribed and wheat flour was applied locally. The inflammation was arrested in about two weeks, after which the patient's health improved daily and the wound healed rapidly. He was discharged from service with a useful stump April 23, 1864, and pensioned. The amputated part of the foot (*Spec.* 2028), contributed with the history by the operator, is represented in the annexed cut (FIG. 349), and shows the metatarsus to have been badly shattered, some of the fragments being necrosed and a slight effusion of callus having occurred in the neighboring parts. After receiving his discharge the patient was supplied with a "Palmer" artificial foot, which, however, did not prove satisfactory, and is reported to have become entirely useless in about two months. The pensioner died December 14, 1866, his physician, Dr. A. G. Peabody, of Machias, Maine, certifying that "death was caused by consumption arising from hardship, exposure, and the loss of the foot, the amputated foot leaving a stump which never thoroughly healed, but remained a constant drain upon the vital powers of the man's constitution."

FIG. 349.—Portion of right foot, metatarsus shattered.—*Spec.* 2028.

CASE 882.—Private J. H. Short, Co. F, 140th Pennsylvania, aged 19 years, was wounded at Spottsylvania, May 12, 1864. Surgeon J. E. Pomfret, 7th New York Artillery, reported his admission to the field hospital of the 1st division, Second Corps, with "shot wound of left foot." Several days after receiving the injury the wounded man was sent to Washington, where he entered Harewood Hospital and suffered amputation of the foot. Surgeon R. B. Bontecou, U. S. V., who performed the operation, made the following report: "The wound was caused by a ball entering in front of the ankle joint, opening the same, and lodging against the astragalus. On his admission to Harewood Hospital the patient was suffering from irritative fever and the parts above the joint were considerably swollen. Syme's operation was performed on May 25th with favorable result, the patient improving rapidly and making a good recovery. Sulphuric ether constituted the anæsthetic used in the case. Simple dressings were used, and the treatment was supporting." The patient was subsequently transferred to hospital at Philadelphia and later to Pittsburgh, whence he was discharged from service November 4, 1864, and pensioned. His photograph, taken at Harewood Hospital and contributed by the operator, is copied in FIGURE 3 of PLATE LXXV, opposite page 596. In his applications for commutation the pensioner continues to describe the condition of the stump as "very good and sound." He was paid September 4, 1880.

CASE 883.—Private W. Darling, Co. E, 6th Wisconsin, aged 41 years, was wounded in the left foot, at Antietam, September 17, 1862. He was admitted to hospital at Smoketown, where the limb was amputated three weeks after the date of the

injury. Surgeon B. A. Vanderkieft, U. S. V., who performed the operation, reported that the patient recovered and was discharged from service January 13, 1863. The man became a pensioner, and was subsequently furnished with an artificial foot by Dr. E. D. Hudson, of New York City, who contributed a cast of the stump (*Spec.* 4957), represented in the adjoining cut (FIG. 350), with the following description of the case: "The injury consisted of a comminution of the tarsus and calcaneum, and the amputation was performed at the ankle joint by Bauden's dorsal flap, the tibia and fibula being left in their entire length with the exception of the malleoli." In his applications for commutation the pensioner continued to report the stump as being in "good condition." He was paid September 4, 1880.

FIG. 350.—Stump of left leg after BAUDEN'S amputation at the ankle. *Spec.* 4957.

CASE 884.—Private J. Loughlin, Co. K, 67th New York, age 22 years, was wounded in the left foot, at Malvern Hill, July 2, 1862. He entered Fourth and George Streets Hospital, Philadelphia, several weeks afterwards, whence Acting Assistant Surgeon J. B. Bowen reported the following history: "The injury was caused by a minié ball, which entered the external portion of the ankle, passing through, fracturing and comminuting the tarsal bones. The man was taken prisoner and sent to Richmond, where he remained about two weeks. Twelve days after the receipt of the wound a portion of stocking and shoe sloughed out. He suffered great pain and the wound discharged large quantities of purulent matter, also several pieces of bone. When released by the enemy he was transferred to a hospital transport, where Pirogoff's operation was performed on July 26th. The patient was received into this hospital the same day. Erysipelas invaded the stump and extended to the knee, and abscesses and sloughing appeared on the posterior surface. Amputation at the upper third of the leg was performed by flap operation on September 16th, by Acting Assistant Surgeon S. D. Gross. Since then the man has improved and the stump has united. The treatment embraced muriatic tincture of iron, quinine, whiskey, and morphine." The patient was subsequently transferred to Haddington Hospital, whence he was discharged from service July 29, 1863, and pensioned. About one year afterwards he was supplied with an artificial leg by Dr. E. D. Hudson, of New York City. The pensioner was last paid March 4, 1869, since when he has not been heard from. The bones, forming the Pirogoff stump and including the lower half of the shafts of the tibia and fibula (*Spec.* 214), were contributed to the Museum by the second operator, and are represented in the annexed cut (FIG. 351), showing the cut extremities of the tibia and calcis to be carious. No union whatever had occurred. The lower extremity of the fibula is also carious, and the upper portion of the shaft is necrosed and enlarged by attempts at an involucrum from the periosteum.

FIG. 351.—Bones of left leg after PIROGOFF'S amputation. *Spec.* 214.

Fatal Intermediary Amputations at the Ankle Joint.—Fourteen of these operations were recorded, eight by Pirogoff's and six by Syme's method. In one instance exarticulation at the ankle joint was followed by re-amputation in the middle, and in two by ablation in the upper thirds of the leg. The fatal issue was ascribed to pneumonia in one, pyæmia in three, tetanus in one, erysipelas in two, exhaustion in four, and typhoid fever in one instance. In one case the right arm had been amputated in the upper third.[1]

CASE 885.—Private S. Smith, Co. K, 86th New York, aged 47 years, was wounded at the Wilderness, May 10, 1864, by two minié balls, one of which passed through the left foot and fractured the tarsal bones; the other produced a flesh wound of the dorsal region near the spine. Several days after receiving the injury the wounded man was admitted to Harewood Hospital, Washington, where he did well up to May 23d. From that date his mind became wandering and delirious, his left arm and right leg keeping up constant motion. Irritation from the wound was suspected as the cause of this unusual action, and amputation was deemed necessary on May 25th, when Surgeon R. B. Bontecou, U. S. V., performed the operation by his modification of Pirogoff's method at the ankle joint. The patient improved after the amputation, all symptoms of derangement of mind disappeared, and he became perfectly conscious. Ether was used as the anæsthetic. The patient continued to do well up to June 1st, when pyæmic symptoms appeared, the wound ceased to suppurate, and rigors set in; skin hot and dry. In spite of a supporting treatment the patient gradually grew weaker. He died July 19, 1864. The tarsal bones, together with the malleoli and a thin section of the tibia, removed at the amputation (*Spec.* 3054), with the history, were contributed to the Museum by the operator.

CASE 886.—Private D. C. Hayes, Co. A, 4th New Hampshire, was wounded at the battle of Pocotaligo, October 22, 1862, by a minié ball, which struck the dorsum and penetrated to the sole of the left foot, passing out nearly opposite the point of entrance without having caused much apparent comminution or splintering of the bone. He was admitted to hospital at Hilton Head the following day, whence Assistant Surgeon J. E. Semple, U. S. A., contributed the pathological specimen (No. 691) with the following report: "We endeavored to save the foot, but the patient became much reduced and mortification set in. Syme's operation was performed on November 11th, and death occurred on the following day from exhaustion." Acting Assistant Surgeon T. T. Smiley, who performed the amputation, states in his publication of the case[2] that the patient died with all the symptoms of pyæmia, also that the injury produced violent pain and high inflammation, which he ascribed to a longitudinal fracture of one of the metatarsal bones, opening the tarso-metatarsal articulation. The specimen consists of a ligamentous preparation of the scaphoid, cuboid, cuneiform, and metatarsal bones of the amputated foot, the bases of the second and third of the latter exhibiting the seat of the fracture by the bullet.

[1] CASE of F. Schoneckles, Private, C, 2d Delaware. See CASE 77, TABLE LXXVII, p. 760 of the *Second Surgical Volume.*

[2] SMILEY (T. T.), *Twenty Cases of Gunshot Wounds*, in *Boston Medical and Surgical Journal*, 1863, Vol. LXVIII, p. 419.

TABLE XCI.

Summary of Thirty-nine Cases of Intermediary Amputations at the Ankle Joint for Shot Injury.

[Recoveries, 1—25; Deaths, 26—39.]

No.	Name, Military Description, and Age.	Date of Injury.	Nature of Injury.	Date of Operation.	Operation and Operator.	Result and Remarks.
1	*Atwell, J. J.*, Pt., A, 8th Virginia, age 20.	July 3, 1863.	Conoidal ball entered instep and lodged among the tarsal bones of left foot.	July 17, 1863.	Syme's amputation at left ankle joint. A. A. Surgeon T. T. Smiley.	Paroled Nov. 12, 1863; stump healed.
2	[1]Bayard, J., Pt., B, 28th N. York, age 28.	July 6, 1861.	Musket ball passed through instep, fracturing tarsal bones of left foot.	July 11, 1861.	Syme's amp. left ankle joint. Ass't Surgs. J. W. S. Gouley and W. J. White, U. S. A.	Discharged July 24, 1861; pensioned. Serviceable extremity.
3	Burns, C. E., Pt., D, 12th Massachusetts, age 24.	Aug. 29, 1862.	Fracture of right foot, involv'g ankle joint, by musket ball.	Sept. 13, 1862.	Syme's amputation at right ankle joint. Surgeon D. P. Smith, U. S. V.	Cushion one inch thick, well united to tibia, and quite tender. April 22, 1863, amp. lower third leg. Discharged July 11, 1863; pensioned.
4	[2]*Butler, W. M.*, —, K, 7th Arkansas.	Sept. 20, 1863.	Ball passed through right foot.	Oct. 3, 1863.	Pirogoff's amputation at right ankle joint.	Hæmorrhage from plantar arch. Doing well.
5	Carter, P., Pt., I, 7th Michigan, age 22.	Dec. 11, 1862.	Conoidal ball comminuted os calcis and cuboid bones, right foot.	Dec. 26, 1862.	Syme's amputation at right ankle joint, posterior flap. Ass't Surg. G. M. McGill, U. S. A.	Discharged March 2, 1863; pensioned. Leg withered to knee; troublesome stump; at times bones exposed and painful. *Spec.* 4859, A. M. M.
6	[3]*Clark, F. W.*, Pt., B, 12th Georgia.	May 10, 1864.	Conoidal ball fractured astragalus and third and fourth metatarsal bones.	May 28, 1864.	Pirogoff's amputation at ankle joint. Surgeon C. B. Gibson, C. S. A.	Recovered. Heel drawn up; a tender cicatrix formed part of sole of stump.
7	[4]Cook, G. L., Pt., B, 1st Pennsylvania, age 22.	June 30, 1862.	Conoidal ball passed through right instep, fracturing tarsal and metatarsal bones.	July 23, 1862.	Syme's amputation at right ankle.	Aug. 1, straps to stump. Disch'd Dec. 7, 1862; pens'd. Stump healed perfectly.
8	Darling, W., Pt., E, 6th Wisconsin, age 41.	Sept. 17, 1862.	Conoidal ball fractured left tarsus and calcaneum.	Oct. 8, 1862.	Syme's modified amputation at ankle joint, dorsal flap. Surg. B. A. Vanderkieft, U. S. V.	Discharged January 13, 1863; pensioned. *Spec.* 4957, A. M. M.
9	Dickey, W. H., Serg't, A, 8th Pennsylvania Reserves, age 28.	Dec. 13, 1862.	Conoidal ball fractured the left foot.	Dec. 24, 1862.	Syme's amputation at left ankle joint. Surg. H. Bryant, U. S. V.	Abscess. Discharged Dec. 10, 1863; pensioned. Stump perfectly healed. *Spec.* 575, A.M.M.
10	Elderkin, W. A., Pt., C, 6th Maine, age 24.	Nov. 7, 1863.	Musket ball entered dorsum of right foot, fracturing metatarsal bones.	Dec. 6, 1863.	Pirogoff's amputat'n with Bontecou's modification. Surg. R. B. Bontecou, U. S. V.	Erysipelas; sloughing. Disch'd April 23, 1864. Stump never healed thoroughly, and was a constant drain upon the vital powers. Died Dec. 14, 1866, of consumpt'n. *Spec.* 2028, A.M.M.
11	Forsyth, G., Pt., E, 14th N. Jersey, age 25.	May 13, 1864.	Conoidal ball injured left foot.	May 18, 1864.	Pirogoff's amputation at left ankle joint.	Discharged April 6, 1865, and pensioned.
12	[5]Gross, D. N., Pt., E, 8th Illinois Cavalry, age 24.	June 29, 1862.	Canister shot comminuted the right astragalus and carried away ends of both malleoli.	July 22, 1862.	Syme's amput'n at right ankle joint. Ass't Surg. R. Bartholow, U. S. A.	Necrosis. Discharged December 7, 1863; pens'd. Good stump.
13	Gurley, W., Pt., C, 11th Infantry, age 18.	May 12, 1864.	Conoidal ball entered below external malleolus and crushed posterior tuberosity of os calcis.	June 1, 1864.	Amputat'n at right ankle joint. Surgeon D. W. Bliss, U. S. V.	Necrosed sequestra removed at different times. Disch'd Feb. 7, 1865. Amp. upper third leg Feb. 18, '68. *Spec.* 2421, A.M.M.
14	Johnson, A. W., Pt., E, 64th New York, age 23.	Dec. 13, 1862.	Ball entered between extensor longus pollicis and calcaneum, fracturing bones of foot.	Dec. 20, 1862.	Syme's amputation at left ankle joint. Surgeon C. Gray, 7th New York.	Discharged Jan. 29, 1863; pensioned. Oct. 9, 1863, amput'n lower third leg.
15	[6]Larkin, P., Pt., C, 48th N. York, age 24.	July 18, 1863.	Piece of shell comminuted tarso-metatarsus except calcis, right foot.	July 25, 1863.	Pirogoff's amputation at right ankle joint. Ass't Surg. J. W. Applegate, U. S. V.	Discharged Dec. 4, 1863. Amp. leg at middle third May 6, 1879, for necrosis. *Spec.* 6913, A.M.M.
16	Loughlin, J., Pt., K, 67th New York, age 22.	July 2, 1862.	Conoidal ball perforated left ankle, comm'g tarsal bones.	July 26, 1862.	Pirogoff's amputation at left ankle joint.	Erysipelas. Sept. 16, amput'n of leg, upper third. Disch'd July 29, 1863; pensioned. Not heard from since March 4, 1869. *Spec.* 214, A. M. M.
17	Morse, G. F., Pt., K, 16th Massachusetts, age 19.	May 1, 1862.	Shot fracture of left foot.....	May 16, 1862.	Pirogoff's amputation at left ankle joint. Surgeon C. C. Jewett, 16th Massachusetts.	Discharged August 4, 1862, and pensioned. Good stump; can bear his weight upon it.
18	*Newton, J. W.*, Pt., E, 14th Virginia, age 26.	July 2, 1863.	Conoidal ball fractured tarsal bones of right foot.	July 16, 1863.	Pirogoff's amputation at right ankle joint.	July 25, sloughing. August 10, amp. at junction of upper thirds of leg; stump healed. Exch'd November 12, 1863.
19	[7]Ramsdell, J. H., Pt., C, 8th Minnesota, age 30.	Dec. 7, 1864.	Conoidal ball passed through tarsus from dorsum to heel.	Dec. 16, 1864.	Amputation at left ankle joint by Syme's method. Surgeon S. D. Turney, U. S. V.	Discharged June 4, 1865; pensioned. Stump sound and reliable for support.
20	Sanford, A. C., Pt., E, 6th Connecticut, age 27.	Aug. 16, 1864.	Conoidal ball fractured tarsal bones of left foot.	Sept. 14, 1864.	Circular amputation at left ankle joint by Syme's method. A. A. Surg. E. B. Woolston.	Discharged April 27, 1865, and pensioned. Stump healed.
21	Short, J. H., Pt., F, 140th Pennsylvania, age 19.	May 12, 1864.	Ball lodged against astragalus, left foot; tarsus comminuted.	May 25, 1864.	Syme's amp. at left ankle joint. Surg. R. B. Bontecou, U. S. V.	Discharged Nov. 4, 1864; pens'd. *Card Phot.*, Vol. I, p. 45.
22	Strout, S., Capt. After Guard, U. S. Navy, age 38.	April 1, 1865.	Pistol shot wound of right foot.	April 15, 1865.	Amputat'n at right ankle joint. Surgeon — Smith, U. S. N.	Discharged June 5, 1865; pensioned. Sound stump.
23	[8]Unknown, age 24.....	Nov. 25, 1863.	Shot fracture of left tarsus ...	———	Intermediary amp. at left ankle joint by Pirogoff's method. Prof. P. F. Eve.	January, 1864, complete disintegration of calcis and end of tibia. Feb., 1864, amp. leg. Recov'ry.
24	Whitney, P. P., Pt., A, 6th Michigan, age 24.	Aug. 5, 1862.	Shot wound of right foot.....	Aug. 16, 1862.	Pirogoff's amp. at ankle joint, leaving portion of os calcis. Surg. E. F. Sanger, U. S. V.	Discharged October 4, 1862; pensioned.

[1] SMITH (S.), *Amputations at the Ankle Joint in Military Surgery*, in *U. S. Sanitary Commission Memoirs*, Surgical Volume II, p. 136.

[2] EVE (P. F.), *Cases of Secondary Hæmorrhage occurring in the Gate City Hospital (Confederate) after the battle of Chickamauga, etc.*, in *U. S. Sanitary Commission Memoirs*, New York, 1870, Surgical Volume I, p. 210.

[3] HOLLOWAY (J. M.). *Comparative Advantages of* PIROGOFF'S, SYME'S, *and* CHOPART'S *Amputations, etc.*, in *Am. Jour. Med. Sci.*, 1866, N. S., Vol. LI, p. 85, and SMITH (S.), *loc. cit.*, p. 134.

[4] SMITH (S.), *loc. cit.*, p. 140.

[5] SMITH (S.), *loc. cit.*, p. 140.

[6] SMITH (S.), *loc. cit.*, p. 134.

[7] SMITH (S.), *loc. cit.*, p. 136.

[8] HOLLOWAY (J. M.) *Comparative Advantages of* PIROGOFF'S, SYME'S, *and* CHOPART'S *Amputations, etc.*, in *Am. Jour. Med. Sci.*, 1866, N. S., Vol. LI, p. 85, and SMITH (S.), *loc. cit.*, pp. 116, 132.

No.	Name, Military Description, and Age.	Date of Injury.	Nature of Injury.	Date of Operation.	Operation and Operator.	Result and Remarks.
25	Whitty, J., Pt., A, 6th Wisconsin, age 22.	May 5, 1864.	Conoidal ball fractured left calcaneum.	May 31, 1864.	Syme's amputat'n at left ankle joint. Surgeon E. Donnelly, 2d Pennsylvania Reserves.	Gangrene in stump. Feb. 8, 1865, amputation at junction of lower third of leg. Discharged June 26, 1865; pensioned.
26	*Alley, J.*	July 2, 1863.	Conoidal ball fractured left tarsal bones; also flesh wounds of thigh and shoulder.	July 15, 1863.	Syme's amputat'n at left ankle joint.	Died July 16, 1863, of tetanus.
27	Bager, A., Pt., K, 2d Maryland.	Dec. 13, 1862.	Shot fracture of right foot.....	Jan. 9, 1863.	Pirogoff's amp. at right ank. j't. A. A. Surg. J. R. Ludlow.	Stump done well. Died Feb. 21, 1863, of pneumonia.
28	Gregg, R., Pt., C, 1st Maine Artillery, age 37.	June 18, 1864.	Shot wound of right foot, with great injury to tarsus.	July 12, 1864.	Syme's amput'n at right ankle joint. A. A. Surgeon O. W. Peck.	Sloughing. July 18, 1864, amp. of leg at junction of upper third. Died Sept. 30, 1864.
29	Havens, W., Pt., K, 17th N. York Heavy Artillery, age 29.	June 25, 1864.	Conoidal ball injured 2d and 3d toes, right foot. June 25, '64, amp. of injured toes; gang.	July 14, 1864.	Pirogoff's amp. at right ankle joint. Surg. R. B. Bontecou, U. S. V. Sloughing; gang.	July 19, amputation leg, middle third. Died July 21, 1864, of exhaustion.
30	[1]Hayes, D. C., Pt., A, 4th New Hampshire.	Oct. 22, 1862.	Conoidal ball fractured 2d metatarsal bone and injured tarsal articulation, left foot.	Nov. 11, 1862.	Syme's amput'n at ankle joint. A. A. Surgeon T. T. Smiley.	Died Nov. 12, 1862, of pyæmia. *Spec.* 691, A. M. M.
31	Haynes, G., Pt., F, 12th N. Hampshire, age 22.	June 3, 1864.	Shot wound left foot near malleolus, fractur'g tarsal bones; exit near little toe.	June 30, 1864.	Joint diseased and œdematous. Syme's amp. at left ankle j'nt. Surg. R. B. Bontecou, U. S. V.	Died, from typhoid fever, July 9, 1864.
32	Johnson, H. H., Pt., A, 9th N. York Heavy Artillery, age 18.	July 9, 1864.	Shell fracture 4th and 5th metatarsal bones; extensive laceration of soft parts.	July 12, 1864.	Syme's amp. at right ankle j'nt. Ass't Surg. R. F. Weir, U. S. A. Malleoli sawn off; articular surface of tibia left intact.	July 18, extensive erysipelas, extending to abdomen. Died July 28, 1864, of erysipelas. *Spec.* 2281, A. M. M.
33	Lincoln, G., Pt., 9th Illinois, age 27.	Feb. 15, 1862.	Rifle ball fractured tarsal and metatarsal bones.	Feb. 25, 1862.	Pirogoff's amputation at ankle joint. Dr. T. L. Maddin, of Nashville.	Feb. 25, erysipelas; March 2, whole body involved. Died March 8, 1862, of erysipelas.
34	Phillips, J., Pt., I, 5th Michigan, age 31.	May 10, 1864.	Conoidal ball fract'd left tarsal bones, leaving os calcis intact.	May 17, 1864.	Pirogoff's amp. at left ankle j't. Surgeon E. Bentley, U. S. V.	Died May 28, 1864, of exhaustion.
35	Schoneckles, F., Pt., G, 2d Delaware.	Dec. 13, 1862.	Shot fracture of bones of right foot; also fracture of right humerus.	Dec. 19, 1862.	Pirogoff's amp. at right ankle joint; also amp. arm at upper third. Surgs. C. S. Wood, 66th N. Y., and C. Gray, 7th N. Y.	Died.
36	Shook, G. L., Corp'l, C, 37th Massachusetts, age 25.	Sept. 19, 1864.	Conoidal ball fractured left foot.	Sept. 26, 1864.	Pirogoff's amp. at left ankle joint, leaving a portion of os calcis. A. A. Surg. J. Younglove.	Died October 14, 1864.
37	Smith, S., Pt., K, 86th New York, age 47.	May 10, 1864.	Conoidal ball fractured tarsal bones, left foot; also flesh wound of back.	May 25, 1864.	Pirogoff's amp. at left ankle j't with Bontecou's modification. Surg. R. B. Bontecou, U. S. V.	Died June 19, 1864, of pyæmia. *Spec.* 3054, A. M. M.
38	[2]Sutton, E. L., Pt., H, 77th Illinois.	Jan. 11, 1863.	Conoidal ball fractured 2d and 3d metatarsal bones, left foot, involving tarsal articulation.	Jan. 24, 1863.	Syme's amputat'n at left ankle joint. A. A. Surgeon T. T. Smiley.	Died Feb. 3, 1863, of pyæmia.
39	Wilbur, W., Pt., B, 1st New York Cavalry, age 27.	May 8, 1864.	Shot fracture of 2d and 3d metatarsal bones of right foot.	May 28, 1864.	Pirogoff's method with Bontecou's modification. Surgeon R. B. Bontecou, U. S. V.	July 6, amputation of leg, upper third. Died July 6, 1864, of exhaustion.

Secondary Amputations at the Ankle Joint.—Thirteen secondary amputations at the ankle joint were recorded; the mortality rate was 7.7 per cent., only one of the cases having a fatal termination. Of the twelve successful operations four were performed after Pirogoff's and six after Syme's method; in two cases the mode of ablation was not indicated. Eight of the patients were Union and four Confederate soldiers. In one instance the leg was subsequently amputated in the middle third. Of the eight Union soldiers the names of seven were found on the Pension Rolls; two have died since their discharge from the service. In the fatal secondary amputation at the ankle Syme's operation had been performed; the patient died of exhaustion.

Case 887.—Private O. C. Crandall, Co. B, 7th Wisconsin, aged 19 years, was wounded in the right foot, at Gettysburg, July 1, 1863. He remained at a First Corps field hospital for nearly two weeks and was then removed to Broad and Cherry Streets Hospital, Philadelphia, whence Acting Assistant Surgeon W. V. Keating contributed the following history: "The wound was caused by a minié ball, which entered on the outer side just in advance of the ankle joint and passed directly across, fracturing the astragalus and lodging beneath the skin on the inner side of the foot, whence it was removed four hours after the reception of the injury. At the time of admission his general condition was broken down, and the foot and ankle were much inflamed, swollen, and painful; the wounds discharging sanious pus. The patient was ordered extra diet, with tonics, milk punch, and beef-essence, and the foot was enveloped in a fomenting poultice. Five days after admission the wounds commenced to slough and a large abscess formed on the outer side of the foot above the wound, in its course burrowing the tendo-achillis. At the same time the patient was rapidly growing weaker. On August 1st it was decided, in consultation, that to operate was the only means of saving life, and on the following day, while the patient was under the influence of ether, Pirogoff's amputation was performed by Acting Assistant Surgeon A. Hewson. The edges of the flaps were brought together by means of lead-wire sutures, and an opening was made along the side of the tendo-achillis to prevent the collection of pus. The stump was covered with lint saturated

Fig. 352.—Portions of tibia, fibula, astragalus, and calcaneum, from a Pirogoff amputation. *Spec.* 2783.

[1] Smiley (T. T.), *Twenty Cases of Gunshot Wounds*, in *Boston Med. and Surg. Jour.*, 1863, Vol. LXVIII, p. 419.

[2] Smiley (T. T.), *Gunshot Wounds from Arkansas Post*, in *Boston Med. and Surg. Jour.*, 1863, Vol. LXIX, p. 159.

with a mixture of laudanum and whiskey, and the limb was kept at perfect rest in a fracture-box. On the third day after the operation sloughing took place to a slight extent on the outer side of the stump in the line of the first incision, exposing the lower extremity of the fibula. The stump was then washed with a solution of permanganate of potassa and a fomenting poultice was applied. The discharge from the stump was very profuse for a few days, but it gradually subsided and healthy granulations established themselves. The patient continued to do well afterwards, bony union taking place and the case promising a good and useful stump, with the limb one inch shorter than the other. The patient's general condition now was very good. The advantages claimed for the operation in this case were, firstly, that it was less extensive than an amputation higher up in the leg and thereby produced less shock; secondly, that less blood would in all probability be lost, and the patient would have a greater length of limb for actual use after recovery." The specimen (No. 2783) represented in the adjoining wood-cut (FIG. 352) was contributed by the operator, and consists of the lower borders of the tibia and fibula, the astragalus, and a slice of the upper portion of the calcaneum, all which were removed at the amputation. The astragalus is shown to be fractured and carious, and the tibial articulation is eroded. The patient was subsequently transferred to Mower Hospital, whence he was discharged June 11, 1864, and pensioned. He formerly represented the stump as being in a good state, but at a special examination on March 16, 1880, its condition was described by Dr. T. B. Mansfield, pension examiner at Sac City, Iowa, as follows: "I find the claimant suffering from necrosis of the end of the stump of the tibia, also atrophy of the muscles of the lower leg. There is some discharge at present from the wound, and the cicatrices present an unhealthy condition, assimilating senile or dry gangrene. The general appearance and appetite of the pensioner is good. He states that he has constant pain in the wound and constant pain in the knee, and that he is unable to walk but a short distance without experiencing great pain in the stump and entire limb. I think his wound will necessitate another amputation." This pensioner was paid June 4, 1880.[1]

CASE 888.—Private I. T. Mossup, Co. D, 100th New York, aged 30 years, was wounded in the left foot, during the assault on Fort Wagner, July 18, 1863. He was admitted to hospital at Beaufort on the following day, and several months later he was transferred to McDougall Hospital, at Fort Schuyler, where amputation was performed but not recorded. Subsequently the patient passed to De Camp Hospital, and lastly, on February 18, 1864, he entered Central Park Hospital, New York City. Surgeon B. A. Clements, U. S. A., in charge of the latter, made the following report: "The patient had been wounded by a conical ball, which passed just under the malleoli, fracturing the astragalus and calcaneum. Amputation at the ankle joint was performed at McDougall Hospital, on November 11th, by Syme's method, and the result has not been retarded by any accident whatever since the operation, the cicatrix being completely formed when the patient was admitted to Central Park Hospital. He has an artificial foot (from Hudson), and at his own request his discharge has been recommended." A cast of the leg (*Spec.* 726), made nine months after the amputation, and showing a well-formed and apparently useful Syme's stump, was contributed to the Museum by Assistant Surgeon J. W. S. Gouley, U. S. A., and is represented in the annexed wood-cut (FIG. 353). The patient was discharged from service June 1, 1864, and pensioned. In his applications for commutations, dated 1870 and 1875, he described the stump as being in "good condition," but five years later he reported it as "painful all the time." The pensioner was paid December 4, 1880.[2]

FIG. 353.—Stump after SYME'S amputation at left ankle. *Spec.* 726.

TABLE XCII.

Summary of Thirteen Cases of Secondary Amputations at the Ankle Joint for Shot Injury.

[Recoveries, 1—12; Deaths, 13.]

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATE OF INJURY.	NATURE OF INJURY.	DATE OF OPERATION.	OPERATION AND OPERATOR.	RESULT AND REMARKS.
1	[3]Connolly, P., Corp'l, K, 70th New York.	Aug. 27, 1862.	Conoidal ball comminuted left tarsus.	Nov. 19, 1864.	Foot a large shapeless mass. Syme's amp. at left ankle j't; tibia sawn through above malleoli. A. A. Surg. S. Smith.	Discharged Aug. 13, 1863; pensioned. In 1870, stump sound; receives entire weight of body on stump; 2½ ins. shortening.
2	[4]Crandall, O. C., Pt., B, 7th Wisconsin, age 19.	July 1, 1863.	Conoidal ball fractured astragalus and was removed from inner side of foot.	Aug. 2, 1863.	Foot and ankle much inflamed; slough'g; Pirogoff's amput'n. A. A. Surg. A. Hewson.	Limb kept in a fracture-box; sloughing. Disch'd June 11, 1864; pensioned. *Spec.* 2783.
3	*Ewing, A. G.*, Pt., Forrest's Cavalry.	July —, 1864.	Shell fracture of right foot; caries of ends of tibia and fibula.	Aug. —, 1865.	Pirogoff's amputation at right ankle joint. Prof. P. F. Eve.	Also partial paralysis from pistol ball in spine. Recovered; caries of ends of tibia and fibula.
4	*Griffin, J. B.*, Lieut., C, 10th Texas Cavalry.	Dec. 31, 1862.	Shot wound of left ankle joint.	Mar. 9, 1863.	Amp. at left ankle joint. Surg. F. Hawthorne, P. A. C. S.	Recovery.
5	[5]Johnes, A., Corp'l, E, 5th New York, aged 27.	June 27, 1862.	Conoidal ball passed through tarsal bones of the right foot; sloughing.	Aug. 4, 1862.	Syme's amputation at right ankle joint. Ass't Surg. R. Bartholow, U. S. A.	Erysipelas; stump healed. Discharged Dec. 6, 1862. Died March 28, 1880, of consumption.
6	[6]Mossup, I. T., Pt., D, 100th New York, age 30.	July 18, 1863.	Conoidal ball fractured left astragalus and calcaneum.	Nov. 11, 1863.	Syme's posterior flap amputation. A. A. Surgeon J. B. Cutter.	Disch'd June 1, 1864; pensioned. Two ins. shortening; limb somewhat atrophied, tissue healthy, compact and symmetrical. *Spec.* 726, A. M. M.
7	O'Donahue, M., Pt., D, 124th Ohio, age 36.	May 4, 1864.	Musket ball injured right foot. Primary amput'n 3d and 4th toes with metatarsal bones; re-amputation.	Nov. —, 1866.	Pirogoff's amputation at right ankle joint. Prof. C. E. Weber, of Cleveland.	Discharged Dec. 27, 1864, and pens'd. Stump healed. Died April 13, 1873.
8	Porter, L. S., Pt., F, 49th Ohio, age 32.	Dec. 31, 1862.	Shell fracture of left ankle	Feb. 25, 1863.	Syme's amputation at left ankle joint.	Disch'd Dec. 6, 1863, and pens'd. Stump healed, but is troublesome and causes pain.
9	[7]R——, F.....	Dec. 9, 1864.	Musket ball passed through tarsus.	Jan. 20, 1865.	Syme's amput'n at ankle joint. Dr. G. Buck, New York city.	Stump firm and useful. Two inches shortening.

[1] SMITH (S.), *Amputations at the Ankle Joint in Military Surgery*, in *U. S. Sanitary Commission Memoirs*, Surgical Volume II, p. 119.
[2] SMITH (S.), *loc. cit.*, p. 140.
[3] SMITH (S.), *loc. cit.*, pp. 111, 136.
[4] SMITH (S.), *loc. cit.*, p. 119.
[5] SMITH (S.), *loc. cit.*, p. 136.
[6] SMITH (S.), *loc. cit.*, p. 140.
[7] SMITH (S.), *loc. cit.*, p. 136.

No.	Name, Military Description, and Age.	Date of Injury.	Nature of Injury.	Date of Operation.	Operation and Operator.	Result and Remarks.
10	*Rooney, J. S.*, Pt., D, 37th Georgia.	Sept. 20, 1863.	Shot wound in front of foot....	Oct. 26, 1863.	Pirogoff's amputat'n; resection of tibia and calcis.	Doing well November 1, 1863.
11	*Taylor, J. W. I.*, Pt., A, 3d Arkansas, age 23.	Sept. 20, 1863.	Shot wound of right foot.....	April 13, 1864.	Disarticulation right foot at the ankle joint.	Retired November 30, 1864.
12	Wells, G. W., Pt., K, 4th New Hampshire, age 24.	Aug. 16, 1864.	Conoidal ball fract'd metatarsal bones, right foot. Necrosis of tarsus and metatarsus.	Oct. 22, 1864.	Syme's amputation at right ankle joint. A. A. Surg. G. A. Chesley.	Sloughing. Discharged Jan. 11, 1865; pensioned. Jan. 16, 1865, amp. of leg at middle third.
13	Frost, E. R., Pt., I, 32d Maine, age 44.	June 15, 1864.	Ball entered inner side of right foot at mid. of first metatarsal bone; exit at base of 2d and 3d toes; prim. amp. 2d and 3d toes.	July 18, 1864.	Syme's amputation at right ankle joint. Surg. R. B. Bontecou, U. S. V.	Gangrene; hæmorrhage. Died July 23, 1864, of exhaustion. *Spec.* 3068, A. M. M.

Of three of the cases cited in the preceding table specimens are preserved in the Army Medical Museum.

Amputations at the Ankle Joint of Uncertain Date.—In six instances the date of the injury, or of the operation, or both were not recorded. Four, it would appear, recovered and two proved fatal. All were Confederate soldiers:

Table XCIII.

Summary of Six Cases of Amputations at the Ankle Joint for Shot Injury of Uncertain Date.

[Recoveries, 1—4; Deaths, 5–6.]

No.	Name, Military Description, and Age.	Date of Injury.	Nature of Injury.	Date of Operation.	Operation and Operator.	Result and Remarks.
1	*Crenshaw, J. W.*, Pt., A, 45th Georgia.	June 2, 1864.	Shot wound.....	———	Amputation at ankle joint.....	Furloughed July 12, 1864.
2	*Lawson, M.*, Serg't, F, 21st North Carolina.	Feb. 6, 1865.	Shot fracture of right foot.....	———	Amputation at right ankle joint.	Furloughed March —, 1865.
3	*Lloyd, J. T.*, Pt., K, 8th Georgia.	Aug. 13, 1864.	Shot wound of right foot.....	———	Amputation at right ankle joint.	Furloughed October 14, 1864.
4	*Ogburn, C. J.*, Pt., D, 57th North Carolina.	May 4, 1863.	Shot wound of foot.....	———	Pirogoff's amputation at ankle joint.	Furloughed June 12, 1863.
5	*Clark, A.*, Pt., D, 6th South Carolina.	———	Shot wound of foot.....	———	Amputation at ankle joint.....	Died June 27, 1864.
6	*Rogers, J. M.*, Pt., G, 48th Georgia.	——— 1862.	Shot wound of foot.....	——— 1862.	Amputation at ankle joint.....	Died September 15, 1862.

Sixty-two of the one hundred and sixty-one cases of amputations at the ankle joint recorded in the preceding pages were performed on the right, eighty-two on the left side; in seventeen instances the side was not indicated.

CONCLUDING OBSERVATIONS ON SHOT INJURIES OF THE ANKLE JOINT.—As far as the records of military surgery indicate, attempts at conservation of the limb in severe shot wounds of the ankle joint were rarely made during the first half of the present century. In cases in which the joint was opened, or in which the lesion of the bones forming the joint was extensive, amputation in the leg, or, if practicable, exarticulation at the ankle, were resorted to, in conformity with the teachings of Desport, Thomson, Hennen, and Williamson.[1] The experience of the surgeons of the American civil war would seem to have led to similar conclusions. Surgeon T. H. Squire,[2] 89th New York Volunteers, from his experience in the hospitals after the battle of Antietam, asserts that "every ankle joint opened by a ball, with any considerable injury of articular bones, should

[1] Desport (*Traité des plaies d'armes a feu*, Paris, 1749, p. 232): "Si la balle passe dans l'articulation et fracasse les os, l'amputation est nécessaire, et ne peut être trop tôt faite." Thomson (J.) (*Report of Observations made in the British Military Hospitals in Belgium after the Battle of Waterloo, etc.*, Edinburgh, 1816, p. 143): "The injuries of the ankle joint might be said to be almost equally severe with those of the knee joint. . . The swelling of this joint was proportionally greater than even that of the knee. Fungous granulations protruding through the wounds were more common, but the constitutional symptoms, though in particular instances severe, were, in general, far less so than in gunshot wounds of the knee joint." Hennen (J.) (*Principles of Military Surgery*, London, 1829, p. 157): "However desirable it may be to save a hand or a foot, yet, in severe and complicated lacerations of the wrist and ankle joints, the frequency of tetanic affections should at once lead us to adopt immediate amputation." Williamson (G.) (*Military Surgery*, London, 1863, p. 159): "When the fracture takes place near the ankle and a fissure extends into the joint, it is rarely that the patient recovers."

[2] Squire (T. H.), *Field Note Book; Case Book* No. 16, Division of Surgical Records, Surgeon General's Office, p. 59.

be amputated, and the quicker the better." Surgeon A. J. Phelps,[1] U. S. V., Medical Director of the Fourth Army Corps, declared, after the battle of Chickamauga: "In my mind there is no question upon the necessity of amputation in cases of knee joint injury (gunshot); and it is also my opinion that the same treatment is scarcely less necessary in wounds of the tarsus and ankle joint." Surgeon J. T. Woods,[2] 99th Ohio Volunteers, after the battle of Chickamauga "found the early history of these cases exceedingly flattering, and affording ample reason to warrant an effort to save the limb in injuries of this class; but at a later date the incapability of nature's power of reparation became apparent, * * the unwarrantableness of conservatism(?) in these cases is most obvious, every indication presented by them warranting the conclusion that, after much suffering and great exhaustion, the choice is still between death and loss of foot." Surgeon H. S. Hewit,[3] U. S. V., in charge of the hospitals at Frederick after the battle of Antietam, expressed the opinion that "amputation of the leg ought to be performed in every case of gunshot penetration and fracture of the ankle joint." A year later, Surgeon Hewit,[4] then Medical Director of the Department of the Ohio, counseled the medical officers under his charge that "amputation was to be employed in almost every penetrating injury of the ankle joint," and made consultation obligatory in all doubtful cases of this injury. It is therefore not surprising that the number of amputations following injuries of the ankle joint, recorded during the war, is proportionally very large. Of one thousand seven hundred and eleven instances of shot injuries of the bones of the tibio-tarsal articulation, five hundred and eighteen were treated by expectant conservative measures, in thirty-three instances excision was practised, and in one thousand one hundred and sixty recourse was had to ablation of the limb either at the ankle joint, in the leg, or in the thigh. It may be assumed that the five hundred and eighteen cases treated by conservation were, as a rule, instances in which the injury was comparatively slight, and in which the articulation originally was not seriously involved. Of these five hundred and eighteen patients four hundred and seven recovered and ninety-nine, or 19.5 per cent., died; in twelve the ultimate result was not ascertained. Free incisions into the joint were frequently made, and in forty-one instances fragments of bone were eliminated; pyæmia was noted in twenty-eight, gangrene in twenty-two, erysipelas in twelve, and tetanus in five instances.

Examining the cases of recovery after conservative treatment of shot fractures of the bones of the ankle joint adduced at pp. 579 to 582, *ante*, it will be seen that the remote results in many instances were less satisfactory than the early progress of the cases had promised. In the case of Private J. H. Noble (CASE 820, p. 580, *ante*), in January, 1863, six months after the injury, the wound had healed and an anchylosed and serviceable limb was reported; but nearly a year later the patient was walking on crutches; the wound had reopened. In 1878, sixteen years after the injury, the pension examining board reported that the "parts broke out again and again, and discharged; the pensioner complains of more or less constant pain in the leg, and if he uses it much it swells and becomes painful, so that he is unable to sleep. He still has to use a cane; the leg is worse than useless." In the case of Sergeant T. B. Sturdivant (CASE 825, p. 582, *ante*), who was discharged in

[1] PHELPS (A. J.), *The Battle of Chickamauga*, Observations by, in *Bound Manuscript* No. 11, Div. of Surg. Records, Surgeon General's Office.

[2] WOODS (J. T.), *Observations of the Surgery of the Battle of Chickamauga*, in *Bound Manuscript* No. 11, Division of Surgical Records, Surgeon General's Office.

[3] HEWIT (H. S.), *Report of the Surgery of the U. S. A. General Hospital No. 5, at Frederick, Md.*, in *Bound Manuscript*, No. 33, Surgeon General's Office, Division of Surgical Records.

[4] HEWIT (H. S.), *Report on the Military Medicine, Surgery, and General Conduct of the Medical Department of the Army of the Ohio, etc.*, in *Appended Documents, Medical and Surgical History of the War of the Rebellion*, Part I, Volume I, p. 311.

1865, with "anchylosis of the ankle joint and extension of the foot," an ulcer formed on the outer side of the ankle and pieces of bone were discharged as late as 1880. Private Dutton (CASE 821, p. 581), when mustered out in June, 1865, was able "to walk a mile or two without difficulty," but several years later there were indolent ulcers at the inner as well as the outer side of the joint, and the patient was unable to walk; his disability was then reported as equal to loss of foot.

Excision at the Ankle Joint for Shot Injury.—The substitution of excision at the ankle joint for amputation effected no saving of life. Of the thirty-three cases in which this operation was practised, the results are known in thirty-one, of which nine, or 29.0 per cent., proved fatal, while the mortality of the cases treated by expectation was only 19.5 per cent. and that of the amputations 25.1. The results of this operation performed in the European wars were even less satisfactory, as will be seen from the appended table:

TABLE XCIV.

Results of Excisions at the Ankle Joint on the Occasions named and from the Authorities quoted.

ACTION, ETC.	Cases.	Recoveries.	Deaths.	Undetermin'd Results.	Percentage of Mortality.
Crimean War, 1854–'57 (MATTHEW,[1] LANGENBECK[2])	2	2			
Italian War, 1859 (NEUDÖRFER[3])	1	1			
Schleswig-Holstein War, 1864 (LANGENBECK,[4] NEUDÖRFER[5])	6	5	1		16.6
Mexican War, 1865 (NEUDÖRFER[6])	1	1			
Austro-Prussian War, 1866 (BECK,[7] LAUFFS,[8] STROMEYER,[9] LANGENBECK,[10] GURLT[11])	26	22	4		15.3
Franco-German War, 1870–'71, (GURLT,[12] BECK,[13] KRATZ,[14] GOLTDAMMER,[15] COUSIN[16])	104	60	40	4	40.0
Russo-Turkish War, 1876–'78 (Soc. Otto. du Croissant Rouge,[17] STEINER,[18] REYHER,[19] TILING,[20] WAHL[21])	10	5	4	1	44.4
Aggregates	150	96	49	5	33.7

Considering the remote results in the twenty-two cases of recovery after excision at the ankle of the American civil war, we find that in three instances the operation was fol-

[1] MATTHEW (T. P.) (*Med. and Surg. Hist. of the British Army which served in Turkey and the Crimea, etc.*, London, 1858, Vol. II, pp. 368, 379): successful excision of lower end of fibula. [2] LANGENBECK (B. v.) (*Ueber die Schussfracturen der Gelenke und ihre Behandlung*, Berlin, 1868, p. 46): v. Kwicinsky, Russian Lieutenant General, wounded at the Alma, Sept. 20, 1854, in left ankle; subperiosteal excision of internal malleolus and astragalus, May 30, 1859, by VON LANGENBECK; recovery without shortening; anchylosis of joint. [3] NEUDÖRFER (J.) (*Die Endresultate der Gelenkresektionen*, in *Wiener Med. Presse*, 1871, S. 405): A. Winkler, shot fracture of right ankle joint, Solferino, June 24, 1859; secondary excision of the ankle joint by NEUDÖRFER; excellent recovery. [4] LANGENBECK (B. v.) (*Ueber Resection des Fussgelenks bei Schussfracturen desselben, nebst Vorstellung eines Falles von subperiostaler Resection der Diaphyse der Tibia und Fibula*, in *Berliner Klinische Wochenschrift*, 1865, S. 30) performed 5 excisions of the ankle joint in the Schleswig-Holstein War of 1864: Werkmeister, Tambour, Düppel, March 28, 1864; fracture of left internal malleolus and astragalus; May 1, 1864, subperiosteal excision of ankle joint; recovery, with useful limb; joint anchylosed. F. Holcke, 7th Brandenburg Reg't, No. 60, April 18, 1864, before Düppel; shot fracture of lower portions of tibia and fibula; excision May 3, 1864; death May 14, of pyæmia. Lieut. C. F. Leth, 3d Infantry, Alsen, June 29, 1864, shot fracture of both malleoli of right foot; excision July 29; recovery, with useful limb. Lieut. Wedell-Jarlsberg, Alsen, June 29, 1864; shot fracture right ankle joint; Aug. 19, subperiosteal excision of lower portion of tibia and part of astragalus; recovery. Groen, 5th Danish Regiment, Alsen, June 29, 1864; shot fracture of left ankle joint; July 15, subperiosteal excision of tibia, fibula, and astragalus; recovery, with useful limb. [5] NEUDÖRFER (J.) (*Aus dem feldärztlichen Berichte über die Verwundeten in Schleswig*, in *Archiv für Klinische Chirurgie*, Berlin, 1865, B. VI, p. 559) excised the lower portions of the tibia and fibula and the head of the astragalus; the patient recovered with one inch shortening and good use of the limb. (See also *Berliner Klinische Wochenschrift*, 1865, S. 31.) [6] NEUDÖRFER (J.) (*Die Endresultate der Gelenkresektionen*, in *Wiener Med. Presse*, 1871, p. 406) excised the ankle joint on May 15, 1865, in the case of J. Kuzelik, wounded at Sayaltepek, April 25, 1865; recovery in five months, with good use of foot. Dr. NEUDÖRFER (*Handbuch der Kriegschirurgie und der Operationslehre*, Leipzig, 1872, Zweite Hälfte, Spec. Theil, Zweite Abth. S. 1603) remarks: "I have performed this resection after shot wounds 14 times, and of these 14 cases I have lost only 2; all the rest recovered with perfectly useful feet." With the exception of the 3 cases referred to above, the editor has not been able to identify the operations claimed to have been performed by Dr. NEUDÖRFER. [7] BECK (B.) (*Kriegs-Chirurgische Erfahrungen während des Feldzuges* 1866, *in Süddeutschland*, Freiburg, I. Br., 1867, S. 354): L. Finkbeiner, 2d Würtemberg Infantry, Tauberbischoffsheim, July 24, 1866, through both ankle joints; July 28, excision, by Professor v. BRUNS, of right ankle joint; both joint surfaces were removed; fatal. [8] LAUFFS (LAURENZ) (*Zur Statistik der Fussgelenkresektionen*, Inaug. Diss., Halle, 1872, p. 36): C. Rochhardt, Lieut., 1st Austrian Inf., Trautenau, June 27, 1866, shot wound left ankle joint; August 16, resection of ends of tibia and fibula and upper surface of astragalus by Prof. VOLKMANN; recovery; shortening 1½ inches; walks well with a cane. [9] STROMEYER (L.) (*Erfahrungen über Schusswunden im Jahre* 1866, Hannover, 1867, p. 60): C. Weidemann, 3d Hannoverian Infantry, shot in left ankle joint; July 10, excision of 1½ inches of tibia and fibula and upper part of astragalus by Dr. STROMEYER; ball extracted; July 18, removal of remaining portion of astragalus; May 21, 1867, amputation upper third of leg; recovery in 4 weeks. [10] LANGENBECK (B. v.) (*Ueber die Schussfracturen der Gelenke, etc.*, Berlin, 1868, p. 47, No. 10): C. Staudinger, 1st Thüringen Inf., No. 31, Königgrätz, July 3, 1866; shell wound of right ankle joint; July 31, excision of internal malleolus and joint surface of astragalus by Prof. v. LANGENBECK; recovery, with 2 centimetres shortening; walks well with an ordinary shoe. LANGENBECK (B. v.) (*loc. cit.*, p. 47, No. 11): J. E. H. Pfitzner, 1st Silesian, No. 46, Nachod, June 27, 1866; shell fracture of lower third of leg; resection of internal malleolus

lowed by secondary amputation, and that in at least nine instances the joint remained painful and swollen, compelling the patients to use crutches or canes for support, and unfitting them for manual labor; in several instances the wounds reopened, abscesses formed many years after the injury, deficient circulation and varicose veins followed, and in one case the continued irritation finally extended into the knee joint. In regard to this operation

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August 7, by v. LANGENBECK; shortening 8–9 centimetres; uses a crutch. (See also GURLT (E.), *Die Gelenk-Resectionen nach Schussverletzungen; ihre Geschichte, Statistik, End-Resultate*, Berlin, 1879, p. 404.) LANGENBECK (B. v.) (*loc. cit.*, p. 47, No. 7): A. Thiel, 1st Austrian Infantry, Königgrätz, July 3, 1866, right ankle joint; July 26, excision of external malleolus and the upper joint surface of the astragalus by Prof. v. LANGENBECK; recovery, with anchylosis. GURLT (E.) (*loc. cit.*, p. 489). LANGENBECK (B. v.) (*loc. cit.*, p. 47, No. 8): M. Wagner, Austrian Infantry Regiment No. 6, Königgrätz, July 3, 1866; shot fracture left ankle joint; July 26, subperiosteal resection of tibia, fibula, and upper surface of astragalus by Prof. VON LANGENBECK; death August 6. GURLT (E.) (*loc. cit.*, p. 493). LANGENBECK (B. v.) (*loc. cit.*, p. 47, No. 9): Bissig, train-captain, Austrian Infantry No. 55, Königgrätz, July 3, 1866; shot in right astragalus; July 26, excision of lower portion of internal malleolus and of astragalus by VON LANGENBECK; gangrene; death. GURLT (E.) (*loc. cit.*, p. 493). [11]GURLT (E.) (*Die Gelenk-Resectionen nach Schussverletzungen, u. s. w.*, Berlin, 1879, p. 400): R. Witt, Kaiser Alexander Garde-Gren. Reg't, Königgrätz, July 3, 1866; shot fracture left ankle joint; August 20, excision of external malleolus and portion of astragalus by Dr. WAGNER; bony anchylosis; 6 centimetres shortening; walks short distances comfortably, sometimes even without a cane. GURLT (E.) (*loc. cit.*, p. 401): A. Streese, Kaiser Alexander Garde-Gren. Reg't, Königgrätz, July 3, 1866; shot fracture of right ankle joint; August 31, excision of both malleoli and talus by Dr. WAGNER; recovery, with 2½ inches shortening; new formation of bone; able to walk a mile with the use of a cane. GURLT (E.) (*loc. cit.*, p. 402): Jacob Raecke, 1st Magdeburg Reg't, No. 26, Königgrätz, July 3, 1866; left ankle joint; August 17, excision of 1 inch of tibia and fibula and joint surface of astragalus by Dr. SPIERING; recovery; walks with apparatus. GURLT (E.) (*loc. cit.*, p. 405): A. Griczka, 7 Pomm. No. 54, Trautenau, June 27; shell wound of left ankle joint; September 19, joint surface of tibia excised and necrosed portions of astragalus removed; recovered; walks on crutches and with a high heel; shortening 6 centimetres. GURLT (E.) (*loc. cit.*, p. 406): A. Bauske, 8th Pommeranian Reg't, No. 61; shrapnel shot, July 3, 1866, at Königgrätz, in left ankle; July 29, excision of lower extremities of tibia and fibula and upper part of astragalus by Dr. BUSCH; recovery, with 9 centimetres shortening; anchylosis; walks with a crutch. GURLT (E.) (*loc. cit.*, p. 445): H. Morgenstern, 6th Saxon Infantry, Königgrätz, July 3, 1866; shot wound of left ankle joint; July 28, excision of lower ends of tibia and fibula and the whole astragalus by Prof. BUSCH; Nov. 21, amputation of leg; recovery. GURLT (E.) (*loc. cit.*, p. 445): G. H. Seifert, 13th Saxon Infantry, Königgrätz, July 3, 1866; shot through right ankle joint; July 29, resection of ends of tibia and fibula by Dr. DIEHL; shortening 10 centimetres; little use of ankle and foot. GURLT (E.) (*loc. cit.*, p. 447): A. Seidel, 12th Saxon Infantry, Königgrätz, July 3, 1866; shot fracture of right leg at the ankle joint; July 26, excision of lower end of tibia and of the astragalus by Dr. BUSCH; death July 31, 1866. GURLT (E.) (*loc. cit.*, p. 489): A. Jano, 2d Austrian Infantry, Königgrätz, July 3, 1866; shell wound of left ankle; August 4, excision of left ankle joint with extirpation of astragalus; recovery. GURLT (E.) *loc. cit.*, p. 490): F. Mistelbauer, 6th Austrian Reg't; shot wound of left ankle joint; resection of left tibia and fibula; Nov. 27, amputation leg; recovery. GURLT (E.) (*loc. cit.*, p. 490): A. Leitgeb, Austrian Infantry Regiment No. 15; Königgrätz, July 3, 1866; right ankle joint; July 27, excision of ends of tibia and fibula and astragalus by Professor BUSCH; recovery, with good use of limb. GURLT (E.) (*loc. cit.*, p. 490): G. Bulsoni, Austrian Inf. Reg't, No. 26, July 3, 1866, Königgrätz; right ankle joint; August 8, excision of the fractured joint surface of the tibia and removal of the fractured external malleolus by Dr. FINCKE; recovery; walks with a cane. GURLT (E.) (*loc. cit.*, p. 490): P. Kanta, 34th Austrian Infantry, Königgrätz, July 3, 1866; left ankle joint; August 3, excision of joint by Dr. HAHN; recovery. GURLT (E.) (*loc. cit.*, p. 490): W. Stelzig, Austrian Infantry No. 42, Königgrätz, July 3, 1866; shot fracture of right ankle joint; July 25, excision of ankle joint by VON LANGENBECK; good recovery. GURLT (E.) (*loc. cit.*, p. 491): J. Bresonelli, 47th Austrian Infantry, Königgrätz, July 3, 1866; comminution of right external malleolus; August 8, excision of end of tibia and upper portion of astragalus by Surgeon FINCKE; Sept. 3, amputation of leg in upper third; recovery. GURLT (E.) (*loc. cit.*, p. 491): A. Diener, 73d Austrian Infantry, Königgrätz, July 3, 1866; ankle joint fractured; Oct. 20, inner surface of external malleolus, portion of astragalus, and part of os calcis removed by Surgeon HECK; recovery, with 4 centimetres shortening; able to walk several miles without pain. GURLT (E.) (*loc. cit.*, p. 492): F. Dubsky, Austrian Jaeger Batt. No. 17; shell wound of outer malleolus of left foot; August 21, excision of 2½ inches of end of tibia by Surgeon GAEHDE; recovery. GURLT (E.) (*loc. cit.*, p. 492): N. Prymak, Austrian Lancers Reg't No. 11, Königgrätz, July 3, 1866; shot fracture lower end of right tibia and fibula; July 28, excision of 2 inches of tibia and fibula by Prof. BUSCH; recovery, with varus position. [12]GURLT (E.) (*loc. cit.*, pp. 611, *et. seq.*) details 99 cases of excisions at the ankle joint from the Franco-Prussian War of 1870–71; the results in 4 cases are not stated; 57 were successful and 38 fatal, a mortality rate of 40 per cent. The operation involved the tibia in 7 (4 recoveries, 2 deaths, 1 unknown result), the fibula in 5 (3 recoveries, 2 deaths), the tibia and astragalus in 7 (2 recoveries, 5 deaths), the fibula and astragalus in 4 (4 recoveries), the tibia and fibula in 22 (14 recoveries, 8 deaths), the tibia, fibula, and astragalus in 38 (24 recoveries, 13 deaths, 1 unknown result), and in 16 instances (6 recoveries, 8 deaths, 2 unknown results) the portions of bone excised were not indicated. In 13 instances, with 11 deaths, amputation was subsequently resorted to. To the 99 cases reported at length by Professor GURLT in his exhaustive work must be added the following 5 cases: [13]BECK (B.) (*Chirurgie der Schussverletzungen*, Freiburg, i. Br., 1872, p. 881): F——, 1 Baden L.-Gr—. Reg't, No. 109; comminuted shot fracture of ankle joint; primary excision; recovery, with anchylosis. BECK (B.) (*loc. cit.*, p. 909): 1 case of resection of internal malleolus; fatal. [14]KRATZ (*Resultate der während des letzten Feldzuges ausgeführten Gelenkresektionen*, in *Deutsche Militair-Aerztliche Zeitschrift*, Berlin, 1871, Jahrg. I, p. 596): Saeckel, Jaeger Bat. No. 11 (Prussians); shot fracture left ankle joint; excision of lower portions of both bones of leg; shortening 2½ inches, with œdematous swelling; atrophy of muscles from knee downwards; active movements of foot weak. [15]GOLTDAMMER (*Bericht über die Thätigkeit des Reserve-Lazaretts des Berliner Hilfsvereins in der Garde-Ulanen-Kaserne zu Moabit*, in *Berliner Klinische Wochenschrift*, 1871, Jahrg. VIII, p. 151): Leclerc, 1st French Engineers, wounded at Wörth, August 6, 1870, in left ankle; Sept. 13, excision of astragalus, os calcis, and os naviculare; recovery, with good use of foot. [16]COUSIN (A.) (*Histoire Chirurgicale de l'ambulance de l'Ecole des Ponts et Chaussées*, in *L'Union Médicale*, 1872, T. XIII, p. 159): Soldier, 110th French line, shot fracture of lower ends of tibia and fibula, November 29, 1870; December, hæmorrhage from peroneal, which was ligated; excision of lower ends of tibia and fibula; pyæmia; death December 25, 1870. (GORDON, *Lessons on Hygiene and Surgery from the Franco-Prussian War*, London, 1873, p. 167.) [17]*Société Ottomane de secours aux blessés et malades militaires constituée d'après la Convention de Genève*, Vol. III, *Ambulances fixes et mobiles du Croissant rouge*, Constantinople, 1878, p. 39, and GURLT (E.) (*loc. cit.*, p. 1153): At the hospital at Beylerbey, under the charge of Dr. BALDRIAN; Mehmet, shot wound of ankle joint; resection; death from anæmia. [18]STEINER (F.) (*Aus dem Tagebuche eines deutschen Arztes während der Zeit des Krieges im Oriente* 1876, in *Wiener Med. Wochenschrift*, 1877, No. 18, p. 426): K. N., aged 29, shell fracture left ankle joint, middle of August, 1876; September 1, excision of 4 inches of fibula; doing well in three weeks. [19]REYHER (CARL) (*Die antiseptische Wundbehandlung in der Kriegschirurgie*, in R. VOLKMANN'S *Sammlung Klinischer Vorträge*, Nos. 142, 143, Leipzig, 1878, pp. 1219 and 1234) tabulates 6 cases (4 recoveries, 2 deaths) of excisions at the ankle joint treated at the Barrack hospital at Swilainatz, but gives no details. The 2 fatal cases are related by G. TILING in his *Bericht über 124 im serbisch-türkischen Kriege im Baracken-Lazareth des Dorpater Sanitäts-Trains zu Swilainatz behandelte Schussverletzungen*, Dorpat, 1877, pp. 76 and 81: St. Petkowitsch, aged 18, shot fracture of right internal malleolus August 20, 1876; excision of ends of tibia and fibula; September 2, amputation at knee joint; September 7, secondary hæmorrhage and death. O. Uroschewitsch, aged 28, shot fracture of astragalus and os calcis; ankle joint opened; wound received a few days before September 21, 1876; September 21, excision of the astragalus and entire os calcis; September 25, amputation at ankle joint; gangrene; death September 30, 1876. [20]Dr. TILING (*loc. cit.*, p. 80) reports a third fatal case, not included in Dr. REYHER'S statistics: G. Konstantinowitsch, aged 56, shot wound of left ankle joint, received in the early part of September, 1876; October 11, excision of articular extremities of tibia and fibula and astragalus; death October 20, 1876. [21]GURLT (E.) (*loc. cit.*, p. 1154) tabulates a successful case of excision at the ankle joint observed by Dr. WAHL at the hospital at Sistowa; no particulars are given.

it is therefore only necessary to reiterate the opinion expressed in the preliminary report,[1] that while the "judicious use of the gouge and bone forceps are admissible in gunshot wounds of the ankle joint, the formal excisions are rarely successful."[2] Recoveries with useful limbs have been claimed for this operation in some instances during the Franco-Prussian War, 1870–71, and later, under antiseptic treatment, in the Russo-Turkish War, 1876–77,[3] but hardly sufficient time has elapsed to judge of the remote effects of the operations performed during these campaigns.

Amputations at the Ankle Joint.—Amputation at the ankle joint for disease had been frequently performed since the middle of the last century[4] in civil practice, but the operation seems not to have been performed for shot injury until about the middle of the present century, during the Schleswig-Holstein War, 1848–1850, in which four exarticulations at the ankle are recorded by Professor Stromeyer. That it was not regarded with favor by surgeons of the late civil war is evident from the limited number of cases in which it was performed; and, although the number of operations recorded has increased from sixty-seven cases reported in the preliminary report from the Surgeon General's Office in 1865,[5] to one hundred and sixty-one cases reported here, yet the proportion of exarticulations at the ankle joint to the cases of fractures remains very small when compared with the number of amputations in the leg following similar injuries. Of the seven thousand five hundred and forty-three shot fractures of the bones of the foot and ankle joint recorded during the war, one thousand six hundred and twelve, or 21.3 per cent., were followed by amputation in the leg, while only one hundred and sixty-one, or 2.1 per cent., were disarticulated at the ankle joint. The operation seems to have been selected by the few surgeons who performed it as an "operation of expediency," with a view of falling back, in case of necessity, upon amputation in the leg as a "*dernier ressort.*"[6] It may be assumed, therefore, that only the cases most favorable to such an operation were selected for its performance. As far as the mortality rate is concerned, the exarticulation at the joint would seem to have been followed by less loss of life than the amputations in the leg—the fatality rate of the former being 25.1,[7] of the latter 32.9 per cent.; but of the one hundred and sixty-one exarticulations at the ankle, twenty-nine, or 18.0 per cent., required reamputation, while of five thousand four hundred and fifty-two amputations in the leg, in only two hundred and twenty-one, or 4.0 per cent., reamputation became necessary.

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[1] *Circular* No. 6, War Department, Surgeon General's Office, Washington, Nov. 1, 1865. *Reports on the Extent and Nature of the Materials available for the preparation of a Medical and Surgical History of the Rebellion.*

[2] Surgeon D. PRINCE, U. S. V., in his *Notes on Surgical Cases and operations at Harrison's Landing, Va.*, August 12, 1862, Surg. General's Office, Div. of Surg. Rec., *File A*, No. 132, remarks: "Any injury requiring a complete exsection of the tibio-astragalean articulation would be almost certain to make amputation a more suitable remedy on account of the thinness of the stratum of soft parts covering the bones." HAMILTON (F. H.) (*A Practical Treatise on Fractures and Dislocations*, 5th ed., Philadelphia, 1875, p. 513): "Resections at the ankle joint are much more hazardous than amputations, and scarcely to be preferred, in army practice, to attempts to save the foot without surgical interference." AGNEW (D. H.) (*The Principles and Practice of Surgery*, Philadelphia, 1878, Vol. I, p. 254): "Amputation either through the joint, or above in the continuity of the limb, is a much more successful operation than excision, which fact of itself should determine our course where the articulating extremities of the bones are comminuted." SÉDILLOT (*Du traitement des fractures des membres par armes de guerre*, in *Arch. Gén. de Méd.*, 1871, T. XVII, p. 457): "Nous la croyons contre-indiquée par l'étendue des surfaces osseuses la présence des nombreux tendons périarticulaires, le volume et la position superficielle des os, la difficulté de la contention de la jambe et du pied, et le danger des complications. Nous maintenons cependant nos appréciations sur les avantages de la résection des malléoles."

[3] GROSSHEIM, *Ueber die Schussverletzungen des Fussgelenks während des letzten Krieges und die Resultate ihrer Behandlung unter Benutzung officieller Quellen*, in *Deutsche Militairärztliche Zeitschrift*, 1876, Jahrgang V, p. 227, *et seq.*

[4] The first authentic example of this operation is recorded by BRASDOR (*Essai sur les Amputations dans les Articles*, in *Mém. de l'Acad. Roy. de Chir.*, Paris, 1774, T. V, p. 771): The foot of a child, 10 years of age, became mortified from some external cause. M. SEDILIER, surgeon at Laval, amputated through the ankle joint. The patient apparently suffered little from the operation; there was little inflammation or suppuration; a sound stump ensued, which never reopened during the twelve years which the patient survived the operation.

[5] *Circular* No. 6, War Department, Surgeon General's Office, Washington, November 1, 1865. *Reports on the Extent and Nature of the Materials available for the preparation of a Medical and Surgical History of the Rebellion.*

[6] SMITH (S.), *Amputations at the Ankle Joint in Military Surgery*, in *U. S. Sanitary Com. Memoirs*, Surgical Volume II, New York, 1871, p. 102.

[7] In *Circular* No. 6, War Dep't, Surg. General's Office, November 1, 1865, p. 45, the number of exarticulations at the ankle joint was stated as 67; 58 recovered and 9 were fatal, a fatality of 13.4 per cent. This mortality rate was ascertained from partial returns, and it was stated at the time that the records were far from complete. The full returns have augmented the mortality rate to 25.1 per cent., as shown in TABLE LXXXIX, p. 595, *ante*.

The operations most generally preferred were those of Syme and Pirogoff, but in a few instances the malleoli and the articular surface of the tibia were retained, and in others the malleoli were removed while the articular surface of the tibia was left intact and the bone covered with a dorsal flap. In Syme's operation (FIG. 354) the malleoli and from one-half to one and a half inches of the surface of the tibia were removed; in Pirogoff's operation (FIG. 355) the os calcis was sawn through and its cut surface placed in apposition to the sawn ends of the tibia and fibula. In both operations the heel flap was used. The advantages claimed for the Pirogoff operation would seem to be a gain in the length of the stump and the preservation of the heel cushion in its natural condition attached to the os calcis, thus insuring a stump capable of readily sustaining the weight of the body. The latter advantage cannot be denied, provided a firm union of the cut surfaces of the os calcis and the tibia and fibula can be obtained; the additional length of the limb may be considered a substantial gain in unaided locomotion, but in the application of an artificial limb the Syme stump offers the best facilities, the base of support being on the same plane as the natural ankle joint, while, in the Pirogoff stump, the base is necessarily on a much lower plane than that of the sound limb, allowing no space for the play of an artificial joint. The few surgeons who recorded their views on the relative value of the Syme and Pirogoff operations have expressed themselves in favor of Syme's operation. Surgeon J. Wilson Wishart, in a letter to the Surgeon General dated May 1, 1866, states: "If called upon to choose in a given case, I should prefer Syme's to Pirogoff's." In a letter to this Office, in 1869, Surgeon C. S. Wood, who had performed Pirogoff's operation on several occasions, states that he had so much trouble in preventing displacement of the parts to be united that afterwards he always gave Syme's operation the preference.

FIG. 354.—SYME'S amputation at the ankle. [After ESMARCH.]

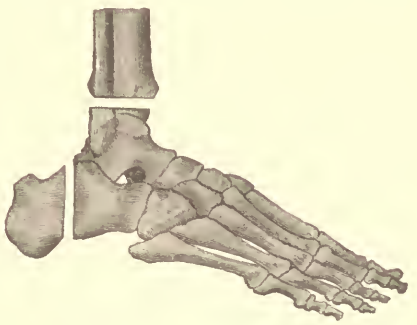

FIG. 355.—PIROGOFF'S amputation at the ankle. [After ESMARCH.]

To what extent union of the cut surfaces of the os calcis and of the tibia and fibula has taken place in the cases of recovery after Pirogoff's operation, and whether the union was osseous or only ligamentous, could not be positively ascertained. Of three cases in which the limb was subsequently amputated in the leg, the bony portions removed at the second operations are preserved in the Army Medical Museum. In two of these cases (Captain Denniston, CASE 875, p. 598, *ante*, and Private Loughlin, CASE 884, p. 604, *ante*) there were no indications whatever of union after two and three weeks; in the third case (Private Larkin, 48th New York, CASE 795, p. 545, *ante*) the patient was discharged cured on December 4, 1863, four months and nine days after the operation; but when seen some weeks after his discharge by Dr. E. D. Hudson, to whom he had applied for an artificial limb, the tibia was already extensively necrosed and the leg was enlarged one-third beyond the normal size. The patient led a life of suffering for fifteen and a half years, until re-amputation was performed in May, 1879. In this case union of bone had taken place, as shown in the specimen (No. 6913 *Surg. Sect.*, A. M. M.) represented in the wood-cut, FIG. 32, on page 545. As far as is indicated by the recorded cases, cure followed more speedily after Pirogoff's than after Syme's operation; in twenty-five cases of the former the average time was 2.8, in forty-seven of the latter 3.7 months.

Judging from the cases before us, the risk of life, in military surgery at least, is somewhat greater in Pirogoff's than in Syme's operation. Of the eighty-three operations after Syme in the American civil war, the result was not determined in one case, sixty-one were followed by recovery, twenty-one by death, a mortality of 25.6 per cent.; while of forty-nine operations after Pirogoff, thirty-five were successful and fourteen fatal, a fatality of 28.5 per cent. A similar result has been obtained from the cases collected in European and other campaigns, grouped in the following table:

TABLE XCIV.

Results of Amputations at the Ankle Joint on the Occasions named and from the Authorities quoted.

ACTION, ETC.	CASES.					OPERATION.										
						SYME'S.				PIROGOFF'S.				VARIOUS OPERATIONS.		
	Total.	Recovery.	Fatal.	Undetermin'd.	Ratio of mortality.	Recovery.	Fatal.	Undetermin'd.	Ratio of mortality.	Recovery.	Fatal.	Undetermin'd.	Ratio of mortality.	Recovery.	Fatal.	Undetermin'd.
Schleswig-Holstein War, 1848–50 (STROMEYER,[1] DJÖRUP[2])	7	4	3	....	.....	2	2	....	.....	....	....	....	.....	2	1	....
Crimean War, 1854–57 (MATTHEW,[3] CHENU,[4] HÜBBENET[5])	120	55	21	44	.....	2	....	....	.....	....	1	....	.....	53	20	44
Bombardment of Sveaborg, 1855 (HEYFELDER[6])	2	....	2	....	.....	....	1	....	.....	....	....	....	.....	....	1	....
British in India, 1857–58 (WILLIAMSON[7])	1	1	....	....	.....	....	....	....	.....	....	....	....	.....	1	....	....
Accidents, 1858–59 (GRAY,[8] CORNAZ[9])	2	2	....	....	.....	....	....	....	.....	2	....	....	.....	....	....	....
Italian War, 1859–60 (CHENU[10])	9	4	5	....	.....	....	....	....	.....	....	....	....	.....	4	5	....
Danish War, 1864 (HEINE[11])	4	2	1	1	.....	1	....	....	.....	1	1	1	.....	....	....	....
Austro-Prussian War, 1866 (FISCHER[12])	5	....	....	5	.....	....	....	2	.....	....	....	3	.....	....	....	....
United States Army, 1865–70 (OTIS[13])	2	2	....	....	.....	1	....	....	.....	1	....	....	.....	....	....	....
Franco-German War, 1870–71, French (CHENU[14])	105	17	88	....	.....	....	....	....	.....	3	....	....	.....	14	88	....
Franco-German War, 1870–71, Germans (BECK, FISHER, GRAF, KIRDMER, RUPPRECHT, SCHINZINGER, STOLL[15])	14	11	3	....	.....	5	....	....	.....	6	3	....	.....	....	....	....
Aggregates	271	98	123	50	55.6	11	3	2	21.4	13	5	4	27.7	74	115	44

Of fourteen operations after Syme with determined results, three, or 21.4 per cent., were fatal, and of eighteen after Pirogoff, five, or 27.7 per cent., had fatal terminations.

[1] STROMEYER (L.) (*Maximen der Kriegsheilkunst*, Hannover, 1855, p. 756) tabulates 4 amputations at the ankle joint by SYME'S method during the Schleswig-Holstein War, 1848–50; 2 were successful and 2 fatal. [2] DJÖRUP (*Bemærkninger over de i Krigen* 1848–50 *foretagne Amputationer i Forbindelse med en Statistik over dem*, in *Hospitals-Meddelelser*. Kjöbenhavn. 1852. B. V, p. 107) reports 3 exarticulations at the ankle joint in the Danish army during the war of 1848–50; 2 were successful, 1 fatal; no details are given. [3] MATTHEW (T. P.) (*Med. and Surg. Hist. of the British Army in the years* 1854-55-56, London, 1858, Vol. II, pp. 372, 373) tabulates 13 cases of exarticulation at the ankle joint; 11 of the patients survived and 2 died. Details of two of the cases are given by GUTHRIE and STANLEY. GUTHRIE (G. J.) (*Commentaries on the Surgery of the Peninsular War*, London, sixth ed., 1855, p. 99): British soldier in the Crimea; round ball lodged against the astragalus but was not removed; inflammation extended into the ankle joint; flap amputation at the ankle joint and subsequent amputation in thigh; recovery. STANLEY (*Result of Syme's Operation of Amputation at the Ankle Joint*, in *The Lancet*, London, 1857, Vol. II, p. 472): A sailor had his foot shattered by an explosion of a shell before Sebastopol, in April, 1857; SYME'S amputation at the ankle joint by a Russian surgeon; October 31, amputation in lower third of leg for painful stump; probably recovered. [4] CHENU (J.-C.) (*Rapport, etc., de Campagne d'Orient en* 1854–55–56, Paris, 1865, p. 473) records 50 cases of exarticulation at the ankle joint; 35 terminated successfully and 15 fatally; and on pp. 474, 475, gives brief details of the successful operations. Two fatal cases are cited by ARONSSHON and SALLERON. ARONSSHON (*Obs. d'un cas d'amputation tibio-tarsienne procédé* PIROGOFF, in *Rec. de Mém. de Méd. de Chir. et de Phar. Mil.*, Paris, 1856, 2me sér., T. XVII, p. 369): J. Sch—; shot wound of right metatarsus June 13, 1855, at Sebastopol; PIROGOFF'S operation by ARONSSHON June 18; gangrene; death July 2. SALLERON (*Compte-Rendu des Amputations Primitives et des Amputations consécutives*, in *Rec. de Mém. de Méd. de Chir. et de Phar. Mil.*, Paris, 1858, 2me sér., T. XXII. p. 317): Cornand, 20th line regiment, received July 10, 1855, a shot fracture of the three first metatarsal bones of left foot; amputation at the ankle joint July 30, 1855; gangrene; death. [5] HÜBBENET (C. v.) (*Die Sanitäts-Verhültnisse der Russischen Verwundeten, etc., in den Jahren* 1854–56, Berlin, 1871, p. 182) tabulates 57 amputations at the ankle joint; the results were ascertained in only 13 cases; 9 were successful, 4 fatal. One of the successful cases is detailed by LEGOUEST (*Amp. de la partie inférieure de la jambe dans la région intra-malléolaire*, in *Gaz. des Hôp.*, 1855, No. 150, p. 597): Russian prisoner G. Gardey, 6th Infantry; shot fracture of right tarsal bones at the Alma, September 20, 1854; SYME'S operation October 3, 1854; nearly healed in one month; marched well in 3 months. [6] HEYFELDER (J. F.) (*Die Verwundungen und Operationen in Folge des Bombardements von Sveaborg vom* 9–11 *Aug.*, in *Deutsche Klinik*, 1855, B. VII. p. 531): Officer's servant of the ship "Russland;" shot wounds of right shoulder and left foot and contusion of chest; exarticulation of right arm and left foot, the latter by BAUDEN'S method; died one hour after the operation. IDEM (*loc. cit.*, p. 554): W. Kolomagin, sailor, aged 22; shell wound of right foot August 9, 1855; August 25, amputation at ankle joint by a modification of SYME'S operation; pyæmia, and death September 1, 1855. [7] WILLIAMSON (G.) (*Military Surgery*, London, 1863, p. 214) relates a successful case of amputation at the ankle joint during the mutiny in India in 1857, in a man of the 75th regiment; a very good stump resulted. [8] E. P——, aged 29, accidental shot wound of left foot May 16, 1858; integuments and muscles of the sole of the foot ploughed up except at the heel; the metatarsals fractured; PIROGOFF'S amputation at the ankle performed by Dr. MASH on the same day; recovery, with a useful stump (J. F. GRAY, in the *Medical Times and Gazette*, London, 1860, Vol.

Considering the number of re-amputations after Syme's and Pirogoff's operations, Pirogoff's method would seem to be the more successful. Of eighty-three cases of Syme's amputation, twenty, or 24.0 per cent.. submitted to re-amputation; of forty-nine Pirogoff's operations, eight, or 16.3 per cent., were subjected to re-amputation. Sloughing of the flaps seems to have been the most frequent cause of the re-amputation after Syme's operation, this complication having been given as the cause in twelve of the twenty re-amputations; tender stump is given in one case, and necrosis in another; in six the cause was not stated. In the eight re-amputations after Pirogoff's operation necrosis and caries are stated as the cause in two, sloughing in four, gangrene in one, and secondary hæmorrhage in one instance. Deducting the cases in which re-amputations were performed there remain forty-six recoveries after Syme's and thirty after Pirogoff's operation. In sixteen of the forty-six opera-

II, p. 9). [9] CORNAZ (*Amputation tibio-tarsienne d'après le procédé de* PIROGOFF, in *Écho Médical*, Sept. 10, 1861, p. 428): J. F. D——; accidental shot wound of left foot, involving tarsus and metatarsus; PIROFOFF'S amputation performed the same day by Dr. CORNAZ; recovery in about 2 months, with union of sawn surfaces and good use of stump. [10] CHENU (J.-C.) (*Statistique Méd. Chir. de la Campagne d'Italie en* 1859 *et* 1860, Vol. II, p. 823) tabulates 9 disarticulations at the ankle joint, 4 successful, 5 fatal, and gives some details of the 4 successful operations: L. J. Boyer, sergeant, 55th line; shot fracture of right metatarsus. Solferino, June 24, 1859; amputation at ankle joint by Dr. ARLAUD, after September 28; the malleoli were removed October 8; December 10, recovery. J. Gros, 86th Infantry; shot fracture of left tarsus, Solferino, June 24, 1859; amputation at the ankle joint by Dr. J. ROUX, Aug. 18, 1859; recovery. X. Hecht, 9th Artillery; shot fracture of right foot, at Solferino; disarticulation at ankle joint; recovery. L. J. Paviot, 86th Infantry; shot fracture of right calcaneum, Solferino, June 24, 1859; amputation at the joint; recovery. [11] HEINE (C.) (*Die Schussverletzungen der Unteren Extremitäten*, Berlin, 1866, p. 338) and OCHWADT (A.) (*Kriegschirurgische Erfahrungen*, Berlin, 1865, *Appended Table of Operations*, p. XIII, Case 54): Private Chr. L——, 3d Danish Infantry; shot fracture of right astragalus and os calcis, April 18, 1864; PIROGOFF'S operation was attempted on May 4, but the os calcis being found fissured the operation was finished according to SYME'S method by Dr. FISCHER; ½ inch of the epiphysis of the tibia was removed; several necrosed fragments of the tibia came away; recovery, with a poor stump. In a case at a hospital at Ulderup, Staffsurgeon ABEL performed PIROGOFF'S operation (HEINE, *loc. cit.*, p. 339, and LÜCKE (A.) (*Kriegschir. Aphorismen in* LANGENBECK'S *Archiv für Klin. Chir.*, Berlin, 1866, B. VII, p. 19): P. Schlott, 3d Danish Infantry, wounded at Düppell, April 18, 1864; shot fracture of tarsal and metatarsal bones; PIROGOFF'S amputation at ankle joint by Dr. ABEL; pyæmia and gangrene; death May 10, 1864. NEUDÖRFER (J.) (*Aus dem feldärztlichen Berichte über die Verwundeten in Schleswig*, in LANGENBECK'S *Archiv für Klin. Chir.*, 1865, B. VI, p. 544): J. Brandner, 9th Chasseurs, at Oeversee, Feb. 6, 1864, received a shot fracture of the right astralagus and internal malleolus; February 24, PIROGOFF'S amputation at the ankle performed by Dr. NEUDÖRFER; April 12, union of os calcis and tibia; May 20, stump healed; patient able to walk on the stump without pain. NEUDÖRFER (*loc. cit.*, p. 558) tabulates a second case of amputation after PIROGOFF, but gives no details or result. [12] FISCHER (K.) (*Militairärztliche Skizzen aus Süddeutschland und Böhmen*, Aarau, 1867, p. 99) refers to 2 operations after SYME and 3 after PIROGOFF, performed during the Austro-Prussian War, 1866; the results are doubtful. [13] OTIS (G. A.) (*Circular* No. 3, War Dep't., S. G. O., Washington, 1871: *A Report of Surgical Cases treated in the Army of the United States from* 1865 to 1871); pp. 193, 194): H. G. Nims, additional paymaster, admitted into post hospital, Fort Vancouver, Washington Territory, Dec. 25, 1866, with shot fracture and comminution of external and middle cuneiform bones of right foot; Dec. 28, PIROGOFF'S amputation at ankle joint by Assistant Surgeon J. E. SEMPLE, U. S. A.; recovered. Private P. Vandel, A. 3d Infantry, accidentally wounded Nov. 5, 1867; conoidal ball shattered left os calcis and injured astragalus; SYME'S amputation at ankle joint by Assistant Surgeon A. D. WILSON, U. S. A.; recovered. [14] CHENU J.-C.) (*Aperçu hist. stat. et clin., etc., pendant la guerre de* 1870–71, T. I, p. 493) tabulates 105 instances of amputation at the ankle joint; 17 recovered and 88 proved fatal; and gives details of a few cases of recovery: T. II, p. 31, P. P. F. Chambon, aged 26, 14th Provisionary regiment; shot fracture of left foot, May 26, Paris; amputation at ankle joint; pensioner; p. 55, L. L. Faivre, 7th Artillery, aged 36; shell fracture of left foot, Monthéliard, January 15, 1871; amputation at ankle joint; pensioner; p. 74, Havart (C. J. M.), 12th Infantry, aged 27; comminuted shot fracture of left foot, received at Saint-Privat; amputation at ankle joint; pensioner; p. 75, Hermier (C. A.), 3d Zouaves, aged 33; shell fracture of left foot; amputation at ankle joint; pensioner; p. 99, Mangin (P. G. A.), Captain, 24th Infantry, aged 31; shell wound of left tarsal bones, received at Bapaume; amputation at ankle joint; pensioner; p. 100, A. Marchand-Liffoz, 64th Infantry, aged 28; shot wound of left foot, Sedan; exarticulation at ankle joint; pensioner. Other cases are given in detail by SÉDILLOT (*Du traitement des fractures des membres par armes de guerre*, in *Arch. Gén. de Méd.*, 1871, VI[e] sér., T. XVII, p. 458): Louis Charlier, 48th Infantry, aged 21; shell wound of foot. Woerth, August 6; PIROGOFF'S amputation on the day after the injury by M. SARAZIN; partial gangrene of stump; recovery; walks well; no consolidation (CHENU, *Aperçu hist. stat. et clin., etc.*, Paris, 1874, T. II, p. 32); Jean Barjet, 9th Cuirassiers, aged 26; shot fracture of right tarsus and metatarsus, Reichshofen, August 6, 1870; PIROGOFF'S operation, August 19, 1870, by M. JOESSEL; abscess; doing well at the end of September; os calcis movable (CHENU, *loc. cit.*, p. 8); François Berga, sergeant, 50th Infantry, aged 33; fracture of left tarsal bones, Woerth, Aug. 6, 1870; PIROGOFF'S amputation performed August 7, by M. JOESSEL; abscess; wound healed September 27; os calcis movable (CHENU, *loc. cit.*, p. 13). [15] BECK (B.) (*Chir. der Schussverletz.*, 1872, p. 838, *et seq.*) details five cases of amputation at the ankle joint; one by SYME'S and four by PIROGOFF'S method: F——, 14th Prussian L. W. regiment; shell wound of right tarsal bones; SYME'S amputation at the ankle joint; recovery. D——, 14th L. W. regiment; severe shot injury of foot, at Strassburg; PIROGOFF'S amputation; good recovery. P——, 14th L. W. regiment; shell comminution of tarsal bones; PIROGOFF'S operation; gangrene; septicæmia; death. S——, Baden Artillery regiment No. 14; shot wound of tarsal bones, January 16, 1871; PIROGOFF'S operation; patient discharged in September, 1871; result of operation very favorable. G——, 7th L. W. regiment; wounded February 9, 1871; PIROGOFF'S amputation at ankle; pyæmia; death 8 days after the operation. FISCHER (G.) (*Dorf Floing und Schloss Versailles*, in *Deutsche Zeitschrift für Chirurgie*. Leipzig, 1872. B. I, p. 262), in a case of PIROGOFF'S amputation performed 19 days after the injury, received September 1, 1870, the remaining portion of the os calcis became necrosed and was removed two months after the operation; the patient then recovered in 3½ months. In a case of SYME'S operation extensive granulations and pus formations retarded the recovery 2½ months. GRAF (E.) (*Die Königl Reservelazarethe zu Düsseldorf*, Elberfeld, 1872, p. 50): H. Riemann, 46th Prussian Infantry; comminution of ankle joint, especially astragalus, August 6, 1870; PIROGOFF'S amputation Aug. 17; death September 11, 1870, from pyæmia. KIRCHNER (C.) (*Aerztlicher Bericht über das Königlich Preussische Feld-Lazareth im Palast zu Versailles*, Erlangen, 1872, p. 89) tabulates a successful amputation after PIROGOFF for shell wound of the tarsal bones, and a successful SYME'S operation for shot fracture of the ankle joint. RUPPRECHT (L.) (*Militairärztliche Erfahrungen während des deutsch-französischen Krieges im Jahre* 1870–71, Würzburg, 1871, p. 86) observed a successful operation by NEUDÖRFER after SYME'S method, at the Bavarian field hospital No. VIII. SCHINZINGER (A.) (*Das Reserve-Lazareth Schwetzingen im Kriege* 1870 *und* 1871, Freiburg, i. Br., 1873, p. 91): Diemenet: shot fracture of left foot, August 18, 1871; comminution of metatarsals; September 2, PIROGOFF'S amputation by Dr. SCHINZINGER; good recovery. A. Glück, 64th Infantry; shot fracture of right ankle joint August 18, 1870; September 14, PIROGOFF'S operation; union of the tibia and os calcis, the latter projecting downward like a shovel; patient cannot walk; February 22, 1871, the remaining portion of the os calcis removed, and ends of tibia and fibula resected; recovery, with useful stump. STOLL (*Bericht aus dem Königlich Württembergischen 4 Feldspital von* 1870–71, in *Deutsche Militairärztliche Zeitschrift*, 1874, Jahrgang III, p. 215): Fahnert, 107th Infantry, shell wound of foot, October 30, 1870: PIROGOFF'S amputation on the day of injury: necrosis of part of the remaining portion of the os calcis; necrosed portions removed; in the summer of 1871 the patient had good use of his leg.

tions after Syme's method the stumps are reported as sound and useful, in ten as simply "healed;" in one case the flaps retracted, in two necrosis is diagnosed, and in three the wounds never healed, abscesses continuing for years; in fourteen the remote conditions are not reported. Of the thirty Pirogoff operations nine are stated to have given good and serviceable limbs, four are reported as "healed," in two the remaining portion of the os calcis is drawn upward, in one caries is reported, in two the retained portions of the os calcis are considered hindrances, in three abscesses continued to form. The conditions of nine of the patients could not be traced beyond the time of their discharge from the service.[1]

To relieve the tension caused by the weight of the flap and the consequent tendency to sloughing so frequently noted, Acting Assistant Surgeon J. E. Janvrin applied a flat padded splint to the anterior surface of the leg, which extended beyond the end of the stump. Adhesive straps were then passed from beneath the leg across the flap and carried over the end of the splint and fastened. These were gradually shortened as the healing process went on.

There seems to have been no foundation for the statement made in the preliminary report,[2] on the authority of Baron von Haurowitz,[3] Surgeon-in-Chief of the Russian Navy (during a visit to this Office in 1865), that Pirogoff had himself abandoned his operation, finding the segment of the os calcis likely to become necrosed. In a letter dated Berlin, March 28, 1866, Professor Pirogoff[4] emphatically denies that he has ever given up this operation, and states that he had not a single case of necrosis of the segment of the os calcis, although he had performed the operation more than sixty times.

[1] SCHEDE (*Ueber partielle Fussamputationen*, in VOLKMANN'S *Sammlung Klinischer Vorträge*, Leipzig, 1874, Nos. 72, 73, pp. 515, 516) remarks: "The difference of the length of the stumps, further, is a very considerable one, and upon this, other authors to the contrary notwithstanding, I would not place too little weight. PIROGOFF himself estimates the length gained by his method at least 1½ inches. According to O. WEBER, the shortening of the leg after PIROGOFF'S operation amounts to 2.8 ctm. in the average, while in SYME'S method the limb loses from 6 to 8 or 9 ctm. Yet the former figure can certainly be still considerably reduced by sawing off the bone obliquely, whereby much more may be preserved, and rotation is rendered easier. Among our patients operated upon there are several on whom no measurable shortening could be shown: as a rule it amounted to about 1 ctm., sometimes to 2, and only once did it rise to 3 ctm. So little shortening, of course, is very easily counterbalanced by a slight dropping of the pelvis. With a PIROGOFF stump the patient can therefore not only walk very well without an artificial apparatus and simply with a somewhat cushioned lace-boot—as our patients learned to do without exception very readily; but in favorable cases not even an elevated shoe was required. But when an American surgeon and inventor of an artificial leg, Dr. HUDSON, rejects PIROGOFF'S operation for the reason that his method results in too long a stump to admit of applying a complicated prothetic apparatus with an artificial ankle joint, and therefore prefers SYME'S cut, one will be inclined, on the same principle, to the views of another American, Dr. BLY, for whom in turn the SYME stump is too long because it is not adaptable to his artificial apparatus, and who, therefore, advises amputations of the leg throughout. We would, therefore, return again to amputation at the point of election as the only alternative, only with this difference, that in this case a greater portion of his limb be sacrificed and his life be put in greater jeopardy, not in his own interest, but in that of the instrument maker." That the patient's life is *not* put in greater jeopardy by the PIROGOFF than by the SYME'S operation has been shown in the statistics of the American as well as the European campaigns above cited. Great stress is laid by SCHEDE upon the increased length of stump, enabling the patient to walk very well with a "somewhat cushioned lace-boot" without the addition of a complicated artificial ankle joint, as required after SYME'S amputation. But in the former case the surface of the stump, acting as a pivot on the cushioned shoe, is exposed to the danger of continued attrition similar to the irritating friction caused by the heel cap of an ill-fitting boot or shoe. In the artificial apparatus the friction is in the joint, and not on the tender surface of the stump, which is securely encased in the parts fitting to the leg. Moreover, the artificial joint will allow an easier and more graceful movement, which, in point of appearance, is quite a desideratum with the young soldier, and which causes no extra expenditure, as the United States government furnishes him, at reasonable periods (every fifth year), with an excellent apparatus. The writer has seen instances in which it was almost impossible to detect the use of an artificial foot with an articulated joint, even after attention had been called to that fact.

[2] *Circular* No. 6, War Department, Surgeon General's Office, Washington, November 1, 1865. *Reports on the Extent and Nature of the Materials available for the preparation of a Medical and Surgical History of the Rebellion*, page 46.

[3] Not *Harronwitz*, as erroneously printed in *Circular* No. 6.

[4] "Berlin, 28 March, 1866. Sir: Having read in the *Circular* No. 6, Surgeon General's Office, dated November 1, 1865, page 46, that the Baron von Haurowitz, Surgeon-in-Chief of the Russian Marine, in his recent visit to your office has mentioned that I had myself abandoned *my osteoplastic operation of the foot*, finding the segment of the os calcis likely to become necrosed, I have the honor to state that I have never given up this operation. I had *not one single case* of necrosed segment of the os calcis, though I have made this operation more than sixty times, the results of which I published in my Outlines of General Military Surgery (*Grundzüge der Kriegs Chirurgie*, Leipzig, 1864). With the urgent request that my protest may be made public, I have the honor to be, very respectfully, your obedient servant. N. PIROGOFF."

Section VII.

WOUNDS AND OPERATIONS IN THE FOOT.

According to the plan pursued in the previous sections of this Chapter, the consideration of the wounds of the bones of the foot in this section will be restricted to those inflicted by weapons of war. The cases number five thousand eight hundred and sixty; viz: one bayonet and five thousand eight hundred and fifty-nine shot wounds.

BAYONET WOUNDS OF THE BONES OF THE FOOT.—A solitary case of bayonet injury of the metatarsal bones is reported from the Fairfax Seminary Hospital:

Case 889.—Corporal J. Hough, Co. I, 120th New York, aged 26 years, received a bayonet wound of the left foot on October 10, 1864. He was treated at the Depot Hospital of the Second Corps, at City Point, and subsequently at Fairfax Seminary Hospital. Surgeon D. P. Smith, U. S. V., in charge of the latter, certified that the metatarsal bones were injured and that the patient was returned to duty June 20, 1865, to be mustered out of service. The man has not applied for a pension.

SHOT WOUNDS OF THE BONES OF THE FOOT.—Twenty-seven shot contusions and five thousand eight hundred and thirty-two shot fractures are recorded. Of the former one, and of the latter four hundred and fifty-one proved fatal, a mortality rate of 8.3 per cent. In four hundred and forty cases the results were not ascertained.

SHOT CONTUSIONS OF THE BONES OF THE FOOT.—Of the twenty-seven cases of this group, seventeen are designated as contusions of the tarsals, four of the metatarsals, one of the metatarso-phalangeal articulation, and two of the phalangeal bones. In three instances the part injured was not indicated. Twenty-six of the patients recovered and one died of tetanus.

Case 890.—Lieutenant W. Stribler, Co. B, 63d Colored Troops, aged 27 years, was wounded in the right foot by the accidental discharge of his pistol, on President's Island, January 14, 1865. He was admitted to the Officer's Hospital at Memphis the following day, when the ball, which had lodged against the scaphoid bone, was extracted through an incision one and a half inches in length by Assistant Surgeon S. S. Jessop, U. S. V. Partial anæsthesia was produced by chloroform. At the time of the operation the foot had become somewhat swollen and was very painful, but the patient's physical condition was good. Profuse suppuration followed during the first month, and an abscess formed over the internal malleolus without involving the ankle joint. Cold and warm-water dressings and poultices were used and stimulants were administered. The patient recovered and was mustered out of service May 5, 1865. The history was reported by the operator. Lieutenant Stribler subsequently became a pensioner. On January 26, 1870, he was examined by Dr. W. Jones, of St. Joseph, Missouri, who reported as the results of the injury: "Anchylosis of the ankle joint, with an atrophied and partially contracted condition of the muscles of the foot, causing deformity of a character sufficient to render it very difficult to secure proper appearing covering that can be worn with any degree of comfort. The loss of the use of the ankle joint also greatly interferes with walking and causes his movements to be imperfect and laborious." The pensioner was paid December 4, 1881.

Case 891.—Lieutenant W. C. Hall, Co. K, 136th New York, aged 28 years, was wounded in the right foot, at Resaca, May 15, 1864. From a field hospital of the Twentieth Corps he passed to Nashville, where he entered the Officer's Hospital one week after the reception of the injury. Surgeon J. E. Herbst, U. S. V., described the wound and its result as follows: "The ball passed transversely through the tissues on the plantar aspect, immediately beneath and grazing the under surface of the os calcis. The internal or external plantar nerves, or both, were injured, and no doubt the patient suffered exposure to draughts during his transportation hither. Tetanus in the form of trismus and emprosthotonos ensued on May 24th. The wound was freely incised and cleansed. Purgatives of croton oil were administered, seconded by the use of calomel and opium, the latter

in large quantities with little effect. Chloroform had the effect of relaxing the spasms; but notwithstanding all our endeavors rigidity increased and spasms became more violent until the patient was at last overcome by their intensity. Death occurred on May 26, 1864."

SHOT FRACTURES OF THE BONES OF THE FOOT.—The cases included in this group number five thousand eight hundred and thirty-two (5,832), or only about one-half of the number of shot fractures of the bones of the hand recorded on page 1019 of the *Second Surgical Volume.* In the following table it has been attempted to group the shot injuries of the foot, as far as possible, according to the different bones implicated.

TABLE XCV.

Summary of Five Thousand Eight Hundred and Thirty-two Shot Fractures of the Bones of the Foot.

TREATMENT.	CASES.					TARSAL BONES.			TARSO-METATARSAL ARTICULATION.			METATARSAL BONES.			PHALANGES.			BONES NOT SPECIFIED.		
	Total Cases.	Recoveries.	Deaths.	Undetermined.	Ratio of mortality.	Recoveries.	Deaths.	Undetermined.	Recoveries.	Deaths.	Undetermined.	Recoveries.	Deaths.	Undetermined.	Recoveries.	Deaths.	Undetermined.	Recoveries.	Deaths.	Undetermined.
Treated by Expectation	3,560	3,111	135	314	4.1	671	40	59	38	3	1	1,238	33	118	725	10	16	439	49	120
Excision of Bones of Foot	88	69	15	4	17.8	24	3	1	3	2	....	41	7	3	1	3	....	....	....	....
Exc. of Bones of Foot and Part. Amp. Foot.	1	1	....	....	.....	....	....	....	....	....	....	.....	....	....	1	....	....	....	....	....
Exc. of Bones of Foot and Amp. Leg	7	4	3	....	42.8	1	2	....	....	....	....	3	1	....	.....	....	....	....	....	....
Exc. of Bones of Foot, Amp. Leg, Amp. at Knee Joint, and Amp. of Thigh	1	1	....	....	.....	....	....	....	....	....	....	1	....	....	.....	....	....	....	....	....
Amputation of the Toes	1,216	1,088	23	105	2.0	....	....	....	....	....	....	.....	....	....	1,088	23	105	....	....	....
Amp. of Toes and Partial Amp. Foot	2	1	1	....	50.0	....	....	....	....	....	....	.....	....	....	1	1	....	....	....	....
Amp. of Toes and Amp. at Ankle Joint	1	.....	1	....	100.0	....	....	....	....	....	....	.....	....	....	.....	1	....	....	....	....
Amp. of Toes, Amp. Ankle Joint, and Amp. Leg	1	.....	1	....	100.0	....	....	....	....	....	....	.....	....	....	.....	1	....	....	....	....
Amputation of Toes and Amp. of Leg	6	4	2	....	33.3	....	....	....	....	....	....	.....	....	....	4	2	....	....	....	....
Amp. of Toes and Amp. at Knee Joint	1	.....	1	....	100.0	....	....	....	....	....	....	.....	....	....	.....	1	....	....	....	....
Partial Amputation of Foot	275	209	50	16	19.3	9	3	....	8	1	1	83	17	3	55	1	4	54	28	8
Part. Amp. Foot and Amp. at Ankle Joint	1	1	....	....	100.0	....	....	....	....	....	....	.....	....	....	1	....	....	....	....	....
Partial Amp. Foot and Amp. of Leg	12	11	1	....	8.5	....	1	....	1	....	....	4	....	....	3	....	....	3	....	....
Amputation at the Ankle Joint	116	84	31	1	26.9	26	7	....	6	6	....	5	1	....	.....	....	....	47	17	1
Amp. at Ankle Joint and Amp. of Leg	25	20	5	....	20.0	9	3	....	4	....	....	2	1	....	.....	....	....	5	1	....
Amp. at Ankle J't, Amp. Leg, Amp. Thigh	1	.....	1	....	100.0	....	....	....	....	....	....	.....	....	....	.....	....	....	....	1	....
Amputation of the Leg	498	329	169	....	33.9	113	57	....	35	16	....	27	29	....	2	1	....	152	66	....
Amputation of Leg and Amp. of Thigh	10	5	5	....	50.0	3	2	....	2	....	....	.....	....	....	.....	....	....	....	3	....
Amputation at Knee Joint	4	1	3	....	75.0	....	2	....	1	....	....	.....	1	....	.....	....	....	....	....	....
Amputation of the Thigh	6	3	3	....	50.0	3	1	....	....	1	....	.....	....	....	.....	....	....	....	1	....
Aggregates	5,832	4,942	450	440	8.3	859	121	60	98	29	2	1,404	90	124	1,881	44	125	700	166	129
						1,040			129			1,618			2,050			995		

The tarsal bones were implicated in one thousand and forty, the tarso-metatarsal articulation in one hundred and twenty-nine, the metatarsal bones in one thousand six hundred and eighteen, and the phalanges in two thousand and fifty cases; in nine hundred and ninety-five instances the parts injured were not indicated. Three thousand five hundred and sixty were throughout treated by expectation, ninety-seven were followed by excision, and two thousand one hundred and seventy-five by amputation.

SHOT FRACTURES OF THE BONES OF THE FOOT TREATED BY CONSERVATION.—The shot fractures of the foot treated without operative interference numbered three thousand five hundred and sixty; the results in three hundred and fourteen cases were not ascertained. Of the remaining three thousand two hundred and forty-six cases, three thousand one hundred and eleven had successful, and one hundred and thirty-five fatal terminations, a mortality rate

of 4.1 per cent. A few cases will be detailed to indicate the manner of treatment generally pursued, which was similar to that of wounds of the hand discussed on page 1020 of the *Second Surgical Volume.* Shot fractures of the os calcis even when quite extensive healed, as a rule, without difficulty:

CASE 892.—*Shot fracture of the os calcis.*—Sergeant D. M. Tarrance, Co. B, 1st Pennsylvania Cavalry, aged 24 years, was wounded in the right foot, at United States Ford, May 25, 1863, and entered Harewood Hospital, Washington, three weeks afterwards. On September 29th the patient was transferred to Mower Hospital, Philadelphia. Surgeon J. Hopkinson, U. S V., reported: "The patient was wounded by a ball entering outside of the tendo-achillis, passing downward, forward and inward through the os calcis, fracturing the bone, and emerging at the inner margin of the sole of the foot. The heel became very much swollen and painful and pus continued to discharge from both the wound of entrance and exit, all the symptoms of necrosed bone being present. Flaxseed poultices were applied; iron and quinine with wine was administered. On December 1st, another examination having been made, it was decided to cut down and remove the diseased bone, and a crucial incision was made along the internal aspect of the bone, its length parallel with the axis of the bone being three and a half inches, in the opposite direction two and a half inches. The loose pieces were then removed and the necrosed bone was scraped with the gouge, after which the wound was closed with sutures and cold-water dressings were applied. The operation was performed by Acting Assistant Surgeon J. H. Jamar, the patient being in good general condition at the time. He did well afterwards. Small fragments of bone exfoliated and were removed at different intervals. By January 20, 1864, the wound was healing kindly and the patient was allowed to go to his home. About the end of February the wound had healed with the exception of a small point, and the patient dispensed with his crutches and used a cane. He was discharged from service July 8, 1864." Examining Surgeon W. Jewell, of Philadelphia, certified to the injury April 7, 1866, and described the wound as still suppurating. The pensioner was paid March 4, 1871.

CASE 893.—*Shot fractures of scaphoid and cuneiform bones.*—Lieutenant J. Miller, Co. A, 5th Ohio, aged 26 years, was wounded in the left foot, at Cedar Mountain, August 9, 1862. Acting Assistant Surgeon J. A. Murphy, in charge of Third Street Hospital, Cincinnati, reported: "The ball entered between the scaphoid and internal cuneiform bones and passed out one inch below the external malleolus. The patient was sent to Cliffburn Hospital, at Washington, where Assistant Surgeon J. S. Billings, U. S. A., on August 14th enlarged the wound of exit and removed several pieces of bone. The patient remained in said hospital for three months, when he obtained a leave of absence and came to his home (in Cincinnati). He applied for treatment in this hospital in December, 1862, when there was still considerable inflammation in the foot. Poultices and cold-water dressings were ordered until the wounds healed. Five small pieces of bone were removed from both the wound of entrance and exit. He is now (April, 1863) able to flex the foot on the leg and walks with a slight halt." Lieutenant Miller was discharged from service June 11, 1863, and pensioned. The Cincinnati Examining Surgeons have certified to the injury from time to time. In 1877 they added that "the cicatrix is small, healthy, and adherent. There is some flattening of the plantar arch; middle tarsal joint very much impaired; motion of ankle good but limited in range." The pensioner was paid March 4, 1881.

CASE 894.—Private J. A. Lunderman, East Missouri Militia, was wounded in the left foot during a skirmish on March 9, 1863. Acting Assistant Surgeon F. A. Bushey reported: "The wound was caused by a conical pistol ball, which entered at the astragalo-cuboid articulation, comminuted the cuneiform and scaphoid bones, and lodged in the foot. The man entered the General Hospital at Springfield eleven months after the injury, at which time the external wound had healed, but the foot was much swollen; constitutional condition good. On February 10, 1864, Dr. B. A. Barette attempted to extract the ball and made an incision three inches in length along the tibialis anticus muscle, when a quantity of necrosed bone was taken out, but the missile could not be found. Simple dressings were applied after the operation. The patient recovered and was returned to duty March 26, 1864." He is not a pensioner.

CASE 895.—*Shot fracture of os calcis and tarsal bones.*—Private J. Chew, Co. C, 58th Indiana, was wounded in the left foot, at Chickamauga, September 20, 1863. He was conveyed to hospital at Chattanooga, where Surgeon J. T. Woods, 99th Ohio, recorded the following history: "A minié ball entered one inch below the outer malleolus, ranging slightly forward and comminuting the head of the os calcis and tarsal bones. Careful exploration failed to detect the missile. Several spiculæ and one small fragment of lead were removed. On September 26th inflammatory action in the parts had increased and the pain was severe and attended with great restlessness. Irrigation was then applied to the parts and anodynes were freely administered. By September 30th the inflammation was increasing, the pain intense, and several more spiculæ were removed. On October 2d an incision was made from the entrance wound forward and inward, opening into the discolored mass freely, after which several pieces of tarsal bone were removed, also a Belgian musket ball from near the internal cuneiform bone. Irrigation to the foot was continued. Three days afterwards the appearance of the parts was better, the pain had decreased, and an anterior splint was applied, elevating the foot. On November 2d part of the tarsal bone from the inner side of the foot was removed." Several days afterwards the patient was transferred to hospital at Murfreesboro' and subsequently to Evansville, where he was discharged from service November 9, 1864, Acting Assistant Surgeon J. A. Jearicon certifying to the use of the foot being completely destroyed by the wound. There is no record of the man ever having applied for pension.

CASE 896.—*Shot fracture of tarsal bones.*—Private J. Campbell, Co. F, 11th New York, aged 36 years, was wounded and captured at Bull Run July 21, 1861. Surgeon R. B. Bontecou, U. S. V., reported: "He was admitted to Hygeia Hospital at Fort Monroe, from Richmond, October 21, 1861, with gunshot wound of right tarsus. A ball had passed into the foot in front of the ankle joint and came out at the tip of the heel. The patient was in bad condition when he arrived, and the foot was very much swollen and painful, with profuse discharge from several sinuses. The fistulæ were dilated with sponge tents and carious bone was removed. He recovered the use of his foot and went to his home in New York City." The patient was discharged from service February 16, 1862, and pensioned. The New York City Examining Board certified, November 4, 1874:

"The wounds are still open and connect with dead bone; the cicatrices and surrounding tissues are thin, inflamed, and tender; movements of joint limited." In the following year the same board reported that "a portion of the astragalus has been removed. Cicatrices are deep and adherent; wound of exit still open and connecting with dead bone." The pensioner was paid September 4, 1880.

CASE 897.—*Shot fractures of tarsal and metatarsal bones.*—Private J. E. Chase, Co. F, 1st U. S. Sharpshooters, aged 25 years, was wounded in the right foot, fracturing the bones, at Spottsylvania, May 12, 1864. He passed through several hospitals and was ultimately transferred to the Veteran Reserve Corps, December 4, 1864, by reason of the results of the injury. On August 31, 1866, the man was mustered out and pensioned. Dr. E. D. Hudson furnished the following description of the case: "Compound comminuted fractures of the metatarsus and tarsus were caused by three rifle shots, and were followed by extensive necrosis and exfoliation of the metatarsus. The insertion and function of the tibialis anticus, peroneus longus, and extensor muscles are destroyed, the plantar aspect of the foot is turned inward and upward, and the patient rests his leg on the outside of the foot, which is turned down, the extensor muscles failing to make the great toe and other parts hug the ground. The limb is not shortened, but there is soreness and stiffness of the foot and considerable anchylosis of the tarsus. An apparatus was applied to antagonize the flexor muscles of the foot and the extensors of the toes, and to reduce the heel and the foot to a normal position." Examining Surgeon L. Richmond, of Troy, Vermont, certified to the injury as follows: "One ball entered between the lower extremity of the tibia and tendo-achillis on the inner aspect, passed outward and downward, and made its exit near the sole of the foot, severely injuring the os calcis. Another ball passed through the foot, severely injuring the three outer metatarsal bones and the tendons; extensive sloughing followed. The third ball entered on the inner side just about the union of the great toe with its metatarsal bone. * * The pensioner walks partly upon the side of the foot," etc. Examiner J. C. Rutherford subsequently reported that "the foot and leg are atrophied and there is but very little muscle left upon the limb. There is no strength in the ankle. He is obliged to use a mechanical support on the foot and leg to enable him to walk at all."

CASE 898.—Captain M. D. Bearden, Co. D, 6th Tennessee, aged 34 years, was wounded in the left foot, at the Chattahoochee River, July 1, 1864, and was admitted to Lookout Mountain Hospital near Chattanooga eight days afterwards. Surgeon L. D. Harlow, U. S. V., reported: "A conical ball fractured the cuboid bone and lodged in the centre of the foot under the scaphoid bone. The foot became greatly swollen and inflamed, particularly on the inner side, and the patient, who had been a strong and robust man previous to the injury, grew weak, feverish, and irritable. On August 27th an abscess which had formed on the internal surface was opened, and the ball was extracted through the opening. Chloroform was used during the operation. Rapid improvement followed." The patient subsequently entered the Officers' Hospital at Knoxville, where he was mustered out of service April 27, 1865, and pensioned. The Knoxville Examining Board certified to anchylosis resulting from the injury. The Pension Office Examining Board, Washington, D. C., reported the pensioner's condition March 11, 1881, as follows: "This man can do no manual labor. The ankle and leg to the knee are much enlarged, and the lower two-thirds of the tibia and soft parts are much diseased. He has to use crutches at times to walk, and a stout cane at all times. He is very lame, and from the great ulceration of the bone and soft parts must suffer constant pain."

CASE 899.—Private H. West, Co. L, 7th Illinois Cavalry, aged 22 years, was wounded in the left foot, at Colliersville, October 11, 1863. He remained at a field hospital for some weeks and was then conveyed to Memphis, where he entered Adams Hospital November 17th. Surgeon J. G. Keenon, U. S. V., in charge of the latter, reported: "The patient had been wounded by a ball penetrating the scaphoid bone and carrying with it the tongue of the buckle of a spur, which lodged. After a time a sinus formed in the injured foot, connecting with what appeared to be necrosed bone, but which proved to be perfectly healthy. On March 10, 1864, chloroform was administered, and a vertical incision was made about one and a half inches in length and continued along the track of the ball from within outward, after which the tongue of the buckle was found and removed. The operation was performed by Acting Assistant Surgeon S. S. Jessop, the patient being in good physical condition at the time. He did well until March 30th, when hospital gangrene supervened, which was checked by one application of pure bromine." The patient was ultimately discharged from service May 13, 1865, and pensioned. Examining surgeons have certified to "anchylosis and deformity of the foot," etc. The pensioner was paid March 4, 1881.

CASE 900.—*Shot fractures of metatarsal bones.*—Private C. S. Wheelwright, Co. M, 1st New Jersey Cavalry, aged 26 years, was wounded on picket duty near Warrenton, January 31, 1864, and admitted to Douglas Hospital, Washington, the following day. Acting Assistant Surgeon C. Carvallo, reported: "The ball entered the external dorsal aspect of the right foot anterior to the fourth tarso-metatarsal articulation, and emerged posteriorly to the metatarso-phalangeal articulation of the big toe, having fractured the fourth metatarsal bone obliquely and passed beneath the others. Water dressings had been applied before admission and were continued. The foot became red, swollen, and painful, and the patient had considerable fever, anorexia, and pain. Epsom salts, weak diaphoretics, and the dressings soothed the symptoms considerably. On February 8th the distal fragment of the fourth metatarsal bone was found to be movable, but still attached by its phalangeal articulation, and an effort to remove it proved impossible without injuring that joint. It was therefore decided to leave its removal to nature, and a seton was conducted through both wounds in order to keep them open and promote suppuration. Subsequently an exacerbation of the symptoms manifested itself, after which the foot showed an erysipelatous tendency by swelling, redness, heat, and puffiness. A solution of nitrate of silver with acacia, constantly applied for forty-eight hours, finally subdued the inflammation, when a profuse discharge of healthy pus followed and gave great relief to the patient. Thenceforward the stimulants were substituted by tonics, and water dressings took the place of all former local applications. In a very short time all the swelling and redness had left the foot, and the wound showed such a healthy appearance and discharged such small quantities of pus that I entertained hopes the fractured bone would heal without being removed. I then applied Sentin's starch bandage, which the patient still had on when he went home on furlough on March 15th. I afterwards heard that he was attacked with erysipelas and had entered Central Park Hospital, New York City." The patient was discharged at the latter hospital May 20, 1864, and pensioned. Examining Surgeon J. T. Burdick, of Brooklyn, N. Y., certified that "the flexor tendons of the middle toes and some of the ligaments of the pedal arch were injured." The pensioner was paid September 4, 1880.

CASE 901.—Private I. Parso, Co. F, 21st Wisconsin, aged 25 years, was wounded in both lower extremities, at Chickamauga, September 19, 1863. The injuries were produced by two musket balls, one of which fractured the first and second metatarsal bones of the right foot, the other fracturing the fibula of the left leg near its lower extremity. The wounded man passed through various hospitals and lastly entered Harvey Hospital, Madison, on July 12, 1864. Surgeon H. Culbertson, U. S. V., who operated in the case at the latter hospital, reported the following result of the injuries: "The patient was assigned to the Veteran Reserve Corps October 7th. The fracture of the metatarsal bone had united with a very large provisional callus, which interfered with the action of the extensor tendons and compressed the tarsus. This growth was mainly developed from the first metatarsal bone, which jutted over the second, the parts being tender and the patient unable to walk without pain. In order to accomplish the chiseling off of the exostosis, if possible, or failing in this, to remove a portion of the first metatarsal together with the diseased bone, an incision was made down to the bone, commencing one-half inch from the metatarso-phalangeal articulation and extending two and three-quarter inches along the inner border of the first metatarsal. Another incision of two inches was then carried over the dorsum of the foot down to the superficial fasciæ and at right angles with the first cut, care being taken not to divide the extensor tendons. The soft parts were now separated with the handle of a scalpel, preserving the periosteum as much as possible, and the bone was sawn through with a metacarpal saw about one inch from the metatarso-phalangeal joint. The old line of the fracture, three-fourths of an inch from the tarso-metatarsal joint, was next separated with a strong narrow knife and removed with the diseased structure. A portion of the exostosis, projecting from the upper fragment and jutting over the second metatarsal bone, was removed with the forceps. No vessels required ligating. The wound was left open for two hours until all bleeding had ceased, after which the edges were brought together and secured with sutures and adhesive plaster. A compress secured by bandages was applied over the seat of the wound for twelve hours; the foot was elevated and cold-water dressings were used. The external wound healed by first intention and the patient progressed well. He was returned to duty February 20, 1865." The removed exostosis, one inch in length, and contributed to the Museum by the operator, constitutes specimen 3694 of the *Surgical Section*. The patient was mustered out of service August 19, 1865, and pensioned. Dr. J. F. Force, pension examining surgeon at Heron Lake, Minnesota, states that "the great toe was left, but it is so tender that he can use it but little in walking. The left ankle joint is considerably weakened. His bodily health is good." The pensioner was paid June 4, 1881.

CASE 902.—Surgeon T. H. Squire, 89th New York, records that "Private C. M. Yarnes, Co. F, 89th New York, aged 24 years, was wounded at the storming of a fort on the Nansemond River, April 19, 1863, by a musket ball, which entered the outer margin of the right foot at the root of the little toe and came out on the inner margin of the foot just below the ankle, traversing the whole sole of the foot diagonally and below the bones. I think the phalangeal extremity of the metatarsal bone of the little toe was injured, but not the rest of the bones, and whether any of the vessels were injured or not was more than I could tell, though there had been no hæmorrhage. The wound of entrance was small, while that of exit was large, ragged, and pouting. The first day after the injury the foot was hot and painful. I placed it in an easy elevated position, applied wet dressings, and drew blood liberally from the patient's arm, from which time the pain grew less. By April 25th the foot had a good appearance. On June 6, 1863, the patient went home on furlough. He had done well. The wound of entrance had suppurated freely and bone was apparently yet to come out of this opening." He was ultimately mustered out of service August 3, 1865, and pensioned. Examining Surgeon J. G. Orton, of Binghamton, N. Y., December 14, 1872, stated that "the action of the ankle joint is much impaired, obliging the patient to walk almost entirely on the heel and always giving him a limping motion. The disability is permanent in its present degree." The pensioner was paid December 4, 1880.

CASE 903.—Private J. Johnson, Co. D, 4th U. S. Artillery, aged 36 years, was wounded in the right foot, at Drury's Bluff, May 14, 1864. He was admitted to Point Lookout Hospital three days afterwards, where Acting Assistant Surgeon J. Gilman recorded the following: "The wound was from a minié ball, which entered at the dorsal surface and was taken out at the plantar aspect, having fractured the metatarsal bone of the great toe. Gangrene set in, destroying the continuity of the dorsalis pedis artery and necessitating ligation, which was performed on July 20th by Surgeon A. Heger, U. S. A., in charge of the hospital, who enlarged the wound and tied the artery above and below. The case progressed favorably, the gangrene being cured and the wound granulating, when the patient was transferred to Judiciary Square Hospital at Washington on August 6th." He was subsequently transferred to Fort Washington, and on July 16, 1865, he was discharged from service and pensioned by reason of "difficulty in walking in consequence of the wound." Examining Surgeon J. O. Stanton, of Washington, D. C., reported, September 10, 1873: "The cicatrix is large, now open, and discharging. He has no motion of the great toe." The pensioner died at the Soldiers' Home, Washington, D. C., November 6, 1878.

CASE 904.—Private J. T. Bartley, Co. B, 38th Indiana, aged 20 years, was accidentally shot in the left foot, at Nashville, March 3, 1864, the ball passing in at the arch, fracturing the third metatarsal bone, and coming out at the plantar surface. On the following day he was admitted to hospital No. 1, whence he was transferred to Jeffersonville two months afterwards, and subsequently to No. 6, at New Albany. Acting Assistant Surgeon E. S. Crosier, in charge of the latter hospital, reported that owing to troublesome hæmorrhage the anterior and posterior tibial arteries were ligated by Acting Assistant Surgeon J. Grant six days after the reception of the injury, also that the parts were attacked with gangrene during the early stage of the case. The patient recovered and was discharged from service April 10, 1865. He is not a pensioner.

CASE 905.—*Shot fracture of toe.*—Corporal R. Steele, Co. F, 27th Massachusetts, aged 23 years, was wounded in the left foot, during the skirmish at Gum Swamp, May 22, 1863. Surgeon E. P. Morong, 2d Maryland, recorded his admission to Foster Hospital, New Berne, and his return to duty one month afterwards. Surgeon G. A. Otis, 27th Massachusetts, made the following report: "Corporal Steele was sent to me from Foster Hospital June 25th. He had been under treatment for a wound at the phalangeal articulation of the left great toe, caused by an Enfield rifle ball. Dead and detached fragments of the distal phalanx could be felt and the wound showed no disposition to cicatrize either on the dorsal or palmar aspect. I laid open the toe and removed the loose fragments, including the entire distal phalanx and part of the proximal phalanx." The man recovered and subsequently continued with his regiment until mustered out September 27, 1864. In 1880 he became an applicant for pension by reason of alleged painfulness in walking.

CASE 906.—*Shot fracture of tarsal bones; death.*—Captain C. E. Jennings, Co. G, 26th New York, was wounded in the foot, at Bull Run, August 30, 1862, and was conveyed to Washington. Surgeon C. L. Allen, U. S. V., reported: "The patient was a man about thirty years of age, of a sanguine temperament, and apparently of good constitution and fair health previous to being wounded; while he was at Alexandria, on his way to Washington, a surgeon had declared the necessity of amputation; but before the operation could be performed the patient was taken to Washington. The ball had entered on the inner side of the foot and passed through the three cuneiform bones and the cuboid, the wound of exit being upon the external and upper surface of the foot. On September 27th the foot was enormously swollen, and there were five or six openings besides the original wounds discharging large quantities of unhealthy sanious pus. The leg and even the thigh were very much swollen and œdematous, and the lower third of the leg was marked by several long cicatrices, said to be the results of incisions made early in the case for erysipelatous inflammation. His general condition was that of marked hectic and his emaciation was great. He had also considerable dyspnœa and complained of pain in his chest, for which sinapisms were being applied. Compound tincture of cinchona and tincture of cantharides, with brandy and liberal allowance of beef-essence, etc., were now immediately ordered for the patient, hoping but not expecting to raise him to a condition to sustain amputation of the leg. Although crowding the nourishment and stimulants to the utmost he continued to sink, and died on October 1, 1862. No *post-mortem* examination was held."

CASE 907.—*Shot fracture of first metatarsal bone; death.*—Private W. S. Hodgkins, Co. A, 14th New York Artillery, aged 27 years, was wounded at Spottsylvania, May 10, 1864, and entered Emory Hospital, Washington, two weeks afterwards. Surgeon N. R. Moseley, U. S. V., reported: "The patient was received with gunshot wound of left foot, fracturing the first metatarsal bone. Cold-water dressings were applied to the wound and alteratives were given internally. This treatment was continued for some weeks, the wound doing well, although the patient's constitutional health was very poor. On June 29th stimulants with alteratives were ordered, and warm applications were made to the wound, which appeared to be obstinate in healing. On July 20th simple cerate dressings were commenced, the wound appearing healthy in some parts, though peculiarly unhealthy around the edges; internal treatment continued. One month later the wound was erysipelatous in appearance and warm poultices were again applied; patient's appetite still good. By September 9th erysipelas and gangrene had invaded the wound and creasote was added to the poultice; stimulants given internally. In about ten days cold-water dressings were resumed, gangrene having disappeared, but the parts still being unhealthy. On September 27th the patient was attacked with chills followed by high fever, when antiperiodics and tonics were prescribed and warm applications were again used. Several days afterwards the patient began to sink rapidly. He died October 3, 1864, from the effects of irritative fever produced by the unhealthy wound."

EXCISIONS IN THE BONES OF THE FOOT.—Ablations of one or more of the metatarsals with their corresponding toes have been classified with partial amputations of the foot and will be cited hereafter. The cases to be considered in this group will be confined to excisions of the tarsal bones or of the metatarsal bones without removal of the corresponding toes. Ninety-seven cases of this nature have been recorded. The results in four cases were not determined. Seventy-five were successful and eighteen proved fatal, a mortality rate of 19.3 per cent. Of the ninety-seven operations, thirty-one involved the tarsal bones, five the tarso-metatarsal articulation, fifty-seven the metatarsal bones, and four the metatarso-phalangeal articulation, as indicated in the following table:

TABLE XCVI.

Numerical Statement of Ninety-seven Cases of Excisions in the Bones of the Foot.

PARTS EXCISED.	CASES.					PRIMARY.			INTERMEDIARY.		SECONDARY.		TIME NOT SPECIFIED.		
	Total.	Recoveries.	Deaths.	Undeterm'd	Percentage of Mortality.	Recoveries.	Deaths.	Undeterm'd.	Recoveries.	Deaths.	Recoveries.	Deaths.	Recoveries.	Deaths.	Undeterm'd.
Excision in the Tarsal Bones	31	25	5	1	16.6	10	3	1	4	1	9	1	2		
Excision in the Tarso-Metatarsal Articulation	5	3	2		40.0	1	1		1	1	1				
Excision in the Metatarsal Bones	57	46	8	3	14.8	28	5	1	10	2	6		2	1	2
Excision in the Metatarso-Phalangeal Articulation	4	1	3		75.0	1	2			1					
Aggregates	97	75	18	4	19.3	40	11	2	15	5	16	1	4	1	2

Fifty-three of the ninety-seven operations were primary, twenty intermediary, seventeen secondary, and in seven the intervals between the injury and the operation could not

be ascertained. A few examples of each of these groups will be detailed, and a brief account of all cases given in a condensed tabular statement.

PRIMARY EXCISIONS IN THE BONES OF THE FOOT.—The results were ascertained in fifty-one of the fifty-three primary excisions; forty were successful, eleven fatal. In five instances, two successful and three fatal, the limb was subsequently amputated in the leg.

CASE 908.—Captain A. Badeau, Aide-de Camp on Brigadier General T. W. Sherman's Staff, was wounded in the left foot, fracturing the tarsal bones, before Port Hudson, May 27, 1863. He was admitted to the field hospital of the 2d division, Nineteenth Corps, where he was treated by Surgeon E. F. Sanger, U. S. V., who contributed the following description of the case: "The ball penetrated at the instep and came out below the internal malleolus. I resected the middle cuneiform bone, portions of the internal and external cuneiform, and the proximal end of the second metatarsal, on account of which operation he was sent to New Orleans permanently disabled. I met him during the following fall at Newport, R. I. He was then still lame and went on crutches." About ten months after being wounded, Captain Badeau was promoted and appointed on the Staff of General Grant, in which position he continued up to a short time before being retired from active service on May 18, 1869. In addition to the history of the case, forwarded by Dr. Sanger on February 26, 1878, the operator makes the following mention of the result of the injury: "I learn that the arch of the foot is somewhat depressed by the wound and operation, tending slightly to valgus."

CASE 909.—Lieutenant L. A. Dubois, Co. E, 120th New York, aged 24 years, was wounded in the right foot, before Petersburg, September 20, 1864. Surgeon O. Everts, 20th Indiana, reported his admission to the field hospital of the 3d division, Second Corps, with "shot fracture of metatarsus, followed by resection." Surgeon H. F. Lyster, 5th Michigan, who performed the operation, reported that the second metatarsal bone was fractured and the posterior tibial artery lacerated, also that the operation consisted of the excision of the distal extremity of the fractured bone and of the ligation of the lacerated artery, and was followed by "recovery with a useful foot." The patient was transferred from the field to the Depot Hospital at City Point, where he obtained a leave of absence on October 8th. On January 10, 1865, he was discharged from service and pensioned. Various examining surgeons have certified to the injury resulting in considerable "lameness, much pain and difficulty in walking." The pensioner was paid September 4, 1880.

CASE 910.—Private B. J. Smith, Co. G, 21st Kentucky, aged 22 years, was accidentally wounded in the left foot, and was conveyed to Cumberland Hospital, Nashville, November 28, 1864. Surgeon B. Cloak, U. S. V., reported: "The metatarsal bone of the second toe was fractured, and the adjacent parts were much swollen by irritation from the comminuted bone. Acting Assistant Surgeon T. C. Eakin made an incision on November 28th, two and a half inches in length on the dorsal surface of the foot, and excised two-thirds of the fractured metatarsal bone. Chloroform was the anæsthetic used; the patient was in good health at the time of the operation. Several days afterwards erysipelas of a simple cutaneous character attacked the foot but was easily arrested. About one month after the operation the patient was progressing favorably." He was subsequently transferred to hospital at Louisville, and lastly to Camp Dennison, where he was mustered out of service September 11, 1865. There is no record of his ever having applied for pension.

CASE 911.—Private J. Leunze, Co. C, 71st Ohio, aged 37 years, was wounded in the right foot, at Campbellsville, November 26, 1864, and entered hospital No. 1, at Nashville, the following day. Surgeon B. B. Breed, U. S. V., reported: "Gunshot fracture of first metatarsal bone; foot much inflamed and tumefied; tarso-metatarsal articulation opened; patient's constitutional condition good; secretions natural. Excision of the first metatarsal bone was performed on November 28th, by Acting Assistant Surgeon C. H. Fisher, while the patient was under the influence of chloroform. The treatment consisted of water dressings and nutritious diet. Wound healing kindly when the patient was transferred to Louisville, December 20th." Subsequently the patient was transferred to Camp Dennison, where he was discharged from service May 16, 1865, by reason of "paralysis of foot and toes resulting from the wound." Several years afterwards the man became an applicant for pension and was examined by Surgeon L. Whiting, of Canton, Ohio, who certified, April 29, 1868, as follows: "There is great deformity and disability of the injured foot. A large part of the metatarsal bone of the great toe is lost, and the toe itself is so distorted that it now lies at least an inch posterior to its original locality. * * * The weight of the body in walking is sustained by the heel and a portion of the external border of the foot."

CASE 912.—Private J. C. Troutman, Co. K, 3d Tennessee, aged 29 years, was wounded accidentally in the left foot, at Kingston, June 19, 1864. After remaining at a field hospital for over two months he was transferred to Chattanooga, whence Assistant Surgeon C. C. Byrne, U. S. A., described the injury as "a shot fracture of the second and third metatarsal bones. Excision of the fractured bones was performed on the field through an incision three inches in length, chloroform being used. At the time of the operation the parts were inflamed and swollen, but the patient was in good constitutional condition. Cold-water dressings constituted the treatment and favorable progress followed." The patient subsequently passed through other hospitals, and was ultimately discharged from Brownlow, Knoxville, July 8, 1865, by reason of "much impairment of the usefulness of the foot." Two years afterwards he made application for pension and was examined by Surgeon A. B. Tadlock, of Knoxville, who certified to the injury and stated: "The second and third metatarsal bones have been exsected, which permanently damages the arch of the foot and materially obstructs locomotion." Owing to subsequent failures to respond the man's claim was suspended by the Pension Office in 1873.

CASE 913.—Private P. Pero, Co. C, 2d New York Cavalry, aged 22 years, was wounded in the right foot, while on picket duty near Alexandria, May 5, 1864. Surgeon C. Powers, 160th New York, in charge of the Alexandria Hospital, made the following report: "The ball entered at the inner side of the middle of the metatarsal bone of the great toe and emerged over that of the little toe. The first, second, third, and fourth metatarsal bones were shattered. The patient suffered considerable pain. Two days after the injury excision of the first metatarsal bone was performed and the shattered fragments of the second, third, and fourth were removed by Assistant Surgeon C. H. Andrus, 128th New York. Chloroform was used, and the patient reacted

promptly. He did well afterwards. Five days after the operation considerable hæmorrhage occurred, but was completely arrested by light pressure on the dorsal artery. Simple water dressings were used. The case was still doing well when the patient was, on May 22d, transferred to University Hospital at New Orleans." Surgeon S. Kneeland, U. S. V., in charge of the latter hospital, reported the result of the case as follows: "The whole foot became greatly swollen, purulent inflammation having occurred on the dorsal and plantar surfaces; several of the bones became disorganized and the tibio-tarsal articulation completely anchylosed; patient greatly reduced by the excessive suppuration; pulse 78; appetite tolerably good. He also suffered from chronic diarrhœa and intermittent fever, from which he had recovered on June 20th, when the leg was amputated at the middle third by Acting Assistant Surgeon F. Hassenburg. Chloroform was used, and the hæmorrhage attending the operation was slight. Under a supporting diet and cool dressings the patient did well up to June 30th. He died from the effects of chronic diarrhœa July 15, 1864."

CASE 914.—Private J. G. Fowler, Co. K, 42d Illinois, was wounded in the left foot, at the battle before Nashville, December 15, 1864. He was admitted to Cumberland Hospital at Nashville, whence Surgeon B. Cloak, U. S. V., reported: "The metatarsal bone of the second toe was fractured and two-thirds of its tarsal extremity was excised the day after the injury. One week after the operation trismus set in, the patient complaining of stiffness of the jaws, and on the following day the muscles of the neck and shoulders were in a state of tonic spasm. The patient was placed under the influence of chloroform and the wound was thoroughly cleaned out with the knife, after which concentrated nitric acid was applied. Large quantities of opium were administered internally, but without effect. On December 25th opisthotonos ensued, in which condition the patient died at 8 A. M."

INTERMEDIARY EXCISIONS IN THE BONES OF THE FOOT.—Twenty cases with fifteen recoveries and five deaths, a mortality rate of 25.0 per cent., belong to this group. In two of the fifteen cases of recoveries the patients subsequently submitted to amputations in the leg:

CASE 915.—Private J. M. Cole, Co. G, 8th Michigan Cavalry, aged 22 years, was accidentally wounded in the right foot, at Waynesboro', November 20, 1864, and entered hospital No. 1, Nashville, eight days afterwards. Surgeon B. B. Breed, U. S. V., who operated in the case, made the following report: "The wound was caused by a ball entering the dorsal surface, fracturing the third and fourth metatarsal bones, and emerging directly opposite on the plantar aspect. The foot became highly inflamed and tumefied; tarso-metatarsal articulation opened; patient suffering much from pain; appetite impaired; bowels constipated. The third and fourth metatarsal bones were excised on November 30th through an incision two and a half inches long on the dorsal surface. Chloroform was used. Hospital gangrene appeared in the wound five days after the operation and was promptly arrested by one application of undiluted bromine. After this the wound healed rapidly. Cold-water dressings were used and nourishing diet was furnished. On December 21st the patient was transferred to Louisville." He was ultimately discharged from Harper Hospital, Detroit, May 12, 1865, by reason of permanent lameness resulting from the wound. Examiner D. A. West, of Lexington, Michigan, June 13, 1877, certified to the wound, loss of metatarsal bones, etc., and added that "the cicatrix is very sensitive to the touch. There appears to be bulbous extremities of some of the nerves," etc. "A spicula of bone is now troubling the plantar surface and may necessitate removal." The man's application for pension was rejected owing to his inability to produce corroborative evidence as to the cause of the reception of the injury.

CASE 916.—Private M. H. Hargrave, 8th Indiana Battery, aged 42 years, was wounded at Chickamauga, September 20, 1863. He was admitted to the field hospital at Crawfish Springs, where Surgeon A. Ewing, 13th Michigan, recorded the injury as "a wound of the left foot, the ball entering the centre of the metatarsal bone, going inward and backward through the tarsus, fracturing all the bones in its passage. Resection of the os calcis and portion of the astragalus was performed on September 29th." After passing through other hospitals subsequently the patient was transferred to Evansville, March 8, 1864, the wound having healed previous to that date. On December 30, 1864, he was mustered out of service and pensioned. Various examining surgeons certified to his inability to walk without crutches. The pensioner died November 16, 1871. His attending physician, Dr. F. W. Billert, testified: "He came under my personal observation when he was discharged from the army; was then very much prostrated, and prostration was succeeded by violent reaction and fever, terminating in general nervous exhaustion. This left him partially paralyzed in the lower extremities, broke down his constitution, and finally generally paralysis, it is supposed, took place, resulting in death."

CASE 917.—Private M. Goffney, Co. A, 114th New York, aged 27 years, was wounded at Cedar Creek, October 19, 1864. Assistant Surgeon J. Homans, jr., U. S. A., reported his admission to the field hospital of the 1st division, Nineteenth Corps, with a "severe bullet wound of the bones of the left foot." Surgeon T. B. Reed, U. S. V., reported the following result of the injury: "The patient was admitted to Filbert Street Hospital, Philadelphia, five days after receiving the wound. The missile had entered at the insertion of the tendo-achillis and remained hidden among the bones of the foot. The os calcis and the astragalus were fractured. After admission the parts commenced to slough; circulation became feeble; appetite depraved, and general condition bad. Hæmorrhage from the posterior tibial artery to the amount of eight ounces occurred on October 31st, when Acting Assistant Surgeon E. L. Duer ligated the vessel in the continuity behind the malleolus, removed a portion of the os calcis and extracted the ball. Ether was used as the anæsthetic. The patient did not recover from its influence for several hours, then suffered from nausea constantly, became jaundiced, and presented decided pyæmic symptoms. The treatment consisted of mercurials, tonics, stimulants, and nutritious diet. Cups were applied over the liver and nitric acid to the wound, followed by permanganate of potash. Death resulted on November 9, 1864. At the *post-mortem* examination no metastatic abscesses were found, nor any pus except in the joints of the foot; liver greatly engorged; blood fluid and dark; stomach softened; gall bladder empty."

CASE 918.—Private W. W. McKeran, Co. H, 3d Michigan, was wounded in the foot, at Fair Oaks, May 31, 1862, by a musket ball, which entered the outer side of the fifth metatarsal bone and made its exit at the first metatarsal just behind the great toe. He was admitted to Judiciary Square Hospital, Washington, four days afterwards, where the wound went on slowly for some days. The foot was probed and portions of the metatarsal bones were found to be bare and broken. There being no apparent natural effort to throw off the fragments, the upper wound was enlarged and one-half the second metatarsal bone,

including the phalangeal articulation, was removed, together with considerable fragments of the third and fourth metatarsals. On the following day there was some pain, but no hæmorrhage. On June 26th the patient was much better; foot a little red; poultices applied. June 28th, severe chills; quinine administered. June 29th and 30th, patient the same; foot inflamed a little. July 1st, very severe chills and fever; skin and conjunctivæ yellow; tongue brown, dry, and horny. July 2d, bad symptoms increased. July 3d, continuous vomiting; jaundice worse; tongue more moist. July 4th, patient apparently a little better. July 5th, foot improved, but general aspect bad. Patient died July 6, 1862. The history was contributed by Acting Assistant Surgeon D. W. Cheever, who also forwarded the removed portions of the metatarsal bones. (*Cat. Surg. Sect.*, 1866, p. 420, *Spec.* 506.)

SECONDARY EXCISIONS IN THE BONES OF THE FOOT.—One of the seventeen secondary excisions in the bones of the foot was followed by death. Of the sixteen patients who survived the operation one subsequently suffered amputation in the leg. The names of twelve are found on the Pension Rolls; one has died since his discharge from the service of Bright's disease of the kidneys.

CASE 919.—Sergeant T. Barbin, Co. C, 81st Pennsylvania, aged 18 years, was wounded in the right foot, at Fredericksburg, December 13, 1862. Assistant Surgeon C. R. Greenleaf, U. S. A., contributed the following report of the injury: "He received the wound from a conoidal ball, which passed directly through the boot and entered the heel, passing through the os calcis in an oblique direction from behind forward and from above slightly downward. Considerable hæmorrhage attended the wound, and after an attempt at walking the man was carried to a house near by, where a bandage was applied. Two days afterwards he was taken to Washington and admitted to Mount Pleasant Hospital, where cold-water dressings were applied. Eight days later he was transferred to Mower Hospital, Philadelphia, where, on examination, the bone was found to be carious, and poultices were ordered. From this date until the time of the operation several pieces of bone were discharged and some small abscesses were opened. As no improvement was observed and the probe could be passed entirely through the bone, showing a considerable loss of substance, it was finally determined to remove the os calcis. On May 16th I proceeded with the operation, being assisted by Drs. J. H. B. McClellan and C. R. McLean (Acting Assistant Surgeons), and the patient being freely under the influence of chloroform. An incision was commenced a little in front of the articulation between the cuboid and calcis and carried around the heel, parallel with the long axis of the calcis, to a point just posterior to the posterior tibial artery; another was made at right angles to this, about two and a half inches in length, through the tendo-achillis. The flaps were then dissected back and disarticulation was effected in the manner recommended by Mr. Erichsen, the operation being completed in thirty minutes and no artery requiring ligation being cut. Monsell's solution was used to control the hæmorrhage from the smaller arterial twigs and veins. The flaps were accurately brought together and retained in position by silver-wire sutures, an opening being left posteriorly for the escape of fluids. Cold-water dressings were used. One-half grain of morphia was given, and some little febrile action during the next two days was controlled by spirits mindereri. On May 18th, Smith's anterior splint was applied to the leg and adhesive strips from the toes to a point near the incision. The incisions on the inner side of the foot healed by first intention and the sutures were withdrawn on May 20th, and a sponge tent was ordered to keep open the posterior point of exit, which had closed by granulations. On May 22d all the sutures were removed and adhesive strips re-applied. Large quantities of grumous pus were being discharged. The patient continued to improve, and on the 24th the splint was removed, a sling made from a sheet being substituted. After this the patient improved rapidly and left his bed on June 12th, the wound having healed with the exception of a slight track at the junction of the two incisions, from which a little healthy pus was being discharged. By June 17th the patient could bear his weight on the foot, the sinus having closed. The contour of the foot was not materially altered, the sole being a little flatter than its fellow. He was in excellent health and fine spirits, and felt no pain when bearing his weight on the foot, but said that it felt very springy." In addition to the history, Dr. Greenleaf also stated that as soon as the parts had become a little hardened and accustomed to their new position, a shoe filled with hair at the heel was to be furnished to the patient. The subsequent records of the hospital show that the patient was able to wear his shoe by July 15th, and could walk without crutch. Afterwards he was allowed to stay at his home in Philadelphia on furlough, getting stronger every day and his foot being entirely healed. On November 30, 1863, he was discharged from service and pensioned. Examining Surgeon W. Jewell, of Philadelphia, September 14, 1866, certified that "the removal of the os calcis has left the pensioner lame in his gait but not otherwise injured. Other examiners report nothing additionally important. The pensioner was paid September 4, 1880. The excised calcaneum, contributed to the Museum by the operator, and exhibiting general caries, constitutes specimen 1286 of the *Surgical Section*.[1]

CASE 920.—Private M. Dean, Co. F, 4th Kentucky, aged 24 years, was wounded in the right foot, at Chickamauga, September 19, 1863. He was sent to hospital at Chattanooga, and thence one month afterwards to hospital No 1, at Nashville. Surgeon C. W. Horner, U. S. V., in charge of the latter, reported: "The wound penetrated the structure of the tarsus and metatarsus. The parts became considerably swollen, painful, and involved in suppurative inflammation. The patient's system was much reduced from irritative fever and nervous disturbance. On December 7th Acting Assistant Surgeon G. P. Hachenberg made an incision about three inches in size and excised the cuboid bone, using two parts of chloroform and one of sulphuric ether as an anæsthetic. The patient improved very slowly. Tonics and stimulants were administered, and warm-water dressings, and a weak solution of bromine was applied to the wound about two weeks after the operation." Three months after the date of the operation the patient was transferred to hospital No. 7, at Louisville, whence he was returned to duty June, 1864. At the expiration of his term of service, October 25, 1864, he was mustered out of service and pensioned. Various examining surgeons have certified to the injury and to the use of the foot and ankle as being very much impaired. The pensioner was paid September 4, 1880.

[1] A detailed account of this case by Surgeon C. R. GREENLEAF, U. S. A., will be found on page 389 of Vol. XLVI of the *American Journal of the Medical Sciences*, Philadelphia, 1863.

TABLE XCVII.

Summary of Ninety-seven Cases of Excisions in the Bones of the Foot.

Primary operations, 1—53; Intermediary operations, 54—73; Secondary operations, 74—90; Time of operation not specified, 91—97.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1	Aldrich, W. S., Pt., B, 14th Infantry, age 21.	May 12, 12, '64.	Right; part of os calcis. Disch'd May 20, 1865; pensioned.
2	Anderson, F., Pt., H, 28th Pennsylvania, age 40.	May 25, 25, '64.	Left; third metatarsal. June 9, amputation toe. Vet. Reserve Corps March 29, 1865.
3	Anderson, J., Pt., F, 76th New York, age 19.	May 5, 5, '64.	Left. Duty December 9, 1864.
4	Badeau, A., Captain and Aide-de-Camp.	May 27, 27, 63.	Left; mid. and parts of int. and ext. cuneiform; end of 2d met. Surgeon E. F. Sanger, U. S. V. Retired May 18, 1869.
5	Chapman, P., Pt., H, 38th Illinois, age 36.	May 19, 19, '64.	Right; 2d metatarsal. Disch'd January 25, 1865; pensioned.
6	[1]*C——, G.*, —, —, age 23.	May 12, 12, '64.	Right; whole calcaneum; amp. left leg. Surg. — Strait, C.S.A. Recovery.
7	Donohue, M., Pt., G, 7th Rhode Island, age 23.	Dec. 5, 5, '64.	Left; metatarsal. Surg. L. W. Bliss, 57th N. Y. Duty April 28, 1865.
8	Drummond, A. H., Pt., H, 3d Maine, age 18.	Dec. 13, 13, '62.	Right; 3d and 4th metatarsals. Disch'd June 4, '64; pensioned.
9	Dubois, L. A., Lieut., I, 120th New York, age 24.	Sept. 20, 20, '64.	Right; end of 2d met. Surg. H. F. Lyster, 5th Mich. Disch'd January 10, 1865.
10	Eggleston, F., Pt., D, 8th New York Cavalry, age 21.	Nov. 12, 12, '64.	Right; head 1st phal. great toe; head 1st met. Surg. N. D. Ferguson, 8th N. Y. Cavalry. Mustered out June 19, 1865.
11	Freeman, D. R., Pt., D, 7th Wisconsin, age 21.	May 5, 5, '64.	Left; 4th metatarsal. Disch'd May 22, 1865; pensioned.
12	Garrity, P. H., Corp'l, H, 91st New York, age 24.	June 14, 14, '63.	Right; 2d metatarsal. A. Surg. J. T. Myers, 91st N. Y. Duty September 3, 1865; pensioned.
13	Goodwin, J. L., Lieut., H, 57th Mass., age 24.	July 22, 22, '64.	Right; 2d and 3d metatarsals. Disch'd Nov. 29, 1864. Died Nov. 22, 1869; consumption.
14	*Greenleaf, B. F.*, Pt., E, 5th Tenn. Cav., age 31.	Aug. 15, 16, '64.	Left; 2d metatarsal. To Provost Marshal Nov. 16, 1864.
15	Harrington, W. C., Pt., C, 1st Vt. H. A., age 19.	April 2, 2, '65.	Left; 5th metatarsal. Disch'd July 6, 1865; pensioned.
16	Henry, A. R., Pt., I, 12th Massachusetts, age 30.	May 12, 12, '64.	Right; 2d metatarsal. V. R. C. April 28, 1865; pensioned.
17	Hitchcock, B. F., Serg't, F, 149th N. York, age 24.	May 25, 25, '64.	Left; 2d metatarsal. Surg. J. V. Kendall, 149th N. Y. Disch'd June 12, 1865; pensioned.
18	Jock, D. B. W., Pt., H, 104th N. York, age 23.	July 1, —, '63.	Left; portion os calcis. Disch'd May 10, 1864; pensioned.
19	Leunze, J., Pt., C, 71st Ohio, age 37.	Nov. 26, 28, '63.	Right; 1st metatarsal. A. A. Surg. C. H. Fisher. Disch'd May 16, 1865; pensioned.
20	McGlinn, J., Corp'l, F, 66th Ohio, age 29.	July 28, 28, '64.	Right; 1st metatarsal. V. R. C. November 19, 1864.
21	Murray, M., Pt., F, 19th	July 30,	Left; lower half os calcis. Right;
22	Colored Troops.	Aug. 2, 1864.	5th metatarsal. Surg. D. MacKay, 29th C. T.; recovery.
23	Nash, C., Serg't, A, 82d Colored Troops, age 21.	April 4, 4, '65.	Right; 3d metatarsal. Surg. N. N. Horton, 47th C. T. Disch'd May 30, 1865.
24	Phalen, P., Pt., B, 117th New York, age 40.	Sept. 29, 29, '64.	Left; portion of os calcis. Discharged July 6, '65; pensioned.
25	*Pickett, G.*, Pt., B, 51st Virginia, age 20.	Sept. 19, 20, '64.	Right; portion cuboid. To prison February 16, 1865.
26	Richards, J., Pt., D, 5th Connecticut.	July 4, 4, '64.	Left; 4th and 5th metatarsals. July —, amp. leg; Aug. 12, re-amp. leg. Disch'd May 12, 1865. Died Feb. 24, 1867.
27	Rowell, P., Pt., A, 1st Maine H'vy Artillery.	June 23, 23, '64.	Left; 4th metatarsal. Duty June 7, 1865.
28	Ryan, J., Serg't, G, 4th West Va., age 25.	Nov. 24, 24, '63.	Right; 4th and 5th metatarsals. Surg. I. N. Barnes, 116th Ill. Disch'd July 6, '64; pensioned.
29	Scanlon, B., Pt., K, 103d Illinois, age 27.	Nov. 25, 25, '63.	Right; 1st metatarsal. Disch'd July 5, 1864; pensioned.
30	Shriver, G. A., Lieut., B, 119th Penn., age 23.	April 2, 2, '65.	Right; 1st metatarsal. Disch'd June 19, 1865; pensioned.
31	Smith, B. J., Pt., G, 21st Kentucky, age 22.	Nov. 28, 28, '64.	Left; two-thirds 2d metatarsal. A. A. Surg. T. C. Eakin. Erysipelas. Disch'd Sept. 11, 1865.
32	Smith, W. A., Serg't, C, 7th Infantry, age 39.	Feb. 21, 22, '62.	Right; 1st and 2d metatarsals. Disch'd Aug. 23, '62; pensioned.
33	Treanor, J., Lieut., H, 28th Mass., age 23.	June 3, 3, '64.	Left; os calcis. Surg. P. E. Hubon, 28th Mass. Disch'd Oct. 13, 1864. Died Feb. 8, 1870; consumption.
34	Troutman, J. C., Pt., K, 3d Tenn., age 20.	June 19, 22, '64.	Left; 2d and 3d metatarsals. Discharged July 8, '65; pensioned.
35	Troutman, P., Pt., A, 77th Penn., age 18.	May 27, 27, '64.	Right; os calcis. Surg. S. H. Kersey, 36th Ind. Discharged April 1, 1865; pensioned.
36	[2]Turner, H. A., Lieut. and Q. M., 43d Mass.	Nov. —, 1862, Primary.	Right; 3d metatarsal. Surg. A. C. Webber, 43d Mass. Duty December 21, 1862.
37	*Vandergriff, J.*, Capt., F, 53d Georgia, age 28.	———	Right; two metatarsals. Surg. J. J. Knott, 53d Ga. Recovery.
38	Van Gorder, C., Serg't, B, 39th Iowa, age 27.	Oct. 5, 6, '64.	Left; internal cuneiform. Surg, J. R. Zearing, 57th Ill. Disch'd June 5, 1865.
39	Weaver, G., Teamster, 97th New York.	July 13, —, '64.	Left; 2d and 3d metatarsals. Recovery.
40	Whittier, C., Pt., C, 12th Massachusetts, age 19.	Sept. 17, —, '62.	Left; large portion os calcis. Discharged Jan. 13, '63; since died.
41	Baumberger, J., Musician, H, 56th N. York, age 22.	Nov. 30, Dec. 2, 1864.	Right; ext. mid. cuneiform and scaphoid. Ass't Surgeon J. F. Huber, U. S. V. Died Dec. 26, 1864; pyæmia.
42	Fowler, J. G., Pt., K, 42d Illinois.	Dec. 15, 16, '64.	Left; two-thirds tarsal and 2d metatarsal. Died Dec. 25, 1864; tetanus.
43	Hall, A. A., Corp'l, M, 31st Maine, age 18.	April 2, 2, '65.	Left; metatarsal. Surg. J. H. Kimball, 31st Me. Died April 15, 1865.
44	Hanson, N., Pt., C, 38th Wisconsin, age 34.	June 17, 17, '64.	Left; metatarsal. Surg. W. B. Fox, 8th Mich. Died June 25, 1864; wound.
45	Hunt, P., Lieut., A, 1st Rhode Island Artillery.	May 30, 30, '64.	Right; os calcis. Surg. G. L. Potter, 145th Penn. Died June 14, 1864; pyæmia.
46	*Jones, J.*, Serg't, H, 21st Georgia.	May 3, 3, '63.	——; os calcis.
47	Judkins, A., Pt., B, 10th Maine.	May 2, 2, '63.	Left; metatar. and phal. of three mid. toes. Died June 14, 1863; gangrene of leg.
48	*Locke, J.*, Pt., G, 5th North Carolina.	July —, 1863.	Left; tarsal and metatarsal. Died July 18, 1863.
49	Norton, W. A., Capt., I, 100th Penn., age 23.	June 18, 18, '64.	Left; 5th metatarsal. Died July 21, 1864; exhaustion.
50	Pero, P., Pt., C, 2d New York Cavalry, age 22.	May 5, 7, '64.	Right; 1st metatarsal. A. Surg. C. H. Andrus, 128th N.Y. June 20, amp. leg. Died July 15, 1864; chronic diarrhœa.
51	Williams, J. M., Capt., C, 31st Maine, age 47.	June 3, 3, '64.	Right. Died June 15, 1864, of wound.
52	Wright, M. F., Major, 29th Ohio, age 26.	Dec. 20, 20, '64.	Left; tarsal; amputation of leg. Died January 7, 1865.
53	Young, —, Pt., G, 8th Ohio.	May 5, —, '64.	——; distal end 4th metatarsal. Surg. C. Bowen, 6th Penn. Res.
54	Arnot, T., Pt., E, 7th Michigan, age 28.	Sept. 17, Oct. 4, 1862.	Left; 2d metatarsal. A. A. Surg. J. Dickson. Discharged Nov. 3, 1862; pensioned.
55	Bailey, D., Pt., G, 3d Iowa Cavalry, age 26.	June 10, 14, '64.	Right; 3d and 4th metatarsals. A. A. Surg. J. N. Sharp, Feb. —, 1865, amp. leg. Discharged Sept. 11, 1865.
56	Bowen, M., Corp'l, H, 57th Mass., age 22.	May 18, 28, '64.	Left; portion os calcis. A. A. Surg. F. G. H. Bradford. Discharged May 13, 1865; pens'd.
57	Brouchard, A., Pt., A, 5th New Hampshire, age 34.	April 7, 17, '65.	Left; 2d and 4th metatarsals. A. Staff Surg. J. Aiken, U. S. A. Disch'd Aug. 12, 1865. Amp. leg. Feb. —, 1866, amp. knee joint; subsequent amp. thigh.
58	Cole, J. M., Pt., G, 8th Michigan Cavalry, age 22.	Nov. 20, 30, '64.	Right; 3d and 4th metatarsals. Surg. B. B. Breed, U. S. V. Discharged May 12, 1865.
59	Hargrave, M. H., Pt., 8th Indiana Battery, age 42.	Sept. 19, 29, '63.	Left; portion of os calcis and astragalus. Disch'd December 30, 1864. Died November 16, 1871; paralysis.
60	Jackson, R. G., Pt., A, 8th New York Heavy Artillery, age 23.	June 3, 9, '64.	Right; 1½ in. 3d metatarsal (erysipelatous). Ass't Surg. S. B. Ward, U. S. V. Disch'd Oct. 6, 1864; pensioned.
61	Jacobs, W. G., civilian, age 30.	Sept. 11, 16, '62.	——; third of os calcis. Disch'd Dec. 1, 1862; pensioned.
62	Kinsell, G. W., Pt., D, 184th Penn., age 19.	June 3, 20, '64.	Left; 4th and 5th metatarsals. A. A. Surg. E. L. Bliss. Disch'd May 18, 1865; pensioned.
63	McDougal, J., Pt., E, 2d N. Y. Cavalry, age 23.	May 26, 30, '64.	Right; 3d metatarsal. A. A. Surg. R. W. W. Carroll. Discharged May 22, 1865; pensioned.
64	Myerson, G., Pt., G, 14th Connecticut, age 24.	Oct. 14, 18, '63.	Left; os calcis. Surg. E. Bentley, U. S. V. Disch'd Aug. 18, '65.

[1] McGUIRE (H.), *Excision of the Os Calcis*, in *The Philadelphia Medical Times*, 1870–71, Vol. I, p. 6.

[2] WEBBER (A. C.), *Army Medical Intelligence*, in *Boston Medical and Surgical Journal*, Vol. LXVIII, 1863, p. 164.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
65	Sherd, W., Corp'l, G, 11th Maine.	Aug. 16, —, '64.	Left; 2d metatarsal. A. A. Surg. F. Gauntt. Discharged May 24, 1865; pensioned.
66	Sweeney, B., Pt., B, 7th Infantry, age 30.	July 2, 22, '63.	Left. A.A. Surg. A. E.Carothers. Disch'd May 14, '64; pensioned.
67	Young, W. C., Corp'l, H, 24th Mich., age 29.	Nov. 27, Dec. 9, 1863.	Left; 3d and 4th metatar. Surg. E. Bentley, U. S.V. Duty July 13, 1864.
68	Zimmerman, B., Pt., B, 111th Penn., age 32.	June 15, 21, '64.	Left; 3d and 4th metatarsals. A. Surg. J. D. Johnson, U. S. V. Disch'd April 11, 1865; pens'd.
69	Carl, A. J., Pt., C, 5th Michigan, age 27.	July 3, 13, '64.	Right; upper half metatarsal of great toe. A. A. Surg. T. T. Devan. Died July 22, 1864; pyæmia.
70	Gaffney, M., Pt., A, 114th New York, age 27.	Oct, 19, 31, '64.	——; portion of os calcis. A. A. Surg. E. L. Duer. Died Nov. 9, 1864; pyæmia.
71	Green, T., Pt., I, 9th Massachusetts.	May 5, —, '64.	Left; 1st, 4th, and 5th metatarsals and mid. cuneiform. A.A. Surg. C. H. Van Tagen. Died May 28, 1864.
72	King, E., Pt., B, 1st Vermont Cavalry, age 18.	Aug. 25, 30, '64.	Right; 1st metatarsal. A. A. Surg. M. J. McHench. Died Sept. 11, 1864; pyæmia.
73	McKernan, W. W., Pt., H, 3d Michigan.	May 31, June 24, 1862.	——; half 2d metatarsal and parts of 3d and 4th. A. A. Surg. D. W. Cheever. Died July 6, 1862. *Spec.* 506.
74	Albert, J. B., Corp'l, K, 110th Penn., age 32.	Mar. 23, May 2, 1862.	Left; 1st metatarsal. A. A. Surg. J. Gibbons. Disch'd Oct. 14, 1862; pensioned.
75	[1] Barbin, T., Serg't, C, 81st Penn., age 18.	De.13,'62, May 16, 1863.	Right; entire os calcis. Ass't Surg. C. R. Greenleaf, U. S. A. Disch'd Nov. 30, '63. *Spec.* 1286.
76	Bennett, T., Pt., E, 5th Michigan, age 28.	July 2, Oct. 27, 1863.	Right; 4th and 5th metatarsals (necrosis). Disch'd Dec. 18,'63. Died May 12,'64; Bright's dis.
77	Dean, M., Corp'l, F, 4th Kentucky, age 24.	Sept. 19, Dec. 7, 1863.	Right; cuboid. A. A. Surg. G. P. Hachenburg. Disch'd Oct. 25, 1864; pensioned.
78	Dutton, L. N., Serg't, C, 3d Vermont, age 20.	De.13,'62, Jan. 16, 1863.	Left; int. cuneiform, portion of metatarsal. Disch'd April 1, 1863; pensioned.
79	Fender, B. F., Corp'l, B, 113th Illinois, age 30.	May 19, Nov. 29, 1863.	Right; 1½ in. 2d and 3d metatarsals (gangrene). Discharged; pensioned.
80	Fritchman, J., Serg't, E, 105th Penn., age 31.	July 2, Nov. 1, 1863.	Right; os calcis. A. A. Surg. T. G. Morton. Discharged Sept. 4, 1864.
81	Gage, C., Pt., D, 8th Maine, age 20.	May 20, 1864, Feb.8,'65.	Left; two metatarsal bones. A. Surg. J. Vansant. Disch'd May 15, 1865; pensioned.
82	Haws, C. B., Pt., B, 7th Maine, age 21.	Se.17,'62, Ja. 24,'63.	Left; portion of os calcis (necrosis). Duty June 9, 1863.
83	Hodges, G., Pt., K, 13th Michigan, age 19.	Sept. 20, Dec. 20, 1863.	Right; almost entire os calcis (necrosis). A. A. Surg. D. O. Farrand. Discharged April 25, 1864; pensioned.
84	Irwin, T., Pt., H, 11th Pennsylvania, age 26.	Se.17,'63, Nov. 3, 1863.	Left; portion of os calcis. Ass't Surgeon C. H. Alden, U. S. A. Discharged June 9, 1864.
85	Shinquin, E., Pt., E, 63d New York.	Se. 17,'62, Ja. 10,'63.	Right; base of os calcis. Vet. Res. Corps June 25, 1863.
86	Spielman, T., Pt., F, 95th Ohio, age 23.	Aug. 29, 1862, Se.21,'63.	Right; os calcis. Surg. J. G. F. Holston, U. S. V. July 10, '64, amputation leg; recovery.
87	*Stroud, D.*, Pt., B, 3d Mississippi, age 41.	Nov. 30, 1864, Jan.1,'65.	Left; 3d metatarsal. A. A. Surg. W. J. R. Holmes. To Provost Marshal May 6, 1865.
88	Twigg, O., Pt., C, 46th Ohio, age 23.	Au. 3,'64, Feb. 7, 1865.	Right; 5th metatarsal. A. A. Surg. W. H. Drury. Disch'd June 30, 1865; pensioned.
89	Yax, O., Pt., C, 22d Michigan, age 23.	Se. 20,'63, Jan. 20, 1864.	Right; almost entire os calcis. Surgeon C. S. Tripler, U. S. A. Disch'd May 2, '64; pensioned.
90	Freese, J. B., Pt., I, 1st Minnesota, age 25.	July 2, Au. 2,'63.	Left; os calcis. Died August 15, 1863; trau. fever and pyæmia.
91	Ferguson, A., Pt., C, 22d Kentucky, age 42.	July 12, —, '63.	Left; part of os calcis. Disch'd Nov. 21, 1864; pensioned.
92	O'Leary, C., Pt., F, 3d Infantry, age 22.	July —, 2, '63.	Left; portion 1st metatarsal. Discharged Aug. 20,'64; pensioned.
93	Whitefield, N., Pt., B, 16th Michigan, age 18.	June 27, —, '62.	Right; portion of os calcis. Discharged Dec. 18, 1862; pens'd.
94	Wendell, D. F., Pt., D, 60th Ohio, age 20.	June 17, —, '64.	Left; 2d metatarsal. Disch'd Feb. 27, 1865. Died August 8, 1870; consumption.
95	Wood, G. F., Pt., E, 24th Massachusetts, age 19.	May 23, —, '64.	Right; metatarsal. Died June 24, 1864; pyæmia.
96	*Cross, T.*, Pt., D, 21st South Carolina.	Oct. 8, —, '64.	——; 3d metatarsal; gangrene.
97	*Smith, L. S.*, Pt., —, 2d South Carolina.	Aug. 14, —, '64.	Left; metatarsal.

The operations were performed in the right foot in forty-four, in the left in forty-eight instances; in five cases the side was not indicated. Eighty-eight patients were Union, seven Confederates, and two unknown soldiers. In seven instances the excision in the foot was followed by re-amputation in the leg, and in one instance re-amputations were performed in the leg, at the knee joint, and finally in the thigh. Gangrene was noted in eight cases (five recoveries, two deaths, and one unknown result); pyæmia in eight (all fatal); erysipelas in one (recovery); and tetanus in one (fatal) instance.

AMPUTATIONS IN THE FOOT.—One thousand five hundred and eighteen amputations in the foot were recorded: in eighty-seven the operation was through the tarsal bones; in forty-one through the tarso-metatarsal articulation; in one hundred and thirteen from one to four metatarsals and the corresponding toes were amputated; in fifty cases the operation was simply denoted as "amputation of the foot;" and in one thousand two hundred and twenty-seven instances the operation was confined to the toes—embracing the ablation of one toe in one thousand and one instances; of two toes in one hundred and forty-five, of three toes in thirty-one, of four toes in eight, and of all five toes in eighteen instances; in twenty-four cases the number of toes removed was not stated.

Seven hundred and fifty were primary, two hundred and sixty-seven intermediary, and ninety-four secondary operations; in four hundred and seven the time of the operation was not indicated.

[1] Greenleaf (C. R.), *Excision of the Os Calcis*, in *American Journal Medical Sciences*, Vol. XLVI, p. 389.

TABLE XCVIII.

Numerical Statement of One Thousand Five Hundred and Eighteen Cases of Amputation in the Foot.

METHOD OF OPERATION.	CASES.					PRIMARY.			INTERMEDIARY.			SECONDARY.		TIME NOT SPECIFIED.		
	Total.	Recoveries.	Deaths.	Undetermin'd.	Percentage of Mortality.	Recoveries.	Deaths.	Undetermin'd.	Recoveries.	Deaths.	Undetermin'd.	Recoveries.	Deaths.	Recoveries.	Deaths.	Undetermin'd.
Medio-tarsal amputation (CHOPART'S)	85	72	11	2	13.2	57	5	1	5	6	1	1	....	9	...	....
Amputation through tarsal bones, method not specified	2	1	1	....	50.0	....	1	....	1	....	....	....	....	....	....	....
Amputation through tarso-metatarsal articulation (LISFRANC'S)	24	22	1	1	4.3	16	1	1	4	...	....	1	....	1	...	....
Amputation through tarso-metatarsal articulation (HEY'S)	17	11	6	....	35.2	9	4	....	1	....	....	1	2	....	....	....
Amputation of from one to four metatarsal bones and toes	113	99	9	5	8.3	52	3	2	24	6	....	12	....	11	....	3
Amputations of toes	1,227	1,093	29	105	2.5	512	18	59	207	5	3	76	...	298	6	43
Parts amputated not specified	50	18	24	8	57.1	5	4	...	1	3	....	1	...	11	17	8
Aggregates	1,518	1,316	81	121	5.7	651	36	63	243	20	4	92	2	330	23	54
							750			267			94		407	

PRIMARY AMPUTATIONS IN THE FOOT.—Of the seven hundred and fifty primary operations the results were not ascertained in sixty-three; six hundred and fifty-one patients survived and thirty-six died, a mortality rate of 5.2 per cent. One hundred and sixty-one operations were through the tarsal or metatarsal bones; five hundred and eighty-nine were amputations of the toes.

CASE 921.—Private M. C. Fitzpatrick, Co. H, 2d New York Mounted Rifles, aged 50 years, was wounded before Petersburg, June 30, 1864. He was admitted to the field hospital of the 2d division, Ninth Corps, where Surgeon J. Harris, 7th Rhode Island, recorded: "Fracture of right foot by minié ball, followed by Chopart's amputation." Several days after the operation the patient was transferred to Washington, where he entered Stanton and subsequently Judiciary Square Hospital. The wound was reported as healing mostly by first intention, leaving an excellent stump. On April 1, 1865, the patient was discharged from service and pensioned, having been previously furnished with an artificial foot by the Jewett Patent Leg Co. Examiner H. N. Loomis, of Buffalo, N. Y., September 4, 1869, certified to the loss of the foot and stated: "Wound healed, leaving the ankle nearly powerless and the end of the stump and heel very tender. His general health is very feeble, with harassing cough and night sweats." The history of the case was accompanied by drawings copied in the adjoining woodcuts (FIGS. 356, 357). The pensioner died of consumption December 28, 1869.

FIG. 356.—CHOPART'S amputation; anterior view. [After a drawing.]

FIG. 357.—CHOPART'S amputation; lateral view. [After a drawing.]

CASE 922.—Private J. Armstrong, Co. H, 39th Illinois, aged 41 years, was wounded in the left foot, at Morris Island, August 15, 1863. Assistant Surgeon J. Trenor, jr., reported the following history: "A shell struck the phalanges and carried off all the toes except the fifth. Amputation was performed through the metatarsal bones at the centre of their continuity, immediately after the wound was received, by Surgeon C. M. Clark, 39th Illinois. Six days after the operation the wounded man was admitted to hospital No. 4, at Beaufort. The wound was then in a sloughy condition, with an exceedingly offensive discharge and every symptom of constitutional irritation. Cold-water dressings were used. The patient continuing to grow worse, a consultation of surgeons was held five days after his admission, when a second operation was deemed the best plan for saving his life, and Chopart's amputation was resolved upon for the next day. As a last resort, however, to avoid another operation, the dressings were changed to oakum, and in about sixteen hours a change for the better was evident in the aspect of the wound. It steadily continued to improve until the date of the report, August 31st, when there was every prospect that the foot would have a good cicatrix and a fair support sufficient for the weight of the body." In the following month the patient was transferred to McDougall Hospital, New York, and subsequently he was admitted to Marine Hospital, Chicago, where he was discharged from service November 3, 1864, and pensioned. In March, 1871, the stump was tender, swelling after exercise.

CASE 923.—Private M. Shaughnessy, Co. H, 2d Pennsylvania Artillery, aged 28 years, received a shot fracture of the bones of the left foot, before Petersburg, June 18, 1864. He was admitted to the field hospital of the 2d division, Sixth Corps, where primary amputation by Chopart's method was performed. Surgeon G. T. Stevens, 77th New York, who performed the operation,

reported that "the flap was made from the inner side of the foot, the sole being too much mutilated for Chopart's operation." Two days after the date of the injury the wounded man was transferred to Hampton Hospital, and several weeks later he was transferred to Philadelphia. He was discharged December 10, 1864, and pensioned. In his subsequent application for commutation the pensioner reported the stump of the foot as being in "good and healthy condition." His pension was paid June 4, 1880.

CASE 924.—Private J. Miller, Co. E, 6th Pennsylvania Reserves, aged 20 years, was wounded in the right foot, fracturing the bone, at Fredericksburg, December 13, 1862. He was admitted to the field hospital of the 3d division, First Corps. Surgeon C. Bower, 6th Pennsylvania Reserves, reported that he performed "amputation at the tarsus" on the day of the injury. Acting Assistant Surgeon H. Hirschfield reported the progress of the case as follows: "The patient was admitted to Harewood Hospital at Washington ten days after being wounded. Chopart's amputation had been performed on the field. On December 27th, when the case was first seen by me, there was much suppuration and the wound seemed to be drawn open by the tendo-achillis. I applied a splint to correct the tension and at first used cold water and afterwards warm dressings; tonics and stimulants were administered. By January 20, 1863, the wound had nearly healed and dry lint and bandages were used. A small abscess had appeared at the ankle and had been opened. About February 15th this opening became gangrenous and the leg in this locality swelled up to an enormous size—the abscess, which originally was only two inches long, growing into a large sore of circular shape three and a half inches in diameter. All the tissues and even the periosteum were destroyed. Healthy granulations, however, were finally brought out, and the part was healing but could not close up on account of necrosis in part of the tibia. While the healing process of the neighboring parts was progressing favorably, erysipelas set in and spread from the foot to nearly up to the knee, being attended by excessive sloughing of the original abscess. This soon passed off, however, and after a few days the wound again became healthy in appearance, decreased in extent, and the leg resumed its natural size rapidly. Things now went on favorably again for a time, when severe pain indicated another collection of matter above the line of the affected tibia and towards the middle of the leg, which was relieved by an incision two inches in length into the periosteum, giving free exit to the confined pus. This last opening healed up readily, and by June 1st nature had completed the exfoliation of the cortical substance of the tibia, which I removed four inches in length. The wound now healed up very rapidly, but several days afterwards gangrene re-appeared and continued up to June 10th. Poultices were continued in the mean time and the treatment was adapted to the exigencies of the case. During the progress of the case the patient's general condition, which was very good now, had varied according to the several complications, being sometimes very low and prostrated from hectic and diarrhœa, but always reacting rapidly. On June 14th healthy granulations once more showed themselves, and by July 8th the wound had closed up to the size of a two-shilling piece. Ten days later it was healed entirely, the patient's general condition being excellent." He was discharged from service September 4, 1863, and pensioned, and one year afterwards he was supplied with an artificial foot by the Palmer Arm and Leg Co. of Philadelphia. The pensioner was paid June 4, 1880.

CASE 925.—Private T. H. Hodgson, Co. F, 67th Ohio, aged 32 years, was accidentally wounded, at Folly Island, June 22, 1863, by a musket ball fracturing the left foot. Amputation by Chopart's method was performed the following day by Surgeon S. F. Forbes, 67th Ohio. The wounded man passed through various hospitals and was lastly transferred to Central Park, New York City, where, as soon as the stump had entirely healed, he was supplied with a "Hudson" artificial foot. Four months later, on August 9, 1864, the patient was discharged from service and pensioned. The Dayton, Ohio, Examining Board on January 16, 1871, reported a "well healed and very useful stump," and described the operation as very creditable to the operator and to the author of it. A cast of the stump (*Spec.* 1530), made about a year after the date of the operation and showing a firm and smoothly united cicatrix well up on the anterior face, was contributed to the Museum by Assistant Surgeon J. W. S. Gouley, U. S. A., and is represented in the adjoining wood-cut (FIG. 358).

FIG. 358.—CHOPART'S amputation of the left foot. [From a cast.]

In the succeeding three cases three or more of the metatarsal bones with the corresponding toes were removed. The remaining toes were a constant source of annoyance:

CASE 926.—Private R. P. Saint, Co. F, 123d Indiana, aged 22 years, was wounded in the right foot by a shell, during the siege of Atlanta, August 4, 1864. Partial amputation of the foot by removing the four outer toes, including the distal extremities of their metatarsal bones, and leaving the great toe intact, was performed on the day of the injury. The wounded man continued under treatment in various successive hospitals until June 11, 1865, when he was discharged from service and pensioned. Examiner G. W. Mears, of Indianapolis, certified, August 23, 1865: "The wound is now healed, but the foot and ankle are weak. As yet but little weight can be sustained on the foot and crutches are therefore still in requisition. It is, however, improving in strength and will soon be used in walking." On November 17, 1866, the same examiner stated: "What disables the pensioner most seriously is the pain suffered when the foot is much used, the eschar being yet tender to the touch from imperfect healing and liable to inflammation," etc. Examining Surgeon G. A. Haise, of Russell, Kansas, October 12, 1877, described the great toe of the injured foot as being drawn or lapped across the cicatrix. The pensioner was paid March 4, 1881.

CASE 927.—Private J. T. Lewis, Co. B, 38th Illinois, aged 21 years, was wounded in the right foot, before Atlanta, August 16, 1864. Surgeon M. G. Sherman, 9th Indiana, reported his admission to the field hospital of the 1st division, Fourth Corps, and described the injury as a "fracture of the metatarsus, followed by amputation of three toes by Surgeon S. H. Kersey, 36th Indiana." The wounded man subsequently passed through various hospitals and was, lastly, transferred to Jeffersonville. Assistant Surgeon A. B. Prescott, U. S. V., in charge of the latter, described the operation as a "flap-amputation of the three lesser toes at the tarso-metatarsal articulation." On June 1, 1865, the patient was discharged from service and pensioned. Examining Surgeon J. Portness, of Xenia, Illinois, certified, April 6, 1866: "The third, fourth, and last toes with their metatarsal bones have been removed, leaving only the great and second toe. This renders the sole of the foot very narrow and destroys the elasticity of the arch of the foot in a great measure." The reports of subsequent examinations show no additional information. The pensioner was paid December 4, 1878, since when he has not been heard from.

CASE 928.—Sergeant H. S. Carroll, Co. D, 33d Missouri, aged 20 years, was wounded in the left foot, at the battle of Lake Chicot, June 6, 1864, by a shell which destroyed the second, third, and fourth toes. He was admitted to the Sixteenth Corps Field Hospital, where partial amputation of the injured foot was resorted to by Surgeon A. T. Bartlett, 33d Missouri, who described the operation as having been performed through the second, third, and fourth metatarsal bones. From the field the patient was sent to Adams Hospital, at Memphis, where he remained under treatment for four months, when he was returned to duty. He was discharged August 10, 1865, and pensioned. Various examiners have from time to time certified to "irritation and swelling of the foot when much used;" and Dr. H. E. Jones, of Louisiana, Missouri, added, January 12, 1878, that "the big toe is drawn nearly at right angle with the foot and rests on the little toe." The pensioner was paid June 4, 1881.

CASE 929.—Private C. L. Daniels, Co. K, 57th Massachusetts, aged 18 years, was wounded before Petersburg, July 20, 1864. Surgeon M. K. Hogan, U. S. V., reported his admission to the field hospital of the 1st division, Ninth Corps, with "shot fracture of the bones of the right foot, treated by Chopart's amputation." Acting Assistant Surgeon F. F. Maury reported the result of the case as follows: "The patient was admitted to South Street Hospital, Philadelphia, July 26th. He stated that he was wounded by a minié ball entering the right side of the foot and fracturing the bones to such an extent as to demand amputation on the field. He was sent to City Point and thence by hospital boat to this city. At the time of his admission to this hospital the patient was in a typhoid condition, fretful, irritable, and at times delirious. The stump was in a very good condition, with but a slight tendency to inflammation in the leg. This condition yielded readily to applications of laudanum and leadwater, after which the stump and leg both improved. Compound tincture of cinchonæ and afterwards quinine was prescribed; beef tea and milk punch were given. The typhoid fever did not yield to the treatment, the patient continuing to sink until July 29th, when death supervened." The amputated metatarsal and part of the tarsal bones (*Spec.* 6531), with the bullet attached and showing the seat of the fracture, were contributed to the Museum by Surgeon H. Ludington, 100th Pennsylvania, who performed the operation. A representation of the specimen appears in the wood-cuts (FIGS. 359, 360).

FIG. 359.—Fracture of metatarsal bones; dorsal view. *Spec.* 6531.

FIG. 360.—The same; plantar view.

CASE 930.—Private W. H. Jamison, Co. G, 24th Michigan, was wounded in the left foot, at Fredericksburg, April 29, 1863. Surgeon J. H. Beach, 24th Michigan, described the injury as follows: "A minié ball passed through the foot from right to left. All the metatarsal bones were injured and all but that of the second were comminuted fractures. The fractures extended to the tarso-metatarsal articulation in the first and in the fourth. Amputation was performed on May 1st, by Surgeon E. Shippen, U. S. V., at the tarso-metatarsal articulation by Lisfranc's method, a good covering being obtained from the plantar flap. Perfect anæsthesia was preserved during the operation by chloroform. The case was left at the First Army Corps Hospital and was doing well at last advices." Surgeon A. W. Whitney, 13th Massachusetts, reported that the patient died at the Fitzhugh House Field Hospital, May 24, 1863, from the result of the injury. The amputated bones of the foot (*Spec.* 1121) were contributed to the Museum by the operator.

In the following table one hundred and sixty-one primary amputations in the tarsal or metatarsal bones are enumerated; space will not permit to cite the amputations of the toes in this and the succeeding three tables:

TABLE XCIX.

Summary of One Hundred and Sixty-one Primary Amputations in the Tarsal and Metatarsal Bones for Shot Injury.

[Recoveries, 1—139; Deaths, 140—157; Unknown, 158—161.]

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.	No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	Adams, J. N., Pt., K, 31st Wisconsin, age 27.	Sept. 17, 17, '64.	Left; Chopart's. Surgeon P. S. Arndt, 31st Wis. Discharged May 13, 1865; nec. of os calcis.	8	Brown, C. W., Pt., B, 3d Vermont, age 23.	Oct. 19, 20, '64.	Right; Lisfranc's. Discharged May 8, 1865.
2	Armstrong, J., Pt., H, 39th Illinois, age 37.	Aug. 15, 17, '63.	Left; Hey's; through the centre of continuity of metatarsals. Surg. C. M. Clark, U. S. V. Disch'd November 3, 1864.	9	Brown, L. C., Pt., E, 30th Colored Troops, age 29.	Oct. 27, 28, '64.	Left; Chopart's. Disch'd June 22, 1865; "stump not good; heel drawn up."
3	*Arney, A. P.*, Pt., H, 52d North Carolina, age 24.	April 2, 3, '65.	Right; Chopart's. Released July 10, 1865.	10	Bumgardner, S., Serg't, F, 14th West Va., age 34.	Sept. 22, 22, '64.	Right; Chopart's; also amp. left leg. Disch'd March 4, 1865. "No better than if amputated in lower third leg."
4	*Avery, J. R.*, Lieut., B, 53d Georgia, age 30.	Oct. 29, —, '63.	Left; Chopart's. Surgeon J. J. Knott, 53d Georgia. Recovery.	11	Burnside, G. M., Pt., E, 89th N. York, age 21.	June 18, 18, '64.	Left; Chopart's, Surgeon G. T. Stevens, 77th N. Y. Disch'd; stump healed.
5	Bean, G. H., Lieut., H, 21st Mass., age 20.	July 20, 20, '64.	Right; 3d and 4th toes and metatarsal bones. Discharged Aug. 30, 1864; pensioned.	12	Butner, A., Pt., E, 15th Kansas Cav., age 18.	Dec. 6, 7, '63.	Right; Chopart's. A. A. Surg. J. Thorne. Disch'd May 18, 1864.
6	*Bowers, A. M.*, Lieut., D, 15th S. C., age 25.	July 1, 2, '63.	Left; Chopart's. To prison Oct. 20, 1863; healed.	13	*Buzzard, A. W.*, Pt., E, 31st Virginia, age 43.	April 6, 7, '65.	Left; Chopart's. Released June 29, 1865; "muscles contracted, elevating heel."
7	Boyan, J., Pt., F, 6th N. Y. Heavy Artillery, age 28.	June 18, 18, '64.	Left; 5th toe and metatarsal; necrosis. Discharged January 20, 1865; pensioned.	14	Campbell, J., Corp'l, 8th Co., N. Y. S. S., age 24.	May 18, —, '64.	Right; 5th toe and metatarsal. Duty September 12, 1864.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
15	Carlisle, J., Pt., H, 16th Vermont, age 22.	July 3, 3, '63.	Left; great toe and metatarsal. Discharged August 11, 1863.
16	Carroll, H. S., Serg't, D, 33d Missouri, age 20.	June 6, 6, '64.	Left; 2d, 3d, and 4th toes thro' metatarsals. Surg. A. T. Bartlett, 33d Missouri. Duty October 6, 1864; pensioned.
17	*Christian, W. T.*, Pt., G, 25th Ala., age 25.	Mar. 25, 25, '65.	Left; Lisfranc's. To Provost Marshal June 13, 1865.
18	Clark, H. W., Pt., H, 100th New York, age 30.	May 13, 13, '64.	Right; Chopart's; also amp. left ankle joint. Surg. M. S. Kittingir, 100th New York. Disch'd Dec. 13, '64. *Spec.* 2857.
19	Coan, N., Pt., H, 12th New Jersey, age 27.	May 5, 5, '64.	Left; 4th toe, mid. of metatarsal. Vet. Res. Corps June 19, 1865.
20	Coffin, I., Pt., D, 69th Pennsylvania, age 21.	June 22, 22, '64.	Left, Chopart's. Confed. surgeon. Disch'd June 27. 1865.
21	Collins, J., Pt., I, 20th Massachusetts, age 26.	Aug. 14, 15, '64.	Left; 1st, 2d, 3d, and 4th toes, portion of metatarsals. Surg. N. Hayward, 20th Mass. Discharged April 1, 1865.
22	Cornwell, N. S., Pt., C, 10th Mass., age 26.	May 5, 5, '64.	Left; Chopart's. Disch'd January 7, 1865.
23	*Cunningham, D. C.*, Pt., A, 5th Louisiana.	May 4, 5, '63.	Left; Chopart's. Surg.—Stricklen, C. S. A. Disch'd Nov. 6, '63.
24	Davis, J., Serg't, A, 12th Massachusetts.	Dec. 13, 13, '62.	Left; small toe and portion metatarsal. Disch'd March 27, 1863.
25	Davis, J. B., Pt., B, 105th Illinois, age 27.	June 7, 9, '64.	Left: 3d toe and portion of metatarsal. A. Surg. A. Waterman, 105th Illinois. Disch'd October 29, 1864; pensioned.
26	*Dunn, B.*, Pt., E, 3d North Carolina.	July 3, —, '63.	Left. Paroled September 23, '63.
27	Dyer, F. A. M., Pt., F, 1st West Va., age 35.	April 9, 10, '64.	Right; 4th toe and 1 inch metatarsal. Surg. P. Gardner, 1st Va. Cav. Duty Sept. 9, 1864.
28	Eddy, W. P., Pt., E, 1st Mass. H. Art'y, age 29.	May 19, 19, '64.	Right; Chopart's; no motion of os calcis. Disch'd July 22, 1864.
29	Elliff, W. W., Pt., G, 117th Illinois, age 24.	May 6, 6, '64.	Left; great toe and metatarsal. Duty July 14, 1864; pensioned.
30	[1]*Finnigan, P.*, Pt., F, 1st Battery.	June 2, 3, '64.	——; Chopart's. Surgeon C. B. Gibson, C. S. A. August 20, amp. leg. Transferred.
31	Fitzpatrick, M. C. (alias Coots, Pt., H, 2d N. Y. M. Rifles, age 44.	June 30, 30, '64.	Right; Chopart's. Disch'd April 1, 1865; "an excellent stump." Died Dec. 28, 1869; consumpt'n.
32	Forbes, W. E., Pt., H, 14th Indiana Battery, age 40.	Aug. 18, 18, '64.	Right; oval; 3d and 4th toes, portions of metatarsals. Recovery Nov. 4, 1864.
33	Franklin, J. W., Pt., B, 8th New York Cavalry, age 32.	June 18, 18, '63.	Left; Lisfranc's. Disch'd Dec. 12, 1863; "painful and difficult use of limb."
34	Fuller, H. D., Pt., F, 28th Iowa, age 16.	Oct. 19, 20, '64.	Left; Chopart's. Surg. J. W. H. Vest, 28th Iowa. (Also amp. arm.) Disch'd June 21, 1865; "better to have removed entire foot." *Spec.* 4226.
35	Galvin, D. G., Pt., G, 32d Mass., age 26.	May 5, 5, '61.	Left; 2d toe and metatarsal. Discharged April 1, 1865.
36	Garvey, P., Pt., E, 3d Infantry, age 21.	Dec. 13, 13, '62.	Right; 4th and 5th toes and metatarsals. Disch'd April 2, 1863; pensioned.
37	*Gay, S. J. J.*, Corp'l, H, 51st Georgia, age 21.	May 1, 2, '63.	Left; Chopart's.
38	Gillespie, C., Pt., F, 94th New York.	Mar. 13, 13, '65.	Left; Chopart's. Surgs. Humphrey and Ramsay. Disch'd May 29, '65; stump badly formed.
39	Gillon, J., Pt., F, 27th Ohio, age 22.	Aug. 4, 4, '64.	Left; Hey's. Discharged July 5, 1865.
40	Givens, W. W., Pt., D, 1st West Virginia Cav.	July 3, 3, '63.	Right; Chopart's. Discharged December 3, 1863.
41	Gohl, F., Pt., K, 8th Pennsylvania Cavalry, age 27.	April 5, 5, '65.	Right; Hey's; thro' metatarsals, near tarsal articulation. Disch'd September 23, 1865.
42	Graham, J., Pt., E, 2d Pa. Art'y, age 22.	June 18, 18, '64.	Left; 2d toe and portion metatarsal. Surg. G. T. Stevens, 77th N. Y. Disch'd Mar. 20, '65.
43	*Greyer, J.*, Serg't, G, 52d Virginia.	June 1, —, '64.	——; great toe at tarso-metatarsal articulation. Surgeon C. B. Gibson, C. S. A. Transferred.
44	Gunderman, S., Pt., F, 46th Pennsylvania, age 21.	June 20, 20, '64.	Right; Chopart's. Surg.—Payne. Disch'd March 6, 1865; "condition worse than if amp. in leg."
45	Hall, J. L., Lieut., L, 1st Mass. H. A., age 24.	June 16, 16, '64.	Left; 4th and 5th toes and metatarsals. Disch'd October 3, '64; pensioned.
46	*Hall, J. T.*, Pt., D, 1st Georgia, age 27.	Nov. 28, 29, '64.	Left; Chopart's. To Provost Marshal March 7, 1865.
47	Hand, E., Pt., K, 2d Michigan, age 18.	June 3, —, '64.	Right; great toe and metatarsal. Vet. Res. Corps March 4, 1865.
48	Harris, L., Pt., A, 100th Pennsylvania, age 18.	Mar. 25, 25, '65.	Right; Lisfranc's. Surg.—Davis. Discharged June 19, 1865.
49	*Harsey, W.*, Pt., G, 27th South Carolina, age 27.	Aug. 21, 21, '64.	Left; Chopart's. Furl'd March 17, 1865.
50	Hart, E., Pt., C, 8th Ohio, age 34.	June 22, 23, '64.	Left; Chopart's. Surg. J. L. Brenton, 8th Ohio. Disch'd January 25, 1865.
51	Hart, J. W., Pt., H, 22d Indiana, age 18.	Mar. 19, 19, '65.	Right; Chopart's. Disch'd June 30, 1865.
52	Hawley, W. S., Corp'l, E, 51st New York, age 30.	May 19, 19, '64.	Left; Hey's. June 9, gangrene. Oct. 15, amp. leg. Disch'd May 21, 1865.
53	Hazel, P., Pt., G, 9th New Jersey, age 18.	May 15, 15, '64.	Left; 3d toe at tarso-metatarsal articulat'n. Disch'd May 23, '65.
54	Herman, L., Pt., M, 7th N. Y. Art'y, age 18.	June 8, 8, '64.	Left; flap; 2d toe at tarso-metatarsal artic. V. R. C. Feb. 21, 1865.
55	Higgins, T., Corp'l, H, 122d Ohio, age 33.	April 2, 2, '65.	Left; Chopart's. Disch'd June 23, 1865.
56	Hodgson, T. H., Pt., F, 67th Ohio, age 27.	June 22, 23, '63.	Left; Chopart's. Surgeon S. F. Forbes, 67th Ohio. Discharged August 9, 1864; well healed, useful stump. *Spec.* 1530.
57	Horr, D. P., Corp'l, H, 17th Maine, age 23.	Dec. 13, 13, '62.	Left; Chopart's. Disch'd May 11, 1863; "stump will always be troublesome."
58	Howland, H., Pt., A, 3d Missouri Cav., age 17.	June 6, 6, '65.	Left: 1st toe at middle of metatarsal. Recovery.
59	Humbarger, A., Pt., E, 30th Indiana, age 31.	Nov. 30, Dec. 2, 1864.	Left; triangular of 2d toe at tarsal joint. A. A. Surg. M. P. Woolf. Soldiers' Home April 27, 1865.
60	Ireland, J., Pt., H, 8th N. Y. H. Art'y, age 24.	Aug. 17, 18, '64.	Right; 3d toe, portion metatarsal. Disch'd May 30, 1865.
61	Jenks, T. B., Pt., A, 37th Mass., age 45.	July 3, 3, '63.	Right; Chopart's. Surg. C. F. Crehore, 37th Mass. Disch'd Jan. 20, '64; serviceable stump.
62	Johnson, S. J., Pt., B, 31st C. T., age 19.	Dec. 13, 14, '64.	Left; Hey's. Discharged May 16, 1865.
63	Kendig, D. E., Pt., C, 5th Tennessee, age 25.	April 2, 2, '65.	Right; 3d, 4th, and 5th toes and metatarsals. Discharged June 18, 1865.
64	King, A., Lieut., K, 62d Pennsylvania, age 25.	June 27, 28, '62.	Right; mortification; July, 1862, amp. leg; 1863, re-amputation. Disch'd March 17, 1863. Died July 12, 1872.
65	*King, J.*, Serg't, K, 50th Georgia, age 41.	Aug. 21, —, '64.	Right; Chopart's. Provost Marshal March 8, 1865.
66	Kingsley, G. H., Pt., A, 1st D. C. Cav., age 27.	June 17, —, '64.	Right; Lisfranc's. Discharged Dec. 14, 1864; serviceable limb.
67	Koon, C., Pt., G, 41st Ohio, age 24.	Nov. 5, 5, '62.	Left; Lisfranc's. Surgeon A. G. Hart, 41st Ohio. Discharged December 31, 1862.
68	Lamb, H., Pt., C, 125th Ohio, age 19.	June 27, 27, '64.	Left; 2d toe and portion metatarsal. Surg. J. B. Burns, 3d Ky. Discharged Feb. 20, 1865.
69	*Langford, J. C.*, Serg't, B, 38th Georgia, age 23.	July 9, 11, '64.	——; great toe and its metatarsal. Surgeon C. H. Todd, C. S. A. Transferred August 25, 1864.
70	Lare, D., Corp'l, A, 51st Pennsylvania, age 23.	Dec. 2, 2, '63.	Right; 2d toe and metatarsal. Disch'd Sept. 11, 1864.
71	Lewis, J., Pt., B, 38th Illinois, age 21.	Aug. 16, 16, '64.	Right; flap; 3 lesser toes at tarso-metatarsal articulat'n. Disch'd June 1, 1865.
72	Lewis, J., Lieut., C, 1st Delaware.	Sept. 17, 17, '62.	Right; Chopart's (modified). Discharged February 23, 1866; "cicatrix under heel; pressure painful."
73	*Lewis, L.*, Lieut., A, 5th Confederate States.	Dec. 31, '62, Jan. 1, '63.	Left; Chopart's. Surgeon W. A. Gentry, 17th Tenn. Recovery.
74	Lillibridge, F. W., Pt., B, 2d New York M. R., age 18.	June 18, 18, '64.	Right; Chopart's. Disch'd Aug. 10, 1865; amputation leg.
75	Little, L. B., Capt., A, 9th N. Hamp., age 24.	July 2, —, '64.	Right; 3d toe and metatarsal. Disch'd Oct. 24, '64; pensioned.
76	Lyford, G. A., Corp'l, D, 13th Mass., age 24.	Dec. 13, 13, '62.	Left; Chopart's. Surg. A. W. Whitney, 13th Mass. Disch'd January 7, 1863.
77	McCarty, T., Pt., B, 4th N. Y. Art'y, age 32.	Feb. 5, 5, '65.	Left; 2d toe at middle of metatarsal. Disch'd June 8, 1865.
78	McGinley, R., Serg't, H, 2d West Va., age 41.	Sept. 5, —, '61.	Right. Surg. R. W. Hazlett, 2d W. Va. Disch'd Nov. 29, 1861. Died Dec. 15, 1866; "absorption of pus from necrosed bone."
79	Mann, W., Pt., A, 11th Illinois, age 32.	May 22, —, '63.	Right; Chopart's. Disch'd Aug. 7, 1863; ankle anchylosed.
80	*Matthews, J.*, Pt., H, 2d North Carolina, age 20.	Sept. 23, —, '63.	Right; Chopart's. Transferred.
81	Manson, J. S., Corp'l, G, 17th Maine, age 21.	May 5, 5, '64.	Left; 2d toe at middle of metatarsal. Duty July 12, '64; pens'd.
82	Marsh, F. M., Corp'l, B, 118th Ohio, age 22.	June 2, 3, '64.	Left, 4th toe and metatarsal. Duty December 3, 1864.
83	Martin, J., Pt., L, 2d N. York Heavy Artillery, age 21.	June 16, 16, '64.	Left; four smaller toes and portion of metatarsal. Discharged Nov. 11, 1864. Also amputat'n right leg; re-amputation 1865.
84	Miller, J., Pt., E, 6th Penn. Reserves, age 22.	Dec. 13, 13, '62.	Right; Chopart's. Surgeon C. Bowers, 6th Penn. Res. Exfoliation; gangrene. Discharged September 14, 1863.
85	Mitchell, C., Pt., E, 149th New York, age 19.	May 3, 3, '63.	Left; 1st toe and metatarsal. Vet. Res. Corps Dec. 15, '63; pens'd.
86	Mizen, H., Pt., A, 145th Pennsylvania.	June 18, 18, '64.	Left; 5th toe and metatarsal. Surgeon J. W. Wishart, 140th Penn. Disch'd Jan. 14, '65; pensioned.

[1] SMITH (S.), *Amputations at the Ankle Joint in Military Surgery*, in *U. S. San. Com. Mems.*, Surgical Volume II, p. 140.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
87	Myers, S., Pt., D, 2d N. York Heavy Artillery, age 24.	June 3, 3, '64.	Right: mid. toe at mid. of metatarsal. Furloughed June 9, '64; pensioned.
88	Neal, T., Pt., I, 6th Michigan Cavalry, age 29.	Oct. 18, 18, '62.	Left; Hey's. Discharged June 29, 1864.
89	*Neile, E. C.*, Serg't, C, 1st Maryland Cavalry.	May 23, 23, '64.	——; Chopart's. Surg. C. B. Gibson, C. S. A. Syme's amp. recommended by returning board.
90	Nicholson, J.W., Pt., B, 97th Illinois, age 30.	April 2, —, '65.	Right; Hey's; "at middle of metatarsal bones." Surg. C. Davis, 77th Ill. Disch'd May 26, 1865.
91	Nicholson, W., Pt., K, 191st Penn., age 18.	June 22, 23, '64.	Right; 2d and 3d toes, and 1st toe and portion of metatarsal. Discharged March 2, 1865.
92	Noyes, D. K., Capt., A, 6th Wisconsin, age 42.	Sept. 17, 17, '62.	Right; Chopart's. Surg. A. J. Ward, 2d Wisconsin. Disch'd July 27, 1864.
93	Oakley, P., Pt., A, 2d Artillery, age 17.	April 20, 21, '64.	Left; 2d toe and metatarsal. A. A. Surg. J. A. Romayne. Duty July 3, 1864; pensioned.
94	O'Connor, D., Pt., I, 66th New York, age 22.	June 22, 23, '64.	Right; Lisfranc's. Confederate surgeon. Disch'd June 16, '65.
95	O'Donahue, M., Pt., D, 124th Ohio, age 36.	May 14, 14, '64.	Right; 3d and 4th toes and metatarsal bones. Disch'd Dec. 27, 1864. Nov., 1866, Pirogoff's amputation; recovered. Died April 13, 1873.
96	*Oliver, A.*, Lieut., K, 18th Miss., age 23.	Nov. 30, 30, '64.	Right; Chopart's. To Provost Marshal March 27, 1865.
97	Parkinson, J., Pt., I, 103d Illinois, age 29.	Feb. 15, 15, '65.	Left; Lisfranc's. Surg. B. Bond, 25th Mo. Disch'd June 15, '65.
98	Parmelee, E. A., Pt., F, 5th New Hamp., age 24.	Mar. 25, 25, '65.	Left; Chopart's. Disch'd June 26, 1865.
99	Quick, S., Pt., F, 28th Kentucky, age 45.	June 18, 19, '64.	Right; 4th toe and metatarsal. Disch'd Feb. 8, 1865; pension'd.
100	Reid, G., Pt., L, 2d Cona. Artillery, age 25.	June 1, 1, '64.	Right; 4th and 5th toes at tarso-metatarsal articulat'n. Disch'd January 5, 1865; pensioned.
101	Reilley, C. J., Serg't, K, 29th Penn., age 23.	July 10, 11, '64.	Left; Chopart's. Surg. J. A. Wolfe, 29th Penn. Furl'd; killed in a railroad accident Sept. 20, 1864.
102	Reynolds, D., Pt., M, 27th Michigan, age 19.	July 24, 24, '64.	Left; 3d toe and metatar. Surg. — Sherlock. Disc'd June 13, '65.
103	Reynolds, S. T., Pt., G, 4th Indiana Cavalry, age 20.	Sept. 3, 3, '64.	Right; three mid. toes near met. phal. artic. A. A. Surg. M. L. Herr. Duty June 14, 1865.
104	Robb, G., Pt., D, 2d Artillery, age 19.	July 21, 21, '61.	Right; Chopart's. Discharged November 17, 1861.
105	Roberts, O. O., Serg't, D, 1st Maine, age 22.	Oct. 19, 20, '64.	Left; Chopart's. Surgeon G. T. Stevens, 77th N. Y. Disch'd February 11, 1865.
106	Rohm, G. W., Pt., H, 11th Indiana.	May 1, 1, '63.	Left; Lisfranc's. Disch'd Oct. 22, 1863; uses eruteh.
107	Rosewell, J., Pt., E, 102d Penn., age 21.	Sept. 19, 19, '64.	Right; Chopart's. Surg. S. F. Chapin, 139th Penn. Disch'd April 15, 1865; sound stump.
108	*Sadler, A. D.*, Serg't, G, 21st Mississippi.	Dec. 11, 11, '62.	Left (also amp. right leg). Surg. — Hill. C. S. A. Recovery.
109	Saint, R. P., Pt., F, 123d Indiana, age 22.	Aug. 4, 4, '64.	Right; four small toes, taking metatarsals obliquely. Disch'd June 11, 1865.
110	Sands, J., Lieut., C, 36th Illinois, age 26.	May 15, 15, '64.	Left; Lisfranc's. Surg. W. P. Pierce, 88th Ill. Disch'd Feb. 17, 1865.
111	Schoop, S. I., Capt., I, 31st Colored Troops.	Oct. —, —, '64.	Left; two toes with metatarsals. Surg. E. Jackson, 30th Colored Troops. Disch'd Dec. 15, 1864.
112	*Schroeder, H.*, Pt., H, 28th Louisiana.	Oct. 8, —, '62.	——. Recovery Feb. 11, 1863.
113	Seiter, B., Pt., C, 9th New York, age 25.	Sept. 17, 17, '62.	Right; three lesser toes and outer side foot. Surg. — Humphreys, Recovery.
114	Shaughnessy, M., Pt., H, 2d Penn. H'vy Artil'ry, age 26.	June 18, 18, '64.	Left; Chopart's (flap from inside). Surg. G. T. Stevens, 77th N. Y. Discharged Dec. 12, 1864.
115	[1]*Shea, J.*, Letcher's Battery, age 45.	Dec. 13. —, '62.	Left; Chopart's. Recovery.
116	Sheffield, B., Corp'l, B, 61st C. Troops, age 39.	July 14, 14, '64.	Left; three outer toes and metatarsals. Duty Dec. 7, '64; pens'd.
117	Shelly, M., Pt., C, 28th Iowa, age 21.	Oct. 19, 19, '64.	Right; Chopart's. Surg. W. A. Daniels, 28th Iowa. Disch'd April 14, 1865.
118	Shipley, T., Corp'l, F, 1st Maryland, age 29.	Aug. 22, 22, '64.	Left; 2d toe, half of metatarsal. Surgeon A. A. White, 8th Md. Disch'd June 14, '65; pensioned.
119	*Smith, B. H.*, Capt., 1st Virginia Artillery.	Oct. 16, 16, '62.	Left; Chopart's. Surg. — Mason, C. S. A. Discharged.
120	Smith, A., Serg't, G, 66th New York, age 47.	Dec. 11, 11, '62.	Right; Lisfranc's. Surg. C. S. Wood, 66th N. York. Disch'd May 1, 1863.
121	Smith, N. R., Lieut., F, 157th N. Y., age 25.	July 1, 2, '63.	Left; Chopart's. Disch'd Sept. 23, 1863; stump good.
122	Spencer, D. M., Pt., B, 184th N. Y., age 21.	Nov. 8, 8, '64.	Left; Chopart's. Surg. N. Barnes, 184th N. Y. Disch'd June 2, '65.
123	Stabler, E., Pt., K, 12th Ohio, age 26.	June 18, 20, '64.	Left; Hey's. Ass't Surg. S. T. Buck, 12th Ohio. Discharged August 18, 1864.
124	Stead, I. B., Serg't, 1, 136th Penn., age 20.	Dec. 13, 14, '62.	Right; Chopart's. Disch'd Feb. 28, 1863; "no power to move ankle except with the hand."
125	Strait, O., Capt., E, 41st Illinois, age 30.	June 25, 25, '63.	Right; Chopart's. Discharged August 20, 1864.
126	Swain, S. F., Pt., B, 65th Indiana, age 32.	July 20, 21, '64.	Left; 2d toe and metatar.; hæm. Discharged April 1, 1865.
127	Swartz, W. S., Pt., F, 107th Penn., age 31.	Aug. 28, 28, '62.	Left; 2d toe and metatarsal. Discharged Dec. 10, 1864; pens'd.
128	*Taylor, W. J.*, Pt., Norfolk Blues Lt. Art'y, age 21.	April 2, 2, '65.	Right; Chopart's. Released May 30, 1865.
129	Thomas, A. P., Lieut., C, 1st Mich. Sharpshooters, age 27.	May 11, 11, '64.	Left; 4th toe and half of meta. Surg. A. F. Whelan, 1st Mich. S.S. Disch'd Sept. 13, '64; pen'd.
130	[2]*Turck, E.*, Pt., E, 7th Louisiana.	May 3, —, '63.	——; Chopart's. Surg. F. Formento, jr., C. S. A. Recovery.
131	Vanwagoner, J. H., Pt., B, 31st Wis., age 24.	Aug. 10, 10, '64.	Left; Lisfranc's. Disch'd May 30, 1865; "better to have removed whole foot; cannot wear boot or shoe, etc."
132	Walker, D., Pt., G, 2d New York H'vy Artillery, age 20.	Mar. 31, April 1, 1865.	Right; Hey's. Disch'd July 6, 1865; stump unhealed.
133	Walters, M., Lieut., A, 3d Penn. Res., age 22.	Dec. 13, —, '62.	Left; Chopart's. Disch'd June 30, 1866. Died Dec. 23, 1879; consumption.
134	Welling, D. C., Lieut., A, 10th Mich., age 24.	July 19, 19, '64.	Left: Lisfranc's. Surg. E. Batwell, 14th Michigan. Gangrene. Discharged Feb. 22, 1865.
135	Williams, H., Pt., K, 198th Penn., age 23.	April 9, 9, '65.	Right; Lisfranc's (also amp. left leg). Surg. H. A. Grim, 198th Penn. Disch'd Oct. 6, 1865.
136	*Williams, J. H.*, Lieut., F, 14th S. C., age 30.	July 2, 3, '63.	Right; Chopart's. Surg. T. A. Means, C. S. A. Exchanged.
137	Williamson, J., Pt., D, 86th Illinois, age 24.	July 19, 19, '64.	Right; Lisfranc's. Surgeon — Houghton. Disch'd March 5, 1865; good stump.
138	Wilson, T. H., Pt., F, 4th Mass. Cav., age 19.	Oct. 7, 8, '64.	Left; 5th toe and meta. Disch'd July 30, 1865.
139	Zimmet, T., Serg't, K, 111th Penn., age 26.	June 21, 21, '64.	Right; Lisfranc's. Surg. J. L. Dunn, 109th Penn. Discharged June 29, 1865.
140	*Beck, R. C.*, Pt., H, 15th South Carolina.	June 2, 3, '64.	Right; Hey's. Surg. C. B. Gibson, C. S. A. Died July 23, '64.
141	Burnell, L. S., Corp'l, D, 43d New York.	May 27, 27, '64.	Right; Chopart's. Died June 26, 1864.
142 143	Carpenter, J. W., Serg't, I, 10th Vermont.	June 3, 3, '64.	Right; 1st metatarsal (Hey's amputation left foot). Died June 15, 1864.
144	Daniel, C. L., Pt., K, 57th Mass., age 18.	July 20, 20, '64.	Right; Chopart's. Surg. H. Ludington, 100th Penn. Died July 29, '64; typh. fever. *Spec.* 6531.
145	Darrow, H. C., Pt., G, 77th New York, age 24.	May 18, 18, '64.	Left; Chopart's (also exc. elbow; hæm.). Died June 23, 1864, gangrene of arm.
146	Edgerton, G. E., Pt., E, 169th N. Y., age 33.	May 9, 10, '64.	Left. Died June 3, '64; pyæmia.
147	Folsom, T. T., Pt., E, 5th New Hampshire.	May 3, 3, '63.	Left; Hey's. Died May 26, '63.
148	*Harrington, G. M.*, Pt., A, 66th Ga., age 20.	Aug. 31, 31, '64.	Right; Chopart's. Confederate surgeon. Died Nov. 10, 1864.
149	Heigans, H., Pt., G, 1st Delaware.	Dec 13, 14, '62.	——; Chopart's; tetanus. Died December 25, 1862.
150	Hintz, C., Pt., K, 35th Massachusetts.	July 30, 30, '64.	Right; 5th toe and meta. Died Aug. 5, 1864; congestion lungs.
151	Jameson, W. H., Pt., C, 24th Michigan.	April 29, May 1, 1863.	Left; Lisfranc's. Surg. E. Shippen, U. S. V. Died May 24, 1863. *Spec.* 1121.
152	Lapham, I. B., Pt., C, 9th N. Y. Artillery.	June 4, 4, '64.	Left; great toe and meta. Died June 17, 1864; acute diarrhœa.
153	*Monroe, H. B.*, —.....	June 1, 1, '64.	Right. Died August 10, 1864; exhaustion.
154	Randall, J., Pt., F, 29th Connecticut.	Oct. 27, 27, '61.	Left. Surg. A. C. Barlow, 62d Ohio. Died Nov. 11, 1864.
155	Umberger, J. W., Corp'l, I, 117th Illinois, age 30.	Dec. 15, 15, '64.	Left; tarsal bones sawn through. Surg. M. Wiley, 117th Illinois. Gangrene; Jan. 12, 1865, amp. leg. Died Jan. 14, 1865; pyæm.
156	*Whitaker, A. J.*, Corp'l, A, 66th N. C., age 24.	June 16, 16, '64.	Right; Hey's; gangrene. Died July 18, 1864; gangrene.
157	Whitehead, H., Pt., L, 16th Michigan, age 32.	June 10, —, '64.	Left. Died July 2, '64; wounds.
158	[3]*Everett, W. P.*, Corp'l, H, 9th Alabama.	May 5, 5, '64.	——; Lisfranc's; excision of tarsal bones and malleoli. Surg. D. Prince, U. S. V.
159	Mitchell, J., Pt., A, 90th Ohio.	May 14, 14, '64.	Left; 4th toe and metatarsal. — Gastner.
160	*Pride, H.*, Pt., F, 61st Virginia, age 36.	July 31, 31, '64.	Right; great toe and metatarsal.
161	*Stillwell, W. R.*, Pt., I, 53d Georgia, age 21.	Oct. 19, 19, '64.	Left; Chopart's. Surgeon J. J. Knott, 53d Georgia.

[1] Holloway (J. M.), *Comparative Advantages of* Pirogoff's, Syme's, *and* Chopart's *Amputations, etc.*, in *Am. Jour. Med. Sci's*, Vol. LI, p. 86.

[2] Formento (F., jr.), *Notes and Observations on Army Surgery*, New Orleans, 1863, p. 27.

[3] Smith (S.), *Amputations at the Ankle Joint, etc.*, in *United States Sanitary Commission Memoirs*, Surgical Volume II, New York, 1871, p. 123.

INTERMEDIARY AMPUTATIONS IN THE FOOT.—Two hundred and sixty-seven operations were followed by recovery in two hundred and forty-three, by death in twenty instances; the result in four cases was not recorded; the mortality rate therefore was 7.6 per cent. Fifty-two were amputations through the tarsal or metatarsal bones and two hundred and fifteen were ablations of the toes.

CASE 931.—Private C. Crandall, Co. K, 2d New York Artillery, aged 18 years, was wounded in the left foot, at Spottsylvania, May 18, 1864, and entered Carver Hospital at Washington six days afterwards. Surgeon O. A. Judson, U. S. V., reported: "Gunshot fracture of metatarsus. The injury was caused by a musket ball, which entered the space of the fifth metatarsal bone and emerged at the corresponding point of the second metatarsal bone. On May 29th partial amputation of the foot by Lisfranc's method was performed by Assistant Surgeon H. Allen, U. S. A. The case did remarkably well. By September 30th the stump had entirely healed but was still very tender, the patient being unable to stand on it." He was discharged from service December 12, 1864, and pensioned. He died May 12, 1867.

CASE 932.—Private *G. W. Leslie*, Co. E, 2d South Carolina Rifles, aged 23 years, was wounded July 8, 1863, by a conoidal ball, which fractured the first and second metatarsal bones of the left foot and produced great laceration of the soft parts. He was conveyed to Confederate hospital No. 9, at Richmond, where amputation by Chopart's method was performed on August 3d by Assistant Surgeon C. W. P. Brock, C. S. A. At the time of the operation the tissues were infiltrated and in a sloughing condition, and the patient was in a debilitated state, having suffered from angeioleucitis and erysipelas. Slight sloughing of the flaps followed, but by September 1st the stump was nearly healed. The patient recovered with a useful limb.

CASE 933.—Private S. Hacket, Co. F, 11th Pennsylvania Reserves, aged 25 years, was wounded in the right foot, at Fredericksburg, December 13, 1862, by a round ball, which entered the sole near the third metatarsal bone, passed through the tarsus, and was extracted just anterior to the internal malleolus. He was admitted to Lincoln Hospital, Washington, ten days after receiving the injury, and Chopart's amputation was performed the following day. The patient's complexion was yellowish, his pulse rapid, and the color of his tongue light red and smooth. On December 29th he had a chill and complained of pain in his hips. There had been a few discharges of laudable pus and the stump looked well. On January 3d an abscess, which had been forming for three days, was lanced and bled profusely. During this time the patient had been costive and continued icteroid, the conjunctiva being of a pearly whiteness and his pulse moderately rapid, full, and regular. The granulations of the sore were more eminent and were bathed in a not unhealthy pus. His tongue on this day was furrowed, and during the morning he had a slight chill. On January 6th he had three chills, and the stump was inactive, the pus being white and cheesy. The abscess over the malleolus was now better, but the patient's skin was very yellow, with a brown tinge; tongue pale; countenance anxious. During the next three days he had one or two chills each day, and by this time he had become very feeble and his mind was wandering somewhat; pulse very rapid. The stump did not look very badly, but some hardness was noticed along the track of the vessels. By January 11th he was wholly delirious, which continued for two days, when he recovered his consciousness. The left pupil was now more dilated than the right; the stump was looking well, but was more swollen than at first. After this he became extremely exhausted and died January 15, 1863. The autopsy showed much emaciation. On opening the chest a large cavity was found just above the right lung, the top of it being lined with a greyish pus. Pleurisy with firm attachments existed on the right side, and there was partial pneumonia in the posterior lobe. A mass of separating dead tissue partially occupied the excavated space in the upper and anterior portion. The walls were lined with a thick and cheesy pus. Partial pneumonia with small circumscribed collections of pus existed in the lower lobe of the left lung posteriorly, while in the upper lobe anteriorly and at the middle there was a sharp-edged and deep excavation having separated dead tissue in it. The spleen was attached by fibrinous adhesions to the surface of the diaphragm and contained small circumscribed collections of pus. The liver was large, heavy, and mottled, with a distinct rough feel; kidneys natural and a little pale; inguinal glands greatly swollen. There was also a deep abscess below the popliteal space and unconnected with the stump. The amputated portion of the foot (*Cat. Surg. Sect.*, 1866, *p.* 421, *Spec.* 4493) was contributed to the Museum by Assistant Surgeon G. M. McGill, U. S. A., who also recorded the history of the case.

TABLE C.

Summary of Fifty-two Intermediary Amputations in the Tarsal or Metatarsal Bones for Shot Injury.

[Recoveries, 1—36; Deaths, 37—51; Unknown, 52.]

NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.	NO.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	Albright, P. J., Corp'l, B, 110th Ohio, age 19.	July 9, 22, '64.	Right; great toe and half of metatarsal. Surg. G. S. Palmer, U. S. V. Disch'd Feb. 19, 1865.	5	Boger, J., Pt., A, 17th Infantry.	June 24, July 9, 1864.	Left (phagadenic); great toe, middle of metatar. A. A. Surg. J. T. Logan. Duty Mar. 9, 1865.
2	Anderson, F., Pt., H, 28th Penn., age 40.	May 25, June 9, 1864.	Left (exc. portion 3d met. bone); amp. 2d toe and metatar. A. A. Surgeon J. G. Harvey. V. R. C. March 29, 1865.	6	Burt, C. M., Pt., E, 141st New York, age 21.	Aug. 5, 17, '64.	Left; great toe thro' metatarsal. A. A. Surg. — Ward. V. R. C. March 10, 1865.
3	Baskett, J., Pt., G, 146th New York, age 37.	May 8, 25, '64.	Left; 4th toe and half of metatarsal. A. A. Surg. O. P. Sweet. Discharged July 6, 1865.	7	Chalton, X., Pt., E, 2d Cavalry, age 25.	May 31, June 4, 1864.	Right; 2d toe at tarso-met. artic. Surgeon A. F. Sheldon, U. S. V. Duty January 25, 1865.
4	Bender, J., Serg't, I, 15th Mass., age 23.	Sept. 17, 20, '62.	Right; Chopart's. Discharged February 28, 1863.	8	Clarkson, J. N., Pt., E, 93d Indiana, age 18.	June 10, 14, '64.	Right; 2d toe and metatar. Surg. J. G. Keenon, U. S. V. Duty March 22, 1865; pensioned.

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
9	Cox, S., Lieut., G, 4th N. Y. Heavy Artillery, age 23.	Aug. 25, 29, '64.	Left; little toe and metatarsal. Surgeon N. R. Moseley, U. S. V. Discharged January 18, 1865.
10	Crandall, C., Pt., K, 2d N. Y. Heavy Artillery, age 18.	May 18, 29, '64.	Left; Lisfranc's. Ass't Surg. H. Allen, U. S. A. Disch'd Dec. 12, 1864. Died May 12, 1867.
11	*Dotson, D. N.*, Serg't, K, 37th Tenn., age 24.	Nov. 30, Dec. 5, 1864.	Right; Chopart's. Surg. D. J. Roberts, 20th Tenn. To Provo. Marshal May 6, 1865.
12	Gelvair, W., Pt., C, 16th Penn. Cav., age 26.	Oct. 27, Nov. 15, 1864.	Right; 3d toe and lower third of metatarsal. Surg. N. R. Moseley, U. S. V. Duty April 20, '65.
13	George, J. H., Pt., I, 49th Illinois, age 20.	Jan. 13, 25, '64.	Right (gangrene); 2d and 3d toes and metatarsals. A. A. Surg. S. S. Jessop. Duty June 8, 1864.
14	Grimstead, R. T., Pt., I, 93d Indiana.	June 11, J'y –, '63.	Left; 2d toe and metatarsal. Discharged Dec. 28, 1863.
15	Green, A., Pt., D, 8th N. Y. Artillery, age 30.	June 23, July 18, 1864.	Right; Lisfranc's. A. A. Surg. D. G. Caldwell. Disch'd Sept. 27, 1864.
16	Hansmeier, A., Pt., A, 114th Illinois, age 19.	June 10, 13, '64.	Right; Lisfranc's. Discharged June 20, 1865; painful, tender cicatrix.
17	Hefferman, P., Pt., F, 14th Infantry, age 20.	Aug. 30, Sept. 9, 1862.	Left; Chopart's. Confed. surgeon. Heel drawn up. Oct. 8, 1863, amp. leg. Disch'd May 17, '64.
18	Kelton, W., Pt., H, 3d Vermont, age 23.	May 6, 13, '64.	Right; 1st toe and metatarsal. Vet. Res. Corps Nov. 25, 1864.
19	Keyes, C. W., Lieut., E, 32d Maine, age 33.	May 12, June 8, 1864.	Left (gang). Dr. P. Dyer, Wilton, Me. Gang. June 12, 1864, amput'n leg. App't in U. S. A. Retired December 31, 1870.
20	Knowlton, D., Serg't, M, 1st Maine H'vy Artillery, age 19.	June 18, July 5, 1864.	Left; 4th toe and half of metatarsal. A. A. Surg. F. B. Greenough. Disch'd March 27, 1865.
21	Lackey, G. H., Serg't, D, 58th Mass., age 24.	May 12, 27, '64.	Left; 1st toe and metatarsal. A. A. Surg. J. C. Nelson. Erysip.; gangrene. July 27, amp. leg. Disch'd March 16, 1865.
22	Landenberger, F. D., Pt., B, 6th Penn. Cavalry, age 57.	Mar. 18, 24, '64.	Right; 2d toe and metatar. Ass't Surg. J. W. Williams, U. S. A. Discharged Sept. 3, 1864.
23	*Leslie, G. W.*, Pt., E, 2d S. Carolina, age 23.	July 8, Au. 3, '63.	Left; Chopart's. Ass't Surg. C. W. P. Brock, C. S. A. Recovery.
24	Little, D. H., Pt., G, 138th Penn., age 20.	Nov. 27, Dec. 9, 1863.	Right; great toe and metatarsal. Surg. E. Bentley, U. S. V. Discharged Feb. 27, '64; pensioned.
25	London, J. C., Pt., C, 90th Penn., age 28.	Nov. 27, De. 15, '63.	Left; 4th toe and metatarsal. Transferred May 30, 1864.
26	Lovelady, A., Pt., A, 4th Iowa Cav., age 22.	June 10, July —, 1864.	Right (gangrene); great toe and metatarsal. A. A. Surg. Sharpe. Disch'd March 29, 1865.
27	Lynch, A., Pt., C, 29th Pennsylvania, age 39.	May 25. June 1, 1862.	Right; Hey's. Confed. surgeon. Disch'd March 16, 1863; good stump.
28	McCarty, J., Pt., F, 48th New York, age 38.	Mar. 2, 21, '64.	Right; Chopart's. A. A. Surg. C. T. Reber. (Mar. 2, lig. post. tibial; gang.) Mar. 23, bones removed; April 25, 1865, amp. leg. Disch'd June 10, 1865. Died Dec. 19, 1874. *Spec.* 3007.
29	Madison, J., Pt., C, 9th Minn., age 48.	July 16, 23, '64.	Right; 2d toe and part of metatarsal. Surg. J. G. Keenon, U. S. V. Disch'd May 26, 1865.
30	Marshall, J. S., Pt., B, 131st Co., 2d Bat. V. R. Corps, age 29.	July 2, 20, '63.	Right; toe at middle of metatarsal. A. A. Surg. J. A. Buchanan. Duty May 21, 1864.
31	Mendenhall, A., Corp'l, H, 39th Illinois, age 38.	Aug. 14, 24, '64.	Left; toe and metatarsal. A. A. Surg. R. O. Sidney. Disch'd April 4, 1865.
32	Quade, C. H., Pt., F, 8th N. Y. Heavy Artillery, age 17.	June 22, July 16, 1864.	Left (erysip.; gang.); 4th and 5th toes and metatar. A. A. Surg. A. Trau. Disch'd Feb. 18, 1865; pensioned.
33	Rooney, A., Pt., F, 40th New York, age 29.	Aug. 29, Sept. —, 1862.	Right; Lisfranc's. Surg. D. W. Bliss, U. S. V. Disch'd May 20, 1863. 1879, stump healthy.
34	Shearer, A., Pt., A, 6th Colored Cavalry, age 25.	De.—, '64, Jan. 8, '65.	Left; thro' ant. part cuboid and cuneiform bones. Discharged June 12, 1865.
35	Snyder, B., Pt., F, 129th Pennsylvania, age 24.	May 7, 15, '64.	Left (gang.); 4th toe at middle of metatar. Surg. A. F. Sheldon, U. S. V. Disch'd May 26, 1865.
36	Watson, J. H., Serg't, G, 121st Peno., age 22.	May 10, 21, '64.	Left; 2d and 3d toes and metatarsals. Surg. E. Bentley, U. S. V. Duty January 30, 1865.
37	Barnes, M., Pt., D, 28th Mass., age 34.	June 4, —, '64.	Right; 3d toe and metatarsal. A. A. Surg. J. G. Nelson. Died July 6, 1864; dysen. and w'nd.
38	*Bell, R. A.*, Pt., A, 14th Virginia.	May 10, 19, '64.	Left; Chopart's. Surgeon C. B. Gibson, C. S. A. Died May 27, '64.
39	Brooks, T. M., Pt., C, 124th N. York, age 19.	Nov. 27, Dec. 8, 1863.	Left; 3d and 4th toes and metatarsals. Surg. E. Bentley, U. S. V. Died Dec. 20, '63; pyæmia.
40	Decay, S., Corp'l, A, 179th New York, age 35.	June 11, 30, '64.	Right; 1st toe and metatarsal. A. A. Surg. J. G. F. Strowbridge. Pyæmia. Died July 29, 1864; excessive suppuration.
41	Graham, P., Corp'l, K, 26th Ohio.	Sept. 19, 25, '63.	Right; Chopart's (also ex. elbow). Died Oct. 8, 1863.
42	Hackett, S., Pt., F, 111th Penn. Reserves.	Dec. 13, 24, '62.	Right; Chopart's. Ass't Surg. G. M. McGill, U. S. A. Died Jan. 15, 1863; pyæmia. *Spec.* 4493.
43	King, E., Pt., B, 1st Vermont Cavalry, age 18.	Aug. 25, 30, '64.	Right; 1st toe and metatarsal and 3d toe thro' 3d phalanx. A. A. Surg. W. J. McIlench. Died Sept. 11, 1864; pyæmia.
44	King, S., Serg't, C, 9th West Va., age 23.	July 20, 25, '64.	Right; 2d toe and part of metatarsal. Died Aug. 3, 1864.
45	Linville, A. J., Pt., G, 44th Illinois, age 18.	Oct. 30, Nov. 12, 1864.	Left; Chopart's. A. A. Surg. — Bell. Died Feb. 10, 1865; exhaustion.
46	Lumbard, M., Pt., D, 15th Ohio.	Sept. 20, Oc. 10, '63.	Left; Chopart's. Died November 24, 1863.
47	Mockler, W., Pt., G, 81st Pennsylvania, age 47.	Dec. 13, 26, '62.	Right; Chopart's. Dec. 31, hæm. Died January 10, 1863.
48	*Nash, J.*, Pt., C, Maryland Battalion.	July 3, 14, '63.	Left; tetanus. Died July 16, 1863.
49	Schmidt, J., Pt., C, 102d Penn., age 29.	June 5, 25, '64.	Left; great toe and metatarsal. Surg. H. Palmer, U. S. V. Died June 27, 1864; inflam. liver.
50	Smith, B. J., Pt., I, 14th N. Y. H. Art'y, age 28.	June 1, 12, '64.	Right. Died, in Libby Prison, July 3, 1864.
51	Whistler, A. W., Pt., I, 54th Pennsylvania.	June 5, 22, '64.	Left. Ass't Surg. H. Grumbine, 20th Penn. Cav. Died August 16, 1864; gangrene and hæm.
52	*Moore, G. M.*, Pt.,—, 28th N. Carolina, age 17.	Aug. 25, 31, '64.	Left; Chopart's. Surg. D. F. Wright, C. S. A.

SECONDARY AMPUTATIONS IN THE FOOT.—Of ninety-four secondary operations ninety-two were successful and two fatal, a mortality rate of 2.1 per cent. Seventy-six were ablations of the toes, eighteen amputations in the tarsal or metatarsal bones.

Case 934.—Private E. McEntee, Co. B, 73d New York, aged 23 years, was wounded in the right foot, at Gettysburg, July 2, 1863, and entered Jarvis Hospital, Baltimore, eight days afterwards. Upon examination a compound comminuted fracture of the tarsal articulation was found, with a musket ball lodging in the foot. Efforts were made to save the limb; but a high degree of suppurative inflammation set in, when it was decided to amputate, and Chopart's operation was performed on August 4th by Assistant Surgeon D. C. Peters, U. S. A. The patient recovered, and was discharged from service December 16, 1863, and pensioned, the stump, though healed, remaining tender and giving indications of remaining unserviceable for a long time, thereby unfitting him for duty in the Invalid Corps. Part of the amputated foot, exhibiting a great effusion of callus and showing necrosis in the track of the missile, was contributed to the Museum, with the history of the case, by the operator, and constitutes specimen 1650 of the Surgical Section. The pensioner was paid September 4, 1880. In his application for commutation, dated 1870, he described the condition of the stump as still "very tender;" but in subsequent statements he reported it as "pretty good" and "healthy."

Case 935.—Lieutenant H. Holt, Co. F, 30th New York, aged 20 years, was wounded in the right foot, at Bull Run, August 30, 1862. Surgeon C. L. Allen, U. S. V., described the injury as follows: "The ball entered at the top of the foot, fracturing the fifth metatarsal bone, and was cut out on the field from the sole of the foot. He went on horseback to Centreville, where during the afternoon of the following day he was placed in an ambulance. The next day he came to Washington, taking

the cars at Fairfax Station and entering Emory Hospital for a day or two, when he removed to a private boarding-house and was attended by a private physician. On September 28th, foot was swollen; abscesses opened, and the original wounds were all discharging freely. The patient was much emaciated, his countenance expressing suffering and showing the strongly marked hectic flush; appetite gone; thirst considerable; pulse 130, feeble and fluttering; pain and stiffness in the jaws, with inability to open the mouth more than to admit the tip of the little finger between the teeth. This condition (trismus), he stated, had been coming on for two or three days. Huxham's tincture, brandy, beef-essence, etc., with an occasional full dose of morphia was prescribed. On October 5th another abscess opened. October 9th: The patient has slowly and steadily improved in general appearance since my first attendance; pulse 110 to 116 with more strength. It was thought advisable to put the patient under the influence of ether and examine and perform any operation considered necessary, Surgeons M. Clymer and J. H. Brinton, U. S. V., being requested to see the case. The foot was still enormously swollen, and the probe passed readily from the wound of entrance to the opening below the external malleolus. In the upper opening four inches above the inner malleolus the probe rapped distinctly upon the denuded tibia. Surgeon Clymer made an incision nearly the whole length of the external side of the foot, and removed the fragments of the fifth metatarsal bone together with the little toe. Since it appeared at this stage that all or nearly all the tarsal and metatarsal bones were diseased, as well as the lower third of the tibia, it was decided that amputation was necessary, but that the patient at this time could not endure any further operation. The tonics, stimulants, and nourishments were now crowded as much as possible. On October 12th the patient had somewhat improved. On the following day tincture of cantharides, in doses of twenty drops every four hours and to be increased if necessary, was prescribed in addition to his other treatment. For three or four days the patient steadily but very slightly improved, after which he evidently failed for a few days. He had taken nearly two ounces of tincture of cantharides and suffered a little of strangury. All remedies except his nourishment and a little brandy were now omitted, and on the following day compound syrup of phosphate of lime and iron was ordered. On October 23d the patient was still very feeble, but looked a little brighter and had a little appetite; pulse 120 to 130. After this he steadily improved, and by November 1st he had a good appetite, his pulse having gradually lessened to from 80 to 90 per minute. On November 8th he was dressed and able to sit in a chair, and about two weeks later he first went down stairs on crutches. The wounds on the external side of the foot had completely healed by December 21st, while the openings on the other side, both above and below the malleolus, were still discharging. All the openings healed up about December 31st, but several days after more swelling appeared toward the toes, and on January 3d an opening occurred over the second metatarsal bone, near the distal extremity. This discharged freely for several weeks, denuded bone being detected by the probe. On January 29th the patient was able to wear his boot all day, and one week afterwards he walked with a cane. By February 15th the last opening had closed. On March 13, 1863, the patient was mustered out of service, walking with ease by the aid of a cane and without much difficulty without one. He subsequently informed me by letter that he was holding a position on the staff of Brigadier General Pierce in Massachusetts." Lieutenant Holt is a pensioner, and was paid February, 1879.

TABLE CI.

Summary of Eighteen[1] Cases of Secondary Amputations in the Tarsal or Metatarsal Bones for Shot Injury.

[Recoveries, 1—16; Deaths, 17—18.]

No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.	No.	Name, Military Description, and Age.	Dates.	Operations, Operators, Result.
1	Carey, J., Pt., E, 149th Penn., age 23.	May 5, June 11, 1864.	Right; 4th toe and metatarsal. Surg. H. Palmer, U. S. V. Discharged July 24, 1865.	10	Noll, E., Pt., G, 147th Penn., age 22.	May 25, Aug. 13, 1864.	Right; 2d toe and portion of metatarsal. A. A. Surg. J. O. Connell. Disch'd Sept. 22, 1865.
2	Finnegan, P., Pt., H, 16th Infantry, age 34.	De.31,'62, Feb. 27, 1865.	Right. Dr. J. E. Pomfret. (Discharged Feb. 21, 1865; ch. erysipelas of foot.) Feb. —, 1866; amputation lower third leg.	11	Palmer, A. G., Pt., D, 4th New York Heavy Artillery, age 21.	May 23, 1864, Jan. 10, 1865.	Left (May 29, 3d and 4th toes; amp.; necrosis); part of 4th and 5th metatarsals. A. A. Surg. D. F. Etter. Disch'd May 30, '65.
3	Foss, G. P., Serg't, K, 1st Mass. Heavy Artillery, age 46.	June 18, Sept. 14, 1864.	Left; 4th toe and metatarsal. A. A. Surg. J. H. Cushing. Disch'd June 26, 1865.	12	Strong, A., Pt., E, 24th Wisconsin, age 24.	J'y 2, '63, Jan. 20, 1864.	Left; 1st toe and part of metatarsal. Surg. E. B. Wolcot, Wisconsin. Disch'd Oct. 14, 1864.
4	Haslam, J., Pt., H, 120th Penn., age 30.	De.13,'62, Feb. 18, 1864.	Right; great toe and part of metatarsal (gangrene; March, 1863, excis. 2d toe); Nov. 17, 1867, amp. leg; June, 1868, amputat'n upper third leg.	13	Titus, A., Serg't, E, 3d Wisconsin, age 28.	Aug. 9, De. 6, '62.	Left; Lisfranc's. Disch'd Nov. 14, 1862; necrosis.
				14	Tooley, F., Pt., D, 103d New York, age 22.	De.16,'62, May 30, 1863.	Right; 2d and 3d toes and metatarsals; hæmorrhage. Disch'd Sept. 12, 1863.
5	Leimond, H., Pt., E, 28th Mass., age 37.	J'y30,'64, Feb. 28, 1865.	Right; 4th toe and part of metatarsal. A. A. Surg. J. H. Cutler. Disch'd July 31, 1865.	15	Williams, S.W., Pt., Andrew's S. S. (Mass.), age 31.	Sept. 17, 1862, Jan. 17, 1863.	Left; Hey's; through metatarsals just ant. to tarsal articulation. Surg. J. Nicll, U. S. V. Disch'd April 17, 1863; depending on crutches.
6	McEntee, E., Pt., B, 73d New York, age 23.	July 2, Aug. 4, 1863.	Right; Chopart's. Ass't Surg. D. C. Peters, U. S. A. Disch'd Dec. 16, 1863. *Spec.* 1650.	16	Wither, C. E., Corp'l, B, 7th Maine, age 23.	May 4, J'e 21,'63.	Left; 1st toe and metatar. Duty.
7	McMorran, S. T., Capt., C, 66th Ohio, age 32.	Aug. 9, Oct. —, 1862.	Left; 3d and 4th toes and metatarsals. Disch'd Jan. 27, 1863; pensioned.	17	Gilman, C. F., Pt., E, 3d Maine, age 24.	May 8, June 22, 1864.	Right; Hey's. A. A. Surg. G. E. Brickett. (Amp. toe; gangrenous.) Died June 30,'64; dipthe.
8	Merrill, M., Pt., K, 12th Maine, age 33.	Oct. 19, Dec. 19, 1864.	Right; 3d toe thro' metatarsal. A. A. Surg. Trau. Duty July 27, 1865.	18	Ryan, A., Pt., C, 114th New York, age 28.	Nov. 5, 1864.	Left; Hey's. Surg. C. T. Simpers, 6th Md. Died Nov. 9, 1864; pneumonia.
9	Meyers, J. J., Pt., K, 102d Illinois, age 33.	June 22, Sept. 7, 1864.	Right; 1st and 2d toes and portions of metatarsals. Disch'd April 4, 1865.				

AMPUTATIONS IN THE FOOT OF UNCERTAIN DATES.—In four hundred and seven instances of amputations in the foot the time between the injury and the operation was not indicated.

[1] As in the preceding two tables, amputations of the toes are not included in this table.

The results in fifty-four cases were not ascertained; three hundred and twenty ended in recovery and twenty-three in death, a mortality rate of 6.5 per cent. Sixty cases were amputations in the tarsal or metatarsal bones; three hundred and forty-seven were amputations of the toes. Few details of the cases were reported.

CASE 933.—Corporal G. Marsh, Co. G, 17th Iowa, aged 25 years, received a shot wound of the right foot, at Champion Hills, May 16, 1863, and was conveyed to Gayoso Hospital, Memphis, two weeks afterwards. After some time had elapsed in an attempt to save the whole foot an operation was resorted to which involved the four small toes and metatarsal bones. The wound healed kindly, and the patient recovered with a comparatively useful foot. The case was reported by Surgeon J. Bryan, U. S. V.[1] The patient was subsequently transferred to Jefferson Barracks, where he was discharged from service October 6, 1863, and pensioned. Examining Surgeon J. Windle, of Des Moines, Iowa, certified to the loss of the four small toes and metatarsal bones, "leaving the big toe greatly deformed, the ankle-joint stiff, and the muscles on the sole of the foot contracted so that the toe touches the ground first and causes him to walk with difficulty. The limb is considerably wasted and weak." The pensioner was paid September 4, 1881.

TABLE CII.

Summary of Sixty Cases of Amputations in the Tarsal or Metatarsal Bones of Uncertain Date for Gunshot Injury.

[Recoveries, 1—32; Deaths, 33—49; Results unknown, 50—60.]

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	*Aikins, J. T.*, Pt., A, Phillip's Legion.	May 3, —, '63.	——; Chopart's. Furloughed.
2	*Barnes, J. G.*, Pt., B, 38th Va. Art'y, age 19.	April 18, —, '64.	Left. Retired March 22, 1865.
3	*Berry, H. T.*, Pt., H, 6Cth Alabama.	———	Right; great toe and metatarsal. Furloughed August, 1864.
4	Bisbee, N., Serg't, K, 89th New York, age 43.	June 18, 1864, ———	Right; toes and 3d metatarsal; April, 1865, amput'n leg. Discharged May 25, 1865.
5	*Blevins, F.*, Pt., A, 26th North Carolina.	J'y 3, '63, ———	Right; Chopart's. Retired February 3, 1865.
6	*Buck, C. N.*, Pt., B, 17th Virginia, age 19.	Aug. 3, —, '62.	——; Chopart's. Furlough'd September 15, 1862.
7	*Burnett, W. B.*, Lieut., G, 10th Arkansas.	——— 1863.	——. To custody of Provost Marshal.
8	*Collins, W. A.*, Pt., F, 63d Tenn., age 31.	——— J'y31,'64.	——; 4th toe and metatarsal; necrosis. Recovery.
9	*Denham, G. D.*, Corp'l, B, 15th Alabama.	Sept. 20, —, '63.	Left. Furloughed Oct. 3, 1864.
10	*Gaspar, J.*, Pt., H, 8th Louisiana.	J'y 3, '63, ———	Left. Discharged November 19, 1863.
11	*Gleason, J.*, Pt., D, 7th N. C., age 42.	Dec. 14, —, '62.	Right; Chopart's. Duty Nov. 4, 1863.
12	*Hardy, R. F.*, Pt., C, 38th Va., age 24.	July 3, —, '63.	Left; Chopart's; gangrene. Exchanged March 17, 1864.
13	*Harvey, S.*, Pt., A, 2d South Carolina.	——— 1863.	Left. Sent to Nashville.
14	*Hickman, J. W.*, Pt., B, 2d Louisiana.	———	Left. Discharged January 23, 1863.
15	Holmes, G. W., Pt., F, 73d Ohio, age 36.	Dc.28,'64, ———	Left; great toe and half of metatarsal. Disch'd May 9, 1865.
16	Ingle, W. F., Serg't, A, 2d Ind. Cav., age 21.	Jan. 27, —, '64.	Left: Lisfranc's. Disch'd October 4, 1864.
17	Johnson, G. N., Serg't, B, 154th New York.	——— Aug.9,'63.	Right; great toe and metatarsal. Recovery.
18	*Johnson, T. T.*, Pt., K, 59th Georgia.	July 3, —, '63.	Right. Paroled September 23, 1863.
19	*McDonnell, C.*, Pt., C, 6th North Carolina.	July 3, —, '63.	——. Paroled September 12, '63.
20	Marsh, G., Corp'l, G, 17th Iowa, age 25.	M'y16,'63. ———	Right; four small toes and metatarsals. Disch'd Oct. 6, 1864.
21	*Miller, M.*, Pt., G, 10th Louisiana.	July 2, —, '63.	Left; Chopart's. Furloughed.
22	*Morrison, J. G.*, Aide-de-Camp to General T. J. Jackson.	———	——; Chopart's. Recovery.
23	*Patrick, W. A.*, Pt., F, 16th Georgia.	July 3, —, '63.	——. Paroled August 22, 1863.
24	*Rogers, J.*, Pt., B, 44th North Carolina, age 23.	Oct. 14, —, '63.	Left: Chopart's. Retired February 14, 1865.
25	Shaw, L., Pt., K, 6th Vermont, age 41.	April 2, 1865, ———	Right; 1st toe at scaphoid, 2d toe and metatarsal. Disch'd Aug. 11, 1865; pensioned.
26	*Simms, W. E.*, Serg't-Maj., 24th Miss., age 22.	Se.13,'64, ———	Right; 2d toe and metatarsal. Transferred Oct. 27, 1864.
27	*Slaughter, D. W.*, Pt., K, 18th Georgia.	——— 1862.	Right. Discharged December 1, 1862.
28	Smithers, B. G., Corp'l, C, 11th Mass.	——— Au. 2, '63.	Right; great toe, excision 1st and 2d metatarsals. Recovery.
29	Sowle, H., Pt., F, 37th Illinois.	———	——; 5th metatar. Ass't Surg. J. Murphy, 37th Ill. Duty May 5, 1863. Died September, 1864.
30	Tedrick, W. L., Pt., F, 149th Penn., age 21.	M'y 5,'64, ———	Left; toe and 2d metatar. Discharged February 10, 1865.
31	*Tilty, J.*, Lieut., E, 34th North Carolina.	July 3, —, '63.	Right; Chopart's. Paroled Oct. 24, 1863; exchanged.
32	*Weinkler, F. E.*, Pt., C, 6th Louisiana.	July —, —, '63.	——. Transferred.
33	Becker, F., Pt., G, 32d Indiana.	De.31,'62, ———	——. Died January 21, 1863.
34	*Colgan, J. A.*, Corp'l, D, 14th South Carolina.	——— 1864.	Right. Died September 13, 1864.
35	Crockett, W., Pt., B, 19th Maine.	May 6, —, '64.	Right. Died June 8, 1864.
36	*Davis, B. M.*, Pt., B, 20th Georgia.	——— 1862.	——. Died September 12, 1862.
37	*Esley, J. A.*, Pt., C, 18th Georgia.	——— 1862.	——. Died September 11, 1862.
38	Freeman, C. D., Pt., F, 4th Massachusetts.	June 14, —, '63.	Left. Died July 17, 1863.
39	Furry, E. M., Serg't, G, 73d Ohio.	Aug. 31, —, '62.	——. Died September 23, 1862.
40	*Gordon, V.*, Corp'l, K, 55th Virginia.	——— J'y31,'62.	Right (gangrenous); erysipelas. Died August 4, 1862.
41	Greenwood, E. W., Pt., G, 53d Mass.	June 14, —, '63.	——. Died July 6, 1863.
42	*Hoffman, A.*, Aide-de-Camp to Gen. Trimble.	——— 1863.	——. Died August 10, 1863.
43	*Hunnicutt, J. B.*, Pt., G, 12th South Carolina.	——— 1864.	Left. Died June 27, 1864.
44	*Mitchell, W.*, Pt., E, 25th Virginia.	——— 1862.	Right. Died July 24, 1862.
45	Rowland, S., Serg't, A,	May 3,	Both. Died June 6, 1863.
46	78th New York.	—, '63.	
47	Stuart, J. W., Pt., I, 9th Iowa.	Mar. 7, —, '62.	Left. Died May 6, 1862.
48	*Wooden, A.*, Pt., E, 21st Virginia.	——— 1863.	——. Died July 1, 1863.
49	Wooding, H., Serg't, I, 24th Connecticut.	May 24, —, '63.	——. Died July 23, 1863; diarrhœa.
50	*Cannady, J. W.*, Pt., I, 3d South Carolina.	July 3, —, '63.	——.
51	*Colley, T. W.*, Serg't, D, 1st Virginia Cavalry.	——— 1864.	Left.
52	*Garrison, F. M.*, Pt., I, 13th Alabama.	———	Left; great toe at tarso-metatarsal articulation.
53	*Greenwood, A.*, Pt., C, 55th Virginia.	———	Right; two toes and portions of metatarsals.
54	*Hendrix, G. A.*, Pt., E, 2d South Carolina.	——— 1864.	Right.
55	*Herron, D. E.*, Pt., I, 42d Georgia.	——— 1865.	Right.
56	*Knight, R. H.*, Pt., K, 45th Georgia.	——— 1865.	Left.
57	*Landing, J. F.*, Pt., A, 38th North Carolina.	——— 1863.	——.
58	*Lindsay, A. T.*, Pt., F, 6th South Carolina.	——— 1864.	Left.
59	*Linsbay, A. L.*, Pt., E, 60th Alabama.	———	Right; 2d toe and part of metatarsal.
60	*Powell, R. B.*, Lieut., C, 2d South Carolina.	Oct. 3, —, '64.	Left.

[1] BRYAN (JAMES), *Seventeen Additional Cases of Amputations from the Armies of the South-West*, in *Am. Med. Times*, Volume VII, p. 287.

Concluding Observations.—Less frequent than the shot lesions of the bones of the hand, the shot fractures of the bones of the foot were found more vexatious,[1] not rarely leading to extensive inflammation and accumulations of pus under fascia and tendons, and to tedious exfoliations of fractured bones; and the percentage of fatality of the injuries of the foot considerably exceeds that of the injuries of the hand, the former being 8.3, the latter only 3.1 per cent. In many of the cases of fractures of the tarsal bones detailed on pages 619 to 622, the wounds suppurated for months and even years. In the case of Campbell (CASE 896, page 619, *ante*), who was shot through the tarsal bones in July, 1861, the pension examiners testified in 1874 that the wound was still open and connected with dead bone; and, in 1875, that a portion of the astragalus had been removed. In the case of Tarrance (CASE 892, page 619, *ante*), who received a shot fracture of the os calcis in 1863, necrosed bone was removed with the gouge six months after the injury, and the wound was yet suppurating in 1866. In other cases, although the wounds closed, the limbs remained of little service. In Chase's case (CASE 897, page 620, *ante*) the foot is turned inward and upward, the leg resting on the outside of the foot, and the patient cannot get along without an artificial apparatus. Flattening of the plantar arch was recorded in the case of Miller (CASE 893, page 619, *ante*), anchylosis of the ankle joint in the case of West (CASE 899, page 620, *ante*), and swelling of the ankle and leg to the knee with disease of the tibia and soft parts in the case of Captain Bearden (CASE 898, page 620, *ante*), who either has to use crutches or a stout cane at all times to walk.

The treatment generally consisted in the application of cold-water dressings or of poultices.[2] Of the grave surgical complications, pyæmia was noted in fifteen cases, all fatal; tetanus in fourteen, with two recoveries, twelve deaths; gangrene in thirty-seven, with thirty recoveries, six deaths, one unknown result; erysipelas in twenty-three, with twenty recoveries, three deaths; and hemorrhage in twenty-three cases, with nineteen recoveries, three deaths, and one unknown result.

Excisions in the bones of the foot for shot injuries are of very recent date. The operations ascribed by Velpeau[3] and Heyfelder[4] to Formey[5] in the sixteenth century and to

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[1] RAVATON (*Chirurgie d'armée ou traité des plaies d'armes à feu, etc.*, Paris, 1768, p. 389): "Les coups de feu qui fracturent les os du pied sont très fâcheux: on peut les distinguer en ceux qui percent le pied suivant sa longueur d'arriere en avant, ou de devant en arriere; en ceux qui le percent de côté, plus ou moine obliquement: en ceux qui ont leur entrée sur le col du pied, et leur sortie au talon, et par la route la plus courte au tarse, au métatarse en fracturant les os des doigts. Toutes ces différentes fractures sont toujours accompagnées de lésion de tendons, et c'est la multitude de ces mêmes tendons qui aggrave la maladie." NEALE (H. ST. JOHN) (*Chirurgical Institutes, etc.*, London, 1805, 2nd ed., p. 256): "Gunshot wounds of the tarsus, when the bullet remains in its substance, or when it has pierced quite through, are much more dangerous than those of the wrist; and many reasons may be given for this. First, the bones of the tarsus are larger than those of the wrist, and of consequence a greater havock is occasioned here; secondly, the tendinous parts that cover these bones and tie them together are larger and more numerous. Thus the nervous system suffers more in the injury. Thirdly, the conjoined group of bones in the tarsus form a much thicker body, and therefore we cannot reach them with our incisions to the bottom of the wound, as in the soft fleshy parts. These wounds should therefore be regarded as being of very great consequence, and even it may be said of as great importance as those that pierce a joint quite through." PORTER (J. B.) (*Medical and Surgical Notes of Campaigns in the War with Mexico, etc.*, in *Am. Jour. Med. Sci.*, 1852, Vol. XXIII, p. 30): "Wounds of the foot and leg do not, by any means, recover so readily or so perfectly as wounds of the hand and forearm." PIROGOFF (N.) (*Grundzüge der Allgemeinen Kriegschirurgie*, Leipzig, 1864, p. 823): "With a wound of the foot the case is different from a wound of the hand. The patient with a wounded hand can stand and go about, and during fair weather can remain in the fresh air the whole day. In shot wounds of the foot on the contrary the patient is confined for half a year or a year to his bed at the hospital, and, in the end, the foot preserved is so crippled that he must have recourse to crutches." THOMSON (J.) (*Report of Observations, etc., after the Battle of Waterloo*, Edinburgh, 1816, p. 144): "Various instances presented themselves of gunshot wounds of the foot. In some of these the balls had passed between the soft parts and the bones on the under as well as upper part of the foot. In other instances the balls had passed through the foot in every direction and had fractured the tarsal and metatarsal bones. These fractures were always accompanied with great swelling, which depended on the communication of inflammation from the wound to the contiguous ligaments and articulating surfaces." GUTHRIE (G. J.) (*Treatise on Gunshot Wounds*, London, 1827, p. 412): "The feet generally suffer from wounds of musket balls; and as the parts in the foot, although bearing a general resemblance to the hand, are more complex and difficult of management, so are wounds of the foot more dangerous and more generally followed by defective cures from apparently slighter causes."

[2] STROMEYER (L.) (*Maximen der Kriegsheilkunst*, Hannover, 1855, p. 748) warns against the too early application of cataplasms in fractures of the tarsal bones; but advises their application in fractures of the metatarsal and phalangeal bones, as the cold applications are apt to become harassing.

[3] VELPEAU (A.-A.-L. M.), *Nouveaux éléments de médecine operatoire*, Paris, 1839, T. II, p. 660.

[4] HEYFELDER (O.), *Lehrbuch der Resectionen*, Zweiter Abdruck, Wien, 1863. p. 194.

[5] RIVERIUS (L.) (*Opera Medica Universa*, Lugduni, 1679, p. 571, Obs. XIII) cites a case of shot wound of the calcaneum; the ball had lodged in the calcaneum and was removed by FORMEY with the aid of a trephine: "trepano calcaneum aperui, et in eo latentem globulum inveni et extraxi."

Morand[1] in the seventeenth, were certainly not excisions, but simply extractions, by the aid of the trephine, of missiles lodged in the calcaneum. An excision of four metatarsals and the cuneiform bone, performed by Langenbeck in 1848, in the Schleswig Holstein war, seems to have been the first operation of this nature for shot injury; and since then only a few cases of excisions of the tarsal or metatarsal bones can be traced,[2] as the surgical histories of the late great European wars barely mention these cases, or include them, without comment, in the tabular statements of operations of the foot and toes.

As indicated in Table XCVI, page 622, the excisions in the tarsal bones had a fatality of 16.6 per cent., in the tarso-metatarsal articulation of 40.0 per cent., in the metatarsal bones of 14.8 per cent., and in the metatarso-phalangeal articulation of 75.0 per cent., making in the aggregate number of cases a mortality of 19.3 per cent., which slightly exceeds that of the partial amputations of the foot, viz: 18.9. The unfavorable results, especially in the cases in which the tarso-metatarsal or the metatarso-phalangeal articulations were involved, were found to be due to inflammation of the synovial membranes and the ease with which purulent suppuration extended through the spaces between the adjacent bones. The usefulness of the limb remained largely impaired in nearly all the patients who submitted to this operation. In the case of General Badeau, in which the middle and portion of the internal and external cuneiforms were removed, the arch of the foot remained depressed,[3] and the operation tended slightly to valgus. In Dubois' case (CASE 909, page 623, *ante*), the pension examining surgeons testify to lameness, and much pain and difficulty in walking; and in Hargrave's case (CASE 916, page 624, *ante*) it is reported that he was never able to walk without crutches. In the case of Leunze (CASE 911, *ante*), in which the first metatarsal was removed in 1864, the great toe had become distorted in 1868 and was pushed at least one inch posterior to its original locality; the weight of the body in walking was sustained by the heel and a portion of the external border of the foot.

Amputations in the Foot.—Amputations were performed in every part of the foot as was deemed necessary from the nature of the injury, thus causing a series of operations

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[1] MORAND (*Opuscules de Chirurgie*, Paris, Seconde Partie, 1772, p. 248): "J'ai vu des balles enclavées dans les os, et entré autres une dans le calcaneum qui ne put être tirée que par l'application du trepan, en l'embrassant dans le cercle de la comonne."

[2] ROSS (G.) (*Militairärztliches aus dem ersten Schleswigschen Feldzuge im Sommer*, 1848, Altona, 1850, p. 56): L——, shot at Düppel, June 5, 1848; ball entered the dorsum of the foot, fractured the metatarsals, and escaped at the sole of the foot; June 15, excision of the four inner metatarsals by LANGENBECK; gangrene; June 16, amputation in the leg; also amputation of left leg for shot wound of ankle; death. MATTHEW (T. P.) (*Medical and Surgical History of the British Army, etc., in the years* 1854-'55-'56, London, 1858, p. 36) tabulates from the Crimean War a case of excision of the os calcis and part of the astragalus; the patient was invalided. OCHWADT (A.) (*Kriegschirurgische Erfahrungen*, Berlin, 1865, Appended Table, p. XVI, Case No. 65): Private C. L——, 64th Prussian Regiment, was shot in the calcaneum, April 18, 1864; excision of calcaneum was performed by LANGENBECK on May 24; recovery. LÜCKE (A.) (*Kriegschirurgische Aphorismen aus dem zweiten schleswig-holsteinschen Kriege, im Jahre* 1864, in *Archiv für Klinische Chirurgie*, Berlin, 1866, B. VII, p. 129): A. Riep, 24th Prussian Regiment, shot June 29, 1864, through the calcaneum; removal of fragments at various periods; August 2, subperiosteal excision of calcaneum by LÜCKE; August 15, gypsum bandage; recovery; in December, 1864, there was a moderate amount of new osseous formation. OTIS (G. A.) (*Circular* No. 3, War Department, Surgeon General's Office, Washington, 1871, p. 227): C. L——, 1st U. S. Cavalry, shot wound of calcaneum, at Camp Bidwell, Nov. 3, 1866; caries; excision of portion of calcaneum February 26, 1867; good recovery. J. E——, 10th U. S. Cavalry, shot through metatarso-phalangeal articulation of left great toe, January 21, 1868, at Fort Riley; March 1, 1868, excision of phalanx and head of metatarsal bone; periosteum preserved; healed with profuse suppuration; recovery. BECK (B.) (*Chirurgie der Schussverletzungen*, Freiburg, i. Br., 1872, p. 900): Soldier, 3d Baden Infantry, shot through the metatarsals; extensive suppuration; excision of the metatarsal bone of the 5th toe in the third week; favorable result. IDEM (*loc. cit.*, pp. 907 and 910) tabulates a fatal case of excision in the metatarsal and another of the calcaneum from the hospitals at Rasstatt and Strassburg. CHIPAULT (A.) (*Fractures par armes à feu*, Paris, 1872, p. 176): J. S——, 41st French Infantry, aged 44; shot wound of left foot; Beaugency, Dec. 8, 1870; February, 1871, extensive suppuration; excision of part of astragalus and the entire os calcis two months after injury; wounds cicatrized and patient walked well in June, 1871; in July a fistulous opening discharged fetid pus; death Aug. 18, 1871, of phthisis. HEYFELDER (O.) (*Bericht über meine Wirksamkeit am Rhein, etc.*, in *Petersburg Med. Zeitschrift*, 1871, B. II, p. 61): Bazze, 67th Infantry; shot wound of os calcis and calcaneum Aug. 16, 1870; December 9, excision of part of calcaneum; reproduction of bone followed in a few weeks. IDEM (p. 80): French officer, shot through the os calcis at Sedan(?); partial excision of calcaneum by HEYFELDER; good recovery. TILING (G.) (*Bericht über* 124 *im serbisch-türkischen Kriege im Baracken-Lazarcth des Dorpater Sanitats-Trains zu Swilainats behandelte Schussverletzungen*, Dorpat, 1877, p. 81): M. G——, aged 21; shot fracture of calcaneum in September, 1876; excision of the os calcis; wound nearly healed in October.

[3] HAMILTON (F. H.) (*A Treatise on Military Surgery and Hygiene*, New York, 1865, p. 508): "The tarsal bones constitute a large portion of that important arch upon which the entire bony superstructure rests. The several portions of which it is composed are all alike essential to its perfection, and the removal of any single bone necessarily gives a certain degree of instability to the gait. What, therefore, might be regarded as a success in any other portion of the body must often be regarded as a failure here."

differing materially from each other. The medio-tarsal operation of Chopart,[1] between the astragalus and scaphoid bone (FIG. 361), was performed in eighty-five instances. In two the results were not determined; seventy-two were successful and eleven fatal. In two instances, with one recovery and one death, the reports merely indicate that the ablation was performed through the tarsal bones; these operations were probably also after Chopart. Lisfranc's[2] amputation through the tarso-metatarsal articulation (FIG. 362) was performed on twenty-four patients; twenty-two recovered, one died, and one result was not determined.

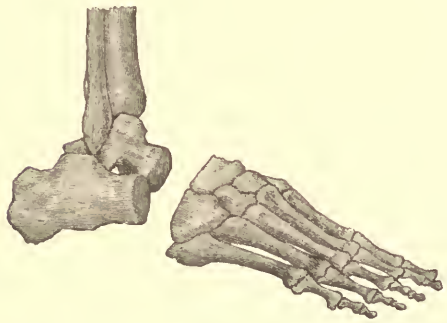

FIG. 361.—CHOPART'S amputation of the foot. [After ESMARCH.]

Hey's operation,[3] in which the four outer metatarsal bones are exarticulated at their junction with the tarsals, and the projecting part of the first cuneiform bone which supports the great toe is removed, was performed in seventeen cases; eleven were successful and six fatal. In one hundred and thirteen instances from one to four toes, with the corresponding metatarsals, were amputated,[4] and in one thousand two hundred and twenty-seven cases one or more toes were removed.[5] Of the two hundred and ninety-one patients with amputations in the foot, thirteen submitted to subsequent operations, viz: one to amputation at the ankle joint and twelve to amputations in the leg; one of the latter died. The twelve hundred and twenty-seven amputations of toes were followed by amputations in the foot in two, at the ankle joint in two, in the leg in six, at the knee joint in one instance, making a total of eleven re-amputations following amputations of the toes. In five hundred and fifty cases the amputation involved the right limb, in eight hundred and forty-seven the left limb, and in one hundred and twenty-one the side was not indicated.

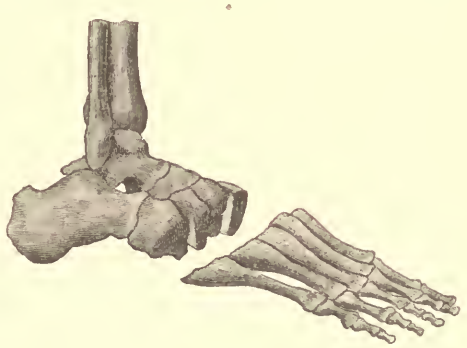

FIG. 362.—LISFRANC'S amputation in the foot. [After ESMARCH.]

It is difficult to attain a common standard of the usefulness of the foot after amputation, as the patient, according to his individuality, personal vanity, or the necessities of his condition, will insist on diverse requirements; but it is evident that a well-rounded stump is of the utmost importance. A remaining portion of a finger or thumb may be very useful; but a remaining toe will frequently be a source of annoyance and even an inconvenience; will add nothing to the patient's power of locomotion and prove a hindrance to the proper fitting of a shoe.

[1] LAFITEAU, *Observation sur une amputation partielle du pied*, in *La Médecine eclairée par les sciences physiques ou Journal des découvertes*, Paris, 1792, Vol. IV, p. 85.

[2] LISFRANC (J.), *Nouvelle méthode opératoire pour l'amputation partielle du pied dans son articulation tarso-métatarsienne*, Paris, 1815, p. 17.

[3] HEY (W.), *Practical Observations in Surgery illustrated by cases*, London, 3d ed., 1814, p. 554.

[4] Four metatarsals with their corresponding toes were amputated in 3 instances; three in 7 instances, two in 19 instances, and one metatarsal and the corresponding toe in 84 instances. Of the 113 cases, 5 were not terminated, 99 recovered, 9 were fatal.

[5] The operation involved one toe in 1,001 cases, two in 145, three in 31, four in 8, and all toes in 18 instances; in 24 cases the number of toes removed was not indicated.

CHAPTER XI.

MISCELLANEOUS INJURIES.

In the beginning of this work, in the first chapter on injuries of the head, and to some extent in the second, third, and fourth chapters on injuries of the face, neck, and spine, the miscellaneous injuries, as well as the injuries by weapons of war, were discussed. But as the work progressed it was found advantageous for the compiler as well as the reader to examine the injuries caused by direct impact of weapons of war by themselves, and to reserve the injuries from other causes for a separate chapter. In this chapter will, therefore, be considered the numerous accidents similar to those daily occurring in civil life, and to which the soldier is likewise exposed, such as burns, scalds, contusions, sprains, dislocations, frostbites, simple and compound fractures, punctured and incised wounds—not including sabre and bayonet wounds—and lacerated wounds. As will be seen from the following tabular statement the number of these injuries was by no means insignificant:

TABLE CIII.

Summary of One Hundred and Seventy-one Thousand Five Hundred and Sixty-five Miscellaneous Injuries.

	CLASSIFICATION.	TOTAL.		Percentage of Mortality.	WHITE TROOPS.		COLORED TROOPS.	
		Cases.	Deaths.		Cases.	Deaths.	Cases.	Deaths.
1	Burns and Scalds	10,100	98	0.97	9,487	94	613	4
2	Contusions	46,972	172	0.36	44,323	161	2,649	11
3	Concussion of Brain	922	215	23.31	873	193	49	22
4	Compression of Brain	61	17	27.86	61	17	.....	.....
5	Sprains	42,704	3	.00	38,387	3	4,317	.....
6	Dislocations	3,016	10	0.33	2,908	9	108	1
7	Fractures	1,287	53	4.11	1,287	53	.....	.....
8	Simple Fractures	4,346	76	1.74	4,215	61	131	15
9	Compound Fractures	1,371	397	28.95	1,316	378	55	19
10	Incised Wounds[1]	22,227	163	0.73	20,932	161	1,295	2
11	Lacerated Wounds	14,748	467	3.16	14,153	459	595	8
12	Punctured Wounds[2]	5,384	169	3.13	4,902	162	482	7
13	Poisoning	3,154	110	3.48	3,087	93	67	17
14	Other Accidents and Injuries	15,273	1,075	7.03	13,099	1,003	2,174	72
	Aggregates	171,565	3,025	1.76	159,030	2,847	12,535	178

[1] The entire number of incised wounds as indicated on page XXV of the First Surgical Volume was 22,749. From these have been deducted 522 sabre wounds referred to in the preceding ten chapters.

[2] The entire number of punctured wounds as indicated on page XXV of the First Surgical Volume was 5,784. From these have been deducted 400 bayonet wounds referred to in the preceding ten chapters.

Besides the number of accidents recorded in the preceding table there were a number of deaths from violence, such as drowning, suicide, homicide, and execution of sentence:

TABLE CIV.

Summary of One Thousand Three Hundred and Thirty-six Deaths from Various Causes.

	CAUSES.	TOTAL DEATHS.	WHITE TROOPS.		COLORED TROOPS.	
			Deaths.	Percentage.	Deaths.	Percentage.
1	Drowning	797	672	84.32	125	15.68
2	Suicide	278	270	97.12	8	2.88
3	Homicide	126	114	90.48	12	9.52
4	Execution of Sentence	135	103	76.30	32	23.70
	Total	1,336	1,159	.....	177	.....

The total number of troops engaged during the war is estimated (see introduction to *First Medical Volume*, p. XXXIX) at 2,335,942 men; of these 2,157,047, or 92.34 per cent., were white and 178,895, or 7.66 per cent., colored. It will thus be seen that the percentage of suicides among the colored troops was very small, while the percentages of deaths from accidental drowning and execution of sentence were large.

The injuries recorded in the preceding tables are of such frequent occurrence in daily life, and their treatment is so fully discussed in surgical journals and text-books and in the reports of civil hospitals, that it will only be necessary here to introduce, without comment, a few of the more serious examples of the different accidents, and to give, in tabular form, a summary of the operations subsequent to these injuries.

Burns and Scalds.—Injuries caused by the exposure of living tissue to a high degree of temperature are called burns; when the burn is produced by hot or boiling liquid it is called a scald. The pathological conditions and the treatment of burns and scalds are fully described by Dupuytren, Long, Erichsen, Crompton, Ashhurst, Follin, and Legouest and others.[1] The large majority of the ten thousand one hundred injuries of this nature during the war were of an exceedingly trivial nature, only ninety-eight, or 0.9 per cent., proving fatal. Those caused by the action of powder,[2] from explosions of cartridges, caissons, or magazines, were the most serious, and a few instances will be cited.

CASE 937.—Private G. Witter, 1st Ohio Battery, aged 29 years, was injured by the explosion of a caisson during the action near Winchester, July 20, 1864, and entered the Cumberland General Hospital three days afterwards. Acting Assistant Surgeon M. M. Townsend recorded the following description of the case: "The patient was suffering from burns of his face, arms, and hands. When admitted his appearance was dreadful, the burns involving the whole of the face, the anterior surface of the neck, and parts of the external surfaces of the forearms. On the hands the skin was destroyed in several places at the dorsal surface and ulnar edge. The patient's face was covered with a complete mask of dried pus, oil, and cotton, causing him to look like a negro in the suppurating stage of confluent small-pox. Warm emollient poultices and assiduous washing soon

[1] DUPUYTREN, *Des Brulures*, in *Leçons Orales de Clinique Chirurgicale*, Paris, 1839, T. IV, p. 503. LONG (JAMES), *On the Post-Mortem Appearances found after Burns*, in *London Medical Gazette*, London, 1840, Vol. XXV, p. 743. ERICHSEN (J. E.), *On the Pathology of Burns*, in *London Medical Gazette*, London 1843, Vol. XXXI, p. 544. CROMPTON (SAMUEL), *Report on Burns and Scalds*, in *The Transactions of the Provincial Medical and Surgical Association*, London. 1851, Vol. XVIII, p. 1. ASHHURST (JOHN, JR.), *On Burns*, in *Am. Jour. Med. Sciences*, Philadelphia, 1862, Vol. XLIV, p. 82. FOLLIN (E.), *Brulures*, in *Traité Elémentaire de Pathologie Externe*, Paris, 1869, T. I, page 521. LEGOUEST, *Brulure*, in *Dictionnaire Encyclopédique des Sciences Medicales*, Paris, 1870, T. XI, p. 184. MONTGOMERY (J. F.), *Burns and Scalds; their treatment, with cases*, San Francisco, 1872, and *Pacific Med. and Surg. Journal*, San Francisco, 1872, N. S., Vol. VI, p. 157.

[2] Burns by gunpowder have been treated by LONSDALE (E. F.), in *London Med. Gazette*, 1833, XI, p. 696; SCHNEIDER, *Verletzungen durch Schiesspulver, Gewehre, Zündhütchen und Zündhölzchen*, in *Zeitschrift für die Staatsarzneikunde*, Erlangen, 1851, B. LXI, p. 461; BUSCH (W.), *Mittel gegen Schiesspulver-Verbrennung*, in *Arch. für path. Anat.*, Berlin, 1858, B. XIV, p. 379; CABASSE, *Des brulures multiples au 1er, 2e et 3e degrés, produites par la déflagration d'une grande quantité de poudre*, in *Gaz. des Hôp.*, Paris, 1867, T. XL, p. 516; MÜLLER (A. W.), *Ueber Pulver-Verbrennung mit letalem Ansgang*, Leipzig, 1870; GILLIAM (D. T.), *Extensive powder burn*, in *Clinic*, Cincinnati, 1875, Vol. VIII, p. 30; MAISSIN (L.-E.), *Quelques cas de brulures causées par la déflagration de la poudre*, Paris, 1875; SMART, *On Burns by Gunpowder and Scalds by Steam*, in *Lancet*, London, 1876, Vol. II, p. 421; DOWNS (S.), *Severe Injury from Discharge of Gunpowder*, in *Toledo Med. and Surg. Journal*, 1880, Vol. IV, p. 167; FAIRBROTHER, *Disfigurement from gunpowder*, in *St. Louis Med. and Surg. Jour.*, 1880, Vol. XXXVIII, p. 491. LONGMORE (T.), *Gunshot Injuries*, London, 1877, p. 171.

removed the offensive incrustations, when a saturated solution of alum was applied with good effect. To the deepest burns on the hands poultices of slippery elm were found to be more grateful and beneficial than the alum and were therefore substituted, being followed three days later by simple cerate. This was continued until cure was complete." On September 5th the patient was transferred to Camden Street Hospital at Baltimore, where he remained until May 16, 1865, when he was mustered out of service and pensioned. Examining Surgeon J. G. Orton certified to the existence of "several extensive scars, the result of burns. One over the posterior part of the left elbow impairs the action of the extensor muscles and renders the joint defective. He also complains of pain in the back and over the bowels, resulting from a fall at the time of the explosion." Subsequent examiners report no additional information. The pensioner was paid September 4, 1881.

CASE 938.—Private C. H. Shields, 6th Maine Battery, aged 21 years, was injured by the explosion of some cartridges during the battle of the Wilderness, May 6, 1864. Surgeon H. C. Tompkins, 4th New York Artillery, reported his admission to the Artillery Brigade Hospital, Second Corps, with "severe burn of face and hands by powder." From the field the injured man passed to Armory Square Hospital at Washington, and thence to Cony Hospital at Augusta, where he was discharged from service for disability June 13, 1865, and pensioned. Examining Surgeon J. B. Bell reported, July 8, 1865, that "the disability results chiefly from disfigurement. Both ears were disagreeably deformed and partially destroyed. The left side of the face is scarred and blackened, and the use of the left hand is somewhat impaired by the scar of the burn." Examiner G. W. Burket, of Tyrone, Penn., certified September 4, 1873: "Both ears were burnt, causing partial deafness from closure of the external meatus of the left ear." Examiner I. E. Oatman, of Sacramento, Cal., September 4, 1879, confirmed the existence of partial deafness, also that the upper and greater portion of both ears were burned off by the explosion.

CASE 939.—Private C. Withee, 1st Wisconsin Battery, was severely injured by the explosion of a caisson during the battle of Big Black River, May 18, 1863. He was admitted to Union Hospital, Memphis, three weeks afterwards, where Surgeon J. D. Brumley, U. S. V., recorded the following result: "He had been very badly burned over his face, both hands and both arms, by the accident, and when he entered this hospital he was a most pitiful and repulsive looking object. His face was covered with scabs so that the eyes could not be opened. A bullous eruption covered the body and arms, and tetanus caused the left hand and wrist to be so contracted that the finger nails were embedded into the wrist, while the wrist was flexed on the arm to such an extent as to bring its dorsal aspect further down than any part of the hand. Trismus existed, so that a spoon could hardly be introduced between the teeth. By tonics, anodynes, and supporting treatment the patient was relieved sufficiently to enable him to converse and to take food by means of a spoon. His mind, which had been delirious, now became sane, and his left arm was straightened by gradual force, after which splints were applied. On June 15th, however, when taking some drink—after having taken his nourishment in the morning as usual—he appeared to have difficulty in swallowing, and in half an hour afterwards he died, apparently from suffocation caused by spasm of the epiglottis."

CASE 940.—Private R. A. Runion, Co. I, 68th Indiana, aged 24 years, had his feet scalded by accident, and was admitted to Hospital No. 13 at Nashville on February 26, 1863. Surgeon E. Swift, U. S. A., contributed the following report of the case: "The injury was caused by the upsetting of a pot of hot coffee, involving the right foot at the heel and toes and affecting the left foot but slightly. No unfavorable symptoms were presented when the patient was admitted. His pulse and respiration were natural; tongue lightly furred; bowels rather loose, with a tendency to diarrhœa. The wound was dressed with simple cerate. On February 28th his bowels became more loose, accompanied by slight pain, when pills of blue mass, ipecacuanha, and opium were prescribed. The effect of this seemed to be favorable and indications were generally promising until March 5th, when the bowels became costive, the urine scanty and very highly colored, and the skin yellow, showing all the symptoms of an aggravated case of jaundice. With a view of gently moving the bowels, two compound cathartic pills were then given, followed four hours afterwards by doses consisting of two grains of quinine, three grains of nitrate of potassa, and one-twelfth of a grain of morphia. On March 7th the bowels were still costive and the urine scanty. Indeed all the symptoms were aggravated and the patient had a severe spasm followed by delirium approaching mania. Three pills, each containing five grains of blue mass and one drop of croton oil, were now prescribed, one to be given every three hours until the patient had an operation. He was bathed, and warm water was given freely, and corn-meal gruel. On March 8, 1863, the patient died, having been comatose and perfectly unconscious since the spasm of the previous day. Perspiration and urine became profuse before death. *Sectio cadaveris:* An incision was made from the ensiform cartilage to the symphysis pubis and transversely to the crest of the ilium. The general appearance of the liver was not marked, though of a rather pale color and tough in texture. The gall bladder contained the usual amount of bile, the hepatic and cystic ducts being perfectly pervious and free. The ileum and jejunum were natural in appearance, but the duodenum gave evidence of being the seat of the disease. It had a soft, doughy feeling, its inner coats being softened down and entirely disorganized; perforation had taken place at a number of places in this part of the intestinal canal. The outer coat was perforated, with sharp well-defined edges, while the inner coats were softened and beveled, and indeed affected in their entire surface. A marked peculiarity was that the disease involved only the duodenum, the other parts of the alimentary canal being in a perfectly normal condition."

Contusions and Sprains.—Less serious even than the preceding group of injuries were the numerous contusions and sprains. Forty-six thousand nine hundred and seventy-two of the former had one hundred and seventy-two, and forty-two thousand seven hundred and four of the latter had three deaths,—a total of eighty-nine thousand six hundred and seventy-six cases, with one hundred and seventy-five deaths, or a mortality of 0.19 per cent. As a rule the patients were returned to duty, no lasting disabilities having followed the injuries. A few of the graver cases will here be cited:

CASE 941.—*Contusion of the spine.*—Private J. Sanford, Co. I, 32d Massachusetts, aged 37 years, was accidentally hurt in the back on September 12, 1862. He was admitted to Fairfax Seminary Hospital the following day, where he was discharged

from service on December 8, 1862. Surgeon D. P. Smith, U. S. V., certified to the following disability: "An injury of the lumbar vertebræ which has resulted in inflammation of the kidneys and of the tissues of the lumbar region, rendering it difficult for him to stand." The Boston Examining Board reported, November 27, 1862: "Partial paralysis of the superior and inferior extremities, bowels, and bladder from injury to spine. The paralysis of the inferior extremities is no worse than a year ago, perhaps the legs are a trifle smaller. The paralysis of the arms has increased somewhat. The disability is permanent and incapacitates him for all manual labor." Dr. W. H. Wallace, of East Boston, testified, March 29, 1880: "The pensioner is suffering from an injury of the spine, partial paralysis of the upper and lower extremities, great irregularity of the bowels—sometimes obstinate constipation, at others diarrhœa; also inability to retain the urine and at times inability to pass it. He requires the passing of a catheter once and often twice a week, and is unable to feed, dress, or undress himself fully two-thirds of the time. There is emaciation and loss of sleep from pain in back and legs. He will never be any better."

CASE 942.—*Contusion of the spine.*—Private R. Clark, Co. D, 6th Ohio Cavalry, aged 54 years, received an injury of the spine during the battle of Bull Run, August 29, 1862, and was treated at St. Aloysius Hospital, Washington. Assistant Surgeon A. Ingram, U. S. A., in charge, reported the man's discharge from service December 18, 1862, by reason of "slight anterior curvature, with much tenderness resulting from the injury." The Chicago Examining Board, September 5, 1873, reported that the man was hurt by falling from his horse, and that "the horse stepped upon his loins, injuring the structure of the spine in the muscular and fibrous portions. There is apparent permanent rigidity of the spinal muscles and great pain on pressure or movement." Examining Surgeon J. F. Daggett, of Lockport, Illinois, May 22, 1877, certified to an injury of the spine, etc., and stated that it is difficult to determine what structural impairment there is, but that the functional derangement is severe and continued, and that there is "anchylosis of the lumbar vertebræ; brain affected from spinal irritation or other causes; tendency to mental derangement; general health bad." The pensioner died August 24, 1881, from the results of his injuries.

CASE 943.—*Sprain of the back.*—Private J. B. Saunders, Co. K, 143d New York, aged 47 years, entered Satterlee Hospital, Philadelphia, December 23, 1862. He had several months previously received a fall against the arm of a seat in a railroad car, straining the small of his back. Since then he had suffered from occasional retention of urine, and his bowels were never moved except by the most powerful cathartics. Pressure upon any of the lumbar vertebræ appeared to give pain, but there was no fracture or displacement to be detected. While the patient remained in Satterlee Hospital large doses of castor oil, with one drop of croton oil added, were administered, and pills of compound extract of colocynth, with one-sixteenth grain of strychnine added, were given. Friction to the spine, with stimulating liniments, was applied. No change took place in the condition of the patient, who was discharged from service January 29, 1863, and subsequently became a pensioner. Surgeon I. I. Hayes, U. S. V., who reported the case, described that there seemed to be a complete paralysis of the muscular coats of the large intestine and also of the sphincter ani, from which cause an evacuation would take place only when the mass of fæces became so great from natural accumulation or from the action of the cathartics as to no longer leave room in the bowels to contain it, when the fecal matter appeared to pass off by force of gravity and unmolested by the sphincter as soon as it reached the rectum. Examining Surgeon A. Otis, of Ellinsville, N. Y., December 8, 1872, certified: "There is great tenderness of the spine, especially of the lumbar vertebræ. His lower limbs are very weak and at times almost paralyzed. He trembles almost continually, has an anxious, waxy, and cadaverous expression of countenance, difficulty in micturition, and is excessively constipated." The pensioner died from the effects of his injuries December 2, 1875.

CASE 944.—*Contusion of the abdomen.*—Private A. Bickel, Co. K, 142d Pennsylvania, aged 29 years, entered Satterlee Hospital July 10, 1863, having received a severe injury during the march to Gettysburg. The accident was incurred while a fence was being knocked down for the purpose of facilitating the passage of troops, when he was struck with the butt end of a musket in the lower part of the abdomen, causing a severe contusion of the bowels and forcing the right testicle back into the abdomen. The patient suffered much from pain in the bowels, which were also quite inactive, and his general health as well as his appetite was poor. His treatment consisted of the administration of compound cinchona tincture and of rhubarb, to which subsequently aloes and small quantities of extract of nux vomica and hyosciamus were added. On November 1st, the patient's bowels being still very painful and inactive, the medicines were discontinued and injections of warm salt water were substituted. Very little change in the condition of the patient occurred up to December 16, 1863, when he was discharged from service and pensioned. The history of the case was contributed by Acting Assistant Surgeon D. Kennedy. Examining Surgeon S. L. Beck, of Mifflinburg, Pennsylvania, September 17, 1873, certified that "the stroke produced an injury of the bladder and an abdominal rupture, which causes some pain and other inconvenience, so that he is somewhat disabled in performing manual labor. He will be no better, but may get worse." Examiner T. H. Wilson, of Lewisburg, Pennsylvania, reported, November 14, 1881: "I find the pensioner has a reducible inguinal hernia in the right side and has been wearing a truss, which, he alleges, does not retain the bowel completely, so that it frequently escapes in spite of the truss," etc.

CASE 945.—*Contusion of the shoulder.*—Private J. M. Granger, Co. F, 141st New York, aged 26 years, entered Central Park Hospital, New York City, December 17, 1862. Surgeon B. A. Clements, U. S. A., forwarded the following report: "In October, 1862, the patient was injured at Annapolis by the falling of a heavy piece of timber on his right shoulder, striking upon the superior and posterior aspect over the spine of the scapula. The blow was so severe as to knock him down. He was immediately taken to hospital, where the hand and arm swelled largely and he became unable to use them without great suffering. Five weeks afterwards he entered Trinity Hospital at Washington, whence he was transferred here two weeks later. On examination the patient was found to be well nourished and in general good condition, but his face had an anxious expression, or that of suffering. The right shoulder was swollen, the greatest amount of tumefaction being directly over the supra-spinous region. The whole arm and hand were also swollen and of a purplish color, and the patient was unable to raise them except to a limited degree. By an assistant the arm could be moved with difficulty and the hand might be placed on the top of the head. The patient underwent a variety of treatment, including colchicum, iodide of potassa, liniments, etc., without any appreciable benefit, the condition of the shoulder and arm remaining unchanged, the hand swollen and cold, and the arm quite stiff and useless. When he received his discharge from service December 23, 1863, his general health was not as good as formerly." He subse-

quently made application for pension, and received the following certificate from Examining Surgeon W. M. Chamberlain, of New York City: "There has been a general contusion of the shoulder, followed by inflammatory action about the joint. Depression of the shoulder and almost total inability to use the arm is dependent perhaps upon rupture of the musculo-spiral nerve." Owing to the applicant's inability to prove the origin of the injury in the line of duty his claim for pension was rejected.

CASE 946.—*Sprain of both ankles.*—Private A. Leehaus, Co. K, 4th Ohio Cavalry, aged 39 years, accidentally sprained both ankles severely at Stone Mountain, October 23, 1864. After passing through various hospitals he was transferred to Madison, where he was mustered out of service May 25, 1865. Subsequently his name was admitted on the Pension Rolls. Examining Surgeon J. S. McNeeley, of Hamilton, Ohio, certified July 2, 1873: "Both ankles are partially anchylosed, the right one to a greater extent, and both are painful when walking, especially at night after having walked much during the day. The pains are influenced by atmospheric changes. The right ankle is always swollen, the left one at times." Other examiners substantially report the same condition. The pensioner was paid December 4, 1880.

Concussion and Compression of the Brain.—The nine hundred and eighty-three cases of this group have been considered in detail in the chapter on injuries of the head, and the reader is therefore referred to pp. 35–68 of the *First Surgical Volume.*

Dislocations.—The percentage of mortality of the three thousand and sixteen cases of dislocations was 0.33, death having followed the injury in ten cases; but the records of the Pension Office show that the results of many of these injuries were severe and of long continuance, the disabilities frequently increasing with time.

The great number of bones, with their projecting processes, which form the vertebral column, the narrow limits to which mobility in the column is confined, the manner in which the articular surfaces are joined, the number and strength of ligaments which hold them together, and of the muscles which enclose them, would seem to preclude the possibility of displacing any portion of the column without at the same time causing a fracture of the body of the vertebra or of its many processes. A few cases of dislocation of the dorsal or lumbar vertebræ without fracture were recorded, but the correctness of the diagnosis in some of the cases may well be questioned. A case of luxation of the lumbar vertebra is reported by Surgeon E. Bentley, U. S. V.:[1]

CASE 947.—*Dislocation of first lumbar vertebra.*—Private A. Hoffman, Co. E, 101st New York, sustained a dislocation of the superior lumbar vertebra by the falling of the brick wall of a building at Port Republic, June 1, 1862. He was admitted to Washington Street Hospital, at Alexandria, sixteen days after the occurrence of the accident, there being perfect paralysis of all

[1] Instances of dislocation of the lumbar vertebræ are not frequent. HAMILTON (F. H.) (*A Practical Treatise on Fractures and Dislocations*, Philadelphia, 1875, p. 541) cites two cases: one from CLOQUET (*Obs. d'une luxation de la colonne vertébrale comp. de fracture, et suivie de guérison*, in *Orthop. Clin. sur les Difformités*, par C. A. MAISONABE, Paris, 1834, T. I, p. 453, a second from DUPUYTREN (*Leçons Orales de Clin. Chir.*, Paris, 1839, T. I, p. 464); both cases were accompanied by fracture. To these may be added instances cited by: FABRICIUS HILDANUS (*Opera quae extant omnia*, Francofurti ad Moenum, 1646, Cent. V, Obs. 68, p. 459): A farmer, falling from a tree, had one of the lumbar vertebræ forced inward; paralysis of the lower extremities; he survived several years. AURRAN (*Luxation incomplete des vertebres*, in *Jour. de Méd. Chir. Phar.*, etc., Paris, Decembre, 1771, T. XXXVI, p. 522): A man was forcibly thrown on his seat; the spinal apophyses of the 2d and 3d lumbar vertebræ became very prominent; diastasis of the vertebræ; body bent forward; unable to straighten out; amelioration in two months. SCHMUCKER (J. L.) (*Von einer Verrenkung des letzten Rücken- und ersten Lendenwirbelbeins, vom Herren* RÜDIGER, in *Vermischte Chirurgische Schriften*, Berlin und Stettin, 1776, B. I, p. 286): A wall falling on a soldier caused dislocation of last dorsal and first lumbar vertebræ, the former being forced outward and to the right to the width of three fingers; recovery. BRÜCKMANN (*Beobachtung einer Verrenkung des zweiten Lendenwirbels*, in *Arch. für Med. Erfahrung. im Gebiete der prakt. Med. Chir. Geburtsh. und Staatsarzneikunde, Jahrgang* 1825, Berlin, 1825, p. 469): Young man, aged 30, jumped from third-story window; dislocation of second lumbar; paralysis of bladder; survived the injury eighteen months. LARREY (D. J.) (*Clinique Chirurgicale*, Paris, 1829, T. III, pp. 271–272): A young soldier received a complete luxation of the first lumbar from a contusion by a cannon ball; recovery. A young Swiss soldier fell from a third story window; complete luxation of first lumbar; leg fractured and amputated; recovery. A soldier named Samson received a complete luxation inward of the first lumbar by a fall from a parapet; spine curved till the head touched the knee; lower extremities paralyzed; paralysis gradually diminished; patient survived. LEBERT (*Luxation simple et incomplète par cause externe de la douzième vertèbre dorsale, en avant de la première lombaire, etc.*, in *Bull. de la Soc. Anat. de Paris*, Paris, 1836–'37, T. II, p. 238): Déloge, aged 50, received a dislocation of the first lumbar by the fall of a scaffolding; paralysis of lower extremities; death in 46 days; at the autopsy the first lumbar was found dislocated downward and inward; there was fracture of the body of the vertebra. MERTENS (*General-Bericht des Königl. Rheinischen Med. Collegii über das Jahr* 1840, Koblenz, 1841, p. 97) successfully reduced a dislocation of the third lumbar which projected half an inch. KEIJ (*Förhandlingar vid Svenska Läkare-Sällskapets sammankomster*, 1857–1858, in *Hygiea*, Stockholm, 1858, B. XX, p. 116): Sailor, aged 23, January 7, 1858, second lumbar dislocated 7 lines backward, fracture of articular and transverse processes; death. KUNKLER (G. A.) (*Case of Dislocation of Third Lumbar Vertebra*, in *Cincinnati Lancet and Obs.*, 1858, Vol. I, p. 212): In 1856, a young man, aged 19, was thrown from a swing; large depression, fully admitting a pigeon's egg, in region of third lumbar vertebra; recovery; depression remaining. VINCENT (*Bulletins de la Société Anatomique de Paris*, Paris, 1850, T. XXV, p. 85), in March, 1850, presented to the Anatomical Society of Paris a specimen of fracture and dislocation of the first lumbar vertebra. Patient had been injured 8 months previously; the fracture had consolidated; there had been paralysis of the lower extremities and of the bladder and rectum. HOLMES (T.) (*Dislocation of the Spine in the Dorsi-Lumbar Region*, in *Transact. of the Path. Soc. of London*, 1859, Vol. X, p. 219): Man, aged 19, struck across the loins by a heavy piece of timber on October 30, 1858; paralysis of lower extremities and bladder; died Nov. 22; preparation in St. George's Museum; the transverse processes of the lumbar vertebra are fractured. RANKE (H. R.) (*Ueber Beugungsluxation der Lendenwirbel*, inaug. diss., Halle, 1873, p. 14): Man, aged 30, fell about 30 feet from a platform; luxation backward of first lumbar; paralysis of lower extremities and bladder; compression of spinal cord; death after 2 months and 11 days. The autopsy showed that there was no fracture. PORTA (L.) (*Delle lussazioni delle vertebre, etc.*, Oss 7, p. 6): A soldier fell from his horse and dislocated the fourth lumbar forward the width of a

the parts below the seat of injury. His stools passed off involuntarily, and the urine was drawn off by the catheter. On July 5th he passed his urine freely and some slight sensation was felt in both feet and legs. Erysipelatous inflammation attacked the inguinal region of the right side and resulted in gangrene, terminating in death on August 29, 1862. No autopsy was recorded.

In the next case the ninth dorsal vertebra was displaced, allowing two fingers to be inserted between the eighth and the tenth vertebra.

CASE 948.—Surgeon G. Jewett, 51st Massachusetts, describes a case of dislocation, which occurred at Newberne, May 20, 1863, as follows: "The case was an injury of the spine, not positively diagnosticated. The patient was in a sitting posture when he was crushed to the ground by a great weight from behind applied to his back and shoulders, bending the back nearly double. Within three minutes I examined the back and found a fluctuating tumor occupying the site of the ninth dorsal vertebra. The tenth was very prominent. Two fingers could be inserted between the eighth and tenth. Perfect loss of sensation and motion existed below the injury, with paralysis of the sphincters, and there was considerable shock and violent pain in the epigastrium. The treatment was by rest and opium. Three days after the accident a digital examination showed a reappearance of the lost vertebra, a great difference between the spinous processes still remaining. No crepitus could be discerned at any time. At this date (the eleventh day after the injury) the patient is in General Hospital and the paralysis still continues. My opinion is that there was a luxation anteriorly of the ninth dorsal vertebra." No positive identification of this case has been practicable from the registers of the New Berne hospitals. Corporal J. F. Simpson, Co. I, 51st Massachusetts, is the only member of that regiment who is recorded as having been treated for "paralysis" at the Stanley Hospital from May 25th to July 6, 1863. Three weeks later he was mustered out by expiration of service. He is not a pensioner.

Displacement of the eighth dorsal vertebra was accompanied by fracture of the processes in the following case:

CASE 949.—Private R. L. Root, Co. D, 32d Wisconsin, aged 33 years, was severely hurt in the back while engaged in building fortifications at Decatur, June 20, 1864. About five weeks afterwards he was transferred to Nashville, whence Surgeon R. R. Taylor, U. S. V., reported his admission to hospital No. 8, and described the injury as a "dislocation of the spine." Several months later the patient was transferred to Brown Hospital, at Louisville, where he was discharged for disability November 10, 1864, Assistant Surgeon B. E. Fryer, U. S. A., certifying to "fracture of dorsal vertebra, producing paralysis of the right inferior extremity." Examining Surgeon W. H. Walker, of Fond du Lac, Wisconsin, reported, June 10, 1865: "He was injured by being crushed down under a stick of timber. Fracture of the process of the eighth dorsal vertebra seems to have been produced, which has resulted in extensive forward curvature of the spine. The ligaments of the right hip joint were strained so that they are now relaxed, weakening the joint." Examiner H. Roberts, of Providence, Pennsylvania, December 28, 1868, made a corroborating report of the injury and its results, stating that "a gradual and increasing curvature of the spinal bones in the portion known as the dorsal has been going on for three years. The curve is about eight inches in length and the deviation is now two inches to the right, with a very short convex curve also. For the past year he has had to almost entirely abandon any work which required him to stoop forward and lift any light weight." The Philadelphia Examining Board, June 8, 1881, referred to curvature and deformity as being very marked, and added that the pensioner "states that he suffers from numbness in the lower extremities. There is atrophy of the muscles over the buttock. He would have been benefited by a spinal support, but owing to the want of this he has become so disabled that he can do no labor."

As an example of sub-luxation of one of the cervical vertebræ Surgeon J. Tunnicliff, 1st Michigan, has furnished the following notes of an accident which occurred on the Baltimore and Ohio Railroad during the month of November, 1861:

CASE 950.—"The man was standing guard during a gale on an embankment while a lumber train was passing. The wind blew him off the bank down into the cut, by the passing train, and at the same time lifted a quantity of lumber from the cars and piled it on him. It was about two minutes before the lumber could be removed sufficiently to relieve him. The main injury seemed to be in the cervical vertebræ. Indeed, the force of the blow as well as the weight of the lumber was on the neck. As he was lifted up he said 'he thought his neck was broken.' His head was inclined to one of the shoulders, and for a number of minutes he was utterly unable to raise it up. The pain he represents as having been most excruciating. He persisted, however, in his efforts, with the assistance of one of his comrades, who performed traction by grasping his head, when a sudden snap was felt and heard distinctly by himself and those about him, and his head had resumed its normal position. This was followed by acute pain at the point of the injury to the cervical column, with a most distressing tingling sensation and pain down the brachial plexus, which continued more or less for four weeks after the injury. He was unable to rotate his head one-half inch even after five weeks, and, although improving, he cannot now (December 31, 1861) do it more than two inches, marking at this time about four inches of a segment of a circle with the end of his nose." The name of the soldier could not be learned.

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finger; no fracture; ligament destroyed. FOWLER (R. S.) (*Dislocation of the Lumbar spine*, in *The British Med. Jour.*, 1863, Vol. II, p. 280): Laborer, aged 25, in 1863; dislocation between 1st and 2d lumbar, the lower vertebra being thrown behind and to the left of that above it; lower extremities not paralyzed; death on the following day; at the autopsy no fracture of the vertebræ was discovered. *Clinical Lectures and Reports of the London Hospital*, London, 1866, Vol. III, pp. 348, 354: At the Museum of the London Hospital are 3 specimens of luxated lumbar vertebræ; in one the body of the first lumbar has slipped forward for about half an inch on the surface of the second, crushing the latter. In the second specimen the third lumbar is nearly half an inch in front of the fourth, with only very slight splintering of the edges of the bones. The third specimen shows a clean dislocation of the third lumbar forward without fracture. The articular processes of the third lumbar have completely left those of the fourth and passed forward a third of an inch. There is no important fracture. EULENBERG (A.) (*Luxation und Fractur des ersten Lumbalwirbels, mit tödtlichem Ausgange durch Rückenmarkscompression und secundäre Cystitis und Pyelonephritis*, in *Archiv für Klin. Chir.*, Berlin, 1866, B. VII, p. 507): A printer, on May 1, 1865, fell a distance of twenty feet; first lumbar dislocated backward ½ inch; death on the following day; splintering of body of vertebra.

In the following, the sternal end of the clavicle was dislocated upward. As in similar cases cited by Malgaigne and Hamilton,[1] the dislocation could readily be reduced, but it was impossible to retain the bone in its place.

CASE 951.—Private E. D. Hallenbeck, Co. B, 1st Wisconsin Cavalry, aged 26 years, entered Hospital No. 2 at Nashville on August 12, 1863, having sustained a dislocation of the sternal end of the right clavicle by falling from his horse. Acting Assistant Surgeon E. Jennings, who reported the case, stated that the attempt was made to reduce the luxation, but the bone could not be retained in its place. In the following month the patient was detailed for light duty about the hospital, and on February 6, 1864, he was assigned to the Veteran Reserve Corps. He was ultimately mustered out and pensioned. Examining Surgeon W. A. Knox, of Chicago, Illinois, May 18, 1867, reported the "dislocation still unreduced. The injury being upon the right side materially interferes with his capacity for manual labor." The Chicago Examining Board certified, March, 1879: "He has permanent dislocation of the right clavicle from its sternal articulation upward. The end of the bone has affixed above its natural position, weakening the part and limiting the power in the right arm."

Examples of dislocations of the various joints of the upper and lower extremities will next be adduced. Dislocations at the shoulder and elbow joints were the most frequent:

CASE 952.—*Dislocation at the shoulder.*—Farrier L. Swafford, Co. G, 9th Indiana Cavalry, aged 36 years, was severely hurt at Pulaski, November 8, 1864, by his horse falling and throwing him upon his left shoulder, dislocating the joint. For some weeks he was at the regimental hospital, where ineffectual attempts were made to reduce the luxation, and subsequently he entered Gayoso Hospital, at Memphis. Surgeon F. N. Burke, U. S. V., in charge of the latter, reported that the patient was transferred to the Veteran Reserve Corps May 11, 1865, by reason of disability from "chronic dislocation of left shoulder joint." The man was mustered out of service September 4, 1865, and subsequently became a pensioner. Examiner J. Mendenhall, of New Castle, Indiana, reported May 17, 1866: "I suppose the joint has been dislocated; it is now partially anchylosed. He cannot put his hand on top of his head, nor raise the elbow up from the body more than about twelve inches, but can move it better forward than backward. But this motion is limited, though I think it will improve." Examining Surgeon W. H. Boor certified, December 9, 1875: "I find the left shoulder joint anchylosed so that the arm cannot be raised only as the scapula gives it motion. The muscles of the arm and forearm are soft. He says his shoulder is painful." This pensioner was paid December 4, 1880.

CASE 953.—*Dislocation at the elbow.*—Private H. Mewes, Co. E, 63d Illinois, aged 28 years, had his elbow joint dislocated by falling from a wagon during the march near Holly Springs, October 20, 1863. He was treated at the regimental hospital, subsequently in Nashville, and lastly in Clay Hospital, Louisville. Surgeon A. F. Watson, U. S. V., in charge of the latter, described the injury as an unreduced "dislocation of the radius." The man was mustered out of service April 11, 1865, and subsequently made application for pension. Examining Surgeon L. W. Low, of Albion, Illinois, reported June 4, 1868: "The injury is such that the head of the radius is luxated and again adjusted by rotary motion of the hand and forearm, rendering the hand and arm nearly useless for labor and weak at all times." Examiner H. C. Reed certified, July 4, 1879: "The ulna is displaced inward, the olecranon resting on the internal condyle. The forearm is quadriflexed and about one-half pronated, there being very little rotary motion retained. The head of the radius could not be located, but a distinct 'snap' could be felt on forcible rotation outward over the normal site."

CASE 954.—*Dislocation at the elbow.*—Private H. Finley, Co. H, 5th Connecticut, aged 29 years, suffered a dislocation of the right elbow while going to Stevenson, Alabama, October 5, 1864, on a railroad train, which was attacked by the enemy and brought to a sudden stop, causing him to be violently thrown to the ground. He was treated in the field hospitals of the Twentieth Corps until the arrival of the troops at Savannah, when he was placed on board of a hospital steamer and conveyed to McDougall Hospital, Fort Schuyler, New York Harbor. Assistant Surgeon S. H. Orton, U. S. A., certified to the patient's discharge from service March 13, 1865, by reason of uselessness of the right arm from an "unreduced luxation of the ulna backward upon the humerus." Examining Surgeon W. W. Potter, of Washington, D. C., March 29, 1869, certified to the following disability: "A fall upon the right elbow while in a semi-flexed position has driven the olecranon process of the ulna upward between the condyles of the humerus, at the same time forcing them apart. Considerable deformity is the result, with inability to flex the forearm beyond a right angle or to extend it perfectly. He has very little strength in the arm; its motions are circumscribed and general usefulness seriously impaired." Examiner M. Burton, of Richmond, Virginia, reported, September 23, 1873, that "the dislocation still exists, the joint is inflexible and the limb useless for manual labor. The fingers have some power of flexion and extension." This pensioner was paid June 4, 1881.

CASE 955.—*Dislocation at the wrist.*—Private C. Meservey, Co. G, 69th Indiana, aged 47 years, received a severe injury of the left forearm and wrist during the battle of Richmond, August 30, 1862. Surgeon M. K. Taylor, U. S. V., reported his discharge from service at the Keokuk General Hospital, March 5, 1863, by reason of the following disability: "Much deformity from an unreduced fracture of the radius and dislocation of the lower end of the ulna." The man subsequently became an applicant for pension, and received the following certificate from Examining Surgeon S. W. Vance, of Connersville, Indiana, on June 18, 1867: "The injury consisted of a fracture of the lower end of the radius about an inch and a half from its articulation with the semilunar and scaphoid bones, together with a dislocation of the lower end of the ulna. This dislocation and the fracture of the radius just above caused the hand to assume a rather pronated condition, carrying forward with it the lower fragment of the radius, which has united to the superior fragment, leaving the bone, however, very crooked at the site of the fracture and the end of the ulna still dislocated. The condition of the bones necessarily renders rotation impracticable, and

[1] MALGAIGNE (J. F.). *Traité des fractures et des luxations*, Paris, 1855, T. II, p. 426. HAMILTON (FRANK H.), *A Practical Treatise on Fractures and Dislocations*, Philadelphia, 1875, p. 561.

moreover greatly weakens and debilitates the muscles and tendons of the surrounding parts," etc. Examiner A. C. Fosdick, of Brownsville, Indiana, in July, 1875 and 1881, reported no change in the condition of the injured parts.

The following is an example of successful reduction of a dislocation of the head of the femur upward and backward into the great ischiatic notch. The thigh had become flexed on the pelvis at nearly right angles, and the limb was well thrown across its fellow:

CASE 956.—*Dislocation at the hip.*—Lieutenant Colonel W. A. Bullitt, 3d Kentucky, aged 24 years, was wounded at the battle of Rocky Face Ridge, May 9, 1864. He was wounded in two places. The first shot entered at a point five inches below the anterior superior spinous process of the ilium, left side, and did not emerge; the second ball struck the right side between the seventh and eighth ribs and came out about four inches below the point of entrance and two inches posteriorly. An ambulance was obtained and the patient was transported five miles to a field hospital, whence he was taken to Chattanooga the following day. On the ninth day erysipelas commenced in the wound of the right side, which extended all over the body and up to the head, resulting in numerous abscesses in the areolar tissue. On June 3d the patient was transferred to Louisville, where an attack of dysentery came on and reduced him very much. This was in turn succeeded by another attack of erysipelas, extending all over the body as the former had done. About August 7th he began to have a great deal of pain in the left iliac fossa, which at first was paroxysmal and continued a month before the abscess that gave rise to it was detected. This abscess was opened by a deep cut one-half inch to the inside of the anterior superior spinous process and above Poupart's ligament, when a large quantity of pus—estimated by the surgeons present at half a gallon—escaped. The abscess continued to discharge for about three months. When the pain first commenced the patient, in order to feel relief, would flex his thigh on the pelvis during the paroxysms, which came on about 5 o'clock daily; but afterwards he kept the knee closely approximated to the chest and any attempt to extend the limb caused severe pain. About October 20th, while in the act of turning over from his back to his right side, he felt the head of the right femur slip from its position with a severely painful jolt. This occurred almost daily for two weeks, when the attention of the surgeon was called to it and a dislocation was recognized. The patient was etherized and an unsuccessful attempt made to replace the bone. The abscess closed up shortly afterwards. A second attempt at reduction in February, 1865, again failed. A few days later the patient got out of his bed and began to walk about on his crutches. He came to New York City May 24th, where he was admitted to the Central Park Hospital, under the care of Dr. L. A. Sayre, who reports the following: "When I saw him in June his general health was good and he was able to walk about very well on crutches. His left thigh was flexed on the pelvis at nearly right angles and strongly adducted across its fellow, lying on its upper third and compressing the genital organ. The difficulty of urinating was a most serious annoyance. The whole limb was much colder than the other, bathed in perspiration, and much shrunken in size. There was some slight mobility of the hip and of the knee, which was stiffened by a firm contraction of the hamstring muscles. Motion, however, gave pain. On July 20th I determined to attempt reduction by manipulation after the method so well described by Dr. Reed and Surgeons W. J. Sloan, J. J. Milhau, U. S. A. Several bed-quilts were folded and laid upon the floor; the patient was placed thereon and thoroughly anæsthetized by chloroform. After removing my boots I placed one heel on the crest of each ilium, thus holding the pelvis by the weight of my own body, when with some considerable force I succeeded in breaking up the adhesions and obtained tolerable free motion of the limb. The finger was then passed into the rectum as far as the ischiatic notch, and when the limb was moved by an assistant the head of the femur could be distinctly felt gliding on the finger. This examination was also made by Professor Hamilton, and the diagnosis as to the position of the head of the bone was confirmed. I thereupon stated my intention that, should the attempt by manipulation prove unsuccessful, I would wait some days for the inflammation necessarily produced to subside, then subcutaneously divide the contracted adductor muscles and restore the limb to parallelism with the other, leaving the head of the bone in its abnormal position. By considerable effort I finally succeeded in reducing the limb to parallelism with the other, retaining it there by means of extension with weight and pulley over the foot of the bed and secured to the thigh by means of adhesive plaster and a roller. On account of the long-continued contraction of the hamstring muscles the leg could not be extended from the thigh; but as the tension had given way somewhat while the patient was under the influence of chloroform, I concluded to try and bring it straight by constant extension, and consequently applied another plaster below the knee, with weight and pulley on the foot of the bed, a little lower than the former one, the thigh being slightly elevated every day until the limb was straightened and the two extending forces acted in the same line. Another weight and pulley was applied at a right angle to the limb, opposite the knee joint, for the purpose of adducting the limb. An irrigating apparatus, from which cold water was constantly dripping, was arranged over the hip joint, and a rubber cloth placed under to protect the bed. For three days the patient suffered great pain and had to use morphine to allay it; but after the third day no anodyne was necessary. No reactionary fever or constitutional disturbance set in, and at the end of the third week the limb was parallel with the other and of the same length. A line drawn, however, from the center of the pubis to the trochanter major of that side proved to be nearly half an inch longer than measurement on the opposite side, and firm pressure from the foot caused it to ride upon the ilium and become more than an inch shorter than the other. It became necessary, therefore, to devise some plan by which the limb could be extended during walking and the weight of the body borne upon it. I therefore took a plaster cast of the hip in its improved position and on this cast fitted a crutch passing under the pubis and around the gluteo-femoral fold, with a wing hammered out so as to accurately fit the buttock, in which he could comfortably sit. Opposite the tuberosity of the ischium I made a ball and socket joint, from which an iron rod ran down the limb to the ankle joint, being bifurcated at its lower extremity and terminating in rounded knobs, and the main shaft being capable of extension by means of a racket and cog-wheel. A neatly fitting shoe, well padded on the instep to bear pressure, had an iron band secured under the sole, which terminated opposite each side of the ankle in cups or sockets to receive the rounded ends of the rod. With this instrument adjusted and the extension applied the limb was brought to the same length as the other, and the patient could bear his entire weight upon it without pain. The limb, which before the operation had been cold and very much atrophied, now grew rapidly in normal temperature and in October had nearly resumed its natural size." Photographs of the patient, showing the position of the limb before and after the operation, and of the apparatus, applied and unapplied, were forwarded with the history of the case by the operator, who also contributed

two plaster casts, one representing the hip eight months after the luxation and the other the condition of the reduced parts. The casts constitute specimen 4033 of the Surgical Section of the Museum. Lieutenant Colonel Bullitt was mustered out of service October 7, 1865.

CASE 957.—*Dislocation at the hip.*—Private J. B. Holroyd, Co. C, 15th Illinois, aged 28 years, was captured by the enemy during the Atlanta campaign, October 4, 1864, and for months underwent the hardships of the Andersonville Prison, where his left hip joint became affected from the exposure and privation. After being released from captivity he was conveyed to Cumberland Hospital at Nashville, thence to Jeffersonville, and lastly, on July 21, 1865, to Camp Butler. Surgeon A. B. Campbell, U. S. V., in charge of the latter, reported that the patient was suffering from "dislocation of the left hip joint," and that he was mustered out of service August 9, 1865. Examining Surgeon J. G. Hostetter, of Mt. Carroll, Illinois, certified, June 19, 1866: "The ligaments and head of the left thigh bone are diseased, allowing displacement of said bone on making a misstep. He cannot raise his left leg to the height of a stair-step, and drags, as it were, rather than moves his limb in walking." Examiner B. T. Buckley, of Freeport, Illinois, reported, April 7, 1871: "The disability consists in the imperfect use of the left leg, produced by partial dislocation of the hip joint and causing pain and lameness on exercise. The displacement has increased and consequently there is increased inability to use the limb." Examiner H. N. Bradshaw, of Monroe, Wisconsin, stated, January 10, 1875, that "the region of the joint is flatter than it should be, showing considerable atrophy of the muscular structure; the leg below the hip is smaller than the right one, and the muscles are flabby. The leg cannot be flexed upon the abdomen, and any attempt to place it in that position is evidently attended with much pain." This pensioner was paid September 4, 1881.

CASE 958.—*Dislocation at the knee.*—S. Chiquoine, a fireman attached to the U. S. Steamer Rudolph, 21 years of age, and of a strong constitution, sustained a dislocation of the left tibia backward during the action in Mobile Bay, April 1, 1865. He was admitted to the Naval Hospital at Pensacola three days afterwards. The luxation was reduced, but there was considerable swelling of the limb, accompanied by inflammation. The treatment consisted in moulding pasteboard splints to the limb, in keeping the extremities at perfect rest on a double-inclined plane, and in applying water dressings. Ten weeks after his admission the patient was transferred to hospital at New York, where he was discharged for disability June 30, 1865, with probabilities of regaining full use of the limb. The notes of the case were furnished by Passed Assistant Surgeon J. R. Tryon, U. S. N., who supplemented the history with the following remarks: "From the severity of this and other cases I think the dislocation of the tibia in each must have been complete. Considerable deformity about the knee existed for months after the injuries, and the joints in most of them were impaired in some degree by the inflammation, adhesion, etc., which invariably follow." Examining Surgeon L. Jemison, of Bordentown, New Jersey, reported, August 23, 1870: "The bones of the leg now stand a little back from their normal position and the joint seems movable upon the cartilages. He complains when standing any length of time upon his feet, and falls from a slight touch to the limb," etc. The Philadelphia Examining Board in October, 1873, certified to "grating in the knee joint when moved; ligaments relaxed and knee falls back unless supported when his weight is borne upon it," etc. At subsequent dates the same board reported that "the patella projects forward and the internal tuberosity projects inward," also that there is decided crepitus, and that deformity is caused by dislocation of the internal semilunar cartilage of the knee. The pensioner was paid June 4, 1881.

CASE 959.—*Dislocation at the ankle.*—Private J. Reich, Co. K, 21st Illinois, aged 33 years, was severely hurt in the left foot while doing guard duty on the Louisville and Lexington Railroad, June 15, 1864. The accident occurred while he was riding on the cowcatcher of the locomotive, which struck an obstruction on the track and threw him off. He was picked up in a senseless condition and was conveyed to Clay Hospital, at Louisville, where his left ankle joint was found to be much injured. Several weeks afterwards he was transferred to Jefferson Barracks, and lastly he entered the General Hospital at Quincy, where he was discharged December 20, 1864, and pensioned. Surgeon D. G. Brinton, U. S. V., in charge of the latter hospital, reported that the patient was "crippled for life," and described the disability as a "dislocation of the left ankle joint (Pott's fracture) with consequent permanent uselessness of the limb." Examining Surgeon J. H. Maxwell, of Newton, Illinois, September 4, 1873, certified to the disability and stated that "there is great deformity of the foot and ankle in consequence of the dislocation never having been reduced. Walking is very difficult, and if continued becomes painful." Four years later the same examiner reported no improvement in the condition of the limb, stating that "the astragalus is forced below the outer malleolus," that the foot is nearly flat, etc. The pensioner was paid June 4, 1878, since when he has not been heard from.

CASE 960.—*Dislocation of tarsal bones.*—Private J. Beers, Co. F, 84th Illinois, aged 27 years, while on duty as assistant teamster, December 23, 1862, was accidentally precipitated to the ground by the slipping of his left foot. He stated that he heard a cracking sound in the foot and felt something give way about the middle of it. This was attended with intense pain, which subsided in the course of a few weeks. The foot remained swelled about a month, when that also partially subsided, and from that time he has not had pain except when he has attempted to use it in walking. He was present at the battle of Murfreesboro' (December 31st), but was unable to participate in that action on account of lameness. After the battle the surgeon applied a roller bandage, but it produced so much pain that he soon had to remove it. No other application was used. On January 30th the man was brought to Nashville, where he was sent to Convalescent Barracks, and several days afterwards to hospital No. 22. At that time he was in good general health. There was slight tumefaction below the external malleolus and the foot was everted, its inner border being nearly thrown in contact with the ground, giving the foot a splay appearance. Below the internal malleolus a prominence existed corresponding to the rounded head of the astragalus, and great and deep-seated tenderness was experienced on pressure upon the astragalo-scaphoid articulation. The most remarkable circumstance of the case was the very slight inflammation in and around the joint. The case was diagnosed as a luxation of the astragalo-scaphoid articulation, and no treatment was deemed advisable nor reduction attempted for the reason that, having been so long delayed, it would have been necessary to break up the new adhesions, it being feared that the resulting inflammation would prove uncontrollable. Locomotion remained much impeded and the patient's condition continued unchanged up to March 10, 1863, when he was discharged as unfit for further service and returned to his home. The history of the case was contributed by Surgeon L. W. Beckwith, 38th Indiana. There is no record of the man ever having applied for pension.

Simple and Compound Fractures.—The total number of injuries of this group was seven thousand and four, of which five hundred and twenty-six, or 7.5 per cent., were fatal. Four thousand three hundred and forty-six, with seventy-six deaths, were specified as simple fractures; one thousand three hundred and seventy-one, with three hundred and ninety-seven deaths, as compound fractures; and one thousand two hundred and eighty-seven, with fifty-three deaths, as fractures merely. Instances of fractures of the cranium and of the vertebræ have been cited on pages 42 to 68 and pages 426 to 429 of the *First Surgical Volume.* Examples of fractures of the bones of the face, of the ribs, the sternum, the clavicle, the scapula, the ilium, and the bones of the extremities will here be detailed.

CASE 961.—*Fracture of the lower jaw from the kick of a horse.*—Assistant Surgeon S. C. Sanger, 6th New York Cavalry, reported the following history of the case of "a contused and lacerated wound in connection with fracture, which was incurred accidentally. The patient was kicked by a horse. The 'heel cork' or iron projection of the shoe impinged the anterior aspect of the lower jaw a little to the right of the symphysis, and drove inward a large portion of the alveolar process to which six teeth were attached. It was determined to place the fragment *in situ.* This was difficult because the fracture was impacted at the point where the blow was received and the separated bone was drawn inward by the upper fibres of the genio-hyo-glossus muscles. But the object was finally accomplished by extracting a tooth from the sound portion of the jaw, when the fragment was secured in its place by silk cord and silver wire, two small braces made of cork being placed between the movable teeth and the corresponding ones of the upper jaw. The patient was sent to General Hospital. The accident happened June 19, 1863, and on August 18th the patient arrived back in camp and reported for duty. An examination made showed that the bone had united perfectly and without any perceptible deformity, but little trace of the severe laceration of the soft parts being discerned in the well-shaped and scarcely apparent cicatrix." This case has been identified as that of Farrier J. O. Bivins, Co. B, 6th New York Cavalry, aged 32 years, who entered Emory Hospital, Washington, three days after the date of the injury, and was returned to duty August 13, 1863. He was mustered out of service September 19, 1864, and has since then filed an application for pension.

CASE 962.—*Fracture of the lower jaw by a fall from a horse.*—Private L. P. Towers, Co. F, 3d Ohio Cavalry, aged 48 years, sustained a simple oblique fracture of the lower jaw by falling from his horse December 1, 1864. The injury was located about an inch to the right of the symphysis, its track being from above downward and forward. Two days after the accident the injured man was admitted to Crittenden Hospital at Louisville. He had lost nearly all his teeth except the incisors, and various surgical dressings were applied to retain the fractured parts in position, but without success. On December 18th Acting Assistant Surgeon A. H. Hoy administered chloroform and made an incision two inches long over the seat of the injury, after which holes were drilled through the fractured ends of the bone and a small iron wire was passed through. The fracture was then reduced and retained in place by twisting the wire, an ordinary retentive apparatus being placed under the chin and fastened over the top of the head. With the help of some little traction the wire came away, bringing with it two small necrosed fragments, on January 7th, at which time not a particle of union had taken place between the parts. Two weeks afterwards the patient was granted permission to leave the hospital for a short time and came back intoxicated. Violent gastritis then supervened, and death resulted on January 24, 1865. At the *post-mortem* examination a second fracture was discovered, being situated in the left condyle and extending obliquely downward and inward. The mucous coat of the stomach was in a state of intense acute inflammation and some inflammation existed in the duodenum and jejunum. The injured maxilla, contributed to the Museum, with the history of the case, by Surgeon R. R. Taylor, U. S. V., is numbered 4246 of the *Surgical Section.* The specimen shows a portion of the body of the bone at the seat of the fracture to be wanting, both ends of the fragments being carious and necrosed and both condyles carious.

CASE 963.—*Fracture of the sternum; railroad accident.*—Private R. Boyle, Co. A, 3d New Jersey, met with a railroad accident on April 3, 1862, and was admitted to hospital at Alexandria several days afterwards. Surgeon J. E. Summers, U. S. A., described the injury as a "transverse fracture of the sternum between the articulations of the third and fourth ribs, with displacement, the fractured ends sliding upon each other and shortening the bone one and a half inches. From the posteriorly curved condition of the spinal column there is reason to think that there was crushing of the first and second dorsal vertebræ, although there was no paralysis of any of the limbs or organs. The patient is much crippled in appearance, but is evidently recovering, although slowly, with considerable deformity." The patient was discharged for disability resulting from his injury June 16, 1862. He is not a pensioner.

CASE 964.—*Fracture of ribs by a fall from a horse.*—Lieutenant E. Whitfield, Co. I, 22d New York Cavalry, aged 29 years, was injured in the right side by falling from his horse near Leesburg, July 12, 1864. Acting Assistant Surgeon A. Edelin, who attended him at Washington, reported that the injury involved a "fracture of ribs, which had not yet united on October 19." Several weeks later the patient obtained a leave of absence, and on December 19, 1864, he was discharged from service and pensioned. Examiner J. D. Button, of Auburn, N. Y., certified, February 9, 1870: "The sixth and seventh ribs on the right side were fractured and dislocated from the sternum, and not being properly adjusted an imperfect cure was the result. There is a projection of two inches outward from the chest at the ends of those two fractured ribs, which are not joined to the sternum. The muscles which move the arm are weakened and exercise causes pain." Subsequent examiners report the existence of an ulcer on the left thigh, alleged to be the result of a wound of the knee by a spent ball, which was also corroborated by the Auburn Examining Board. The latter, on December 5, 1877, described the projection caused by the fractured ribs, and added that the pensioner "has an anxious expression of countenance; distended nasal alæ; respiration easily disturbed; loud resonance and weak respiration in right lung, indicating emphysematous condition of the lung." The pensioner was paid September 4, 1881.

CASE 965.—*Fracture of ilium from a fall under a horse.*—Major W. E. Bryan, 3d New Jersey, aged 41 years, was injured in the right hip by his horse falling upon him, near Brandy Station, February 22, 1864. Two days after the accident he was conveyed to Washington, where he entered Armory Square Hospital and afterwards Georgetown Seminary. Surgeon D. W. Bliss, U. S. V., in charge of the former, and Surgeon H. W. Ducachet, U. S. V., in charge of the latter, both described the injury as a "fracture of the right ilium." Subsequently the patient was treated for a time in private quarters, and on June 23, 1864, he was discharged from service, since when he has become a pensioner. The Philadelphia Examining Board, consisting of Drs. J. Collins, T. S. Harper, J. H. Sherwood, and E. A. Smith, certified, February 7, 1872: "The pensioner sustained a fracture of the crest of the right ilium. He complains of constant pain and inability to follow any occupation, looks delicate, and carries the right hip somewhat higher than the left." Subsequent examining boards reported, in 1875 and 1877, that "the hip is flattened and the leg slightly shorter than its fellow. He alleges pain and fatigue in the hip, and has oblique inguinal hernia of right side, well supported by a truss." The pensioner was paid June 4, 1881.

FIG. 363.—Bones of the right forearm. *Spec.* 1784.

FIG. 364.—The left scapula transversely fractured. *Spec.* 1631.

CASE 966.—*Fracture of scapula, humerus, and forearm; railroad accident.* John Gazell, a laborer of the Commissary Department, U. S. A., aged 36 years, was run over by a city passenger railroad car at Washington, August 10, 1863, and died at Douglas Hospital one hour after the accident. Acting Assistant Surgeon J. E. Smith made the following report of the injury: "Everything to alleviate his sufferings was done that could be, but the man did not react from the shock in the least. At the autopsy a tumor was observed on the right side of the throat which was supposed to have resulted from the injury, but on cutting down upon it I discovered it to be a pre-existing enlargement of the thyroid gland. A section of the tumor displayed fatty degeneration of the greater part with two sacs, each containing about one-half ounce of sero-sanguinolent fluid. The left inferior portion of the tumor was ossified. Previous to his death the patient had passed bloody urine which could not be satisfactorily accounted for, the kidneys, ureter, and bladder being found apparently uninjured. The right humerus was comminuted, as were also the radius and ulna of each forearm. On the left anterior side the ribs were all broken except the twelfth, and the lung was considerably lacerated; posteriorly the same ribs were fractured except the first, second, and twelfth. The left scapula was transversely fractured below its spine and the left clavicle at its acromial extremity." The injured scapula (FIG. 364, *Spec.* 1631), humerus (*Spec.* 1786), and both bones of both forearms (FIGS. 363, 365, *Spec.* 1784 of the *Surgical Section* of the Museum), were contributed by Assistant Surgeon W. Thomson, U. S. A., and are represented in the adjoining wood-cuts. The left radius and ulna show an oblique fracture at the junction of the upper thirds, the superior fragments being wanting, while in the right radius a nearly transverse fracture exists in the lower part of the middle third and longitudinal fractures occupy the lower fragment. The lowest third of the right ulna is comminuted.

FIG. 365.—Bones of left forearm, obliquely fractured. *Spec.* 1784.

FIG. 366.—Upper portion of left humerus. *Spec.* 3311.

CASE 967.—*Fracture of humerus from the blow of a club.*—Private W. Jordan, 1st Alabama Colored Artillery, aged 27 years, was wounded at the battle of Fort Pillow, April 12, 1864, and entered Mound City Hospital two days afterwards. His injuries consisted of a comminuted shot fracture of the left ankle, flesh wounds of the left arm and right thigh, and a comminuted fracture of the superior portion and head of the left humerus, inflicted by a club. The wound of the ankle became very painful and the soft parts much inflamed. Amputation at the middle third of the leg was performed by Surgeon H. Wardner, U. S. V., on April 15th, chloroform and ether being used and three ligatures applied. The patient was in good condition at the time of the operation and seemed to do well for several days, when hæmorrhage took place from the tibial artery, which was checked by the application of persulphate of iron. Death, from pyæmia, took place on April 23, 1864. The upper portion of the injured humerus and the amputated bones of the leg, contributed with the history of the case by the operator, constitute specimens 3311 and 3312 of the *Surgical Section* of the Museum. A representation of the former appears in the annexed wood-cut (FIG. 366).

CASE 968.—*Fracture of the bones of the elbow; railroad accident.*—Private P. Stutz, Co. A, 91st Pennsylvania, met with a railroad accident on April 9, 1864, and entered South Street Hospital at Philadelphia, whence Acting Assistant Surgeon J. F. Koerper reported the case as a "compound fracture of the right elbow, cured with partial mobility of the joint. The patient stated that while on his way from Chester to Philadelphia he attempted to alight from a railroad car, when the sudden starting of the train caused him to fall and the wheel to strike his elbow. He was brought to this hospital soon after the accident. The parts were much swollen and contused, and crepitation could be felt around the joint. The wound on the inner side, a little above the joint, communicated with a detached piece of the internal condyle. Hæmorrhage, though not very profuse, was controllable only by pressure on the brachial artery. Cold-water applications were used to the joint, and angular splints were applied to the posterior surface of the arm. Ten days after the accident the swelling had become reduced, and by May 15th the wound was healed and slight movements of the arm had been restored. Only simple bandages were now used, and the patient was detailed for light duty. By September 1st the patient had almost recovered the entire use of the arm. He deserted from the hospital on October 11, 1864."

CASE 969.—*Fracture of the bones of the forearm; railroad accident.*—Private W. Call, a substitute, aged 19 years, was severely injured in the right forearm by a railroad collision at Madison, Wisconsin, December 30, 1864, and entered Harvey

Hospital the following day. The limb was found to have suffered a compound comminuted fracture of the radius and ulna at the lower fourth and a simple fracture of the radius at the upper third. The radial and ulnar arteries and large nerves were intact. In the course of several weeks inflammation resulted, the arm, forearm, and hand becoming greatly swollen from effusion of serum and blood into the cellular tissue, bullæ existing on the dorsum of the wrist, and the skin being very sensitive. Healthy pus was freely discharged from the openings. The patient, though in possession of medium strength and appetite and having a naturally good constitution, was suffering from intermittent fever, deranged secretions, and much emaciation. On February 11, 1865, Surgeon H. Culbertson, U. S. V., made an incision four inches long over the radius, extending upward from the wrist on the dorsum of the forearm, separated the soft parts down to the ulna and removed five loose pieces of radius and ulna, together with one-quarter of an inch of the lower end of the latter, from the seat of the fracture. An incision was also made through the integuments of the radial and ulnar borders of the dorsum of the hand to liberate the effusion of blood and serum. The lips of the upper wound were then approximated with sutures and plaster, being left open at the seat of the fracture below and filled with lint, and light poultices were applied over the seat of the fracture as well as over the dorsum of the hand; arm placed in a fracture box filled with tow. One grain of morphia was given immediately after the operation, to be followed with such doses as the patient might need. Whiskey, quinine, and muriated tincture of iron were prescribed, with good diet. About one month after the operation the external wounds were healing up, the swelling having subsided and the patient's constitutional state continuing good. On April 21, 1865, he was returned to the Post Commander, having entirely recovered. The history of the case was reported by the operator. There is no record of Private Call ever having applied for pension.

CASE 970.—*Fracture of the femur from a fall under a horse.*—Sergeant D. F. Mansfield, Co. F, 91st Pennsylvania, aged 37 years, was admitted to Harewood Hospital, Washington, January 18, 1865, suffering from great deformity of the right thigh, the result of a simple fracture of the femur at the middle third, the injured parts not having been properly adjusted. The injury occurred near the Weldon Railroad November 29, 1864, by a horse falling upon the man. At the time of admission the deformed limb was of no use whatever to the patient and locomotion was impeded, although the fractured parts were firmly united. The constitutional state of the patient otherwise was good. On January 28th Surgeon R. B. Bontecou, U. S. V., refractured the limb, after which a straight splint and counter-extension were applied. An anæsthetic consisting of chloroform and sulphuric ether was used. The patient did well after the operation, the parts uniting symmetrically. On March 13th the splint and extension were removed, when the fractured parts were found to be firmly united and the limb was placed in a plastic bandage. The patient continued to do well. On April 6th the plastic bandage was removed and the patient was allowed to be up on crutches, the fractured limb being one and a half inches shorter than the other, but firm and of perfect use. The history was reported by the operator. The patient was discharged from service June 24, 1865, and pensioned. Examining Surgeon O. I. Beach, of Parkerville, Kansas, May 19, 1873, certified to the injury resulting in shortening of the limb, and added that there is "displacement of the patella downward, causing much weakness in the leg; muscles placid. Complains of constant numbness and occasional severe pain in the leg, restricting locomotion," etc. The pensioner died of consumption April 17, 1875.

CASE 971.—*Fracture of the femur caused by a fall from a bridge.*—Private F. Buob, Co. C, 108th Ohio, aged 36 years, was admitted to the Government Hospital for the Insane near Washington on May 16, 1865, his condition being described by the superintendent, Dr. C. H. Nichols, as follows: "The patient's mental condition was that of slight chronic dementia. He was not able to walk up stairs to the ward on account of a lameness of the left hip, the sergeant in charge of him stating that this was caused by a fall from a bridge, which had occurred between two and three weeks previous to his admission. His own statement was that in marching across the bridge at night he was accidentally crowded off the side and fell down some distance, striking upon his left hip. As he laid upon his back the injured limb appeared shortened and the toes turned toward the other foot. By measurement the shortening was found to be three-fourths of an inch. The trochanter was flattened and approximated to the anterior superior spinous process of the ilium. On rotating the limb no point of false motion was discovered and no crepitation. The arc of the movement of the trochanter was less than that of the sound side. When the patient stood erect there was the same shortening and the same inversion of the foot. He could limp about a little by the aid of a chair, bearing considerable of his weight upon the injured limb. The diagnosis of the case was that of an impacted fracture of the neck of the femur. The limb improved rapidly, and in a few weeks the patient walked without inconvenience excepting what arose from the shortening. The general appearance of the man, however, led to the suspicion of pulmonary tuberculosis, and a physical examination of the chest confirmed this suspicion. The tuberculosis advanced with the ordinary phenomena of cough, expectoration, some hæmoptysis, and occasional pleuritic and pneumonic inflammation. From this disease the patient died January 28, 1866. The *post-mortem* examination of the body proved the correctness of the diagnosis respecting the lung disease. Nothing peculiar was noticed about the acetabulum of the injured side except that the ligamentum teres and the cushion of fat at the bottom were more vascular than on the sound side. The femur presented unmistakable evidence that the injury was an impacted fracture of the neck of the bone, the line of it being partly within and partly without the capsular ligament. By comparison with the sound femur a shortening of three-fourths of an inch was shown, and the impaction was found to be greater anteriorly than posteriorly, thus causing the inversion of the foot. The union of the bone appeared to be firm and sound." Both the injured and the sound femur were contributed to the Museum by the reporter of the case and constitute specimen 2376 of the *Surgical Section*.

CASE 972.—*Fracture of the patella.*—Lieutenant J. H. Sullivan, Co. G, 1st Regiment Potomac Home Brigade, aged 27 years, was thrown out of a wagon on July 24, 1864, striking his knee on the stone pavement and fracturing the patella. The bone was split into three fragments, there being one outer lower, one inner lower, and one larger upper piece. The patient was admitted to the General Hospital at Frederick on the day of the injury. Anti-inflammatory treatment, such as ice and evaporating lotion, was used to the joint, and a straight splint was applied to the back of the limb, coaptation being made by compress above and below the bone, drawn and pressed together by adhesive plaster. The limb was kept elevated during part of the treatment on an inclined plane. After union had taken place a plaster of Paris splint was applied to enable the patient to go about. On October 20, 1864, he returned to his regiment to be mustered out, his term of service having expired. At the time of leaving the hospital the patient had recovered from his injury with short ligamentous union. The case was reported by Acting Assistant Surgeon J. H. Bartholf. The patient has never applied for a pension.

CASE 973.—*Fracture of the tibia.*—Sergeant-Major J. L. Keys, 18th Pennsylvania Cavalry, was admitted to Frederick Hospital July 13, 1864, with a chronic indolent ulcer of the right leg, the result of an old fracture of the tibia. Assistant Surgeon R. F. Weir, U. S. A., recorded that the ulcer was treated by straps and stimulant applications and became much diminished in size. On September 25th the patient received a furlough for thirty days, and when he returned he showed evidence of protracted intoxication. Symptoms of *mania a potu* soon after prevailed, and, though subdued for periods by treatment, resulted fatally on October 26, 1864. At the autopsy the body was found to be well nourished, the lungs healthy, and a large deposit of fat on the outer surface of the heart. The liver was much enlarged and decidedly fatty; kidneys fatty; spleen and intestines healthy; omentum very large; stomach very much contracted, its coats being intensely thickened, the rugæ remarkably prominent, and the mucous membrane much congested. On removing the calvarium the membranes were found to be much congested, with slight effusion between the arachnoid and pia mater, slight deposit of lymph on the pia mater and considerable effusion beneath. The substance of the brain was quite firm. A section of the injured tibia was presented to the Museum and forms specimen 3932 of the *Surgical Section*, showing the old consolidated fracture followed by a spongy and carious condition of the anterior portion of the bone.

FIG. 367.—Consolidated fracture of tibia. *Spec.* 1057.

CASE 974.—*United fracture of the tibia.*—Specimen 1057 (FIG. 367) was contributed to the *Surgical Section* of the Army Medical Museum by Assistant Surgeon E. Coues, U. S. A., and consists of a portion of the shaft of the tibia, exhibiting a simple oblique fracture firmly consolidated. Death occurred from an independent cause.

CASE 975.—*Fracture at the ankle joint.*—Captain T. M. Howrigan, Co. H, 1st Michigan Cavalry, aged 37 years, suffered a fracture at the left ankle joint while passing through Washington, November 11, 1862. The accident was occasioned by his horse becoming frightened and falling with him, causing his left foot to be caught under the horse and to be fractured. He was discharged for disability June 30, 1863, but re-entered his regiment as Major several months afterwards, and remained in service until ultimately mustered out June 19, 1865, since which date he has become a pensioner. Examining Surgeon J. A. Brown, of Detroit, Michigan, August 11, 1869, certified to the fracture and to the tibia being partially dislocated at the ankle, and added that "motion and strength of the foot and ankle are considerably impaired." The Kansas City Examining Board reported, September 4, 1873: "Upon careful examination we find fracture of the tibia and fibula and dislocation of the internal malleolus, it being projected inward and downward, with tumefaction and pain. Close to the femur and femoral vessels at the upper third of the thigh there is found an osseous deposit about six and a half or seven inches long, one and a half inches wide above and tapering off in a wedge-shape below, and one-half inch thick, and just above this there is a smaller deposit, being two inches long and one inch wide. These deposits interfere materially with the circulation and mobility of the limb, which is atrophied and partially paralyzed. General health bad." The same board on September 8, 1877, reported the existence of "large varicose veins of the entire limb. He is feeble, very nervous, and quite lame, being compelled to support himself by a cane in walking. He is much more feeble now than two years ago, and unable to do manual labor." One year later the board reported that the pensioner "is now confined to his bed and has not been able to walk for several months. He has to have constant attendance and is not able to help himself." The pensioner died May 2, 1879. His attending physician, Dr. A. B. Sloan, of Kansas City, testified that death was caused by "exhaustion induced by ossification of the arteries in the lower limbs and the deposit of bony masses in his left thigh, resulting from the injury and exposure in the army."

Punctured, Incised, and Lacerated Wounds.—Thirty-six thousand nine hundred and seventy-five punctured and incised wounds, not including those caused by sabre or bayonet, were reported; five hundred and thirty had fatal terminations, a mortality rate of 1.4 per cent. The number of lacerated wounds is recorded as five thousand three hundred and eighty-four, of which one hundred and ten, or 2.0 per cent., ended in death.

CASE 976.—*Punctured wound of chest.*—Private B. McGinnis, Co. H, 7th Kansas, aged 31 years, was discharged from service at the General Hospital at Leavenworth City, December 29, 1863, Acting Assistant Surgeon S. F. Few certifying to the following disability: "He has been under treatment in this hospital since August 18, 1862, for a punctured wound of the right side below the axilla, caused by a knife in the hands of a comrade during a drunken quarrel. Chronic pleurisy exists, accompanied by empyema. The thoracic walls on the right side are much compressed, and there is dullness on percussion and almost entire absence of respiratory murmur in the right lung. There is discharge of fetid matter from a fistulous opening in front of the right axilla, and the patient's general health is much impaired." There is no record of this man ever having applied for pension.

CASE 977.—*Punctured wound of urethra.*—Passed Assistant Surgeon J. R. Tryon, U. S. N., reports that "J. Welsh, a seaman, aged 43 years, and of strong constitution, was admitted into the Naval Hospital at Pensacola June 29, 1864. He had been admitted on the sick list eight days previously with difficulty of micturition accompanied by inflammation of the spermatic cord and tunica vaginalis, and on June 28th he had ruptured the urethra by passing a sail needle for a bougie. At the time of the patient's admission to hospital the scrotum and perinæum were gangrenous, consequent upon extravasation and infiltration of urine in the surrounding cellular tissue, caused by the laceration of the urethra. The buttocks were swollen and inflamed, large quantities of pus escaping on incision. He was weak and faint, unable to void urine, and laboring under all the effects of a severe shock. Upon consultation it was decided that no operation could possibly be of benefit to the patient. A catheter was accordingly passed into the bladder after considerable difficulty; tonics and stimulants were freely administered, and the affected parts were dressed with liquor sodæ chlorinatis. On June 30th the patient was no better, being hectic and comatose, from which he could be easily aroused. Urine passed freely through the catheter. On July 1st there was no change. During the following night the patient removed the catheter; the scrotum sloughed away entirely and the testicles became exposed, with an ulcerated surface extending over the perinæum, and the buttocks filled with maggots, which seemed unavoidable from the extreme difficulty in keeping the parts clean and from the heat of the weather. On July 3d a gum-elastic catheter was again passed into the

bladder. The patient, however, failed rapidly, became fully comatose under all the depressing circumstances, and died in a pitiable condition on the morning of July 15, 1864. The autopsy revealed the stricture and point of rupture just external to the triangular ligaments. The severe symptoms of the case at the time of reception into the hospital render it highly doubtful whether the laceration of the urethra and extravasation of urine could have taken place only the day previous to admission, but under any circumstances should not the treatment in the first instance have been decisive, puncturing the bladder through the rectum (if the catheter could not be introduced) and making numerous and deep incisions into the affected parts?"

CASE 978.—*Punctured wound of knee joint.*—Private B. F. Carr, Co. G, 2d Minnesota Cavalry, aged 19 years, was wounded in the left knee during the engagement with the Indians near the Little Missouri River, August 8, 1864. He remained at a field hospital for two months and was then transferred to Fort Ridgely. Acting Assistant Surgeon A. Muller, in charge of the latter, certified to his discharge from service, February 1, 1865, by reason of "an arrow wound through the knee immediately below the patella, causing stiffness of the knee joint and considerable limping." Examining Surgeon B. R. Palmer, of Sauk Centre, Minnesota, reported, June 17, 1868: "An Indian arrow passed into the knee joint under the knee pan. There are evidences of extensive inflammation of the joint in numerous cicatrices around the joint. There is no anchylosis, but great irritability in the joint after exercise, and difficulty in walking far or standing long." Examiner J. M. McMasters on September 6, 1877, made a corroborating report of the nature of the injury, and stated that "an iron or steel arrow penetrated the knee joint. At present there is partial anchylosis of the joint, with dryness of the synovial membranes, indicated by cracking upon motion, and considerable tumefaction in the popliteal region." The pensioner was paid December 4, 1881.

CASE 979.—*Punctured wound of knee joint.*—Private T. A. Jackson, Co. H, 1st Rhode Island Cavalry, aged 23 years, is recorded by Assistant Surgeon E. J. Marsh, U. S. A., as having been admitted to Judiciary Square Hospital, Washington, April 29, 1863, with a "perforating wound of the left knee," and as having been transferred to Philadelphia one week afterwards. Acting Assistant Surgeon W. W. Keen, jr., reported the case as a "punctured wound of the knee joint" and described the injury as follows: "The patient was admitted to Satterlee Hospital May 7th. He stated that in the previous December he met with a fall from his horse, during which a pair of scissors from his knapsack punctured the knee joint and broke off; that the points were removed three days after the accident, being three inches deep according to the statement of his surgeon, and that severe inflammation followed and a large number of abscesses formed about the joint. At the time of the patient's admission the injured joint was smaller than the sound one, the hamstrings were contracted, and motion was limited from complete flexion to an angle of 135° with the thigh. Crepitation was very marked and motion of the patella much restricted. Just to the inside and above the tubercle of the tibia there was a cicatrix from a wound, and all about the joint old cicatrices from abscesses were found. The evidence was rather in favor of penetration of the joint, both by the position of the cicatrix mentioned and the escape of synovia, which seems probable from his statement, though of this he is not quite confident. The scissors were rusty when he was wounded. He walks about on crutches but is unable to bear weight on the limb." Surgeon I. I. Hayes, U. S. V., reported that the patient was discharged from service June 1, 1863, by reason of anchylosis of the left knee joint resulting from an injury by scissors penetrating the knee joint." The man is not a pensioner.

CASE 980.—*Incised wound of neck.*—Assistant Surgeon G. W. Hogeboom, 8th Kansas, reports that "Private S. Noyes, Co. K, 13th Wisconsin, was admitted to hospital at Leavenworth, May 28, 1862, with a partially healed incised wound across the throat, running diagonally from left to right and crossing the trachea just below the pomum adami. He was sent here from the Lawrence Hospital and no account came with him of the injury, which is said to have been inflicted by himself with a bowie knife while laboring under a temporary aberration of mind some time in March. When I first saw him the wound was discharging healthy matter and there was some hoarseness of voice and expectoration of considerable quantities of pus at times; pulse 70, full, soft and regular; general condition of system very good; mind sound. There was no apparent opening from the external wound into the trachea. It soon, however, became evident that there existed some obstruction to the closing up of the wound by granulation, and from time to time thorough search was made for any deep-seated abscess and for sinuses connecting therewith. From the character of the sputa at times I feared that there might exist such connections with the trachea internally, but failed in every attempt to find any leading from the external wound. The patient's general condition, though every effort was made to find the true seat of the difficulty, continued much the same until the morning of June 29th, when his hoarseness was a great deal worse and accompanied with great difficulty of respiration and increased frequency of pulse attended with considerable hardness. I immediately put him on calomel and tartar emetic in pretty liberal doses. By 6 P. M. the symptoms were in a measure relieved. The treatment was continued through the night. At 8 P. M. on the following day the dyspnœa was still aggravated and the patient's blood greatly in need of oxygenation. I then sent for instruments for the purpose of performing tracheotomy, but before the operation could be done the patient expired asphyxiated. At the *post-mortem* examination I found an old sinus communicating with the trachea from behind, just below the chordæ vocales, leading to an abscess below and immediately behind the opening into the trachea. The trachea was contracted from behind to less than one-third its normal size, and following it closely a very tortuous and small sinus connected the abscess also with the external wound. Sub-acute inflammation extended in a limited degree to the larger bronchia, and patches of false membrane were found on the right side of the trachea. Other organs healthy."

CASE 981.—*Incised wound of abdomen.*—Private J. Mooney, Co. G, 1st California Cavalry, was stabbed with a knife by a fellow soldier May 18, 1863. He was conveyed to Camp Stanford Hospital at Stockton, whence Surgeon W. W. Hays, 6th California, made the following report: "When first seen, about three-quarters of an hour after the injury, I found a wound in the left side of the abdomen extending from about the centre of the seventh rib three inches diagonally toward the umbilicus, and another in the back, on the left side of the second lumbar vertebra, extending upward and across the vertebral column for about two and a half inches. About three feet of the small intestine, with some omentum, was lying upon the external surface of the abdomen, being partly cold from exposure to the air and distended with gas. By gentle manipulation all was reduced in about half an hour, and the wound was closed by interrupted sutures. The wound in the back bled freely and was only controlled by an injection of sulphate of iron. The treatment consisted of the free use of opium, half a grain being given every hour during the first twenty-four hours, and low diet. On the third day the bowels were opened by an enema and afterward by a full dose of castor oil. Very little inflammation occurred, and that was controlled by opium and cold water. The patient improved rapidly,

and to day (May 31st) he is walking about the camp, although the wound in the back is still discharging slightly." About two months after the occurrence of the accident the patient was admitted to hospital at Camp Drum, whence Surgeon S. S. Todd, 4th California, reported his discharge from service September 6, 1863, by reason of "ventral hernia."

CASE 982.—*Incised wound of knee.*—Private R. Moody, Co. G, 118th New York, aged 24 years, entered Turner's Lane Hospital, Philadelphia, May 23, 1864, and was discharged for disability seven months afterwards. Acting Assistant Surgeon W. W. Keen, jr., contributed the following history of the case: "The patient had been struck by an axe in the right leg, just below the patella, during the fall of 1862. The axe severed the ligamentum patella, but he states that no synovia escaped and but very little blood. He was sick in bed for five months and then got up, having no anchylosis and the great primary swelling having disappeared. In December, 1863, he enlisted in the army, having good use of the limb, though he could not run nor walk rapidly without care. He states that within the last six weeks the patella has been drawn upward, and that before then it had almost kept its normal position. He now constantly requires a cane and cannot extend the limb by the quadriceps muscle. No anchylosis exists." The cast (*Spec.* 6692, A. M. M.) was taken by Dr. Keen at the time of the patient's admission to Turner's Lane Hospital, and shows the position of the patella, also the scar and resulting deformity, the limb being flexed. Some years after his discharge the man claimed a pension for disability from diarrhœa, etc., alleged to have originated in the service, and was inspected by Examining Surgeon T. C. Noyes, of Oshkosh, Wisconsin, who in connection with the case mentioned the condition of the injured limb on August 19, 1880, as follows: "I find the right thigh atrophied from hip to knee, with slight paralysis. Its size above the knee is three inches smaller than the left, somewhat weaker, and uncertain in movement."

CASE 983.—*Lacerated wound of leg.*—Private J. Farrell, Co. B, 132d New York, aged 21 years, was severely injured by an explosion at Bachelor's Creek, May 26, 1864. Surgeon C. A. Cowgill, U. S. V., reported his admission to Foster Hospital at New Berne with "extensive laceration of the popliteal space of the left lower extremity." Four months after receiving his injury the patient was well enough to leave for his home on furlough. He subsequently entered Ladies' Home Hospital, New York City, and lastly McDougall Hospital, whence he was discharged from service June 16, 1865, and pensioned. The New York City Examining Board certified to the injury on November 23, 1870, and stated that "the outer hamstring muscles were carried away, causing partial paralysis of the left foot. The cicatrix is eight inches in length by three in width." Five years afterwards the same board reported that "the strength of the knee joint is greatly impaired; complete paralysis of foot at the ankle joint and also of the toes; foot cold and badly nourished." The pensioner was paid September 4, 1881.

CASE 984.—*Lacerated wound of leg.*—Private P. Berrer, Co. I, 3d New Jersey Cavalry, aged 26 years, was kicked in the left leg by a horse on March 14, 1864. He was admitted to hospital at Philadelphia, where simple dressings were applied and where he remained until June 19th, when he was transferred to Ward Hospital at Newark. At the latter place the injured limb was operated upon by Assistant Surgeon J. T. Calhoun, U. S. A., who made the following report of the case: "The site of the limb kicked by the horse was on the anterior aspect, at the junction of the middle and upper thirds of the tibia. A lacerated wound was produced and the bone was laid bare. In the course of some months a large and unhealthy ulcer developed itself, covering the whole face of the lower upper third and upper part of the middle third of the tibia and causing profuse suppuration. On November 8th an anæsthetic of ether and chloroform was administered and an incision three inches long was made, after which a sequestrum four inches long was extracted with a bone forceps and carious bone was removed by means of a gouge. The patient's general health at the time of the operation was in a fair state. His subsequent treatment consisted of simple dressings, stimulants, and full diet. The wound did well for a time, but prospects of complete recovery remained remote and indifferent at the time of the patient's discharge from service on April 8, 1865." The Philadelphia Examining Board reported, September 4, 1875: "On the inner side of the injured leg there is an extensive scar, which involves fully one-half of the surface. The tibia is enlarged and the scar is hard and discolored. It has been open recently, but is now nearly healed." Two years later the same board described the scar as discharging pus and the limb as greatly discolored and hypertrophied. The pensioner was paid June 4, 1881.

Other Accidents and Injuries.—Of fifteen thousand two hundred and seventy-three injuries of various kinds, grouped in this class, one thousand and seventy-five were fatal, a mortality of 7.03 per cent. A large number of these cases were injuries from frostbite.

CASE 985.—Private A. Zufall, Co. C, 142d Pennsylvania, aged 21 years, had his feet frost-bitten in the field during the month of January, 1863. After undergoing treatment in field hospitals for several months, he was transferred to Washington and subsequently to Philadelphia. Acting Assistant Surgeon R. M. Girvin reported that at the time of the patient's admission to Satterlee Hospital, June 23d, his feet were swollen and purplish looking and he had not been able to wear his shoes for five months. He was doing well and no treatment was required. The patient was returned to his regiment for duty on December 2, 1863. At the battle of the Wilderness, May 5, 1864, he received a gunshot flesh wound in the left thigh, for which injury he was again treated in various hospitals. He was ultimately mustered out of service May 29, 1865, and pensioned. Examining Surgeon H. Brubaker, of Somerset, Pennsylvania, reported, November 4, 1874: "The toes of both feet are stiff and the feet are very tender from the presence of chilblains, which become very troublesome during the winter, when he is unable to wear shoes most of the time." Examiner S. L. Good, of Meyersdale, Pennsylvania, March 15, 1880, certified to "loss of motion of the toes of both feet; cold and imperfect circulation. He states that the feet are numb and get cold easily. He cannot walk much." The pensioner was paid December 4, 1881.

CASE 986.—*Frostbite of both feet.*—Private L. S. Cronkhite, Co. I, 40th Indiana, aged 46 years, was taken prisoner at the battle of Franklin, November 30, 1864, and had his lower limbs frozen by exposure during his captivity, which lasted for several months. Assistant Surgeon J. A. White, U. S. V., reported that he was admitted as a paroled prisoner to McPherson Hospital at Vicksburg, April 2, 1865, suffering from "frostbite of both feet," subsequent to which date the patient passed through various hospitals until August 31, 1865, when he was mustered out of service. Having made an application for pension, he was examined on December 31, 1880, by Examining Surgeon J. T. French, of Knoxville, Iowa, who described his condition

as follows: "He has suffered from frozen feet. The flesh has sloughed off both the great toes and inner side and bottom of the feet, causing extensive contraction of the tendons. He is unable to walk or attend to ordinary farm labor, rendering his disability equal to one-half of total."

CASE 987.—*Struck by lightning.*—Private S. Millard, Co. K, 52d Pennsylvania, aged 20 years, was struck by lightning while doing guard duty near Port Royal, May 13, 1864. He was treated at the regimental hospital and subsequently at the General Hospital at Hilton Head, whence Assistant Surgeon J. F. Huber, U. S. V., reported the case, stating that "the electric fluid passed down the man's body in a zigzag direction and burned the body in its course." The patient is recorded as having been returned to duty three months after the occurrence of the accident. He was ultimately mustered out of service July 12, 1865, and afterwards allowed a pension. The following detailed account of the case was subsequently contributed by Dr. J. B. Crawford, of Wilkesbarre, Pennsylvania, who at the time of the accident held the rank of regimental surgeon of the 52d Pennsylvania volunteers: "I saw the man about ten minutes after the reception of his injury. He laid upon the ground apparently dead. No pulsation of the heart could be felt, no respiration could be observed, nor could any symptoms of life be discovered. There was complete relaxation of the muscles and the pupils were much dilated. The electric fluid seemed to have first touched the point of the bayonet, about one inch of which was melted. The brass buckle of his belt, his steel watch-chain, and the larger portion of the silver casing of the watch were also melted. The hair was burned from his chest and pubes, and the skin of nearly the whole anterior portion of his body was more or less deeply burned. The injury to the skin was most severe about the pubic region, where some sloughing subsequently took place. Passing down the legs the fluid singed the hair and slightly burned the skin on the anterior surface of each limb. The soles of his boots were completely torn off, and no trace of them, with the exception of a few small portions left attached, could be found. No marks of the electric fluid were made upon either of the upper extremities nor upon the head or the neck. It seemed to have first touched him below the clavicle and to have descended over the anterior portion of the body, where it left its visible traces. The woolen shirt which he wore at the time was also much burned and was still smoking when I reached him. At first I had no thought of making any attempt at resuscitation, but while awaiting the arrival of a stretcher for the purpose of removing the body I decided to try the effect of artificial respiration. No appliances for this purpose, however, were at hand, and my only resource was to compress and expand the chest, depending on the elasticity of its walls and on the forcible elevation of the arms for means of expansion and inflation, and on direct compression of the chest with the hands for expiration. Being aided by my assistant, Dr. J. Flowers, I proceeded to carry out my purpose, the relaxed state of the muscular system seeming to facilitate the proceeding greatly. Ammonia was applied to the mouth and nose while the forced respiration was being carried on. After continuing this procedure for a quarter of an hour or more, and when about despairing of success, we were rewarded by what seemed to be a faint gasp in our patient—so slight, indeed, that we were not quite sure of its reality, yet enough to induce us to persevere in our efforts. We soon saw more unequivocal signs of life, and at the expiration of half an hour we could detect positive evidence of the heart's action, which was feeble and exceedingly slow, not amounting to more than thirty-five beats per minute. After continuing the treatment for another half hour our patient was so far restored that we had him conveyed to the regimental hospital. As he was yet unable to swallow, ammonia was given by inhalation, and whiskey was freely applied to the surface of the body. After the expiration of some hours the patient became able to swallow small quantities of liquid; the limbs and organs of speech, however, remained paralyzed. He continued in a similar condition for about five days, the bowels being constipated and the urine passing involuntarily. Sensibility seemed to have been lost. On the sixth day after the injury a slight improvement in all the suspended functions was apparent. The voice gradually returned; movements of the limbs again became possible; the bladder and bowels gradually resumed their wonted action, and sensibility and motion returned by slow and uniform degrees. At the expiration of three weeks I left for the north and lost sight of the patient, who was then able to walk a few rods with the aid of crutches. Some three years afterwards he applied to me for a certificate on which to found a claim for a pension. At that time he had not fully recovered, sensibility and motion being still impaired. His gait was unsteady and his movements tremulous and feeble; his pulse had regained its normal frequency and force. His condition still continued to improve, and at the expiration of another year he was able to attend to some light labor. I again saw the man in July, 1873, when he told me that he had nearly recovered from his injury and had resumed his trade as wagon-maker. He also stated that he enjoyed tolerable health, and experienced none of the ill effects of his injury except on the approach of and during a thunder storm, at which time he would feel excruciating pains throughout his system," etc. In consequence of adverse reports by the examining surgeons the pensioner's name was dropped from the rolls on March 4, 1869, since when he has made ineffectual attempts to be restored. The Scranton, Pennsylvania, Examining Board certified, on March 7, 1877, to "reflex paraplegia consequent on the general electric shock of such intensity as to disturb the co-relation of the nerve centres. While it did not utterly destroy, it has so far impaired the neural force as to give rise to loss of power by exhaustion more or less complete and to consequent occurring nutritive changes."

CASE 988.—*Struck by lightning.*—Sergeant W. Roberts, Co. C, 56th Ohio, aged 24 years, was struck by lightning while on the march from Jackson to Vicksburg, July 22, 1863. He was conveyed to hospital at Vicksburg, where he was under treatment for several weeks, after which he received a furlough and was allowed to proceed to his home. Surgeon L. R. Stone, U. S. V., reported that "the man was admitted from his home to the General Hospital at Gallipolis on February 9, 1864. At the time of his admission he could not walk, only shuffle along a few inches at a time, and could stand only when supported on crutches or canes. He showed considerable emaciation; appetite poor; pulse 120 and feeble; skin dry and cool. His mind was not at all affected. According to his account of the accident he had sought shelter in the woods during a heavy thunder storm and was standing under and against a tree, when he was struck senseless to the ground, one or two other soldiers being killed at the same time. He remained unconscious for some hours, but was at last resuscitated by the dashing of cold water and by friction, and was then removed to a hospital as soon as possible. The physician under whose care he was while staying at his home stated that at first he was nearly helpless, and in December there was yet no perceptible improvement in the case, his pulse being 125 and feeble, his emaciation considerable, and the use of his lower extremities being greatly impaired. Nothing was mentioned about the treatment employed. On examination of the patient after his admission here, well-marked general paralysis of the motor system was found, particularly of the lower extremities, with some slight insensibility, and a sluggish-

ness of the capillary circulation. There was no œdema nor subsultus tendinum. He could move his toes and partially flex his legs or his thighs, but could not walk. The upper extremities were somewhat affected, but in a much less degree; bowels very sluggish; no affection of the urinary organs. Though occasionally there were severe paroxysms of pain just below the scapulæ, no pressure at any particular point along the spine caused pain. Atmospheric changes affected the patient very much, and when the air was charged with electricity he showed considerable constitutional irritation, with fever, pain in the head and limbs, and nausea. This was followed by two or three days of depression before he would recover his usual condition. The treatment was principally chalybeate, with milk diet. The patient is slowly improving now (May 12th) and able to walk more easily with crutches, but is still quite feeble." At a subsequent date the patient was transferred to Columbus, where he was discharged by expiration of service on October 27, 1864. On making an application for pension he received the following certificate from Examining Surgeon W. G. Gill, of Decatur, Alabama, dated April 23, 1881: "I have carefully examined the applicant. He appears quite nervous, and says his left side gives him great pain when he exercises in attempting to do manual labor; that he has never been able to do a regular day's work since the war, and although partially recovered from paralysis caused by lightning, he still suffers very much. I rate his disability total."

CASE 989.—*Fatal case of sunstroke.*—Private C. Vaughn, Co. B, 1st Louisiana, aged 30 years, was sunstruck at New Orleans, and admitted to St. James' Hospital on September 16, 1863. Acting Assistant Surgeon J. V. C. Smith reported that "the patient was brought to the hospital in a state of unconsciousness. He could swallow nothing and occasionally had spasms of the lumbar muscles. He was carefully watched. Cold-water applications were made to the head, and mustard was applied to the back of the neck and to the soles of the feet. On the following day the patient's jaws were still spasmodically closed and nothing could be forced into his mouth. At 2 P. M. the ice was taken from his head and his whole body was washed in mustard water. His pulse was not much different from that of one in ordinary health. At 3 P. M., by some singular movement which no one saw—although he was in a ward of forty-three beds, mostly occupied, and the nurses were but a few feet off—he seemed to have rolled over and broken a wash-basin, a sharp edge of which cut a gash three inches in length across the masseter muscle of the left side of his face, nearly dividing it, and cutting in twain a branch of the transversalis faciei artery, which bled pretty freely. The artery was secured by a ligature and the wound was stitched and secured by adhesive strips. The patient groaned several times during the operation, but never recovered his consciousness nor took either nourishment or medicine while in the hospital. He died at 10 P. M. on September 17, 1863."

CASE 990.—*Injury from a scorpion bite.*—Private J. Sculley, Co. H, 6th New York Cavalry, aged 25 years, was stung by a scorpion on the back of the neck, between the third and fourth cervical vertebræ, while in camp at Fair Oaks, June 27, 1862. Surgeon A. P. Clark, 6th New York Cavalry, who treated the case, made the following report: "The patient was a man of robust constitution and of good health. I saw him a few minutes after the reception of the wound, which occurred at 10 A. M. There was no swelling of the part, but he complained of intense pain in the back and lower extremities. I cauterized freely. Severe spasms soon came on, producing in quick succession complete emprosthotonos and opisthotonos; pulse 55 and weak; pupils dilated; voice feeble; face livid; surface cold and bathed in clammy perspiration. He remained in this condition for two and a half hours, when he gradually became insensible, the action of his heart becoming more feeble and irregular. Ten minims of Bibron's antidotal mixture and a tablespoonful of brandy diluted with the same quantity of warm water was administered and repeated every half hour until two and a half ounces of the brandy had been given. During this time hot sinapisms, with diluted acetic acid, were kept applied along the spine and lower extremities. At 12 o'clock his face and hands began to swell, the skin of these parts resembling an attack of phlegmonous erysipelas, though of a duskier hue. The swelling continued to increase until about 6 P. M., at which time his head was of an enormous size and his eyes very glassy, appearing as if they would burst from their sockets. The swelling also extended down the neck and chest as far as the lower part of the pectoral muscles, down the arms as far as the insertion of the deltoid, and over the shoulder on either side of the wound; but there was none in its immediate vicinity or below it on the back. The patient still remaining unconscious, I took twelve ounces of blood from the left median cephalic vein and cupped him along the spine and lower part of the thorax, put two minims of croton oil upon his tongue, and administered an enema of warm water and olive oil. Sinapisms were still continued. About 2 A. M. on the following morning signs of returning consciousness appeared, when another enema was given and his feet were put into warm water. In about a quarter of an hour afterwards he had a copious discharge from his bowels, very offensive and of a dark gelatinous character, which was soon followed by the vomiting of a large quantity of matter of a similar but not so offensive nature. After this consciousness returned and the swelling gradually subsided. At 3 P. M. the patient was able to sit and ride in an ambulance. He reached Harrison's Landing on July 1st, when he reported to his company for duty. No untoward symptoms afterwards appeared. During the course of the first day some ten different medical officers saw the patient and none of them entertained any hope of his recovery. I am of the opinion that it was through the action of Bibron's antidote conveyed into the circulation that the virus of the scorpion was neutralized or eliminated from the system, and that the action of the medicine was promoted by the other measures employed."

Section II.

OPERATIONS FOR MISCELLANEOUS INJURIES.

Numerous operations for miscellaneous injuries or diseases, such as excisions, amputations, ligations, operations on the eye, the mouth and its dependencies, the air passages, the chest, the genito-urinary organs, etc., were reported during the war. Detailed reports will be given of the more important cases, and all will be cited in condensed tabular statements.

EXCISIONS.—Forty-five cases of excisions for miscellaneous injuries or diseases were reported. Twenty-five were excisions of the bones of the head, five of the upper extremities, and fifteen of the lower extremities. The results are indicated in the following table:

Table CV.

Numerical Statement of Forty-five Cases of Excisions following Miscellaneous Injuries or Diseases.

EXCISIONS.	Cases.				For Injury.			For Disease.	
	Total.	Recoveries.	Deaths.	Undetermin'd Results.	Recoveries.	Deaths.	Undetermin'd Results.	Recoveries.	Deaths.
Excisions of Cranial Bones	25	12	12	1	12	12	1	.....	.....
Excisions of the Scapula	1	1	.....	.....	1	.....	.....	.....	.....
Excisions at the Shoulder Joint	1	.....	1	.....	.....	1	.....	.....	.....
Excisions in the Shaft of the Humerus	1	1	.....	.....	1	.....	.....	.....	.....
Excisions at the Elbow Joint	1	.....	1	.....	.....	1	.....	.....	.....
Excisions in the Shaft of the Ulna	1	1	.....	.....	1	.....	.....	.....	.....
Excisions in the Shaft of the Femur	1	.....	1	.....	.....	1	.....	.....	.....
Excisions in the Bones of the Leg	9	9	.....	.....	5	.....	.....	4	.....
Excision in bones of Leg and amputation of Thigh	1	.....	1	.....	.....	1	.....	.....	.....
Excision in bones of Leg and amputation of Leg	1	1	.....	.....	1	.....	.....	.....	.....
Excisions at the Ankle Joint	1	1	.....	.....	1	.....	.....	.....	.....
Excisions in the bones of the Foot	2	2	.....	.....	1	.....	.....	1	.....
Aggregates	45	28	16	1	23	16	1	5	.....

The twenty-five cases of excisions of the cranial bones for injuries from miscellaneous causes have been detailed in the *First Surgical Volume*.[1] A few examples of excisions in the extremities will here be cited, and all will be given in tabular form.

Case 991.—*Excision in the bones of the leg.*—Private C. Peasley, Co. A, 10th Massachusetts, was kicked by a mule in the left leg, fracturing both bones, while driving ambulance at Camp Brightwood, August 31, 1861. He was admitted to the Washington Infirmary Hospital on the day of the injury. One month after the accident no attempt at union of the bone had yet taken place, but much suppuration had occurred and the bone had become bare in its whole circumference for the space of two inches. Free

[1] Cases of: Citizen J. Berry, p. 316; Pt. J. Burns, C, 4th Kentucky Cav., p. 57; Pt. W. H. Edwards, D, 3d Iowa Cav., p. 317; Corp'l A. Gasslein, B, 6th Penn. Cav., p. 51; Pt. P. H. Greene, H, 125th N. Y., p. 57; Pt. C. Horahan, G, 61st Ohio, p. 57; Pt. *J. T. Jenkins*, 5th Alabama, p. 58; Pt. W. H. Lowery, C, 6th Tenn. Cav., p. 58; Pt. J. McTye, G, 6th Tenn., p. 317; Pt. E. Miller, G, 6th Va. Cav., p. 58; Pt. S. H. Needham, I, 6th Mass., p. 58; A. B. Parish, employé Q. M. Dep't., p. 58; Pt. G. W. Phillips, G, 6th Iowa Cav., p. 317; Pt. P——, 14th Tenn., p. 59; Pt. J. Rogers, L, 4th Ohio Art'y, p. 59; Pt. J. Ruytz, H, 2d Mich., p. 59; Pt. J. C. Shedd, D, 11th N. Y. Cav., p. 59; Freedman J. Smith, p. 59; Pt. W. H. South, H, 168th Penn., p. 60; Pt. C. E. Towns, I, 9th N. H., p. 60; Unknown, 4th U. S. C. H. A., p. 316; Unknown German soldier, p. 316; Unknown negro, p. 58; Pt. C. Vorrist, Signal Corps; and Pt. C. Williams, B, 161st N. Y., p. 60.

incisions were made anteriorly and posteriorly and resection of the tibia and fibula was performed. Firm union resulted three months after the operation, a gypsum apparatus being used during the last month. The patient was discharged from service December 17, 1861, and sent home. He had urgently requested that amputation be performed, but on careful examination it was deemed more prudent to saw off the dead bone which had not yet been cast off and to resort to amputation only in case of failure of the resection. The excised portion of the tibia (*Spec.* 346), represented in the adjacent cut (FIG. 368), and measuring one and one-fourth inches in length, was contributed with the history of the case by Assistant Surgeon J. W. S. Gouley, U. S. A. The patient became a pensioner after receiving his discharge. Examining Surgeon H. D. Train, of Sheffield, Massachusetts, September 7, 1872, certified to the injury and resection, "shortening the limb three inches. There is a perfect solidification at the place of fracture; no motion of ankle and instep. After slight exertion or during damp weather he has often severe pain, which prevents any labor. Since his discharge he has been obliged to lead a sedentary life from inability to walk. His general health is fair, but his system is generally weakened and sensitive to cold weather. The foot is gradually perishing, and the pensioner would have been infinitely better off to-day if amputation had been performed." Five years later the same examiner reported that "since last examination spiculæ of bone were frequently discharged, the wound breaking out afresh. He cannot walk any distance without crutch or cane. General health poor." The pensioner was paid December 4, 1881.

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FIG. 368.—Excised portion of fibula. *Spec.* 346.

CASE 292.—*Partial excision at the ankle joint.*—Private L. Ettinger,[1] Co. K, 58th New York, aged 52 years, was accidentally injured, near Hunter's Chapel, December 6, 1861, by the blow of an axe, which struck his right foot just below the external malleolus, penetrating the ankle joint. Assistant Surgeon J. S. Billings, U. S. A., who operated in the case, made the following report: "The man was admitted to the Union Hotel Hospital, Georgetown, January 1, 1862, being very feeble and emaciated and complaining of great pain in the foot. A large gaping wound existed at the site of the injury, from which sanious fetid pus was escaping and at the bottom of which dead bone could be felt. Sinuses also ran down each side of the tendo-achillis, and the whole integument about the ankle joint was livid and undermined. On January 6th partial excision of the ankle joint was performed by a curved incision three inches long, made just below the external malleolus and including the original wound. The external malleolus, the whole of the astragalus, and a small portion of the scaphoid were found to be carious and were removed by means of the bone gouge and Liston's forceps. The hæmorrhage was slight. Simple dressings were applied, and ale and good diet were furnished. By March 1st the wound had entirely healed, the skin had resumed its natural appearance, and the patient could walk with a cane. He was then sent to Philadelphia, where he was discharged from service. I saw him eight months afterwards, walking with a cane and with but a very slightly perceptible limp. The age and debilitated condition of this patient rendered the expediency of excision very doubtful; but the result proved entirely satisfactory." The records of South Street Hospital, Philadelphia, show that the patient was discharged September 17, 1862, by reason of "anchylosis of the right ankle joint" resulting from the wound. The man subsequently became a pensioner. The nature of his injury and disability has since then been corroborated by successive certificates of various examining surgeons. The pensioner has been for some years an inmate of the hospital for the insane at Randall's Island, New York Harbor.

TABLE CVI.

Summary of Twenty Cases of Excisions of the Bones of the Extremities.

[Upper Extremities, 1—5; Lower Extremities, 6—20.]

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATE OF INJURY OR DISEASE.	NATURE OF INJURY OR DISEASE.	DATE OF OPERATION.	OPERATION AND OPERATOR.	RESULT AND REMARKS.
1	Ormsby, M. S., Pt., D, 8th Infantry, age 20.	——— 1862.	Abscess on right shoulder from pressure of knapsack and accoutrements. Another abscess in leg; ulceration.	Aug. 15, 1862.	Portion of acr. proc. of scapula excised; August 22, spine and balance of acr. proc. remov'd. A. Surg. R. Bartholow, U. S. A.	Discharged Nov. 1, 1862. Claim for pension rejected. *Spec.* 415, A. M. M. *See First Surgical Volume*, p. 564.
2	Bliss, O. M., Capt., H, 9th Iowa, age 41.	Oct. 8, 1864.	Compound fracture of the left humerus, caused by fall of horse.	Oct. 9, 1864.	Excision of upper part left humerus thro' a single incision. Surg. A. Goslin, 48th Illinois.	Erysipelas appeared; had nearly passed away on Oct. 31, 1864. Died March 21, 1865.
3	Reynolds, T., Pt., Permanent Party at Carlisle Barracks, Penn., age 27.	May 11, 1863.	Right arm run over by a street car, fracturing humerus.	———	Resection of 2 inches of shaft of right humerus.	Disch'd Mar. 26, 1864. Necrosis; wound re-opened; discharged pus; pensioned; arm impaired.
4	West, W., Pt., F, 78th Ohio, age 39.	Oct. 20, 1863.	Compound comminuted fracture of the right elbow joint. Condyles of humerus, head of radius, and portion of ulna crushed by a car wheel.	Oct. 22, 1863.	Excision of condyles of right humerus, head of radius, and point of olecranon through an incision 5 ins. long. A. A. Surg. J. S. Baily.	Erysipelatous inflammat'n, which appeared on the 8th day, was readily subdued. Died June 20, 1864, of mortification of the arm.
5	Reynaud, C., Pt., H, 2d Kentucky Cavalry, age 26.	May 5, 1864.	Right ulna fractured at upper part by blow from a musket; both ends of bone denuded.	June 4, 1864.	Resection of both ends of bone, about 3 ins. of shaft removed. Surg. R. R. Taylor, U. S. V.	Disch'd June 13, '65: pensioned; anchylosis elbow; good motion of fingers. Died Dec. 28, 1879.
6	Taylor, J., Pt., C, 38th Colored Troops, age 16.	——— 1864.	A log fell upon him, fracturing lower third of right femur; necrosis and sloughing.	Oct. 17, 1864.	Resection of 4 inches of lower third of shaft of right femur. A. A. Surg. O. Shittler.	Wound sloughing. Died October 29, 1864, of exhaustion.
7	Burnett, A. J., Pt., G, 6th East Tennessee, age 36.	Aug. 7, 1863.	Compound comminut'd fracture of left leg and dislocation of ankle; run over by a wagon.	Aug. 21, 1863.	Excision of the left tibia	Discharged June 27, '64: anchylosis of the ankle joint. Claim for a pension rejected.
8	Coburn, S., Pt., G, 3d Illinois Cavalry, age 38.	——— ———	Ulcer of the right leg; periostitis of tibia and inflammation of leg from knee to ankle.	Secondary.	Excision of 3½ inches of the right tibia.	Mustered out July 6, '66; tissues inflamed and indurated; ankle partially stiffened.
9	Disney, T. W., Pt., B, 36th Massachusetts, age 33.	——— ———	Accidental fracture of the right tibia; 3 inches of necrosed bone exposed.	Sept. 2, 1864.	Excision of 5 inches of the right tibia.	Discharged March 8, 1865; pensioned; two inches shortening; lameness. Died Jan. 31, 1873.
10	Harper, H. S., Pt., E, 137th New York, age 35.	Aug. —, 1864.	Scurvy and ulcer of left leg; tibia extensively necrosed.	Jan. 21, 1865.	Excision of 10½ inches of left tibia through an incision 12 inches long. Surg. G. Grant, U. S. V.	Mustered out Sept. 15, 1865; pensioned. 1877, parts still discharging extensively; walks with difficulty; limb nearly worthless.

[1] CULBERTSON (H.), *Excision of the Larger Joints of the Extremities*, in *Transactions American Medical Association*, 1876, Supplement to Vol. XXVII, p. 344. Prize Essay.

No.	Name, Military Description, and Age.	Date of Injury or Disease.	Nature of Injury or Disease.	Date of Operation.	Operation and Operator.	Result and Remarks.
11	Hickey, T., Corp'l, E, 3d Michigan Cavalry.	Jan. 21, 1864.	Fracture of bones of right leg; kick by a mule; fractured ends overlapped; gangrene.	Mar. 10, 1864.	Fractured ends of tibia remov'd by chain saw. A. A. Surg. S. S. Jessop.	March 19, ligation of post. tibial; metastatic abscess. March 29, amp. thigh. Died Mar. 31, 1864.
12	Hughes, J., Contraband, age 52.	———	Comminuted fracture of the tibia; necrosis about middle.	Mar. 3, 1865.	Excision of about 2 inches of tibia at middle third. A. A. Surg. H. H. Watts.	March 31, 1865; recov'd. Walking on injured leg.
13	Mickey, B. F., Unassigned recruit, age 25.	April 6, 1865.	Comp'd comminut'd fracture of the lower third of left tibia and fibula, caused by leaping from railroad car while in motion.	April 20, 1865.	Excision of 2 inches of left tibia through incision 3 inches long. Surgeon T. W. Fry, U. S. V.	Absented himself without leave. Not pensioned.
14	Moulton, A. S., Pt., A, 6th New Hampshire.	———	Disease of left leg, caused by fever; necrosis of tibia.	July 31, 1862.	Excision of a portion of tibia.	Discharged Sept. 27, 1862; pensioned. 1871, leg swollen and painful; varicose veins.
15	Olds, J. K., Serg't, B, 10th New York Artillery, age 29.	May 29, 1864.	Compound fracture of middle third of right tibia and fibula; fibula firmly united; no attempt at union in tibia.	Feb. 7, 1865.	Ends of tibia remo'd with chain saw; holes drilled to facilitate formation of callus. Surg. O. A. Judson, U. S. V.	Discharged June 14, 1865; tibia ununited; limb totally useless. May, 1877, amputation of leg below the knee.
16	Peaseley, C., Pt., A, 10th Massachusetts.	Aug. 31, 1861.	Comminuted fracture of the left tibia and fibula by kick of a horse; no attempt at union; bone bare for space of 2 inches.	Secondary.	Excision of 2 inches of shafts of tibia and fibula through anterior and posterior incisions.	Discharged Dec. 16, 1861; pens'd. 1877, no flexion or motion at ankle; wound breaking out afresh. *Spec.* 346, A. M. M.
17	White, H. C., Pt., C, 40th New York, age 23.	———	Necrosis of the right tibia, caused by syphilis.	Secondary.	Excision of 6 inches of the right tibia, middle third.	Discharged Oct. 3, 1865. 1869, ulcerated surface of limb with indurated and adherent border.
18	[1]Ettinger, L., Pt., K, 58th New York, age 52.	Dec. 6, 1861.	Right foot struck with an axe just below malleolus, penetrating ankle joint; large gaping wound, at the bottom of which dead bone could be felt.	Jan. 6, 1862.	Curved incision 3 inches long just below external malleolus; malleolus, astragalus, and a small portion of scaphoid bone removed by bone gouge and Liston's forceps. Ass't Surg. J. S. Billings, U. S. A.	March 1, entirely healed. Discharged September 17, 1862; anchylosis of ankle joint; pensioned. February, 1881, has been for the past eight years an inmate of Hospital for the Insane at Randall's Island.
19	Danbury, E., Pt., K, 14th New Jersey, age 22.	Oct. 3, 1863.	Comminuted fracture of the right os calcis by a railroad accident.	Oct. 10, 1863.	Excision of entire os calcis. Surg. A. Treganowan, 14th New Jersey.	Wound healed but opened again during march in Wilderness. Transferred for muster out May 23, 1865; not a pensioner.
20	Pettie, H., Pt., K, 76th New York, age 22.	May —, 1863.	Ulcer, causing caries	July 26, 1863.	Excision of the first metatarsal bone of right foot. Assistant Surg. W. Thomson, U. S. A.	Discharged Dec. 19, 1863; pens'd. 1877, foot partly everted, toe retracted, foot weakened.

AMPUTATIONS.—Seven hundred and seventy-six cases of amputations in the bones of the extremities are found on the records. One hundred and ninety-five were in the upper, and five hundred and eighty-one in the lower extremities. Of the former twenty, or 10.5 per cent., and of the latter one hundred and forty-six, or 25.5 per cent., were fatal.

AMPUTATIONS IN THE UPPER EXTREMITIES.—Six were amputations at the shoulder joint, forty-four in the arm, thirty-four in the forearm, seventeen of the hand, and ninety-four of the fingers; in one of the latter re-amputation in the forearm became necessary:

Table CVII.

Numerical Statement of One Hundred and Ninety-five Cases of Amputations in the Upper Extremities for Disease or for Injury not inflicted by Weapons of War.

Amputations.	Cases.					For Injury.			For Disease.	
	Total.	Recovery.	Fatal.	Undetermin'd Results.	Percentage Fatality.	Recovery.	Fatal.	Undetermin'd Results.	Recovery.	Fatal.
Amputations at the Shoulder Joint	6	3	3	.....	50.0	3	3	.....	.....	.....
Amputations in the Upper Arm	44	34	10	.....	22.7	33	9	.....	1	1
Amputations in the Forearm	34	28	6	.....	17.6	22	5	.....	6	1
Partial Amputations of the Hand	17	17	.....	.....	.....	12	.....	.....	5	.....
Amputations of Fingers	93	87	.....	6	.....	75	.....	6	12	.....
Amputation of Fingers followed by Amputation in Forearm	1	.....	1	.....	100.0	.....	.....	.....	.....	1
Aggregates	195	169	20	6	10.5	145	17	6	24	3

[1] CULBERTSON (H.), *Excision of the Larger Joints of the Extremities*, in *Transactions of the American Medical Association*, 1876, Prize Essay, Supplement to Volume XXVII, p. 344.

CASE 993.—*Amputation in the arm.*—A. J. Ross, a civilian, was hurt in the left forearm by a railroad accident at Mound City, April 18, 1863. The injury and its results were described by Surgeon H. Wardner, U. S. V., as follows: "The radius and ulna were fractured in several places and the superficial muscles of the palmar side of the arm were terrible lacerated, besides which the arm was bruised about the elbow joint. The patient was considerably prostrated from loss of blood, so much so as to cause me to desist from operating when counseled by his attending physicians. Adhesive strips and cold-water dressings were used and the patient was put upon stimulants and tonics. By May 1st much of the superficial muscular substance of the forearm had sloughed away and the olecranon process was exposed and denuded. Flaxseed poultices with charcoal and cinchona were now applied. On June 3d I again visited the patient and urged him to have the limb amputated. The treatment was continued until June 18th, when it was found that the bones would not unite and the patient was on the decline, and I was called by the attending physician for the purpose of operating. I found the patient quite weak and showing symptoms of epilepsy. I performed the amputation at the middle third of the humerus by circular operation and dressed the stump with simple dressings, which were continued until June 24th, when a portion of the ligatures came away. Two days afterwards the patient was able to walk about the room, and the next day the remaining ligatures came away. On July 4th the patient was attacked with fever and diarrhœa, which continued over two weeks, reducing him very low and seriously retarding the progress of the case. By July 25th, however, he was regaining his strength rapidly and the stump was again improving. In the following month he was able to walk about town and was gaining flesh very fast. On October 13th he was considered cured." The amputated portion of the humerus and the bones of the forearm (*Spec.* 1770) were contributed to the Museum by the operator and are represented in the cut (FIG. 369). The specimen shows the bones of the forearm to be fractured near the middle and again at their upper extremities, the greater portion of the shafts being necrosed and having slight and imperfect involucra. The fragments of the lower extremity of the humerus are attached to it in irregular positions by callus.

FIG. 369.—Bones of the forearm, with portion of humerus. *Spec.* 1770.

CASE 994.—*Amputation in the forearm.*—Private N. W. Pelton, 2d Wisconsin Cavalry, aged 46 years, was admitted to Harvey Hospital at Madison on November 15, 1864, with disease of the right hand, for which amputation was performed by Surgeon H. Culbertson, U. S. V., who reported the following history: "The patient had lost the thumb and index finger of his right hand, which were removed by Dr. R. L. Tolfore, of Lone Rock, Wisconsin, on April 20, 1864, the operation being the result of a felon contracted the previous month. On December 30th, when the forearm was amputated, the wrist joint had become partially anchylosed from ostitis and necrosis of several of the carpal bones, and there was an open sinus on the dorsum of the hand; plastic organized material in the cellular tissues of the fingers, hand, wrist, and along the extensor and flexor tendons; cellular tissues indurated and of a yellow color; periostitis extending up the radius and ulna three inches above the wrist joint; structure of ulna somewhat softened and darkened for two inches above its lower extremity; loss of motion in the remaining fingers induced by the organized effusion about the tendons. The patient's system had become impaired from continued pain and discharge. He had recently had an attack of erysipelas in the hand and arm, but had entirely recovered and earnestly desired to have the hand removed. The amputation was performed by the circular method at the lower fourth of the forearm, above the diseased bone, three vessels, the radial, ulnar, and interosseous arteries, being taken up. Chloroform was used with good effect. One grain of morphia was given after the operation, and the wound was closed with sutures, adhesive plaster, and bandage. Fifteen hours afterwards the bandage was removed and cold-water dressings were applied. The patient died January 7, 1865, of erysipelas, which extended to other parts of the body and was arrested in the arm and stump." The bones of the amputated limb, comprising the lower portion of the forearm, the carpus, and three metacarpal bones, were contributed to the Museum by the operator and constitute specimen 3695 of the *Surgical Section*. The carpus shows the semilunar bone to be partly necrosed and caries exists in the adjacent bones.

CASE 995.—*Amputation in the forearm.*—Private F. Schubnel, Co. A, 23d Indiana, aged 37 years, had his right hand poisoned in May, 1864, while engaged in pulling and gathering leaves for bedding for a field hospital during the Atlanta campaign. Surgeon M. Brucker of the regiment certified to the injury, and reported that it produced malignant ulceration, affecting the whole arm. At the expiration of his service, July 28, 1864, the man was mustered out and returned to his home, where amputation subsequently became necessary and was performed four inches below the elbow on September 2, 1864. Dr. D. H. Combs, of Charlestown, Indiana, who performed the operation, certified that when the man came to him "he was suffering from poison which had affected his system. Gangrene had ensued, the arm was greatly swollen, and there was no remedy but amputation, which was performed. After a time the stump healed well and the patient was in a fair way to recovery, though his system was weakened from the effects of the poison; his gums were spongy, tongue flabby," etc. The operator further added that he saw but little of the patient after the stump had entirely healed. In his application for commutation, dated 1870, the pensioner described the stump as being in a "sound condition." No definite cause of his death, which occurred on April 5, 1873, has been reported to the Pension Office.

Ninety-three of the one hundred and ninety-five amputations in the upper extremities were ablations of fingers. In the following tabular statement are given condensed accounts of the remaining one hundred and two cases of amputations at the shoulder, in the arm, in the forearm, and in the hand; sixty-seven were for fractures caused by falls, railroad accidents, etc., six for punctured and incised wounds, eight for burns or scalds, four for poisoning, and seventeen for diseases.

TABLE CVIII.

Summary of One Hundred and Two Cases of Amputations in the Upper Extremities for Miscellaneous Injuries or Disease.

[Amputations at the shoulder, 1—6; amputations in the arm, 7—50; amputations in the forearm, 51—85; amputations in the hand, 86—102.]

No.	Name, Military Description, and Age.	Date of Injury or Disease.	Nature of Injury or Disease.	Date of Operation.	Operation and Operator.	Result and Remarks.
1	Armes, A., Pt., D, 93d New York, age 22.	Sept. 20, 1864.	Right arm crushed by railroad cars.	Sept. 20, 1864.	Amputation at the shoulder joint; flaps from deltoid muscle and axilla. A. A. Surg. M. Baldwin.	Discharged February 17, 1865; pensioned; good stump.
2	Corragin, J., Pt., 13th Michigan Battery, age 23.	June 19, 1865.	Right arm carried away by railroad cars.	June 20, 1865.	Amputat'n at the shoulder joint by external and internal flaps. A. A. Surg. F. P. Foster.	Discharged September 19, 1865; pensioned.
3	Wunderlich, M., Pt., H, 1st Michigan Artillery, age 20.	June 30, 1865.	Comminuted fracture of right arm, caused by a railroad accident.	June 30, 1865.	Antero-posterior flap amputation at shoulder joint. A. A. Surg. M. L. Herr.	Discharged October 27, 1865; not a pensioner.
4	Bowers, G. W., Pt., A, 3d Maryland, age 25.	Oct. 4, 1863.	Right forearm and arm crushed by railroad cars.	Oct. 4, 1863.	Flap amputation at shoulder joint by Lisfranc's process. A. A. Surg. J. Kirker.	Died October 9, 1863, of pyæmia.
5	Hill, I. B. (Rev.), U. S. Sanitary Commission, age 68.	June 15, 1864.	Left arm crushed by railroad cars.	June 15, 1864.	Amputation at the shoulder joint. Ass't Surg. C. C. Byrne, U. S. A.	Died June 16, 1864, of shock.
6	Whalen, M., Corp'l, G, 32d Massachusetts, age 38.	Sept. 15, 1864.	Right arm severed and scapula fractured by railroad cars.	Sept. 15, 1864.	Amputat'n at the shoulder joint and removal of fragments and head of scapula. Ass't Surg. C. Bacon, jr., U. S. A.	Died September 16, 1864, of injuries. Autopsy revealed also fracture of first, second, and third ribs, etc.
7	Baker, J., Serg't, A, 48th Pennsylvania.	Feb. 3, 1864.	Comp'nd comminuted fracture of left arm and laceration middle finger, right hand; railroad accident.	Feb. 3, 1864.	Circular amputat'n of arm near shoulder joint. A. A. Surg. A. H. Halberstadt.	Transferred to Veteran Reserve Corps March 3, 1865.
8	Carpenter, J. N., Pt., A, 11th Michigan.	Sept. 24, 1864.	Railroad injury of right arm...	Sept. 24, 1864.	Circular amputation of arm 4 inches from fold of pectoralis major.	Discharged September 30, 1864.
9	Carrigan, F. S., Pt., F, 5th Cavalry.	Nov. 21, 1865.	Right forearm crushed by being run over by a locomotive.	Nov. 21, 1865.	Circular amputation of right arm at lower third. Ass't Surg. D. Bache, U. S. A.	Discharged March 2, 1866; rejected as a pensioner.
10	Coleman, J., Pt., D, 6th Tennessee Mounted Infantry, age 18.	Mar. —, 1865.	Incised wound of left elbow joint; gangrene.	April 9, 1865.	Circular amputation at middle third of left arm. A. A. Surg. J. W. Taylor.	Discharged June 6, 1865.
11	Dilley, A., Gov't employé, Nashville and Chattanooga Railroad, age 20.	June 12, 1863.	While attempting to get on a moving train had both arms crushed by car wheels; left humerus crushed to its head.	Prim'ry.	Amputation of left arm, 3 ins. of bone allowed to remain in stump; also of right forearm at middle third. Dr. Brandish, Nashville.	Recovery. Wound of left shoulder has never healed. May 20, 1866, three sinuses in front and one behind shoulder leading to necrosed bone. Oct., 1866, his health is very good.
12	Downey, J., Pt., D, 145th New York, age 40.	Oct. 28, 1863.	Comminuted fract. of forearm and arm, great laceration of soft parts; railroad accident.	Oct. 29, 1863.	Flap amputation at upper third of left arm. Surg. R. S. Kenderdine, U. S. V., and A. A. Surg. D. W. Hunt.	Much sloughing. Disch'd Nov. 3, 1864; stump healed.
13	Feigley, J. C., Serg't Maj. 31st Ohio, age 25.	Feb. 24, 1864.	Compound fracture of left arm; railroad accident.	Feb. 24, 1864.	Amputat'n of left arm at upper third. Pension Exam. Surg. Hamlin, Newark, Ohio.	Discharged June 1, 1864.
14	Freeman, H., Pt., D, 60th Illinois, age 21.	———	Unfavorable result of vaccination in rebel prison; gangrenous.	Sept. 28, 1864.	Circular amputation of left arm near shoulder joint. Confederate surgeon.	Mustered out July 31, 1865.
15	Fuller, A., Serg't, G, 14th Maine, age 24.	June 30, 1864.	Left arm crushed by railroad cars.	June 30, 1864.	Arm amputated 5 inches from shoulder. Surg. T. F. Perley, U. S. V.	Discharged September 11, 1865; stump healed.
16	Funking, H., Pt., D, 5th N. Y. H'vy Artillery, age 23.	Oct. 25, 1864.	Comminuted fracture of right arm and left foot; railroad accident.	Oct. 25, 1864.	Circular amputation at middle third of right arm and at lower third of left leg. Surg. Z. E. Bliss, U. S. V.	Doing well. Discharged May 31, 1865.
17	Loveridge, J., Pt., G, 14th N. Y. Heavy Artillery.	Dec. 18, 1862.	Injury of the right arm by railroad cars.	Dec. 18, 1862.	Flap amputation of right arm, upper third. Surg. S. Morse, 14th N. Y. Heavy Artillery.	Discharged May 19, 1864.
18	Lowry, P., Pt., C, 21st New York Cavalry, age 27.	June 14, 1865.	Comminuted fracture of right humerus, radius, and ulna, also of second and third toes of right foot.	June 15, 1865.	Flap amputation of right arm, upper third, also of second and third toes. A. A. Surg. H. S. Streeter.	Discharged November 22, 1865.
19	Marcy, G. F., Pt., F, 21st Massachusetts.	Aug. 29, 1861.	Left arm injured above elbow; railroad accident.	Aug. 30, 1861.	Amputation of arm at upper third.	Discharged January 13, 1862; stump good.
20	*Meeks, J. C.*, Serg't., A, 24th Georgia, age 22.	July 16, 1864.	Comminuted fracture of right elbow joint.	July 19, 1864.	Circular amputation at middle third of right arm.	Sent to prison February 16, 1865.
21	Megans, T., Hospital Steward, 90th Penn., age 41.	July 4, 1864.	Railroad cars completely crushed and comminuted right humerus in lower third.	July 4, 1864.	Circular amputation of right arm at upper third. A. A. Surg. E. L. Duer.	Gangrene. July 10, secondary hæmorrhage. Discharged December 12, 1864.
22	Mitchell, E., Pt., E, 6th Indiana Cavalry, age 28.	Oct. 30, 1864.	Right arm crushed and almost severed; railroad accident.	Oct. 30, 1864.	Circular amputation at upper third of arm. Ass't Surg. W. H. Jones, 115th Ohio.	Transferred December 1, 1864; not a pensioner.
23	Murphy, B., Pt., H, 1st Rhode Island Arti'ry, age 46.	May 14, 1863.	Fell from caisson and sustained compound comminuted fracture of left arm.	May 14, 1863.	Flap amputation of arm at upper third.	Discharged September 17, 1863; stump healed but tender.
24	Navins, J., citizen	July 23, 1863.	Compound fracture of right radius and ulna and simple fracture of humerus; fall from a bridge; sphacelus.	July 26, 1863.	Oval skin-flap amputation of right arm at surgical neck of humerus, with circular section of muscles. Ass't Surg. W. Thomson, U. S. A.	Discharged from hospital Nov. 15, 1863, perfectly well. *Spec.* 1849, A. M. M.
25	Neer, M., Pt., H, 14th West Virginia, age 29.	April 14, 1864.	Left forearm crushed from wrist to elbow, also fracture of inferior maxilla; railroad accident.	April 14, 1864.	Antero-posterior flap amputation at lower third of arm. Surg. S. N. Sherman, U. S. V.	Hæmorrhage on 17th day; no recurrence. Discharged September 10, 1864; not pensioned.
26	Newcomb, N. L., Pt., G, 174th Ohio.	May 12, 1865.	Right arm injured above the elbow; railroad accident.	May 13, 1865.	Circular amputation at lower third of arm. Surg. G. W. Kizer, C. S. A.	Discharged June 28, 1865; stump sound.

No.	Name, Military Description, and Age.	Date of Injury or Disease.	Nature of Injury or Disease.	Date of Operation.	Operation and Operator.	Result and Remarks.
27	Osborne, C., Pt., 28th New York Battery.	Feb. 24, 1865.	Compound comminuted fracture of right humerus; railroad accident.	Feb. 24, 1865.	Flap amputation of arm 9 ins. from shoulder.	Discharged June 14, 1865.
28	Rieman, H., Pt., G, 12th Maine, age 23.	Jan. 16, 1864.	Injury of left arm; railroad accident.	Jan. 16, 1864.	Flap amputat'n at middle third of arm. Surg. O. M. Humphreys, U. S. V.	Jan. 31, ligation of axillary. Feb. 17, ligation of subclavian. Gangrene; necrosis. Disch'd July 31, 1865.
29	Romine, J., Pt., F, 122d Ohio, age 20.	Sept. 14, 1864.	Right arm crushed under car wheel.	Nov. 4, 1864.	Flap amputation of arm near insertion of deltoid. Surg. T. A. Dargan, P. A. C. S.	Discharged June 20, 1865; good stump.
30	Ross, A. J., civilian.....	April 18, 1863.	Fracture of left radius and ulna, involving elbow joint; railroad accident.	June 18, 1863.	Circular amputation at middle third of arm. Surg. H. Wardner, U. S. V.	October 18, 1863, cured. *Spec.* 1770, A. M. M.
31	Seary, J., Pt., H, 1st Missouri Cavalry, age 26.	May 26, 1864.	Fracture of left arm by being thrown from his horse.	May 26, 1864.	Flap amputation at upper third of left arm.	Discharged July 31, 1864. Died July 15, 1868.
32	Secor, D., Corp'l, A, 56th New York, age 32.	July 12, 1865.	Comp'nd comminuted fracture of left arm; railroad accident.	July 12, 1865.	Circular amputation of left arm at lower third.	Discharged November 4, 1865.
33	Seit, F., Pt., F, 68th New York.	Sept. 15, 1864.	Right arm crushed by railroad accident.	Sept. 15, 1864.	Amputation of right arm about 3 ins. from shoulder. Surg. L. Schultz, 68th N. Y.	Discharged June 17, 1865; sound stump.
34	Sumner, L. G., Pt., D, 78th New York.	July 10, 1862.	Injury of right arm; railroad accident.	Twelve hours after.	Amputation of arm 3 inches from shoulder. Surg. E. P. Gray, 78th N. Y.	Discharged January 17, 1863; sound stump.
35	Thompson, M., Pt., C, 1st Penn. Light Art., age 30.	Jan. 22, 1865.	Railroad injury of left arm....	——— 1865.	Amputat'n of arm below shoulder joint.	Deserted July 2, 1865; no pension record.
36	Tucker, W. J., Pt., G, 11th Veteran Reserve Corps.	July 15, 1864.	Injury of right arm above elbow and dislocation of thigh; railroad accident.	July 16, 1864.	Flap amputat'n at middle third of right arm.	Discharged Nov. 2, 1864; stump healed.
37	Tuttle, J. H., Pt., E, 38th Massachusetts	Mar. 28, 1865.	Injury of left arm by railroad accident.	Mar. 28, 1865.	Flap amputation of left arm 9 inches from shoulder. Surg. H. Fearn, 175th N. Y.	Stump wasted and weak, but healed. Disch'd June 30, 1865.
38	Van Vleck, W., Pt., H, 125th New York, age 37.	Oct. 19, 1862.	Injury of right arm and right knee; railroad accident.	Oct. 19, 1862.	Flap amputation at upper third of arm. Surg. W. S. Cooper, 125th N. Y.	Discharged November 21, 1862. Died July 28, 1868, of pyæmia.
39	Wade, S., Pt., E, 177th Ohio, age 21.	Oct. 13, 1864.	Compound fracture at middle third of left humerus; railroad accident.	Oct. 13, 1864.	Circular amputation at upper third of arm. A. A. Surg. S. L. Merrill.	Discharged April 13, 1865; stump healed.
40	Wait, H. L., Pt., C, 3d Iowa, age 25.	May 9, 1864.	Right elbow joint crushed by railroad car wheel.	May 9, 1864.	Flap amputation 2 inches above elbow.	Mustered out August 26, 1865.
41	Clark, J., employé in the Quartermaster's Departm't, age 30.	Jan. 4, 1865.	Compound comminuted fracture of left humerus, radius, and ulna; railroad accident.	Jan. 4, 1865.	Amputation of arm by antero-post. semi-circular flaps. A. A. Surg. W. Balser.	January 22, pyæmic symptoms set in. Died February 11, 1865, of pyæmia.
42	Coker, J., Pt., C, 6th Tennessee, age 34.	Jan. 26, 1865.	Comp'nd comminuted fracture at upper third of left radius and ulna, also fracture and dislocation of right elbow.	Jan. 27, 1865.	Flap amputation of both arms at middle third. A. A. Surg. H. S. Streeter.	In a semi-moribund condition. Died January 27, 1865.
43						
44	Conway, J. A., Pt., A, 55th Pennsylvania, age 22.	May 24, 1865.	Railroad cars completely crushed left radius and ulna and right tibia and fibula.	May 24, 1865.	Circular amputat'n, lower third, left arm. A. A. Surg. R. M. Kirk. Amp. of right thigh.	Died May 28, 1865, of internal injuries.
45	Dougherty, J., Pt., A, 90th Pennsylvania.	Nov. 11, 1863.	Compound fracture left radius and ulna, laceration of scalp and cone. of brain, fracture of 2d and 3d ribs; gangrene.	Nov. 15, 1863.	Antero-posterior flap amputation at middle third of arm. A. A. Surg. S. C. King.	Died November 18, 1863, of injuries; autopsy.
46	Enyart, H. D., Pt., G, 23d Veteran Reserve Corps, age 28.	Oct. 13, 1864.	Compound fracture of right radius and ulna; accident; gangrene.	Oct. 24, 1864.	Amputation at upper third of right arm. Surg. A. Hammer, U. S. V.	Died November 11, 1864, of pyæmia; autopsy.
47	Hitchens, C., Pt., C, 2d Maryland P. H. B.	April 3, 1863.	Right arm crushed from wrist to middle of humerus; railroad accident.	April 3, 1863.	Amputation of arm near shoulder joint.	No reaction. Died April 5, 1863.
48	Ready, P., Pt., E, 13th New York Cavalry, age 48.	June 9, 1864.	Compound comminuted fracture of middle and up. thirds of right radius and ulna, joint destroyed; railroad accident.	June 9, 1864.	Flap amputat'n at middle third of arm. Ass't Surg. J. H. Frantz, U. S. A.	June 13, pyæm. symptoms. Died June 29, 1864, of pyæmia; autopsy.
49	Rouse, M., colored woman, age 23.	———	Ulcer of left arm and neck resulting from frequent attacks of malarial fever; gangrene.	April 15, 1865.	Circular amputation at upper third of arm. Surgeon T. J. Wright, 64th U. S. C. T.	Died April 27, 1865, of diarrhœa.
50	Sweeny, J., Pt., E, 70th N. York.	Mar. 28, 1864.	Comp'nd comminuted fracture of right humerus, lower third, extensive laceration of forearm; also compound fracture of left metatarsus and phalanges; railroad accident.	Mar. 29, 1864.	Circular amputation of right arm. A. A. Surg. W. S. Ward.	Rallied to some extent. Died March 31, 1864, from nervous shock.
51	Adams, T. B., Pt., A, 6th Kansas Cavalry, age 39.	———	Scrofula; inflamma'n involving ligaments, carpal bones, and low. thirds of radius and ulna.	———	Amputation of right forearm ..	Discharged August 12, 1863.
52	Campbell, S., Pt., H, 2d Maryland, age 22.	———	Palmar abscess of left hand; erysipelas.	Feb 19, 1863.	Antero-posterior flap amputation at middle third of forearm.	Feb. 23, sec. hæm., lig. of radial artery. Trans. to V. R. Corps July 16, 1863; stump perfectly healed. *Specs.* 1184, 1185, A. M. M.
53	Dilley, A., Gov't employé, Nashville and Chattenooga Railroad, age 20.	June 12, 1863.	Both arms crushed by car wheels; attempting to get on moving train.	Prim'ry.	Amputation of right forearm, middle third, and of left arm, upper third. Dr. Brandish, Nashville.	Recovered. May 20, 1866, three sinuses in front and one behind shoulder leading to necro. bone. Oct., 1866, health very good.
54	Dunlap, O., Capt., I, 26th Illinois.	Dec. 28, 1864.	Injury of right hand and right foot; railroad accident.	Dec. 28, 1864.	Amputation forearm just above wrist and of leg just above ankle. Surg. O. Hoyt, 30th Wisconsin.	Discharged May 15, 1865.
55	Fleming, J., Corp'l, F, Cole's Maryland Cavalry.	June 20, 1864.	Left hand mangled and forearm fractured, also thumb and first finger right hand; railroad accident.	June 21, 1864.	Circular flap amputat'n at lower third of left forearm and thumb and finger right hand.	Discharged March 11, 1865.
56	Fosgate, O., Pt., C, 57th Massachusetts, age 43.	———	Felon on right index finger; fissures of hand sloughing; hæmorrh. from palmar arch.	June 16, 1864.	Circular amputation at lower third of forearm. A. A. Surg. M. M. Jarratt.	Transferred to Veteran Reserve Corps January 18, 1865; sound stump.
57	Gardner, C. A., Pt., B, 10th New York Artillery.	Mar. —, 1864.	Fever sore	Aug. 28, 1864.	Flap amputation at lower third of left forearm. Dr. Trowbridge, Watertown, N. Y.	Transferred to Veteran Reserve Corps.

No.	Name, Military Description, and Age.	Date of Injury or Disease.	Nature of Injury or Disease.	Date of Operation.	Operation and Operator.	Result and Remarks.
58	Gardner, M., Pt., I, 12th Colored Troops.	Aug. 26, 1864.	Injury of right hand and foot by railroad cars.	Aug. 27, 1864.	Amput'n of forearm and leg at lower thirds. Surg. G. Stegman, 12th Colored Troops.	Discharged July 18, 1865.
59) 60)	Garrett, E., Pt., A, 43d Colored Troops, age 20.	———	Both limbs injured by falling into fire.	———	Circular amputation at middle third of both forearms.	Discharged August 22, 1865.
61	Glavin, J., Pt., G, 21st New York Cavalry.	Jan. 18, 1865.	Right hand burned, destroying bone and muscles.	Jan. 18, 1865.	Amputation at middle third of forearm. Acting Staff Surg. N. F. Graham.	Discharged March 8, 1866.
62	Graeser, W., Pt., I, 42d New York.	——— 1864.	Left hand poisoned while a prisoner of war.	Feb. —, 1865.	Amputation below elbow joint.	Discharged Aug. 16, 1865; good stump; died since.
63	Gridley, J., Pt., —, 9th Michigan, age 30.	Sept. 16, 1864.	Contusion of left forearm by cars.	Sept. 17, 1864.	Flap amputat'n at middle third of forearm.	Discharged February 4, 1865.
64	Halbert, J. S., Pt., I, 8th Illinois Cavalry.	June 24, 1865.	Injury of left forearm; railroad accident.	June 24, 1865.	Amputation 2 inches below elbow joint.	Discharged; stump painful.
65	Hawkins, S., Pt., A, 9th New York Cavalry, age 35.	Jan. 20, 1865.	Axe wound in left wrist joint..	Jan. 20, 1865.	Circular flap amput'n at lower third of forearm. Surg. R. Curran, 9th N. Y. Cavalry.	Discharged.
66	Hughes, T., Pt., H, 49th N. York, age 44.	Aug. 30, 1864.	Comp'nd comminuted fracture of right radius and ulna; railroad accident.	Aug. 30, 1864.	Circular amputation at upper third of forearm. Ass't Surg. P. C. Davis, U. S. A.	Transferred to Veteran Reserve Corps November 27, 1864.
67	Jones, N., Pt., D, 4th Engineers, Colored Troops.	———	Cut by an axe across forearm and face.	———	Double flap amputation at middle third of forearm.	Discharged March 10, 1864; excellent stump.
68	Kennedy, P. A. B., Pt., B, 36th Indiana.	April —, 1863.	Scrofula. Right wrist joint, knee, and ankle affected by tuberculosis; exten. destruction of bony and soft parts.	Aug. 16, 1864.	Circular amp. 5 inches below elbow. Dr. J. M. Youal, Indianapolis. (Feb. 25, 1864, amp. right thigh, low. third.)	Mustered out September 21, 1864.
69	Killgore, J. A., Pt., B, 97th Illinois, age 19.	Nov. 1, 1863.	Lower two-thirds of right forearm badly crushed; railroad accident; also scalp wound.	Nov. 1, 1863.	Circular amputation at upper third of forearm. Ass't Surg. S. H. Orton, U. S. A.	Rapid recovery; discharged December 9, 1863.
70	Laviers, M. H., Pt., F, 26th Michigan, age 30.	———	Injured by a thrashing machine previous to enlistment.	———	Amputation at middle third of left forearm.	Discharged October 29, 1864.
71	Moreland, J., Pt., G, 9th Ohio Cavalry.	Mar. 14, 1865.	Fracture of the right hand: accident; mollities of carpal bones.	Aug. 15, 1865.	Amputat'n between elbow and wrist. Dr. J. Tingle, Cambridge, Ohio.	Discharged April 21, 1865.
72	Osborne, W. L., Pt., H, 12th West Virginia.	———	Cancer of left forearm.....	——— 1864.	Amputation forearm at upper third.	Discharged April 20, 1864.
73	Pampell, J. E., Serg't, B, 3d Maryland, age 23.	Nov. 9, 1863.	Comp'nd comminuted fracture left forearm and right middle finger; railroad accident.	Nov. 9, 1863.	Circular amputation at middle third of forearm. Surg. R. R. Clark, 34th Mass. Amputat'n right middle finger and portion metacarpal bone.	Healed kindly; discharged April 11, 1864.
74	Payne, W. T., Serg't, M, 6th Kentucky Cavalry, age 22.	May 3, 1864.	Right hand and wrist crushed by railroad cars.	May 3, 1864.	Flap amputat'n at middle third of forearm.	Flaps united by first intention; discharged September 15, 1864.
75	Price, H., Pt., H, 66th New York.	Feb. 6, 1863.	Fell into fire and burned right forearm from elbow to fingers; gangrene.	Feb. 27, 1863.	Flap amputation about middle of forearm.	Discharged April 14, 1863; excellent stump.
76	Roller, J., Bugler, 13th New York Battery.	July 13, 1865.	Right hand crushed; railroad accident.	July 13, 1865.	Antero-posterior flap amputat'n at lower third of forearm.	Discharged August 4, 1865.
77	Schubnel, F., Pt., A, 23d Indiana.	May 14, 1864.	Right hand poisoned by weeds; malignant ulceration, threatening mortification.	Sept. 2, 1864.	Amputation at upper third of forearm. Dr. D. H. Combs, Charlestown, Ind.	Discharged July 28, 1864.
78	Woodfolk, H., Pt., B, 28th Colored Troops, age 22.	Sept. 1, 1864.	Right hand injured by falling into fire.	———	Flap amputation at upper third of forearm.	Discharged December 30, 1865.
79	Aylmer, E. P., Lieut., 1st Wisconsin Battery.	June 25, 1864.	Comminution of right forearm; run over by a horse-car.	June 27, 1864.	Flap amputation at lower third of forearm. A. A. Surg. J. C. Lee.	Died July 13, 1864, of pneumonia.
80	Ball, T. E., Pt., 9th Indiana Battery, age 40.	Jan. 27, 1865.	Burn and scald of left forearm; explosion of Steamer Eclipse.	Feb. 15, 1865.	Circular amputation at upper third of forearm. Surg. W. Varian, U. S. V.	Sloughing; secondary hæmorrh. Died March 24, 1865, of exhaustion and pyæmia.
81	Hede, C., Corp'l, E, 32d Indiana, age 28.	June 21, 1864.	Right radius comminuted at lower third by car wheel.	July 15, 1864.	Circular amput'n at the upper third of forearm. A. A. Surg. E. Kramer.	Died July 29, 1864, of chronic diarrhœa.
82	Norton, M., employé Quartermaster's Department, age 20.	Mar. 26, 1864.	Compound frac. lower third of left radius and ulna; caught in an engine; skin and muscles torn from hand and forearm.	Mar. 26, 1864.	Circular amputat'n of forearm.	Mar. 29, erysipelas. April 2, hæm. from radial art.; lig. at middle third of brachial. Died April 4, 1864, of hæmorrhage.
83	Pelton, N. F., Serg't, 2d Wisconsin Cavalry, age 46.	Mar. —, 1864.	Felon of thumb and index finger of right hand. April 20, thumb and index finger removed; ostitis and necrosis of carpal bones; erysipelas.	Dec. 30, 1864.	Circular amputation at lower third forearm; radial, ulnar, and interosseous arteries tied Surg. H. Culbertson, U. S. V.	Died January 7, 1865, of erysipelas. *Spec.* 3095, A. M. M.
84	Shields, J., Pt., G, 83d Pennsylvania.	——— 1864.	Extensive burn of right forearm; extensive slough'g and suppuration.	Oct. 31, 1864.	Circular amputation 2 inches below elbow. Ass't Surg. H. Allen, U. S. A.	Typhoid pneumonia and diarrh. Died November 4, 1864, of exhaustion; autopsy.
85	Tomlison, J., Pt., A, 120th Indiana, age 42.	Dec. 5, 1864.	Erysipelas of right hand followed by gangrene; sloughing.	Jan. 21, 1865.	Circular amputation at upper third of forearm. Ass't Surg. B. Knickerbocker, U. S. A.	March 3, gang. in stump. Died May 23, '65, of acute dysentery.
86	Davidson, S. H., Pt., 2d Iowa Battery, age 19.	Mar. 22, 1864.	Bowie knife dividing right ulnar artery and opening ulnacarpal articulation. Mar. 22, 1864, ligation of ulnar artery; dry gangrene.	April 12, 1864.	Amputation of fourth finger with head of metacarpal bone. Surg. J. G. Keenon, U. S. V.	Returned to duty June 8, 1864. *See Second Surgical Volume*, p. 436.
87	Denmark, J. H., Pt., H, 14th New York H'vy Artillery, age 19.	Jan. 12, 1865.	Punctured wound of right hand.	Feb. 20, 1865.	Amputation of little finger and head of metacarpal bone; antero-posterior flaps.	Furloughed Mar. 25 1865; nearly healed.
88	Dickey, C. B., Pt., C, 104th Ohio, age 22.	July —, 1864.	Right hand injured by railroad accident; little finger cut off, third and fourth fing'rs broken.	July 12, 1864.	All the bone of little finger and its metacarpal bone removed.	Recovered.
89	Doan, C., Pt., C, 3d Penn. Res. Corps, age 30.	April 3, 1864.	Railroad car passing over left hand and crushing it.	April 5, 1864.	Amputat'n of fingers, left hand, through the metacarpus.	Discharged ——— 1865.
90	Doyle, J. B., Pt., K, 18th Iowa.	Nov. 23, 1864.	Bitten in the middle of third left finger by a comrade; bone denuded and exposed.	Dec. 7, 1864.	Oval amputation of finger and head of metacarpal bone. Surg. C. E. Swasey, U. S. V.	Recovery.
91	Ellison, D., colored seaman, U.S. Steam'r Gen. Thomas, age 16.	Nov. 11, 1864.	Metacarpal bone of mid. finger crushed by machinery.	Nov. 21, 1864.	Amputation of middle finger and metacarpal bone. Ass't Surg. H. T. Legler, U. S. V.	Recovery.

No.	Name, Military Description, and Age.	Date of Injury or Disease.	Nature of Injury or Disease.	Date of Operation.	Operation and Operator.	Result and Remarks.
92	Harris, A. W., Corp'l, D, 5th Kentucky.	Mar. 10, 1864.	Gangrene of index finger, right hand.	April 13, 1864.	Amputat'n of index finger with head of metacarpal bone. Confederate surgeon.	Returned to duty Aug. 25, 1864.
93	Keeler, J., Pt., 105th Co. 2d Veteran Reserve Corps, age 32.	———	Gangrenous sloughing of left second finger.	Sept. 18, 1864.	Amputation left second finger with head of metacarpal bone. A. A. Surg. J. W. Hall.	Discharged April 28, 1865.
94	Loveland, A. A., Pt., H, 1st Conn. Cavalry, age 21.	———	Tumor first finger of left hand, supposed to be fungus hæmatodes.	Mar. 26, 1864.	Amputat'n of finger with head of metacarpal bone. A. A. Surg. J. Neff.	Recovery.
95	Luecke, A., Pt., G, 11th Infantry.	June 10, 1862.	Axe wound of left index finger; anchylosis and deformity.	June 8, 1863.	Amputat'n of index finger with greater portion of metacarpal bone. Ass't Surg. P. Adolphus, U. S. A.	Returned to duty Sept. 11, 1863.
96	Mansur, J., Pt., H, 8th New Hampshire, age 41.	———	Left mid. finger affected with an ill-conditioned sore, probably from absorption of unhealthy pus; erysipelas; sloughing.	Oct. 17, 1864.	Amputation of middle finger above head of metacarpal bone. A. A. Surg. F. Hassenburg.	Returned to duty Dec. 4, 1864.
97	Martz, J., Corp'l, K, 5th Michigan, age 25.	Jan. 1, 1864.	Comp'nd dislocation of second finger, left hand; extensive necrosis.	April 10, 1864.	Amputation of second finger with head of metacarpal bone. A. A. Surg. D. O. Farrand.	Useful hand. Returned to duty July 5, 1864.
98	Peoples, R., Pt., B, 151st Illinois, age 45.	Mar. —, 1865.	Ulcer of phalangeal bone of left index finger, result of a felon; extensive slough.; erysipelas.	April 14, 1865.	Flap amputat'n of index finger and one half of metacar. bone. A. A. Surg. W. J. R. Holmes.	Discharged June 7, 1865.
99	Taylor, J. T., Pt., C, 83d Pennsylvania, age 24.	Dec. —, 1863.	Severe burn of right and left hands; necrosis.	Mar. 18, 1864.	Amputation of fifth finger with entire metacarpal bone. A.A. Surg. J. O. French. (Jan. —, 1864, amputation left index and middle fingers.)	Discharged September 9, 1864; stump healed.
100	*Tracey, T.*, Pt., M, 1st Louisiana Cavalry, age 27.	Oct. 5, 1864.	Left thumb severely bitten in a fight; necrosis; sloughing.	Nov. 5, 1864.	Amp. of thumb and metacarpal bone at its trapezial attachment. A. A. Surg. J. C. Lee.	Healed. Returned to Provost Marshal November 23, 1864.
101	Wadley, M., Pt., H, 9th N. Hampshire, age 35.	Nov. 22, 1864.	Poisoned second finger from dressing wounds.	Nov. 22, 1864.	Amputation second finger with head of metacarpal bone.	Discharged May 29, 1865.
102	Wren, J., employé Military Railroad, age 18.	Jan. 9, 1865.	Left thumb cont. and crushed; accident.	Jan. 9, 1865.	Amputat'n of thumb with metacarpal bone at carpal articulation. A. A. Surgeon S. T. Buck.	Discharged from hospital January 26, 1865.

Amputations in the Lower Extremities.—They comprise five hundred and ninety-seven operations performed on five hundred and eighty-three patients, as follows:

Table CIX.

Table of Five Hundred and Eighty-three Cases of Amputations in the Lower Extremities for Disease, or for Injury not inflicted by Weapons of War.

Amputations.	Cases.					For Injury.			For Disease.		
	Total.	Recovery.	Fatal.	Result Undetermined.	Percentage of Fatality.	Recovery.	Fatal.	Result Undetermined.	Recovery.	Fatal.	Result Undetermined.
Amputations at the Hip Joint	1	1	.....	.....	.....	.....	.....	.....	1	.....	.....
Amputations in the Thigh	142	86	56	.....	39.4	69	53	.....	17	3	.....
Amputations at the Knee Joint	3	2	1	.....	33.3	1	1	.....	1	.....	.....
Amputations at the Knee Joint, Re-amputation in Thigh	1	.....	1	.....	50.0	.....	.....	.....	.....	1	.....
Amputations in the Leg	249	174	74	1	29.8	152	61	.....	22	13	1
Amputations in the Leg and Re-amputations in Thigh	5	3	2	.....	40.0	3	2	.....	.....	.....	.....
Amputations at the Ankle Joint	5	4	1	.....	20.0	4	1	.....	.....	.....	.....
Partial Amputations of the Foot	48	44	4	.....	8.3	42	4	.....	2	.....	.....
Partial Amputations of Foot and Re-amputation in Leg	1	1	.....	.....	.....	1	.....	.....	.....	.....	.....
Amputations of the Toes	122	109	6	7	5.2	97	6	7	12	.....	.....
Amputations of Toes and Re-amputations in Foot	2	2	.....	.....	.....	2	.....	.....	.....	.....	.....
Amputations of Toes and Re-amputations in Leg	3	1	2	.....	66.6	1	2	.....	.....	.....	.....
Amputation of Toes and Re-amputation in Leg and Thigh	1	1	.....	.....	.....	1	.....	.....	.....	.....	.....
Aggregates	583	428	147	8	25.5	373	130	7	55	17	1

One hundred and twenty-eight were amputations of the toes, followed in two instances by re-amputations in the foot, in four by amputations in the leg, and in one by re-amputation in the thigh. Forty-nine were ablations in the foot with one re-amputation in the leg; five were disarticulations at the ankle joint; two hundred and fifty-four were amputations

in the leg with five re-amputations in the thigh; four exarticulations at the knee joint with one re-amputation in the thigh; one hundred and forty-two were ablations in the thigh, and one an exarticulation at the hip joint.

CASE 996.—*Amputation at the hip joint.*—Private J. W. Spradling, Co. A, 33d Illinois, was wounded in the right side and back by a shell at Black River Bridge, May 17, 1863. He passed through various hospitals and was lastly admitted to Moand City on January 25, 1864. Surgeon H. Wardner, U. S. V., in charge of the latter, recorded the following description of the injury:[1] "The missile struck the right side between the ilium and lower rib, inflicting a wound six by nine inches. Cold-water dressings were applied for four weeks, and afterwards simple cerate. The wound healed kindly in about three months. About five or six days after the reception of the wound a bedsore commenced forming on the left hip, which was attacked with gangrene, causing sloughing of the soft parts and exposure of bone. This continued sore for ten months. By March 22d the sore had entirely healed up, but the patient had no use as yet of the leg, the integuments being adherent to the bone. Feeling in the leg and foot was almost normal; but feeling in the thigh was rather dead, though improving. The patient was able to walk about on crutches." He was discharged from service for disability April 3, 1864, and pensioned in pursuance of a certificate by Examining Surgeon A. H. Kellogg, of Clinton, Illinois, who stated that "the applicant now has partial paralysis of both lower extremities, resulting from the effects of the wound, and incapacitating him for obtaining his subsistence by labor." Examiner J. Wright, of Clinton, reported March 25, 1867: "The original wound was in the right lumbar region, which has healed, leaving a large cicatrix. While being treated in hospital a bedsore formed on the left hip which was attacked by hospital gangrene, destroying the muscles, cellular tissues, periosteum, and injuring the bone. This wound partially healed, leaving four and sometimes five fistulous openings communicating with the femur, there being also anchylosis of the hip and knee joints. He has been laying on his right side for over three years, being unable to be turned over or to sit up, and requiring a nurse all the time. I amputated the left leg at the hip joint on the 20th day of February, 1867. The wound is nearly healed and will get well, I think. How much the other limb will be worth is more than I can tell now." One year later the same examiner reported that "the right leg is perfectly useless; he cannot bear his weight on it nor use it with the aid of crutches, and requires an attendant constantly." At a subsequent date Dr. Wright certified that he continued as the attending physician of the pensioner, who was taken with diarrhœa, and then "dropsy followed and continued off and on until the date of his death on September 28, 1872."

CASE 997.—*Amputation in the thigh.*—Private C. W. Barnes, Co. I, 95th New York, aged 23 years, was admitted to Mower Hospital, Philadelphia, May 6, 1863, suffering from osteo-cephalomatous tumor of the right tibia. Surgeon J. Hopkinson, U. S. V., reported: "The history of this patient's case is as follows: While he was assisting in building a wharf at Aquia Creek about June 20, 1862, he fell and bruised himself over the spine of the right tibia. He was soon able to resume duty, but in about ten days after the accident he noticed a small lump growing on his leg. This gave him no annoyance and he remained with his regiment until the battle of Bull Run, August 29, 1862, when he was taken prisoner. He remained in captivity until the following December, when he was paroled, sent to Annapolis, and thence back to his command. He now continued to perform the duties of a soldier until February 20, 1863, when he was again excused on account of the swelling, and one month later he was sent to Douglas Hospital, whence he was transferred here. The tumor in the mean time had gradually grown larger, attaining the size of a goose egg by July 29th, when it was decided to remove it, which was accordingly done by Assistant Surgeon C. R. Greenleaf, U. S. A. In a few days, however, it began to reappear in the wound, and large portions of it were removed on August 20th by the same operator, after which it was not long before it again showed signs of returning, and amputation was decided upon. The limb was taken off, after gaining the patient's consent, on October 17th, at the lower third of the thigh, by Acting Assistant Surgeon J. H. Jamar. But little hæmorrhage attended the operation, which was performed by the antero-posterior flap method, four ligatures being applied. Chloroform constituted the anæsthetic and the patient reacted promptly. The wound united by first intention, and by November 8th the stump had almost entirely healed, there being no indication of reappearance of any tumor. The tumor, when removed, had been examined by Dr. J. M. Da Costa, of Philadelphia, and pronounced to be undoubtedly carcinomatous." The patient was subsequently transferred to Haddington Hospital, where he was supplied with a "Palmer" artificial limb. He was ultimately discharged from service, at Broad Street Hospital, December 16, 1864, and pensioned. A wet preparation of the shaft of the tibia of the amputated limb, exhibiting the tumor at the upper third of the bone, was contributed to the Museum by the operator, and constitutes specimen 2779 of the *Surgical Section*. The pensioner was inspected on February 1, 1882, by Examining Surgeon O. Warner, of Paterson, New Jersey, who reported that he found the "stump small, shrunken, painful, tender, and sore on the end, so that it is impossible for an artificial limb to be worn with any comfort or benefit."

FIG. 370.—Compound comminuted fracture of left femur. *Spec.* 2455.

CASE 998.—*Amputation in the thigh.*—Dr. D. Stanton, late Surgeon U. S. V., reports that "John Meyer, who represented himself as a discharged soldier of a Minnesota regiment, on his way to his home, was left by reason of an attack of remittent fever at New Brighton, Pennsylvania, where, during a fit of delirium on January 9, 1866, he jumped from a second-story window to the ground, a distance of twenty feet. When called to see him I found a compound comminuted fracture of the left femur extending about four inches above the condyles, the upper end of the bone protruding through the skin and pantaloons. The condyles were split apart and the patella was slightly fractured. I amputated at the junction of lower and middle thirds of the bone, making anterior and posterior flaps. Two arteries were ligated. Union through almost the entire extent took place by first intention, and in six weeks the stump was entirely healed and of very good shape." The amputated portion of the femur and the patella (*Spec.* 2455), contributed to the Museum by the operator, are represented in the adjoining wood-cut (FIG. 370), showing the line of the operation to have

[1] WRIGHT (JOHN), *Amputation at the Hip Joint*, in *Cincinnati Lancet and Observer*, 1868, Vol. XI, p. 257. *Circular* No. 2, S. G. O., p. 109.

passed through a small exostosis. No subsequent history of the patient has been ascertained. There is no record of his ever having applied for pension.

CASE 999.—*Amputation in the thigh.*—Private P. O'Reilly, Co. F, 5th New York Heavy Artillery, aged 40 years, had both his legs horribly mutilated by the car wheels of a railroad train near Baltimore, November 5, 1864. He was conveyed to Patterson Park Hospital, where the right thigh was amputated at the middle third by Surgeon T. Sim, U. S. V. The patient then was so rapidly failing that it was considered useless to proceed with any further operation on the other limb. He was insensible at the time of admission and remained so up to his death, which occurred four hours afterwards. The amputated portions of the leg were forwarded, with the history, by the operator, and form specimen 3470 of the *Surg. Sect.* of the Museum.

TABLE CX.

Condensed Summary of One Hundred and Forty-nine Amputations in the Thigh for Miscellaneous Injuries or Diseases.

[Recoveries, 1—90; Deaths, 91—149.]

No.	Name, Military Description, and Age.	Date of Injury or Disease.	Nature of Injury or Disease.	Date of Operation.	Operation and Operator.	Result and Remarks.
1	Anders, J. J., Pt., E, 65th New York, age 20.	Oct. 19, 1864.	Frac. right leg; fall from horse; leg shortened and atrophied; toes paralyzed; exostosis.	June 20, 1868.	Flap amputation at lower third of thigh. Dr. A. Marsh, Albany, N. Y.	Recovery. (Disch'd June 5, '65.) Died March 31, 1870; absorption of pus.
2	Anderson, M., Pt., K, 115th Illinois.	Oct. 5, 1862.	Right leg injured; railroad accident.	Oct. 5, 1862.	Flap amputation at lower third of thigh.	Discharged.
3	Barnes, C., Pt., I, 95th New York, age 23.	June —, 1862.	Injury of the right leg; osteo-cephalomatous tumor of tibia; tumor removed.	Oct. 17, 1863.	Antero-posterior flap amputat'n at lower third of right thigh. A. A. Surg. J. H. Jamar.	Discharged November 5, 1864. *Spec.* 2779, A. M. M.
4	Beard, R., Landsman, U. S. Navy, age 31.	Sept. 1, 1864.	Left leg caught in engine on board steamer Alabama.	———	Amputation of thigh 6 inches below trochanter major.	Discharged Aug. 9, 1865; stump puckered and tender.
5	Bergman, J., Pt., 7th New York Battery, age 38.	April 30, 1864.	Comp'nd fract. of lower thirds of right tibia and fibula by a caisson wheel.	July 6, 1864.	Circular amputation at lower third of thigh. A. A. Surg. E. Curtis.	Wound healed, leaving a good stump. Discharged December 2, 1864.
6	Bice, J. A., Pt., C, 95th New York.	Dec. —, 1864 to 1865.	Phlegmonous erysipelas, right foot and leg, caused by exposure to wet and cold.	May 23, 1865.	Amputation at middle third of thigh. Dr. H. B. Salmon, Stuyvesant, N. Y.	Discharged October 5, 1865.
7	Blackburn, J., Pt., B, 19th Illinois.	Sept. 17, 1861.	Right leg mashed from knee to ankle; accident.	Sept. 17, 1861.	Amp. at lower third of thigh. Dr. R. G. Bogue, Chicago.	Discharged October 4, 1861.
8	Boderker, G., Pt., C, 6th Missouri, age 39.	Nov. 6, 1863.	Run over by ammunit'n wagon, fractur'g right tibia at middle. Extensive supp. and necrosis. Jan. 3.4, hæm. fr. post. tib. art.	Jan. 4, 1864.	Circular amputation at upper third of thigh. Surg. N. Gay, U. S. V.	Discharged.
9	Bolton, P., Serg't, F, 51st New York.	June 7, 1863.	Left limb injured by railroad accident.	June 10, 1863.	Flap amput'n at middle third of thigh. Surg. J. T. Carpenter, U. S. V.	Discharged.
10	Bowen, T., Pt., E, 13th New York.	Sept. 8, 1862.	Fracture of the left leg; railroad accident.	Sept. 29, 1862.	Amputation at middle third of thigh. A. A. Surg. W. Sargent.	Discharged Feb. 16, 1863. Piece of bone subsequently removed from stump.
11	Bruce, C., Pt., K, 95th Illinois, age 37.	Dec. 19, 1864.	Compound comminuted frac. at upper third of left leg; railroad accident.	Dec. 19, 1864.	Circular amputation at middle third of thigh. Surg. S. E. Fuller, U. S. V.	Discharged.
12	Buckridge, J. N., Pt., C, 6th New York Artillery.	——— 1864.	Axe wound of right foot, severing tarsus and metatarsus; erysipelas; gangrene.	May 27, 1864.	Antero-posterior flap amputat'n of thigh near junct. of middle and lower thirds. Surg. D. W. Bliss, U. S. V.	May 30, slight hæmorrhages; recovered.
13	Burgess, O. S., Pt., L, 8th New York Artillery, age 18.	———	Scrofulous inflammat'n of right knee joint; anchylosis; cartilages disorganized; hæmorrh.	Nov. 20, 1864.	Circular amputation at lower third of thigh. Surg. R. W. Pease, U. S. V.	Necrosis of stump. Discharged May 31, 1865.
14	Burns, J., Pt., A, 17th New York, age 21.	June 20, 1865.	Right foot and left thigh at middle third fractured; railroad accident.	June 20, 1865.	Circular amputation at upper third of left thigh. A. A. Surg. R. P. Johnson. Amputation right leg, lower third.	Stumps ulcerated. Discharged November 14, 1865.
15	Carlisle, J. L., Recruit, 10th Michigan Cavalry, age 21.	Feb. 29, 1865.	Injury of right knee and fracture of tibia; railroad accid't; inflammation in knee joint.	June 26, 1868.	Amputation at middle third of right thigh. Dr. D.W. Flora, Chicago, Illinois.	Discharged August 5, 1865; recovered.
16	[1]Cator, A., Pt., G, 48th New York, age 21.	——— 1861.	Wrenched his right leg; osteo-sarcoma of fibula; leg much swollen, red, and tender.	July 21, 1862.	Flap amputation at junction of middle and lower thirds. Dr. W. Parker, New York.	Discharged July 8, 1863.
17	Chapman, O.W., Pt., E, 76th Pennsylvania.	———	Scurvy; extensive ulceration of right leg, exposing 6 inches of tibia.	Aug. 20, 1865.	Amputation at lower third of thigh. Dr. A. Strong, Honesdale, Penn.	Discharged July 29, 1865; recovered, with sound stump.
18	Clarke, T.W. Chaplain, 99th New York, age 42.	May 10, 1862.	Injury of left second toe; deformity and partial dislocat'n.	Feb. 7, 1872.	Amputation at lower third of thigh. Dr. J. Homans, late Ass't Surg. U. S. A.	Disch'd Feb. 11, 1863. (Nov. 26, 1862, amputation toe; Jan. 21, 1863, amputat'n low. third leg.)
19	Coe, S., Col'd Pioneer Corps.	Aug. 11, 1863.	Falling tree crushed the left leg.	Aug. 11, 1863.	Flap amputat'n at middle third of thigh.	Returned to regiment September 22, 1863.
20	Collier, L., Pt., I, 6th Missouri, age 17.	Sept. 25, 1861.	Right thigh crushed by a wagon.	Oct. 4, 1861.	Flap amputat'n at middle third of thigh.	Transferred to Veteran Reserve Corps.
21	Concannon, E. C., Corp'l, H, 9th Veteran Reserve Corps, age 24.	May 4, 1864.	Fracture left tibia and fibula; laceration lower third of right thigh; railroad accident.	May 4, 1864.	Antero-post. flap amputat'n at junct. of mid. and lower thirds of left thigh. Surg. E. Bentley, U. S. V.	Discharged January 27, 1865; stump very well shaped. *Spec.* 2550, A. M. M.
22	Dillon, R., Pt., F, 5th New York.	Nov. 23, 1861.	Injury of right knee by fall of a fence.	Secondary.	Flap amp. at upper third thigh. Surg. G. Taylor, U. S. A.	Discharged December 13, 1862.
23	Drysdell, H., Pt., E, 71st Pennsylvania.	Sept. 28, 1863.	Railroad cars crushed the right leg.	Sept. 28, 1863.	Antero-posterior flap amputa'n at lower third of thigh.	Discharged
24	Duncan, G. W., Pt., F, 21st Pennsylvania Cav., age 16.	———	Strumous synovit. left knee j't; large amount of pus deeply seated in the joint; necrosis of external condyle.	June 19, 1864.	Circular amputation at lower third of thigh. Ass't Surg. C. Wagner, U. S. A.	Recovered.
25	Dunn, W. F., Pt., I, 192d Pennsylvania, age 20.	Aug. 12, 1864.	Right leg crushed; railroad accident. Aug. 12, amputation leg; stump diseased.	Jan. 1, 1865.	Amp. of thigh at lower third. A. A. Surg. F. F. Maury.	Discharged.

[1] KENNEDY (J. T.), *Amputations of Thigh, etc.*, in *American Medical Times*, Volume V, 1862, p. 105

No.	Name, Military Description, and Age.	Date of Injury or Disease.	Nature of Injury or Disease.	Date of Operation.	Operation and Operator.	Result and Remarks.
26	Flanary, J., Pt., B, 5th New York Heavy Artillery.	———	Hydrarthrus of left knee joint.	April 26, 1865.	Flap amput'n at middle third of thigh. Medical Cadet Stille.	Discharged.
27	Gallagher, L., Pt., A, 69th Ohio, age 18.	Jan. 31, 1865.	Comp'nd comminuted fract. of right leg; railroad accident.	Jan. 31, 1865.	Flap amp. at lower third thigh. Surg. C. McDermont, U. S.V.	Disch'd March 2, 1866. (Amputation left arm Sept. 2, 1864.)
28	Gleeson, H., Pt., A, 140th New York, age 27.	——— 1864.	Scurvy of both legs, resulting in mortification.	April 25, 1865.	Amp. at middle third of right thigh. Dr. A. M. Leonard, Lockport, N.Y. June 7, 1865, amputation left leg.	Subsequent operations. Disch'd August 29, 1865; stump healed but tender.
29	Godfrey, T., Pt., H, 22d Kentucky Artillery, age 35.	Feb. 26, 1864.	Fract. of leg ext. into knee j'nt and comp'nd fract. ankle j't; crush. bet. ferryboat and dock.	Mar. 29, 1864.	Circular amputation at lower third of thigh. A. A. Surg. N. F. Marsh.	Discharged June 11, 1864.
30	Green, O. F., Lieut., D, 16th West Virginia, age 43.	———	Injury of right leg by a fall; lameness. Must. out June 10, 1863. Enlargement of artery behind knee; gangrene.	Oct. 7, 1863.	Amputation of thigh 6 inches from hip. Dr. J. Swinburn, Albany, N. Y.	Recovered; bone tilted upward and forward by action of muscles in stump.
31	Haspell, F., Pt., B, 39th Illinois, age 39.	———	Anchylosis of left knee joint; necrosis of femur and tibia; diseased bones fractured by accident.	Oct. 17, 1867.	Amputation at lower third of thigh. Dr. J. H. Thompson, surgeon at Soldiers' Home, Milwaukee, Wis.	Discharged Dec. 22, 1863. Recovered.
32	Hooks, H. A., Pt., G, 78th Pennsylvania.	Sept. 29, 1864.	Right tibia, fibula, and patella fractured; railroad accident.	Sept. 29, 1864.	Circular amputation at lower third of thigh. A. A. Surg. S. T. Williams.	Discharged February 15, 1865.
33	Hornbeck, S. S., Pt., F, 28th Kentucky.	Aug. 15, 1862.	Injury of left limb; railroad accident.	Aug. 16, 1862.	Amp. at middle third of thigh. Surg. G. W. Ronald, 34th Ky.	Discharged September 25, 1863.
34	Hutchinson, A., contraband, age 55.	Mar. 5, 1864.	Thigh crushed by a falling tree.	Mar. 10, 1864.	Post. flap amp. at upper third thigh. Surg. F. E. Piquette, 86th Colored Troops.	Discharged from hospital Nov. 27, 1864.
35	Jackson, E. H., Serg't, D, 2d Michigan Cavalry, age 31.	Sept. 1, 1864.	Left tibia injured by chafe of stirrup; disease inv. knee j'nt.	Jan. 14, 1869.	Amp. at lower third thigh. Dr. Z. E. Bliss, late Surg. U. S.V.	Mustered out August 17, 1865. Recovered.
36	Kalbfleish, J., Pt., A, 116th Ohio, age 27.	Feb. 24, 1864.	Compound fract. of right tibia, fibula, and ankle; crushed by car wheel.	Feb. 24, 1864.	Antero-posterior flap amputat'n lower third thigh. Surg. T. J. Shannon, 116th Ohio.	Discharged May 15, 1865.
37	Keller, F., Pt., E, 18th Ohio, age 21.	Jan. 24, 1865.	Fracture middle third of right femur; railroad accid't; mortification.	Feb. 25, 1865.	Circular amputat'n upper third of thigh. Dr. B. Tappan, Steubenville, Ohio.	Discharged September 29, 1865; stump healthy. (Also a shot wound of right leg Dec., 1864.)
38	Kennedy, P. A. B., Pt., B, 36th Indiana.	———	Scrofula; r't ankle, knee, and wrist affected by tuberculosis. Destruct. bony and soft parts.	Feb. 25, 1864.	Amputation at lower third of right thigh. Dr J. M. Yonant, Indianapolis.	August 16, 1864, amputation of right forearm. Mustered out September 21, 1864.
39	Kennedy, W., Pt., C, 37th Illinois.	Jan. 5, 1863.	Leg broken by accident	Mar. 9, 1863.	Flap amputat'n at upper third of thigh. Ass't Surg. S. D. Carpenter, U. S. V.	Discharged June 14, 1864.
40	Lambert, H. M., Serg't, D, 12th Illinois Cav., age 29.	Oct. 10, 1863.	Comminuted fracture of right leg at middle third by fall of horse.	Nov. 10, 1863.	Double flap amputat'n at lower third. A. A. Surgeon W. H. Ensign.	Disch'd July 30, '64. *Specs.* 1744, 1879, A. M. M. (Oct. 25, 1863, amp. leg; Nov. 8, 26, hæmorrh.)
41	Lewis, P., Musician, G, 183d Ohio.	July 20, 1865.	Fracture of right leg; railroad accident.	July 20, 1865.	Flap amputat'n at middle third of thigh.	Recovery.
42	Lindsay, W., Corp'l, I, 81st Colored Troops, age 35.	Mar. 20, 1865.	Accid'tal injury left knee joint; pus in and around joint; inflammation.	Aug. 12, 1865.	Circular amput'n at lower third thigh. Surg. F. E. Piquette, 86th Colored Troops.	Discharged December 4, 1865.
43	Little, T. W., Pt., L, 10th Indiana Cavalry.	May 5, 1864.	Compound fracture of left tibia and fibula; railroad accident.	May 26, 1864.	Flap amputation at lower third of thigh. Surg. C. N. Hoagland, 71st Ohio.	Discharged October 16, 1864.
44	Long, S., Pt., E, 5th Kentucky Cavalry, age 40.	June 24, 1863.	Left leg fractured; fall of horse; erysipelas; gangrene.	Oct. 27, 1863.	Circular amput'n middle third thigh. Ass't Surg. J. E. Link, 21st Illinois.	Discharged July 11, 1864.
45	Lynch, H., Pt., G, 15th Connecticut, age 35.	Aug. 28, 1862.	Injury of left knee by a fall; periostitis and ostitis; enlargement of head of tibia.	Jan. 24, 1865.	Amputat'n at lower third thigh. Dr. F. Bacon, of the Conn. State Hospital.	(Discharged September 13, 1863.) Recovered.
46	McCabe, J., Pt., A, 23d Illinois, age 33.	Sept. 20, 1862.	Left limb injured by railroad accident.	Sept. 20, 1862.	Flap amputation at upper third of thigh.	Discharged September 30, 1863.
47	McLay, W., Pt., G, 12th Illinois.	——— 1856.	Bones of right leg fractured by machinery; necrosis and displacement of fractured ends.	Jan. 15, 1864.	Lateral flap amputat'n at lower third of thigh. Surg. J. G. Keenon, U. S. V.	Discharged July 5, 1864. (Nov. 3, 1863, amputation leg; gang.)
48	Marcellus, L., Pt., B, 94th New York.	———	Gangrene of right leg and foot from exposure.	April 30, 1865	Circular amputation at lower third of thigh.	Discharged November 3, 1865.
49	Marshall, W., Pt., A, 55th Pennsylvania.	Aug. 4, 1863.	Sprain of right ankle; disorganization of tibia and astragalus.	Mar. 4, 1865.	Circular amputat'n lower third of thigh. Dr. T. St. Clair, Blairsville, Penn.	Mustered out August 26, 1863. Recovered.
50	Martindale, L., Pt., K, 54th Indiana, age 25.	Nov. 1, 1863.	Leg crushed, extending into knee joint; femur obliquely fractured; railroad accident.	Nov. 1, 1863.	Circular amputation at lower third of right thigh. Ass't Surg. J. Homans, jr., U. S. A.	Discharged December 15, 1863.
51	Maxwell, J., Pt., K, 176th New York.	———	Old extensive necrosis of left tibia; inflamm. of knee joint.	May —, 1865.	Antero-post. flap amp. at junc. of lower thirds of thigh. Dr. Todd, Tarrytown, N. Y.	Discharged January 30, 1864.
52	Meyer, J., discharged soldier, Minnesota regiment.	Jan. 9, 1866.	Compound comm. fract. lower third left femur into knee j'nt; jumped from 2d story window.	Jan. 9, 1866.	Antero-post. flap amp. at junc. of lower thirds of thigh. Dr. D. Stanton, late Surg. U. S.V.	Stump entirely healed in six weeks. Recovered. *Spec.* 2455, A. M. M.
53	Morton, C. L., Pt., I, 4th Michigan Cavalry.	Oct. 14, 1862.	Right knee; kicked by a horse.	Oct. 14, 1862.	Flap amp. low. third thigh. Dr. E. Thorn, Constantine, Mich.	Discharged February 27, 1863.
54	Murdock, G., Pt., A, 23d Illinois, age 28.	May 16, 1864.	Severe contus. left leg; accid't; sloughing; gang. of foot; pus burrowed along popliteal vein and in it.	June 6, 1864.	Circular amputation at lower third of thigh. A. A. Surg. R. N. Isham.	Progress steady but slow. Mustered out June 24, 1865.
55	Myers, J., Pt., L, 4th Ohio Cavalry.	June 6, 1863.	Injured by railroad accident ..	June 6, 1863.	Amputation at lower third of right thigh.	Discharged January 7, 1865.
56	O'Brien, F., Pt., A, 4th New York.	Feb. —, 1862.	Axe wound of the left knee; necrosis.	Secondary.	Amputat'n at middle third of thigh, lateral flaps. Surg. G. Taylor, U. S. A.	Discharged April 28, 1863. *Spec.* 919, A. M. M. (Case 524, p. 362, *ante.*)
57	Pflueger, F., Pt., H, 8th N. York, age 37.	July 21, 1861.	Injury of left knee joint by fall; caries of cartilage of knee.	July 7, 1863.	Circular amputat'n at middle third left thigh. A. A. Surg. C. F. Heuser.	Discharged September 5, 1861. Recovered July, 1865.
58	Phillips, J., Pt., A, 1st Michigan Cavalry.	April 10, 1864.	Contusion, result'g in synovitis left knee.	Nov. 26, 1866.	Circular amput'n middle third of thigh. Dr. D. O. Farrand, Detroit, Mich.	Recovered. (Discharged Jan. 11, 1866.)
59	*Pierce*, A., Pt., C. S. Engineers, age 45.	Aug. 2, 1864.	Injury of right leg; boiler explosion, Steamer Anna Lyon.	On field.	Amputation at middle third of thigh.	Discharged from hospital November 2, 1864.

No.	Name, Military Description, and Age.	Date of Injury or Disease.	Nature of Injury or Disease.	Date of Operation.	Operation and Operator.	Result and Remarks.
60	Pittman, W. H., Pt., E, 4th Tenn. Cavalry, age 38.	1864.	Ulcers on left leg from scurvy resulting from imprisonment.	Aug. 27, 1865.	Amputation lower third of left thigh. Dr. J. D. Ketcherside, Ducktown, Tenn.	Discharged June 16, 1865; bad stump; bone protruding. Recovered.
61	Powell, J., Pt., E, 28th Pennsylvania.	Jan. 5, 1862.	Fell from horse and injured r't leg: caries of tarsus, tibia, and fibula; erysipelas; abscesses.	July 6, 1862.	Teale's rectangular flap amp. at middle third thigh. Ass't Surg. R. Bartholow, U. S. A.	Discharged December 12, 1862.
62	Putnam, G. A., Pt., E, 2d Colorado Cavalry, age 24.	———	Anchylosis left knee; chronic enlargement of knee joint.	Mar. 17, 1867.	Flap amputation at lower third of thigh. Dr. T. B. Dearborn, Hillsborough, N. H.	Discharged February 13, 1864. Recovered.
63	Quinn, P., inmate of Soldiers' Home, age 54.	——— 1862.	Scrofulous inflammation disorganizing right knee; abscess.	Sept. 3, 1864.	Amput'n at lower third thigh. Surg. R. B. Bontecou, U. S. V.	Healed by first intention. Returned to Soldiers' Home cured.
64	Randolph, W. M., Pt., A, 10th Missouri Cav., age 21.	July 3, 1864.	Right lower limb kicked by a horse; extensive suppuration: knee joint disorganized, with ulceration of bones.	April 8, 1865.	Double flap amput'n at middle third of thigh. Surg. J. R. McClurg, U. S. V.	Discharged May 27, 1865.
65	Roberts, L., Pt., G, 12th Wisconsin, age 24.	May 2, 1864.	Right leg injured; railroad accident.	May 2, 1864.	Flap amput'n low. third thigh. June 18, 3 ins. bone removed.	Discharged Mar. 24, 1865. *Specs.* 2990, 3698, A. M. M.
66	Robinett, M. B., Musician, B, 2d Maryland P. H. B.	April 11, 1863.	Railroad cars crushed the left leg.	April 11, 1863.	Amputation at lower third of thigh. Surg. S. P. Smith, 2d Maryland P. H. B.	Discharged August 19, 1864.
67	Seoville, E., Pt., E, 123d N. York, age 20.	Dec. 20, 1864.	Contusion from fall of tree; necrosis left tibia.	Feb. 18, 1865.	Circular amput'n at lower third of left thigh. Surg. J. Reily, 33d N. J.	Discharged August 5, 1865.
68	Sealey, D. K., Pt., C, 74th Illinois.	Oct. 7, 1864.	Fracture both legs; bad comm. of right leg; railroad accid't.	Oct. 25, 1864.	Circular amputation at lower third of right thigh.	Discharged February 28, 1865.
69	Shenerman, J., Pt., K, 10th Ohio Cavalry, age 34.	May 1, 1865.	Right femur crushed by railroad accident.	May 11, 1865.	Flap amputat'n at middle third of thigh.	Discharged August 22, 1865.
70	Smith, R. H., Pt., D, 3d W. Virginia, age 38.	July 24, 1864.	Compound comminuted fract. right leg; railroad accident.	July 25, 1864.	Antero-post. flap amputation at lower third of thigh. Surg. S. N. Sherman, U. S. V.	August 1, hæmorrhage; ligation of popliteal artery. Mustered out September 3, 1864.
71	Southard, J. W., refugee, age 14.	———	Scrofulous affection of lower part of right thigh and knee.	Oct. 5, 1864.	Circular amp. at middle third of thigh. Surg. H. Wardner, U. S. V.	December 31, exfoliation from femur removed. July 31, 1865, stump healed. Left for home.
72	Sowle, H. A., Pt., G, 5th Michigan Cav., age 28.	———	Mortification of left leg from defective circulation and innervation.	Oct. 18, 1862.	Amput'n of left thigh at lower third. Dr. C. W. Topping, DeWitt, Mich.	Discharged Oct. 2, 1862; unable to wear artificial limb.
73	Spragg, G., Pt., G, 1st Kansas, age 33.	Mar. 12, 1862.	Left knee cut just above joint by an axe.	About April 12, 1862.	Amputation at middle third of thigh. Surg. H. Nauman, 9th Wis.; subsequent operation.	Discharged April 19, 1863. 1870, stump sound and healthy.
74	Stanber, W., Pt., L, 14th Illinois Cavalry.	Feb. 20, 1863.	Erysipelas resulting from cold.	April 4, 1863.	Amp. at middle third left thigh. A. A. Surg. E. Andrews.	Discharged December 4, 1863. Died September 10, 1872.
75	Straw, P., Pt., G, 203d Pennsylvania.	Mar. 3, 1865.	Left leg, kicked by a horse....	Mar. 26, 1865.	Flap amputation at lower third of thigh.	Mustered out June 23, 1865.
76	Sullivan, E. O., Serg't, K, 18th Missouri Mounted Volunteers, age 38.	Oct. 14, 1863.	Fract. middle right femur; accident; limb shortened and flexed at knee.	July 1, 1865.	Flap amputation at mid. third of thigh.	(Mustered out February 27, '65.) Recovered.
77	Tanner, D. B., Pt., D, 1st R. Island Light Art., age 26.	Oct. 6, 1861.	Right leg fractured by a kick from a horse; erysipelas.	Secondary.	Amputation at middle third of thigh. Ass't Surg. J. W. S. Gouley, U. S. A.	Discharged April 7, 1862. *Spec.* 21, A. M. M.
78	Tarwater, H. C., Pt., C, 61st Tennessee, age 24.	Jan. 26, 1865.	Injury of left ankle joint, fract. external malleolus; contusion of foot; erysipelas.	Feb. 6, 1865.	Circular amputation at lower third of thigh. Ass't Surg. C. Bacon, jr., U. S. A.	Discharged May 16, 1865.
79	Trowbridge, L. M., Corp'l, F, 6th West Virginia, age 28.	Oct. 24, 1864.	Left leg entirely severed at knee, severe burn over sacrum, nates, and both thighs; railroad accident.	Oct. 24, 1864.	Flap amputation at mid. third of left thigh. Surg. S. N. Sherman, U. S. V.	Gangrene. December 11, 1864, 2 inches of protruding bone sawn off; recovered.
80	Tscholl, J., Pt., D, 12th Missouri, age 28.	Oct. 1, 1863.	Fracture of left femur; railroad accident.	Oct. 1, 1863.	Circular amputation at upper third of thigh.	Mustered out August 15, 1864. Died Jan. 25, 1868, of phthisis pulmonalis.
81	Utter, J., Drummer, F., 5th Ohio.	Oct. 6, 1863.	Injured by a railroad accident.	Oct. 6, 1863.	Amputation at upper third of left thigh.	Discharged January 30, 1864.
82	Van Inwagen, A., Pt., B, 111th New York, age 37.	Oct. 12, 1864.	Left tibia and fibula fractured at lower third; railroad accident.	Oct. 23, 1864.	Antero-posterior flap amputat'n at lower third of thigh. Surg. W. O'Meagher, 9th N. Y.	Carious bone remov'd from stump. Discharged September 4, 1865.
83	Van Nordstrand, D., Wagoner, H, 12th Indiana Cav.	Oct. 9, 1864.	Injury of left lower extremity; railroad accident.	Jan. 24, 1865.	Flap amputation at mid. third of thigh. Dr. J. N. Green, South Bend, Indiana.	Discharged May 25, 1865.
84	Webber, C., Pt., 8th Co. N. York Ind. Vols.	——— 1863.	Axe wound 2 inches above patella, suppuration extending into knee joint.	Oct. 4, 1863.	Amputat'n at junction of lower thirds of left thigh. Surg. D. P. Smith, U. S. V.	Discharged. *Spec.* 2004, A. M. M. (CASE 8, p. 8, *ante.*)
85	Weiser, A., Pt., A, 65th Illinois.	Aug. 17, 1863.	Foot fractured and tibia split into knee joint; railroad accident.	Aug. 17, 1863.	Circular amputation at lower third of thigh. Ass't Surg. I. Brown, 65th Illinois.	Discharged April 23, 1864.
86	Welch, J. M., Serg't, A, 24th Massachusetts.	Feb. 8, 1862.	Sprain of left leg; ulceration of knee joint.	Aug. 1, 1863.	Circular amp. low. third thigh. Dr. H. J. Bigelow, Boston.	Discharged March 26, 1863; recovered.
87	Wheeler, C., Pt., I, 2d Ohio Heavy Artillery, age 18.	Jan. 29, 1865.	Comp'd comm. fract. mid. third left thigh; railroad accident.	Jan. 30, 1865.	Flap amp. at upper third thigh. A. A. Surg. T. W. Baugh.	Feb. 8 and 14, hæmorrhage. Discharged June 2, 1865.
88	Wilkinson, J. W., Pt., D, 6th New Hampshire.	May 29, 1862.	Accidental injury right leg and knee; inflam. and sup. knee j't.	Sept. 29, 1863.	Flap amp. at upper third thigh. Dr. T. Haynes, Concord, N.H.	Discharged September 22, 1862; recovered.
89	Williams, R. A., Pt., F, 184th Pennsylvania, age 19.	———	Typhoid fever, resulting in ulceration of right leg and disease of bone.	June 16, 1864.	Flap amputation at mid. third of thigh. Dr. J. B. Mitchell, Bellefonte, Penn.	Discharged October 9, 1866.
90	Zachman, S., Pt., D, 82d Ohio.	Oct. 2, 1863.	Left thigh crushed; railroad accident.	Oct. 2, 1863.	Flap amputation at junction of upper and mid. thirds of thigh. Dr. J. C. Reeve, Dayton, Ohio.	Discharged.
91	Allee, M. J., Corp'l, I, 33d Indiana, age 22.	June 17, 1865.	Punctured wound of right knee joint by the point of an axe; synovitis.	July 31, 1865.	Amputation at middle third of right thigh. A. A. Surg. D. J. Griffiths.	Died Aug. 11, 1865, of diarrhœa. See p. 362, *ante.*
92	Allen, —, contraband, age 23.	Nov. 10, 1864.	Comminuted fracture of both knee joints by railroad accident.	Nov. 11, 1864.	Circ. amp. at middle third left thigh; flap amp. right thigh at low. third. Ass't Surg. H. T. Legler, U. S. V.	Died November 11, 1864, from shock, four hours after operat'n.
93						
94	Anderson, D., Conductor U. S. Mil. Railroad, age 25.	May 28, 1865.	Comp'd com. fract. of left tibia and fibula; railroad accident.	May 28, 1865.	Circular amputation at middle third of left thigh.	Died June 25, 1865, of exhaust'n.
95	Ashenhurst, J. D., Pt., H, 8th Kansas, age 22.	Sept. —, 1864.	Axe wound of left thigh and knee, opening joint; gangrene.	Sept. 22, 1864.	Circular amp. at middle third of thigh. Ass't Surg. T. A. McGraw, U. S. V.	Died September 30, 1864, of exhaustion.

No.	Name, Military Description, and Age.	Date of Injury or Disease.	Nature of Injury or Disease.	Date of Operation.	Operation and Operator.	Result and Remarks.
96	Bowns, W. A., Quartermaster, 15th Conn., age 26.	May 21, 1865.	Comp'd comm. fracture middle third left femur and mid. third right tibia and fibula; railroad accident.	May 21, 1865.	Circ. amp. at upper third of left thigh; amp. right leg. Surgs. C. A. Cowgill, U. S. V., and N. Meyer, 16th Conn.	Died May 21, 1865.
97	Brown, G., Pt., C, 34th Illinois.	Sept. 24, 1864.	Fracture of right leg; railroad accident.	——— 1864.	Amputation at middle third of thigh.	Died December 4, 1864.
98	Caringer, J. L., Pt., G, 141st New York, age 43.	———	Accidental incised wound left foot; gangrene; sloughing.	Jan. 24, 1865.	Circular amp. at low. third left thigh. Surg. G. Grant, U.S.V.	Died January 25, 1865.
99	Cavanry, W., Pt., —, 102d Pennsylvania.	June 14. 1864.	Fracture of right femur by fall; knee joint involved.	June 15, 1864.	Antero-posterior flap amputat'n at middle third of thigh. A. A. Surg. S. G. Minassian.	Died June 15, 1864, of concussion.
100	Cochran, M. F., Teamster, H, 70th New York, age 34.	Nov. 15, 1863.	Fracture of right knee joint; run over by a wagon.	Nov. 15, 1863.	Amputation at middle third of thigh.	Died Dec. 8, 1863, of pyæmia.
101	Conway, J. A., Pt., A, 55th Pennsylvania, age 22.	May 24, 1865.	Comp'd comminut'd fract. right tibia and fibula and left radius and ulna; railroad accident.	May 24, 1865.	Circular amp. at lower third of right thigh and of left arm. A. A. Surg. H. S. Streeter.	Died May 28, 1865, from effects of internal injuries.
102	Curgill, W., Pt., —, 90th New York.	Oct. 29, 1864.	Left foot, leg, and lower third of right thigh crushed; railroad accident.	Oct. 29, 1864.	Amp. right thigh at lower third and left leg. Ass't Surg. C. Bacon, jr., U. S. A.	Died October 29, 1864.
103	Draper, B. F., Serg't, F, 1st Rhode Island Artillery.	Mar. 30. 1862.	Both bones of left leg fractured by kick of a horse.	May 8, 1862.	Circular amputation at lower third thigh.	Died May 27, 1862.
104	Dunn, J., Pt., G, 20th Connecticut.	Nov. 4, 1863.	Comp'd comm. fract. left thigh into knee; railroad accident.	Nov. 4, 1863.	Amputation at lower third of thigh.	Died November 5, 1863.
105	Ely, J. R., Corp'l, H, 12th Infantry, age 24.	———	Fall upon right knee caused scrofulous disease of joint.	Sept. 8, 1864.	Antero-posterior flap amputat'n at upper third of thigh. A. A. Surg. O. D. Norton.	Died September 14, 1864.
106	English, P., U. S. Railroad employé, age 25.	April 11. 1865.	Right leg crushed; railroad accident.	April 12, 1865.	Amput'n at lower third thigh. A. A. Surg. S. T. Buck.	Died April 20, 1865.
107	Foley, M., Pt., G, Marine Artillery, age 28.	Sept. 6, 1862.	Left tarsus lacerated; explos'n of gunboat Picket; gang.	Sept. 14, 1862.	Circular amputation of thigh immediately above knee.	Died October 3, 1862, of tetanus.
108	Frazer, H. C., Pt., A, 40th New York.	June 20. 1862.	Axe injury of left knee joint; gangrene.	Aug. 14, 1862.	Antero-post. flap amputat'n of thigh 6 inches below trochanters. Brig. Surg. J. C. Dorr.	Rapidly sinking. Died Aug. 14, 1862. *Ante*, p. 362.
109	Furgerson, M. A., contraband.	Nov. —, 1863.	Injured by a fall; gangrene from below knee to foot; tibia exposed and partly destroyed.	Feb. 15, 1864.	Circular amputation at lower third of thigh. Surg. D. O. McCord, 9th Louisiana C. T.	Gang. again set in; gangrenous inflammation of throat. Died March 4, 1864.
110	Good, H. J., Serg't, I., 10th Indiana Cavalry, age 29.	May 5. 1864.	Comp'd fracture of lower third of femur; pyæmia; gangrene.	June 24, 1864.	Flap amp. middle third thigh. Surg. C. N. Hoagland, 71st O.	Died June 27, 1864, of pyæmia.
111	Harmer, S., Pt., C, 98th Pennsylvania, age 18.	May —, 1864.	Fracture of right leg; run over by cars.	June —, 1864.	Amp. of thigh just above knee. (May —, 1864, amp. of leg.)	Abscesses forming. Died Aug. 30, 1864, of epilepsy.
112	Hartz, T., Pt., G, 7th Iowa, age 41.	Nov. 4, 1864.	Comm. of right femur at mid. third by railroad accident.	Nov. 10, 1864.	Flap amputation of thigh. A. A. Surg. A. Robillard.	Died December 12, 1864, of gangrene.
113	Hickey, T., Corp'l, E, 3d Michigan Cavalry.	Jan. 21, 1864.	Bones of right leg broken by kick of a mule; gangrene; fractured ends overlapping.	Mar. 29, 1864.	Lateral flap amputation lower third thigh. A. A. Surg. S. S. Jessop.	(March 10, excis. tibia; Mar. 19, ligation posterior tibial artery. Died Mar. 31, '64, of exhaust'n.)
114	Hofer, F., Hospital Steward, U. S. A.	———	Compound fracture of knee j't; accident.	———	Amputation of thigh	Died November 22, 1865.
115	Hume, C. M., Pt., A, 3d Iowa Cavalry.	Dec. 11, 1864.	Fract. both legs, dislo. r't ankle, injury face and chest; explo. steamer Maria; mortifi. r't leg.	Dec. 14, 1864.	Flap amputation at junction of lower thirds right thigh. A. A. Surg. T. F. Rumbold.	Died December 24, 1864.
116	Irmer, C., Pt., —, 86th Ohio, age 23.	Sept. 23, 1864.	Third and 4th met. bones and little toe r't foot crushed and heel lacerated: railr'd accid't; slough'g of foot and leg; inflammation of thigh.	Oct. 10, 1864.	Antero-posterior flap amputat'n nt lower third right thigh. A. A. Surg. C. E. Boyle.	Oct. 19, hæm.: ligation of artery. Died Oct. 29, 1864, of pyæmia. Autopsy: saphenous and femoral veins full of pus.
117	Jennings, D., Pt., C, 37th Iowa, age 52.	Aug. 13, 1864.	Fracture of left tibia; railroad accident; abscesses; mortification.	Aug. 25, 1864.	Circular amputation at upper third of thigh. A. A. Surg. R. W. Coale.	Gangrene of stump. Died Sept. 2, 1864, of pyæmia.
118	Jones, H., Pt., D, 1st New York Cavalry, age 17.	Mar. 13, 1865.	Left leg crushed and right foot contused; railroad accident.	Mar. 13, 1865.	Double flap amputation lower third of left thigh. Act. Staff Surg. N. F. Graham.	Died March 28, 1865.
119	Kellins, D. H., Serg't, G, 81st Indiana, age 30.	Sept. 24, 1864.	Fracture of left leg, including ankle joint; railroad accident.	Sept. 28, 1864.	Double flap amputation middle third of thigh. A. A. Surg. J. B. McPherson.	Died October 1, 1864.
120	King, F. J., Pt., C, 6th Tennessee, age 22.	Jan. 26, 1865.	Comp'd comminuted fracture right tibia, fibula, and lower third femur; railroad accid't.	Jan. 27, 1865.	Circular amp. at middle third of thigh. A. A. Surg. H. S. Streeter.	Semi-moribund. Died January 27, 1865.
121	King, J., freedman	Mar. —, 1864.	Right leg run over by a dray; gangrene.	May 28, 1864.	Circular amp. lower third thigh. A. A. Surg. B. E. Dodson.	Died June 4, 1864.
122	Kitteredge, A., Pt., H, 4th Vermont, age 56.	Jan. —, 1864.	Subcutaneous cellular inflam. left foot and leg; gangrene.	Mar. 18, 1864.	Circular amp. lower third thigh. Ass't Surg. A. Ingram, U.S.A.	Died March 19, 1864, of shock and exhaustion.
123	Leeds, A. P., Pt., H, 10th Indiana Cavalry, age 24.	May 5, 1864.	Laceration of foot around heel and up tendo-achilles; railr'd accident: gangrene in leg.	May 10, 1864.	Flap amputation thigh at lower third. Surg. C. N. Hoagland, 71st Ohio.	Died May 12, 1864, from effects of gangrene.
124	Lindsley, E. D., Pt., D, 114th Illinois.	———	Scrofulous abscess involving left knee joint.	Mar. 16, 1864.	Lateral flap amp at lower third thigh. A. A. Surg. J. E. Wilson.	Died March 20, 1864, of exhaustion.
125	Lucas, S., colored employé Quartermaster's Dep't.	May 9, 1864.	Comp'd comminuted fracture of right tibia and fibula; railroad accident.	May 9, 1864.	Antero-posterior flap amp. at lower third of thigh. A. A. Surg. B. P. Brown.	Sloughing. Died July 1, 1864, of diarrhœa.
126	Matthews, A., Serg't, 82d Co. 2d Vet. Res. Corps, age 31.	May 22. 1864.	Comp'd fracture of left leg near ankle by railroad cars.	June 4, 1864.	Circular amp. lower third thigh. A. A. Surg. G. P. Norris.	Hæmorrhage. Died June 19, '64, of pyæmia.
127	Miller, M. G., Pt., F, 87th N. York, age 23.	Aug. 16, 1862.	Contusion resulting in sloughing ulcer.	Sept. 1, 1862.	Amputation at middle third of thigh.	Oct. 6, hæm. Died Oct. 11, 1862, of marasmus.
128	Moore, M. B., Pt., B, 6th Maryland, age 22.	Dec. 3, 1864.	Injured by railroad accident.	Dec. 25, 1864.	Amputation at juncture lower thirds of right thigh.	Died Dec. 30, 1864, of pyæmia.
129	O'Reilly, P., Pt., F, 5th N. York H'vy Art., age 40.	Nov. 5, 1864.	Both legs mutilated by railroad cars.	Nov. 5, 1864.	Right thigh amput'd at middle third. Surg. T. Sim, U. S. V.	Died November 5, 1864. *Spec.* 3470, A. M. M.
130	Providence, T., Pt., B, 55th Ohio, age 25.	July 4, 1865.	Fract. r't femur and extensive lacerat'n thigh; railr'd accid't.	July 5, 1865	Circular amp. at up. third thigh. A. A. Surg. D. J. Griffiths.	Died July 6, 1865, from effects of shock.
131	Reams, O. F., Pt., B, U. S. Engineers, age 23.	Mar. 12, 1864.	Axe wound of right knee joint.	April 24, 1864.	Lateral flap amputation upper third thigh. Surg. E. Bentley, U. S. V.	Died May 1, 1864, of pyæmia. *Specs.* 2234, 2253, A.M.M. CASE 529, p. 363, *ante*.
132	Robinson, S., Pt., C, 15th Pennsylvania Cav., age 22.	Nov. —, 1864.	Necrosis of tibia from a bruise; periosteal inflam. Jan. 13, 1865, portion of tibia removed.	Jan. 23, 1865.	Circular amputation at lower third of right thigh. Ass't Surg. J. C. Thorpe, U. S. V.	Died February 13, 1865, from exhaustion.
133	Rose, J., Pt., B, 119th Illinois, age 35.	——— 1864.	Simple fracture of lower third of right tibia; gangrene.	Sept. 5, 1864.	Circ. amp. at lower third thigh. Surg. J. F. Randolph, U. S. A.	Died September 7, 1864.

No.	Name, Military Description, and Age.	Date of Injury or Disease.	Nature of Injury or Disease.	Date of Operation.	Operation and Operator.	Result and Remarks.
134	Searle, T. E., Lieut., G, 1st New York Artillery.	Oct. 31, 1864.	A 32-pounder gun crushed right thigh.	Oct. 31, 1864.	Amputation at upper third of thigh.	Died November 1, 1864.
135	Smith, M. V., Pt., A, 11th West Virginia, age 24.	Sept. 19, 1864.	Contusion of left knee joint and fracture of patella; fall from a horse.	Nov. 7, 1864.	Amp. middle third thigh by lat. oval skin flaps, circ. sec. musc. A. A. Surg. J. Neff.	Died December 4, 1864, of exhaustion.
136	Smith, O. F., Serg't, F, 69th Ohio, age 28.	June 11, 1865.	Comp'd comm. fract. heads of right tibia and fibula and obl. fract. of int. condyle of femur; r't hand injured; railr'd accid.	June 11, 1865.	Antero-posterior flap amp. of right thigh by transfixion.	Died June 30, 1865, of pyæmia.
137	Storey, R. G., Pt., K, 95th Illinois, age 44.	Dec. 19, 1864.	Comp'd comminuted fract. of right leg; railroad accident.	Dec. 19, 1864.	Flap amp. at lower third thigh. Surg. S. E. Fuller, U. S. V.	Died December 20, 1864, of shock.
138	Strouse, A., Pt., G, 174th Ohio, age 20.	———	Abscess of right thigh; gangrene.	Feb. 6, 1865.	Amputation at middle third of thigh.	Died Feb. 16, 1865, of pyæmia.
139	Swift, R. B., Pt., H, 1st Michigan, age 23.	Nov. 24, 1863.	Axe wound of right knee joint; sloughing; joint extensively opened.	Jan. 5, 1864.	Circular amputat'n at junction of lower thirds. Surg. S. D. Turney, U. S. V.	Died January 7, 1864, of exhaustion. CASE 527, p. 362, *ante*.
140	Taylor, T., Pt., D, 5th Pennsylvania Res., age 36.	——— 1864.	Contusion left foot, fracture os calcis, and injury of ank. joint by a fall; gangrene.	May 13, 1864.	Antero-posterior flap amputation of thigh. A. A. Surg. F. F. Maury.	Died May 13, 1864, from shock.
141	Thomas, J. L., Pt., E, 12th Missouri, age 25.	Nov. 1, 1864.	Fract. left leg, rupture femoral artery; limb tumefied; railroad accident.	Nov. 3, 1864.	Flap amputation at junction of middle and lower thirds.	Died November 3, 1864, of exhaustion.
142	Tinkler, F., Pt., A, 18th Illinois.	———	Accidental injury.....	———	Amputation of left thigh	Died July 9, 1863.
143	Towne, W. H., Pt., A, 18th Connecticut, age 30.	Nov. 17, 1863.	Right ankle crushed by railr'd accident. Nov. 18, 1863, amp. leg; necrosis of tibia.	Mar. 8, 1864.	Lateral flap amputation lower third of thigh. Surg. H. W. Owings, 2d E. S. Maryland.	Secondary hæmorrage from femoral artery. Died March 28, 1864, of hæmorrhage.
144	Turner, R. H., Corp'l, E, 1st Maryland, age 23.	Oct. 3, 1864.	Incised w'nd, adze penetrating left knee joint.	Oct. 18, 1864.	Circular amp. at middle third of thigh. Ass't Surg. R. F. Weir, U. S. A.	Died October 24, 1864, of pyæmia. CASE 528, p. 363, *ante*.
145	Urban, H., Serg't, F, 20th Massachusetts, age 22.	Feb. —, 1864.	Chronic ulcers of left leg; gangrene; flaps sloughed and condyles protruded.	Jan. 4, 1865.	Circular amputation at middle third of thigh. A. A. Surg. J. C. Morton.	(Dec. 25, '64, amp. at knee.) Jan. 6, '65, hæm.; lig. femoral artery. Died Jan. 7, '65; hæmorrhage.
146	Vigor, J. H., Pt., D, 175th Ohio, age 18.	Oct. 13, 1864.	Comp'd comm. fract. right tibia, fibula, and femur; knee joint involved; railroad accident.	Oct. 13, 1864.	Circular amputation at upper third of thigh. Surg. J. C. Whitehill, U. S. V.	Died October 14, 1864, of shock.
147	Walton, J., Pt., C, 72d Ohio, age 43.	April 7, 1864.	Compound fracture right ankle joint; railroad accident; erysipelas.	April 26, 1864.	Lateral flap amputation lower third of thigh. Surg. J. R. McClurg, U. S. V.	Died May 12, 1864, of pyæmia.
148	Wilkins, R., Pt., B, 8th Iowa, age 24.	Oct. 20, 1863.	Right leg crushed; railroad accident; gangrene involving knee joint.	Nov. 9, 1863.	Flap amputation at upper third of thigh. A. A. Surgeon D. Cummins.	Died January 24, 1865, of chronic diarrhœa and bronchitis.
149	Wilson, T., Pt., C, 7th Vet. Reserve Corps, age 41.	———	Contusion of leg: ant. surface a black slough from ankle to knee; ant. tibial art. involved.	Dec. 25, 1863.	Flap amputation at lower third of thigh. A. A. Surg. J. C. Marr.	Varioloid and pleuro-pneumonia. Died March 13, 1864, of pneumonia.

Exarticulations at the Knee Joint.—Four amputations at the knee joint for miscellaneous causes were reported; two proved successful, two fatal. In one instance amputation in the thigh was subsequently performed:

CASES 1000–1003.—Private G. Brown, E, 34th Illinois, aged 54, had his right leg crushed in a railroad accident, September 24, 1864; circular amputation at the knee joint was performed on the same day, the condyles of the femur being sawn off; gangrene appeared but was checked by the application of bromine; the patient recovered.—Private H. Gertjahr, D, 82d Pennsylvania, aged 45, had the left leg removed at the knee joint by Surgeon E. Bentley, U. S. V., on March 7, 1865, for necrosis of the middle third of the left tibia. He was discharged the service June 4, 1865.—Sergeant J. Shearer, A, 11th Maryland, aged 28, received, on May 20, 1865, several kicks from a horse which caused compound comminuted fractures of both legs; excessive hæmorrhage followed. On May 21st the left leg was amputated through the knee joint, retaining the patella and condyles of femur; the right leg was removed at the upper third by the antero-posterior flap method; Assistant Surgeon G. M. McGill, U. S. A., performed both operations. The patient died May 22, 1865.—Sergeant H. Urban, F, 20th Massachusetts, aged 22, suffered from chronic ulcers of the left leg; gangrene set in and the lower part of the tibia became exposed and necrosed. Acting Assistant Surgeon J. H. Parkard, on December 25, 1864, amputated the limb at the knee joint, removing the patella; the flaps sloughed and the condyles protruded, and on January 4, 1865, circular amputation of the thigh at the middle third was performed by Acting Assistant Surgeon J. C. Morton; hæmorrhage subsequently occurred, and on January 6th the femoral artery was ligated in continuity. The patient died on January 7th, of recurring hæmorrhage.

Amputations in the Leg.—Of two hundred and fifty-nine amputations in the leg the results were determined in all but one case; one hundred and eighty were followed by recovery and seventy-eight by death, a mortality rate of 30.2 per cent. One hundred and forty-seven were for fractures, forty-four for frostbites, seventeen for gangrene, and the remainder for various accidents and diseases.

CASE 1004.—*Amputation in the leg.*—Private C. O. F. Clark, Co. G, 1st Oregon, aged 35 years, was frost-bitten in his feet and hands while on march between Owyhee and Malheur rivers, Idaho, December 17, 1865. He was conveyed to Camp Auburn, where portions of the lower limbs were amputated by Acting Assistant Surgeon M. V. Amen on January 17, 1866. The patient recovered, and was mustered out of service April 14, 1866, and pensioned. Having been sent East, after receiving his discharge from service, for the purpose of being provided with artificial limbs, he was admitted to the Post Hospital at Washington on February 2,

1867, whence Assistant Surgeon W. Thomson, U. S. A., described the case as follows: "The operation seems to have been Chopart's, on the right foot, which had entirely healed when the patient was admitted. The stump was firm and well formed, but so sensitive for the space of one and a half inches from the cicatrix that the man desired the limb to be removed at a point above the ankle. The amputation of the left leg had been performed about six inches above the ankle and had failed to close from the presence of a ligature. After this was removed the stump healed entirely. The patient had also lost portions of the phalanges of both hands from the same cause. On May 22, 1867, he was furnished transportation to New York City to be fitted with artificial limbs." These were supplied by the firm of Monroe and Gardiner. Re-amputation of the stump of the left leg subsequently became necessary and was performed by Professor F. H. Hamilton, at Bellevue Hospital, on November 9, 1868. Several years later, when the pensioner was supplied with artificial limbs by D. W. Kolbe, of Philadelphia, both stumps were reported as being in a sound condition. The pensioner was paid December 4, 1881. Casts of the stump of the foot and of the leg were prepared at the Army Medical Museum, and constitute specimens 4128 and 4191, respectively, of the *Surgical Section*. The latter is represented in the annexed wood-cut (FIG. 371) and apparently shows the amputation to have been performed by the posterior flap-method.[1]

FIG. 371.—Stump after posterior flap amputation of leg. *Spec.* 4191.

TABLE CXI.

Condensed Summary of Two Hundred and Fifty-nine Amputations in the Leg for Disease or Miscellaneous Injuries.

[Recoveries, 1—180; Deaths, 181—258; Result undetermined, 259.]

No.	Name, Military Description, and Age.	Date of Injury or Disease.	Nature of Injury or Disease.	Date of Operation.	Operation and Operator.	Result and Remarks.
1	Aylesworth, F. P., Serg't, E, 5th Vermont.	Oct. —, 1861.	Typhoid fever, resulting in hospital gangrene.	Jan. 4, 1862.	Amp. right leg, middle third, circular, and all toes left foot.	Discharged February 27, 1862.
2	Baker, C. R., Pt., E, 11th Massachusetts.	May —, J'ne, '64.	Scrofulous ulcers from chafing of boot during marching.	Dec. —, 1866.	Amp. left leg, lower third, flap. Dr. J. H. Bigelow, of Boston.	Discharged April 18, 1865.
3	Banks, A. M., Pt., H, 13th Pennsylvania, age 32.	——— 1861.	Running sores of legs, the result of fever; necrosis of both tibiæ.	June 3, 1869.	Amp. left leg, upper third. Dr. J. W. King, Covington, Ky.	Must'd out Aug. 6, 1861. Stump healed; right leg improved after amputation of left.
4 & 5	Bates, C., Corp'l, E, 20th Maine, age 31.	Jan. —, 1865.	Frostbite and gangrene in both feet, contracted in rebel prison.	April 25, 1865.	Amp. both legs, lower thirds, antero-posterior flap. A. A. Surg. A. J. Smith.	Discharged Oct. 21, 1865; sound stumps.
6	Bell, W. H., Pt., D, 33d Kentucky.	July 20, 1863.	Comp'd fracture lower third by wagon wheel; severe injury to ankle joint; mortification.	Aug. 8, 1863.	Amput'n right leg, upper third, flap. Dr. Moore, Greensburg, Kentucky.	Discharged December 15, 1863.
7	Best, R., Pt., D, 1st N. Y. Mounted Rifles, age 41.	Dec. 1, 1864.	Disorganization of right foot and ankle joint from burn.	May 1, 1865.	Amp. right leg, upper third, bilateral flap. A. A. Surg. L. McLean.	Discharged October 14, 1865.
8	Bishop, R., Government employé, age 28.	Aug. 17, 1864.	Right ankle joint crushed by railroad accident.	Aug. 17, 1864.	Amput'n right leg, lower third, posterior flap. Surg. J. L. Roe, 137th Indiana.	Recovered September 25, 1864; stump entirely healed.
9	Bond, J., Pt., A, 149th Illinois, age 20.	Feb. 26, 1865.	Right leg crushed by railroad accident.	Feb. 26, 1865.	Amp. right leg, middle third, circular. Surg. J. H. Phillips, U. S. V.	Discharged July 25, 1865.
10	Bond, J., Pt., K, 150th Illinois.	May 5, 1865.	Right leg injured by railroad accident.	———	Amputation right leg, middle third.	Discharged July 25, 1865.
11	Boon, N., Pt., E, 2d Colored Cavalry.	———	Scrofulous disease, involving bones of right leg.	Dec. 11, 1865.	Amp. right leg, junction upper and mid. thirds. A. A. Surg. A. McLetchie.	Discharged July 14, 1866; sore stump.
12	Bouchsein, T. E., Pt., A, 68th New York.	May 2, 1864.	Com. fracture of left foot and ankle joint by railroad accid't.	May 3, 1864.	Amp. left leg, upper third, flap. Surg. L. Schultz, 68th N. Y.	Discharged October 12, 1864.
13	Branson, D. A., Pt., C, 73d Illinois, age 25.	Mar. —, 1865.	Erysipelas, gang., abscesses, and diseased bone from abrasion of foot.	Jan. 10, 1866.	Amp. right leg, lower third, post. flap. Dr. R. H. Buck, late surgeon 13th Ind. Cav.	Discharged July 19, 1865; stump healed.
14	Brazier, J., unassigned Recruit, Vet. Vols., age 22.	Mar. 28, 1865.	Injury to right leg by railroad accident.	Mar. 28, 1865.	Amp. right leg, middle third, flap. Dr. W. W. Rutherford, Harrisburg, Penn.	Discharged July 19, 1865.
15	Brockway, M., Pt, I, 47th Ohio.	June 22, 1863.	Comminuted fracture right leg by falling tree.	June 22, 1863.	Amp. right leg, middle third. Surg. S. P. Bonner, 47th Ohio.	Discharged May 8, 1864.
16	Brown, A. R., Pt., D, 3d Vermont, age 20.	Dec. 5, 1863.	Opening in right ankle joint and ill-conditioned leg from a misstep.	Jan. 3, 1866.	Amp. right leg, junct. middle and lower thirds, circ. Dr. L. Richmond, Derby, Vermont.	Must'd out July 27, 1865; stump healed. Died April 10, 1867.
17	Brown, C., Pt., H, 9th Missouri.	April 15, 1865.	Left leg fractured by railroad accident.	April 15, 1865.	Amputation left leg, upper third, flap.	Discharged November 17, 1865.
18	Brown, C. E., Pt., G, 1st Massachusetts Heavy Artillery, age 22.	Jan. 3, 1865.	Frostbite of left foot followed by ulceration.	Mar. 15, 1865.	Amp. left leg, lateral skin flaps and circular section muscles. A. A. Surg. B. B. Miles.	Discharged May 16, 1865.
19	Brown, R., Pt., G, 31st Ohio.	Feb. 1, 1864.	Left leg crushed by railroad accident.	Feb. 1, 1864.	Amp. left leg, upper third, ant. posterior flap.	Discharged September 24, 1864.
20	Buckner, A. J., Pt., E, 4th Iowa Cavalry, age 27.	July 19, 1864.	Axe wound, fract'g phalanges and met. bones 3d toe, r't foot; ulceration and sloughing.	Dec. 10, 1864.	Amp. right leg, lower third, flap. Surg. M. K. Taylor, U. S. V.	Discharged August 7, 1865.
21	Burns, J., Pt., A, 17th New York, age 21.	June 20, 1865.	Comp'd fract. right foot with great destruction of soft parts, and comp. fracture left thigh, mid. third, by railr'd accid't.	June 20, 1865.	Amp. right leg, lower third, circular, and left thigh in upper third. A. A. Surg. R. P. Johnson.	Discharged November 14, 1865.
22	Burns, J., Pt., G, 20th Penn. Cavalry, age 18.	Jan. 28, 1864.	Right leg injured by railroad accident.	Jan. 28, 1864.	Amputation right leg, upper third, flap.	Discharged.
23	Callaway, A. R., Pt., A, 115th Illinois, age 22.	Sept. 9, 1863.	Fracture of left leg above ankle by railroad accident.	Sept. 9, 1863.	Amp. left leg, upper third, flap. Ass't Surg. J. A. Jones, 115th Illinois.	Discharged March 25, 1865.
24	Carson, E., Pt., 1st Kentucky Battery.	Sept. 12, 1862.	Right leg crushed by cannon wheel.	Sept. 12, 1862.	Amp. right leg, flap, mid. third. Ass't Surg. R. F. Weir, U. S. A.	Discharged December 2, 1862.

[1] *Account of Several Amputations, etc.*, in *Circular* No. 3, S. G. O., Washington, 1871, p. 197.

No.	Name, Military Description, and Age.	Date of Injury or Disease.	Nature of Injury or Disease.	Date of Operation.	Operation and Operator.	Result and Remarks.
25	Caton, G. W., Pt., M, 2d E. Tennessee Cavalry.	July 25, 1863.	Left foot and ankle crushed by railroad cars.	July 25, 1863.	Amp. left leg 3 inches above ankle, circular. Surg. W. Hobbs, 85th Indiana.	Gangrene. Discharged April 24, 1865.
26	Christofferson, J., Pt., E, 10th Veteran Reserve Corps.	July 10, 1864.	Left leg torn off and left thigh fractured by railroad accid't.	July 11, 1864.	Amp. left leg, upper third, circ. Dr. J. Evans, Havre-de-Grace, Maryland.	Discharged.
27	Clark, C. O. F., Pt., G, 1st Oregon.	Dec. 17, 1865.	Frostbite of both feet	Jan. 17, 1866.	Amp. left leg, mid. third, and right foot. A. A. Surg. M. V. Aman. Nov. 9, 1868, re-amp. in upper third.	Disch'd April 14, 1866. 1870, sound stumps. *Specs.* 4128 and 4191, A. M. M.
28	Clark, T. W., Chaplain, 99th New York, age 42.	May 10, 1862.	Injury of left 2d toe, resulting in painful deformity and partial dislocation.	Jan. 21, 1863.	Amputation left leg, low. third, flap.	Disch'd Feb. 11, 1863. (Nov. 26, 1862, amp. left 2d toe.) Feb. 7, 1872, amp. thigh, lower third: recovered.
29	Collins, P., Pt., I, 29th Indiana, age 28.	July 2, 1865.	Left leg injured by railroad accident.	July 2, 1865.	Amp. left leg, low. third. Surg. F. B. Kimball, 3d N. H.	Recovered Aug. 13, 1865. (Discharged soldier.)
30	Conn, S., Pt., G, 18th Missouri, age 22.	Jan. 17, 1862.	Comp'd fracture left leg by a fall from a wagon.	Feb. 1, 1862.	Amput'n left leg, middle third. Surg. W. Varian, U. S. V.	Discharged April 10, 1862.
31	Connell, J., Pt., A, 51st Illinois, age 35.	Oct. 31, 1864.	Left leg injured by railroad accident.	Oct. 31, 1864.	Amp. left leg, mid. third, flap. Dr. J. Northrup, Woodstock, Illinois.	Discharged Mar. 23, 1865. (Also wound right thigh.)
32	Crane, H., Pt., E, 89th Illinois, age 30.	Jan. 16, 1864.	Axe wound of right foot: erysipelas; necro. of tarsal bones.	Mar. 5, 1864.	Amput'n right leg, lower third, antero-post. skin flap. Surg. H. T. Legler, U. S. V.	Discharged June 14, 1864.
33 34	Cummins, J. W., Pt., L, 5th Michigan Cavalry, age 22.	Feb. —, 1865.	Slough'g and unhealthy condition of stumps following amp. of both feet at ank. j't on acc. of scurvy contracted in prison.	May 10, 1865.	Amputation of both legs, lower thirds, flap. A. A. Surg. E. Seyffarth.	Discharged Aug. 2, 1865. (Feb., 1865, amputation both feet at ankle joint.)
35 36	Dougherty, B. T., Pt., K, 31st Illinois, age 22.	———	Gangrene of both feet following frostbite while prisoner of war.	April 17, 1865.	Amp. both legs, lower thirds, circular. A. A. Surg. F. E. Martindale.	Discharged October 13, 1865.
37	Davis, J., Pt., B, 31st Wisconsin.	Mar. 2, 1863.	Left leg injured by railroad accident.	Mar. 2, 1863.	Amput'n left leg, upper third.	Discharged August 29, 1863.
38 39	Dees, G. W., Pt., E, 13th Missouri Cavalry, age 23.	Dec. 13, 1865.	Frostbite of both legs.....	Dec. 16, 18, 1865.	Amp. both legs, lower thirds. Ass't Surg. D. G. Wilson, 1st Michigan Cavalry.	Discharged June 2, 1866.
40	DeLong, R. L., Pt., B, 5th Vermont, age 20.	Mar. 24, 1864.	Comp'd fract. both bones right leg by railroad accident.	Mar. 24, 1864.	Amp. right leg, junct. middle and lower thirds, flap.	Discharged November 4, 1865.
41	Dennis, F., Pt., K, 98th Illinois.	Sept. 8, 1862.	Left leg injured by railroad accident.	Sept. 8, 1862.	Amput'n left leg, upper third.	Discharged July 30, 1863.
42 43	Devine, P., citizen, age 17...	Sept. 14, 1863.	Comp'd comminuted fracture of bones of both legs.	Sept. 14, 1863.	Circ. amp. both legs, low. th'ds. A. A. Surg. T. H. Stillwell.	Gangrene. Recovered June 24, 1864. *Spec.* 1844. A. M. M.
44	Doherty, E., Pt., D, 9th Massachusetts, age 40.	Feb. 9, 1864.	Comp'd com. fracture of bones right leg by kick of a mule.	Feb. 24, 1864.	Amput'n right leg, upper third. Surg. J. F. Sullivan, 9th Mass.	Mustered out June 21, 1864.
45	Dolaway, H., Pt., D, 50th Pennsylvania, age 17.	Aug. 15, 1864.	Comp'd com. fracture of left foot by railroad accident.	Aug. 15, 1864.	Antero-posterior flap amp. left leg, lower third. A. A. Surg. W. C. Merrillat.	Discharged June 28, 1865. *Spec.* 251, A. M. M.
46 47	Douglas, S., Governm't employé, age 33.	Dec. 20, 1863.	Frostbite of both feet.....	Feb. —, 1864.	Circular amput'n of both limbs 1 inch above ankle joint.	Recovery slow.
48	Doyle, T., Pt., G, 14th Connecticut, age 28.	April 24, 1864.	Comp'd com. fracture left leg by railroad accident.	April 24, 1864.	Flap amp. left leg 2 ins. below knee. Surg. Z. E. Bliss, U. S. V.	Discharged August 1, 1865.
49	Dunlap, O., Capt., I, 26th Illinois.	Dec. 28, 1864.	Injury of right foot and right hand by railroad accident.	Dec. 28, 1864.	Amput'n of right leg at lower third. Surg. O. Hoyt, 30th Wisconsin.	Discharged May 15, 1865. (Also amput'n right forearm.) Stump well healed.
50	Dunn, W. F., Pt., I, 192d Pennsylvania, age 20.	Aug. 12, 1864.	Fracture mid. third right tibia and fibula by fall from a railway car.	Aug. 12, 1864.	Circular amputation mid. third right leg.	Jan. 1, 1865, amp. in right thigh, lower third. Feb. 22, ligation femoral artery; recovery.
51	English, C., Pt., C, 12th N. Y. Cavalry, age 33.	Nov. 30, 1864.	Compound fracture of right leg.	Nov. 30, 1864.	Flap amputation of leg at junction of upper and mid. thirds.	Discharged June 7, 1865.
52	Faulkner, J., Pt., B, 13th Infantry.	April 21, 1865.	Compound fracture right foot by railroad accident.	May 19, 1865.	Flap amputat'n of leg at lower third.	Discharged May 30, 1866.
53	Feely, M., Pt., C, 38th New York.	May 27, 1862.	Left leg fractured by a falling tree.	May 27, 1862.	Amputat'n in middle third leg. Surg. A. J. Berry, 38th N. Y.	Discharged December 29, 1862.
54 55	Ferguson, J. C., citizen	Nov. 18, 1863.	Comp'd com. fract. both legs, lower third, by railr'd accid't.	Nov. 18, 1863.	Circ. amp. both legs, low. third. A. A. Surg. T. H. Stillwell.	Transferred.
56	Fink, J., Pt., G, 1st Maryland P. H. B., age 30.	Aug. 30, 1862.	Right leg and left foot mangled by railroad accident.	Aug. 31, 1862.	Amputation right leg 1½ ins. below tuberosity of tibia. A. A. Surg. J. H. Bartholf.	Discharged Oct. 24, 1864. (Also loss of great and 2d toes of left foot.)
57	Fitzgerald, W., Pt., A, 103d Illinois, age 29.	——— 1865.	Frostbite of left leg in rebel prison.	——— 1865.	Amputation of leg at middle third.	Mustered out August 15, 1865.
58	Fitzmier, F., Pt., D, 3d New Jersey Cavalry.	Dec. 13, 1864.	Frostbite of both feet.....	———	Amputation of right leg, lower third, after discharge.	Amp. of right foot at met. phal. art., and great toe, left foot, Dec. 20, 1864. Disch'd July 5, 1865.
59 60	Flack, M., Pt., B, 135th Pennsylvania.	Jan. 28, 1863.	Injury to both legs by railroad accident.	Jan. 28, 1863.	Amputation right leg 5 inches below knee, and left leg 4 ins. below knee.	Discharged: sound stumps.
61	Ford, T., Corp'l, F, 1st Alabama Cavalry.	———	Scrofulous disease of right foot, contracted in Andersonville prison.	June 30, 1865.	Antero-post. flap amp. of leg at upper third. A. A. Surg. J. D. Skeer.	Discharged November 4, 1865.
62	Freeland, J. J., Corp'l, I, 74th Indiana.	Oct. 18, 1864.	Right foot crushed.....	Oct. 18, 1864.	Flap amputation of leg, lower third. Dr. B. Larrimer, Millersburg, Indiana.	Discharged February 1, 1865.
63	Funking, H., Pt., D, 5th N. Y. Artillery, age 23.	Oct. 25, 1864.	Comp'd fracture left foot and right arm by railroad accid't.	Oct. 25, 1864.	Circular amp. of leg, low. third. Surg. Z. E. Bliss, U. S. V.	Disch'd May 31, 1865. (Also circ. amputation arm, middle third.)
64	Gainey, J., Pt., C, 18th New York Cavalry.	May 10, 1865.	Right leg fractured by fall of horse.	May 10, 1865.	Flap amputation of leg, middle third. Surg. A. C. Walker, 18th N. Y. Cavalry.	Mustered out in 1865.
65	Gardner, M., Pt., I, 12th Colored Troops.	Aug. 26, 1864.	Injury of right foot and hand by railroad accident.	Aug. 27, 1864.	Flap amput'n right leg, lower third. Surg. G. Stegman, 12th Colored Troops.	Disch'd July 18, 1865. (Also amputation right forearm, lower third.) Stumps healed.
66	Garrett, J. W., Pt., B, 1st Ohio Artillery, age 27.	Sept. 4, 1864.	Comp'd fract. of bones of right leg by railroad accident.	Sept. 4, 1864.	Circular amputation leg in upper third.	Discharged.
67	Gates, L., Capt., H, 7th Indiana, age 24.	Sept. 15, 1864.	Left leg crushed by railroad accident.	Sept. 15, 1864.	Flap amp. of leg, upper third. Surg. W. M. Wright, 79th Pa.	Hæmorrhage; gangrene. Discharged May 15, 1865.
68	Geary, J., Pt., K, 131st New York, age 53.	———	Extensive necrosis of tibia and large sloughing ulcer from injury by falling.	Mar. 23, 1863.	Circular amp. upper third leg. Surg. J. J. Reese, U. S. V.	Disch'd October 9, 1863. *Spec.* 2793, A. M. M.

No.	Name, Military Description, and Age.	Date of Injury or Disease.	Nature of Injury or Disease.	Date of Operation.	Operation and Operator.	Result and Remarks.
69	Gilbert, J. N., Serg't, B, 4th Michigan Cavalry.	Feb. 4, 1863.	Fracture of right leg by kick of a mule.	April 5, 1863.	Amputat'n of leg, middle third. Ass't Surg. C.C.Gray, U.S.A.	Discharged August 3, 1863.
70	Gleeson, H., Pt., A, 140th New York, age 27.	———	Scurvy, resulting in mortification, contracted while a prisoner of war.	June 7, 1865.	Amputat'n upper third left leg. Dr. A. M. Leonard, Lockport, New York.	(April 25, 1865, amp. right thigh, mid. third.) Disch'd Aug. 29, 1865; stumps healed.
71	Glover, W. A., Pt., B, 18th Indiana.	———	Tubercular synovitis of left ankle joint.	May 5, 1865.	Flap amp. leg at lower third. A. A. Surg. S. A. Cummins.	Discharged June 17, 1865; stump entirely healed.
72	Grady, M., Pt., A, 48th Ohio.	Aug. 9, 1863.	Left ankle joint fractured by explosion of steamboat.	June 13 1867.	Flap amp. leg, lower third. Dr. W. H. Mussey, Cincinnati.	Discharged; good stump.
73	Griffin, R. D., Pt., B, 40th Illinois.	Oct. 26, 1861.	Right leg crushed by cannon falling on it.	Oct. 26, 1861.	Flap amput'n leg, upper third. Surg. S. W. Thompson, 40th Illinois.	Discharged February 23, 1862.
74	Griswold, F. N., Saddler, G, 2d New York Cavalry, age 21.	May 1, 1865.	Sprain of right ankle; inflammat'n of synovial membrane; carious bone.	Dec. 26, 1867.	Flap amputation of leg at upper third.	Mustered out Nov. 8, 1865. Died June 18, 1870, of consumption.
75	Hassett, J., Pt., I, 13th Maryland P. H. B.	Mar. 25, 1865.	Comminuted fract. of os calcis and mid. cuneiform bone, right foot, by railroad accident.	April 9, 1865.	Amp. of leg, upper third, lateral flap of skin, circ. sect. of musc. A. A. Surg. M B. McCausland.	Discharged August 5, 1865.
76	Hatch, G., Pt., M, 14th Col'd Heavy Artillery, age 23.	May 22, 1865.	Lower third right leg crushed by railroad accident.	May 24, 1865.	Circular amp. leg at junction of upper and middle thirds. A. A. Surg. D. Shephard.	Discharged; stump healed.
77	Hearn, J. M., Pt., A, 7th Tennessee Cavalry.	May —, 1864.	Burn of left leg, at Andersonville prison.	Sept. 9, 1864.	Flap amp. of leg, lower third. Drs. Elon and Pelat, C. S. A.	Discharged July 13, 1865.
78	Heckathorn, —, Pt., E, 100th Pennsylvania.	———	Œdema of right foot from sprain: mortification.	May 2, 1866.	Amp. of leg at mid. third. Dr. M. P. Barker, Newcastle, Pa.	Must'd out July 19, '65; healthy stump.
79	Hoblitt, W. S., Pt., 82d Ohio, age 35.	Nov. 7, 1864.	Comp'd fracture of left ankle by railroad accident.	Nov. 8, 1864.	Antero posterior flap amput'n leg at middle third.	Mustered out June 9, 1865.
80	Houghtaling, H., Pt., B, 8th Michigan, age 22.	Sept. 20, 1864.	Necrosis following sprain right ankle joint.	April 20, 1865.	Ant. flap amp. of leg, low. third. Surg. R. B. Bontecou, U. S. V.	Discharged August 12, 1865.
81	Housefelter, J., Pt., M, 6th New York Artillery.	Nov. 15, 1862.	Diffused aneurism left post. tib. artery near int. mal., inj. to artery by broken glass; hæm.	Dec. 7, 1862.	Amputation leg at junct. lower and middle thirds. Surg. J. G. Wood, 6th N. Y. Artillery.	Discharged March 3, 1863.
82	Hurley, T., Pt., K, 8th Tennessee Cavalry.	Mar. 7, 1865.	Injury of both legs by railroad accident.	Mar. 7, 1865.	Amp. right leg, upper third, left leg, middle third. Drs. L. C. Brown and E. B. Root, Painesville, Ohio.	Mustered out July 17, 1865.
83						
84	Huyard, A., Pt., C, 122d Pennsylvania.	Feb. 10, 1863.	Frostbite of both feet.....	Mar. 10, 1863.	Amp. of both legs, mid. third. A. Surg. E. Marshall, 124th New York.	Discharged August 11, 1863.
85						
86	James, H., Pt., G, 6th Penn. Cavalry, age 25.	May 28, 1865.	Bones of right leg comminuted at middle third by railroad accident.	May 28, 1865.	Antero-posterior flap amp. leg, upper third. A. A. Surg. H. M. Bellows.	Discharged September 7, 1865.
87	Johnson, O., Pt., B, 44th Wisconsin, age 44.	Mar. 28, 1865.	Left inter. malleolus and posterior tibial artery severed by an axe.	Mar. 28, 1865.	Flap amput'n leg, lower third. A. A. Surg. J. K. Simmons.	Mustered out July 29, 1865.
88	Jones, J., Pt., H, 11th Penn. Cavalry, age 30.	———	Typhoid fever; disease of both limbs, resulting in gangrene.	Mar. 22, 1865.	Left leg at up. third, right leg at lower third, circular. A.A. Surg. A. Claude.	Disch'd May 27, 1865. (Sabre cut in lumbar region October 17, 1864.)
89						
90	Jones, S., Pt., I, 30th Iowa, age 21.	——— 1863.	Disease of both feet, ending in gangrene.	Oct. 16, 1863.	Flap amputation of left leg near upper third. Surg. N. Gay, U. S. V.	Nov. 6, Chopart's amp. right foot. Nov. 11, int. plantar artery tied. Discharged June 3, 1865.
91	Josephus, M., Government teamster, age 25.	July 23, 1863.	Left foot crushed by a wheel; gangrene.	Oct. 20, 1864.	Oval amp. leg at junct. middle and lower thirds. Surg. T. J. Wright, 64th Col'd Troops.	December 31, 1864; nearly well.
92	Keffe, J., Pt., D, 12th Massachusetts.	Aug. 14, 1863.	Compound fracture right ankle joint by railroad accident.	Aug. 14, 1863.	Posterior flap amp. of leg at junction mid. and lower thirds.	Discharged October 19, 1863.
93	Keller, J. C., Pt., I, 49th Pennsylvania.	Mar. —, 1864.	Frostbite toes of left foot: gangrene.	Nov. —, 1864.	Flap amput'n leg, lower third. Dr. B. F. Wagonseller, Selin's Grove, Pennsylvania.	Discharged May 15, 1865.
94	Kelly, U. F., Serg't, B, 28th Kentucky, age 19.	June 10, 1862.	Right foot and leg crushed by railroad accident.	June 10, 1862.	Amp. leg in upper third. Surg. A. H. Thurston, U. S. V.	Discharged July 10, 1862.
95	Kelsey, J., Pt., I, 18th Indiana, age 24.	Nov. 15, 1862.	Axe wound of right foot; caries extending to tarsus.	Sept. 26, 1863.	Amputation at middle third of leg.	Discharged Dec. 10, 1863; stump healed.
96	Kenyon, G. W., Pt., H, 46th Penn., age 25.	Aug. 18, 1864.	Right foot fractured by railroad accident.	Aug. 18, 1864.	Flap amp. of leg at lower third. Surg. S. Hart, U. S. V.	Mustered out July 16, 1865.
97	Kier, I., Pt., A, 99th Colored Troops.	July 14, 1864.	Right foot injured by railroad accident.	July 15, 1864.	Flap amp. of leg, lower third. Surg. H. E. Huberich, 99th Colored Troops.	Discharged.
98	Lambert, H. M., Serg't, D, 12th Illinois Cav'ry, age 30.	Oct. 10, 1863.	Comp'nd comminuted fracture right leg by fall of a horse.	Oct. 25, 1863.	Double flap amputation of leg in upper third. A. A. Surg. W. H. Ensign.	Hæm. Nov. 10, amp. thigh, low. third. Disch'd July 30, 1864. *Specs.* 1744 and 1879, A. M. M.
99	Lashander, J. B., Pt., L, 4th New York Heavy Artillery, age 19.	June 3, 1865.	Left ankle run over by wagon; tibia dislocated and low. third of fibula and internal malleolus broken.	June 3, 1865.	Amput'n of leg at lower third, skin flaps and circ. section of muscles. A. A. Surg. A. W. Merrill.	Discharged November 3, 1865.
100	Leonard, J. S., Pt., B, 1st N. Jersey Light Artillery, age 45.	May 28, 1864.	Left leg run over by a wagon; sloughing and necro. of tibia.	Mar. 15, 1865.	Antero-post. flap amp. of leg at junct. upper and mid. thirds. A. A. Surg. R. B. Watson.	Mustered out. *Spec.* 2403, A.M.M.
101	Lewis, C., Pt., B, 116th Colored Troops, age 22.	June —, 1865.	Sprain in right instep	Feb. 1, 1866.	Flap amp. of leg at lower third. A. Surg. G. M. McGill, U.S.A.	Discharged May 5, 1866.
102	Lowe, G. S., Pt., F, 35th	———	Hospital gang. of both limbs..	Jan. 12, 1863.	Circular amputation of both	Discharged May 2, 1863. Died
103	Massachusetts.				legs at lower third.	August 5, 1867.
104	McCann, R., Pt., D, 92d Illinois, age 43.	June 2, 1864.	Comp'd fracture right tibia and fibula by falling timber.	June 2, 1864.	Antero-posterior flap amputat'n leg. Surg. C. Helm, 92d Ills.	Discharged June 28, 1865.
105	McDonald, W. H., Pt., F, 60th New York.	Dec. 11, 1862.	Right foot and leg crushed by railroad accident.	Dec. 11, 1862.	Amputation of leg in middle third.	Discharged February 5, 1864.
106	McIntyre, J., Pt., A, 3d Pennsylvania.	Mar. 18, 1865.	Left foot injured by railroad accident.	Mar. 18, 1865.	Flap amp. of leg, lower third. Dr. A. B. Carr, St. Clair, Penn.	Discharged.
107	McLay, W., Pt., G, 12th Illinois.	———	Comp'nd comminuted fracture of bones of right leg by machinery.	Nov. 3, 1863.	Antero-post. flap amp. right leg, junct. upper and middle thirds. A. A. Surg. W. P. Sweetland.	Gangrene of stump. Jan. 15, '64, amputation of thigh, low. third. Discharged July 5, 1864.
108	McQuade, T., Pt., F, 69th New York.	July 26, 1861.	Comminuted fracture left ankle joint by railroad accident.	July 26, 1861.	Circular amputation of leg at middle third.	Mustered out August 3, 1861.
109	Magly, A., Pt., F, 66th Ohio, age 37.	Oct. 29, 1864.	Comminuted fract. both bones of left leg; railroad accident.	Oct. 30, 1864.	Antero-posterior flap amput'n of leg in upper third.	Discharged May 17, 1865.
110	Mahaffey, S., Pt., H, 30th Iowa.	June 8, 1865.	Right leg crushed by railroad accident.	June 8, 1865	Flap amp. of leg, middle third. Surg. S. G. Rogers, 30th Iowa.	Mustered out.

No.	Name, Military Description, and Age.	Date of Injury or Disease.	Nature of Injury or Disease.	Date of Operation.	Operation and Operator.	Result and Remarks.
111	Manson, M., Pt., F, 21st Maine.	———	Periosteal inflam. of left ankle and caries of tarsal bones.	June 15, 1867.	Flap amputation of leg, lower third. Dr. G. E. Brickett.	Disch'd January 12, 1863. Died Jan. 4, 1874, of typhoid fever.
112	Manuel, J., Contraband, age 10.	Feb. 4, 1864.	Comp'd com. fracture of leg 4 inches below knee joint by railway cars.	Feb. 5, 1864.	Posterior flap amputat'n of leg. A. A. Surg. C. Pelaez.	Feb. 20, ligation of anterior tibial artery for hæmorrhage. Discharged December 15, 1864.
113	Marshall, J., Corp'l, B, 4th Ky. Cavalry, age 25.	Jan. 1, 1864.	Fracture of both bones of left leg by fall.	Feb. 10, 1864.	Flap amputation of leg, middle third.	Discharged May 23, 1865.
114	Mason, G., Pt., C, 12th Vet. Reserve Corps.	May 10, 1864.	Left foot crushed by railroad accident.	May 15, 1864.	Circular amp. of leg at junct. of middle and lower thirds. A. A. Surg. J. B. Cutter.	Discharged July 19, 1865. Reamputation 4 ins. higher Sept. 26, 1865. Died Dec. 24, 1868.
115	Merwin, D. G., Pt., B, 44th Wisconsin, age 40.	———	Phagedenic ulcer of right leg; sloughing of soft parts.	Jan. 7, 1865.	Antero-post. flap amp. of leg, upper third. Ass't Surg. J. C. Thorpe, U. S. V.	Jan. 9, hæmorrhage. Discharged May 31, 1865.
116	Miller, D. W., Pt., A, 13th	Dec. —,	Loss of both feet from frostbite.	May 13, 1865,	Amp. left leg at junct. mid. and lower thirds; amp. right leg at junct. of middle and lower thirds. Dr. H. Owens.	Discharged January 14, 1865.
117	Kentucky Cavalry, age 18.	1863.		Feb. 1, 1866.		
118	Morgan, M., Pt., H, 3d Col-	Jan. 1,	Frostbite of both feet.....	Jan. 25,	Amput'n of left and right legs at middle thirds. Surg. H. H. Hood, 3d Colored H'vy Art.	Discharged May 9, 1865.
119	ored H'vy Art., age 19.	1864.		29, '64.		
120	Mullally, J., Pt., C, 49th Mass., age 18.	Dec. 8, 1862.	Right leg injured by railroad accident.	Dec. 9, 1862.	Amputat'n of leg at mid. third. Dr. W. J. Gilfillan, Brooklyn College Hospital.	Discharged June 18, 1865.
121	Nash, J., Pt., H, 5th Penn. Cavalry, age 31.	———	Scrofulous caries right tibia, the result of an old fracture.	Jan. 8, 1864.	Circular amputation of leg at middle third. Ass't Surg. C. A. McCall, U. S. A.	Discharged June 18, 1864.
122	Ohring, C., Corp'l, F, 42d Indiana, age 21.	———	Dry gangrene of left leg.....	Sept. 9, 1863.	Flap amp. of leg, upper third. A. A. Surg. H. M. Lilly.	Discharged May 10, 1864. *Spec.* 1921, A. M. M.
123	Older, B., Pt., I, 68th Ohio, age 22.	Feb. —, 1862.	Camp fever and disease right foot; excessive ulceration.	April 1, 1862.	Amp. of leg in middle third. A. A. Surg. W. R. Burke.	Discharged August 19, 1862.
124	Olds, J. K., Serg't, B, 10th N. Y. Artillery, age 29.	May 29, 1864.	Comp'nd fract. mid. third right tibia and fibula by a blow from a eable.	May —, 1877.	Amputation of leg below knee.	Discharged June 14, 1865. (Feb., 1865, ends of tibia removed.)
125	Orne, W. H., Corp'l, D, 16th New Hampshire.	———	Sore on left leg, followed by disease of bones of foot after debility and intermittent fev.	Mar. —, 1870.	Amputation leg in mid. third. Dr. T. Haynes, Concord, N.H.	Discharged Aug. 20, 1863. Died Jan. 5, 1874, of chr. diarrhœa.
126	Peaceley, C., Pt., B, 49th Indiana, age 26.	May 15, 1865.	Compound fracture left ankle by railroad accident.	May 15, 1865.	Circular amputat'n of leg, low. third. Surg. J. G. Hatchitt, U. S. V.	Extensive sloughing. Mustered out August 7, 1865.
127	Peck, S., Pt., C, 184th New York, age 37.	Sept. 17, 1864.	Lacerated wound left ankle, opening joint, by railr'd accident.	Sept. 17, 1864.	Flap amp. of leg, lower third. Dr. D. T. Krebs, Watsontown, Penn.	Discharged July 18, 1865.
128	Penny, L., Pt., E, 11th Ohio, age 22.	Mar. —, 1864.	Right foot and leg crushed by railroad accident.	Mar. —, 1864.	Flap amp. of leg at mid. third. A. A. Surg. R. Wirth.	Discharged June 26, 1865.
129	Perrigo, C. M., Pt., I, 143d New York.	Oct. 20, 1862.	Necro. of left ank. j't and wasting of leg, the result of sprain.	Sept. 24, 1863.	Flap amp. of leg, middle third. Dr. F. Hyde, Courtland, N.Y.	Discharged September 17, 1863.
130	Pettibone, S., Pt., D, 33d	Mar. 2,	Both legs injured by railroad	Mar. 2,	Flap amp. of both legs in mid.	Discharged August 4, 1865.
131	Illinois.	1865.	accident.	1865.	third. Surg. G. P. Rex, 33d Ill.	
132	Peusehke, A., Corp'l, K, 145th New York.	Sept. 30, 1863.	Right leg injured by railroad accident.	Sept. 30, 1863.	Flap amputation of leg, middle third.	Discharged June 7, 1865.
133	Pike, P., Pt., D, 1st Colorado Cavalry.	Nov. 21, 1864.	Compound fracture of left leg by a fall from a horse.	Jan. 29, 1867.	Amput'n of leg in upper third. Dr. J. W. Hamilton, Columbus, Ohio.	Discharged.
134	Poole, R. W., Pt., 15th Ohio, age 19.	June 3, 1865.	Left leg injured by railroad accident.	June 4, 1865.	Double flap amp. of leg, mid. third. A. A. Surg. C. E. Boyle.	Mustered out June 8, 1865.
135	Quaid, W. R., Pt., L, 5th Pennsylvania Cavalry.	July 29, 1865.	Left leg injured by horse falling on it.	July 29, 1865.	Flap amputation of leg in middle third.	Discharged September 21, 1865.
136	Redfoot, G., Corp'l, K, 106th Pennsylvania, age 29.	Feb. 20, 1865.	Frostbite of left foot in rebel prison.	Aug. 11, 1865.	Circular amp. of leg, low. third. A. A. Surg. E. DeWitt.	Discharged December 12, 1865.
137	Rew, M. D., Corp'l, E, 5th New York Cavalry.	———	Inflam. right ank. j't from scurvy contracted in rebel prison.	Aug. 15, 1867.	Amp. of leg, mid. third. Dr. D. Prince, Jacksonville, Ill.	Discharged June 29, 1865.
138	Richardson, J., Contraband.	Dec. 2, 1864.	Necrosis of lower end of tibia and sloughing ulcer involving foot, after injury.	Mar. 15, 1865.	Posterior flap amp. of leg, upper third. Surg. F. E. Piquette, 86th Colored Troops.	Good result.
139	Robinson, A., Pt., I, 8th Col-	Dec. 18,	Frostbite of both limbs.....	Feb. —,	Amput'n of both legs in lower	Discharged June 7, 1865; sound
140	ored Troops, age 26.	1864.		1865.	third.	stumps.
141	Rumpf, J., Serg't, B, 75th Pennsylvania.	Mar. 15, 1865.	Injury to right leg by railroad accident.	Mar. 15, 1865.	Flap amputation of leg at middle third.	Discharged June 19, 1865.
142	Scott, M., Pt., I, 14th Ohio.	———	Irritative fever, debility, and gangrene of right foot, resulting from imprisonment.	April 19, 1865.	Flap amput'n of leg in middle third. Dr. S. F. Forbes, Toledo, Ohio.	Mustered out March 8, 1865.
143	Severy, W. F., Pt., I, 3d Vermont, age 25.	Dec. 25, 1861.	Left leg jammed by boat against wharf; bones of foot crushed.	Dec. 25, 1861.	Circular amp. of leg, mid. third. Dr. S. Cabot, Boston.	Discharged October 31, 1862.
144	Shanger, R., Pt., 4th New Jersey Lt. Battery, age 20.	July 27, 1864.	Left leg crushed by wagon; gangrene; necrosis of tibia.	Oct. 27 1864.	Flap amp. of leg, upper third. A. Surg. T. Calhoun, U.S.A.	Discharged October 21, 1865.
145	Simmons, W., Substitute, age 32.	Mar. 4, 1865.	Right foot and ankle crushed by railroad accident.	Mar. 4, 1865.	Circular amp. of leg, mid. third. A. A. Surg. J. C. Morton.	Discharged July 8, 1865.
146	Skillin, W. E., Pt., H, 15th Maine.	Jan. 17, 1865.	Left leg cut off by railroad accident.	Jan. 17, 1865.	Circular amput'n of leg. Ass't Surg. G. Z. Higgins, 15th Me.	Discharged.
147	Slater, C. H., Pt., D, 27th New York.	Dec. 28, 1862.	Axe cut of left foot.....	Jan. 8, 1863.	Circ. amp. of leg, middle third. Surg. H. Bryant, U. S. V.	Mustered out May 25, 1863. Died January 8, 1872.
148	Smith, J. D., Pt., C, 74th Illinois.	Nov. 7, 1864.	Left leg injured by railway accident.	Nov. 7, 1864.	Flap amputation of leg in middle third.	Discharged April 25, 1865.
149	Smith, R., Pt., E, 100th N. York.	Sept. 13, 1864.	Fracture of right foot by railroad accident.	Sept. 13, 1864.	Flap amp. of leg, lower third. Surg. — Hiland, C. S. A.	Discharged December 4, 1864.
150	Smith, T., Contraband, age 33.	Nov. —, 1864.	Comminuted fracture of leg; railway collision.	Jan. 25, 1865.	Circular amp. of leg in upper third. Ass't Surg. T. A. McGraw, U. S. V.	Recovered in 30 days.
151	Snyder, J., Pt., B, 51st New York, age 27.	Oct. 4, 1864.	Comp'nd fract. left ankle and foot by railroad accident.	Oct. 4, 1864.	Circ. amp. left leg, lower third. A. A. Surg. L. Curtis.	Discharged July 26, 1865. *Spec.* 3676, A. M. M.
152	Stacy, A., Pt., H, 12th Kansas, age 51.	Mar. 20, 1864.	Axe wound of left foot; necrosis of bone.	Aug. 15, 1864.	Amput'n at lower third left leg by Dr. Clark.	Discharged December 31, 1864.
153	Stevens, J. A., Pt., E, 1st Wisconsin Cavalry.	———	Erysipelas of right foot.....	July 27, 1865.	Post. flap amputation right leg. A. A. Surg. J. D. Skeer.	Discharged September 8, 1865.
154	Stone, I. M., Pt., M, 1st Illinois Artillery, age 24.	Oct. 21, 1863.	Comminution of lower end right tibia and astragalus by falling timber.	May 22, 1864.	Short ant. and long post. flap amp. of leg, up. third. Surg. H. Culbertson, U. S. V.	Discharged December 28, 1864. *Spec.* 2422, A. M. M.

No.	Name, Military Description, and Age.	Date of Injury or Disease.	Nature of Injury or Disease.	Date of Operation.	Operation and Operator.	Result and Remarks.
155	Stoner, F., Pt., K, 57th Pennsylvania.	Dec. 22, 1864.	Right foot fractured by railroad accident.	Dec. 22, 1864.	Circular amputation left leg, middle third.	Discharged July 7, 1865.
156	St. Ong, M., Pt., B, 7th Ohio, age 34.	Sept. 20, 1863.	Left foot and ankle crushed by railroad accident.	Sept. 20, 1863.	Antero-post. musc. flap amputation of leg, middle third.	Discharged January 23, 1864.
157	Storer, L., Pt., F, 105th Illi-	Sept. 24,	Both legs injured by railroad	Sept. 24,	Flap amp. right leg. Surg. J.	Discharged December 15, 1863.
158	nois.	1863.	accident.	1863.	Bennett, 19th Mich. Circ., left leg. Ass't Surg. J. E. Link, 21st Illinois.	
159	*Taylor, G. H.*, Pt., H, 1st N. C. Cavalry, age 22.	Sept. 23, 1863.	Fracture of left tibia and fibula by fall of horse.	Sept. 23, 1863.	Amputation of leg.....	Transferred to prison December 15, 1863.
160	[1] Taylor, H., Serg't, B, 30th Illinois.	May 2, 1863.	Fract. of left leg, lower third; hæm.; lig. ant. tibial artery.	May 18, 1863.	Double flap amp. leg, upper third. A. A. Surg. L. Dyer.	Discharged August 9, 1863.
161	Thomas, J. C.. Pt., I, 8th N. Y. H'vy Artillery, age 19.	———	Dry gangrene of right leg from exposure in rebel prison.	April 5, 1865.	Flap amp. leg, up. third. Dr. M. W. Townsend, Byron, N.Y.	Discharged October 3, 1865.
162	Thompson, H., Corp'l, G, 5th Tenn. M't'd Inf., age 20.	Mar. 20, 1865.	Comp'd dislocation right ankle outward by railroad accident.	April 13, 1865.	Flap amp. leg, middle third. A. A. Surg. A. S. Austin.	Discharged June 2, 1865.
163	Thompson, W., Boatswain's Mate, U. S. N.	Oct. 27, 1864.	Right foot contused by recoil of gun.	Oct. 28, 1864.	Amputat'n of leg, middle third.	Discharged Jan. 19, 1865. Died May 1, 1874.
164	Troutman, J. W., Corp'l, F, 40th Indiana.	Sept. 16, 1862.	Fracture of right leg by accident.	Sept. 16, 1862.	Flap amp. of leg, mid. third. Dr. D. Funkhouber, Indianapolis.	Discharged April 1, 1863.
165	Trueheart, G. W., Pt., F, 67th New York, age 20.	June 15, 1864.	Fracture of right leg by railroad accident.	June 15, 1864.	Circular amp. of leg, mid. third. A. A. Surg. W. C. Merrillat.	Discharged May 30, 1865. (May 12, '64, amp. arm, lower third.)
166	Underwood, J., Pt., I, 103d Illinois, age 24.	June 6, 1863.	Compound fracture of left leg by railroad accident.	July 2, 1863.	Amputation of leg below knee. A. A. Surg. J. Thompson.	Hæmorrhage. Discharged Nov. 18, 1863. *Spec.* 1704, A. M. M.
167	Wallace, B., Freedman, age 35.	———	Old ulcer of right heel, extending up leg; gangrene.	July 14, 1864.	Oval amptat'n leg, upper third. Surg. T. J. Wright, 64th C. T.	Did well.
168	Ward, W., Pt., B, 60th New York.	May 10, 1862.	Left leg injured by railroad accident.	May 10, 1862.	Flap ampt'n leg, middle third. Surg. J. S. Gale, 60th N. Y.	Discharged September 16, 1862.
169	Watkins, E. D., Pt., H, 5th Kentucky Cavalry, age 30.	Feb. 21, 1864.	Frostbite of both feet; amput'n both feet April, 1865.	Mar. 18, 1866.	Amputation right leg 6 inches below knee.	Recovered.
170	Watson, R., Pt., E, 10th Tennessee, age 23.	Oct. 24, 1864.	Left leg fractured by railroad accident.	Oct. 24, 1864.	Amputation of leg, mid. third.	Discharged.
171	Watt, P., Pt., A, 28th Massachusetts.	Jan. 11, 1862.	Left leg injured by railroad accident.	Jan. 11, 1862.	Flap amp. of leg, lower third. Jan. 14, 1864, re-amputation.	Discharged.
172	Watts, A., Pt., E, 73d Illinois.	——— 1863.	Erysipelas and disease of bone from a sprain.	Nov. 20, 1863.	Circular amp. leg, lower third. Ass't Surg. B. E. Fryer, U. S. A.	Gangrene. Discharged March 15, 1865.
173	Way, C., Pt., H, 47th Iowa.	Sept. 18, 1864.	Left foot injured by railroad accident.	Sept. 18, 1864.	Circ. amp. leg at low. third. Dr. Cherry, Bloomington, Ill.	Discharged.
174	Weed, E. D., Pt., I, 128th Indiana.	Oct. 11, 1864.	Right leg crushed by railroad accident.	Oct. 11, 1864.	Amp. leg, middle third. Dr. T. Higday, Rolling Prairie, Ind.	Mustered out May 24, 1865.
175	Weidle, J. F., Pt., G, 29th Ohio, age 40.	Feb. 13, 1864.	Right ankle dislocated and tib. and fibula fractured by falling building.	Feb. 13, 1864.	Teale's rect. flap amp. A. A. Surg. A. F. Johnson; gang.; re-amputated May 7.	Discharged September 29, 1864.
176	Wellirs, W., Pt., K, 60th Illinois.	June 15, 1865.	Fracture of bones of left leg by railroad accident.	July 30, 1865.	Amp. leg, junct. upper thirds. Dr. Owens, St. Luke's Hospital, Chicago.	Mustered out July 31, '65. Died Nov. 29, 1874, of consumption.
177	Werner, A., Pt., 101st Pennsylvania.	Mar. 11, 1865.	Right leg injured by railroad accident.	Mar. 11, 1865.	Amputation leg in middle third. Surg. S. J. Mintzer, U. S. V.	Discharged June 27, 1865.
178	Williams, B., Pt., I, 3d Col-	Jan. 1,	Both legs frostbitten.....	Jan. 25,	Oval amp. of both legs at junc-	Discharged May 9, 1865; stumps
179	ored Heavy Artillery, age 14.	1864.		1864.	tion lower thirds. Surg. H. H. Hood, 3d Col'd H'vy Art.	healed.
180	Wilson, J., Government employé, age 23.	———	Necrosis of right tibia of four years' standing.	Aug. 20, 1864.	Flap amput'n leg, upper third. Surg. E. A. Clark, U. S. V.	Convalescent.
181	Aernshield, L., Corp'l, H, 66th Illinois, age 19.	Mar. 30, 1865.	Right foot cut by an axe; swelling and inflammation.	April 19, 1865.	Flap amput'n leg, upper third. A. A. Surg. R. J. Lalder.	Died April 20, 1865.
182	Black, H., Pt., D, 3d Maine, age 20.	———	Disease of left foot; necrosis of metatarsus.	July 3, 1864.	Circular amp. leg, lower third. A. A. Surg. W. B. Carey.	Died July 8, 1864.
183	Buchanan, D., Pt., F, 12th Penn. Cavalry, age 17.	July 13, 1864.	Contusion of left foot by fall from horse; necrosis.	Aug. 6, 1864.	Circular amp. leg, middle third. A. A. Surg. A. R. Gray.	Died Aug. 6, '64; shock and loss of blood. *Spec.* 1839, A. M. M.
184	Black, J., Pt., I, 16th Conn.,	———	Frostbite of both feet while in	April 24,	Circular amp. both legs, lower	Died April 27, 1865, of exhaust'n.
185	age 33.		captivity.	1865.	third. A. A. Surg. E. DeWitt.	
186	Bowns, W. A., Lieut. and Quartermaster, 15th Conn., age 26.	May 21, 1865.	Comp'd com. fract. right tibia and fibula, middle third, and left femur, middle third, by railroad accident.	May 21, 1865.	Circ. amp. mid. third right leg and up. third left thigh. Surgs. C. A. Cowgill, U. S. V., and Surg. N. Meyer, 16th Conn.	Died May 21, 1865.
187	Bryant, B., Pt., B, 2d East Tennessee Cavalry.	Sept. 1, 1862.	Right leg inj. by falling down an embankment; necrosis.	June 8, 1863.	Amputation of leg at upper third.	June 11, hæmorrh. Died June 16, 1863, of pyæmia.
188	Bucke, N. F., Serg't U. S. Marines.	Dec. 17, 1861.	Left leg fractured by railroad accident.	Dec. 17, 1861.	Amputation of leg in upper third.	Died December 17, 1861. *Spec.* 20, A. M. M.
189	Coleman, R., Pt., B, 83d	Nov. —,	Frostbite of both feet; mortifi-	———	Amputation of both legs below	Died January 2, 1865.
190	Pennsylvania.	1864.	cation.		knee.	
191	Colman, M., Pt., F, 103d Illinois, aged 42.	——— 1863.	Senile gangrene, left foot, from scorbutus.	Nov. 9, 1863.	Antero-post. flap amp. leg at middle third. A. A. Surg. R. H. Brown.	Died November 12, 1863, of exhaustion.
192	Creek, J. W., Pt., D, 91st Indiana, age 21.	——— 1862.	Ulcer of left leg, exposing tibia, from injury by fall.	June 29, 1864.	Amputation of leg, upper third.	Died July 5, 1864.
193	Curgill, W., Pt., 90th New York.	Oct. 29, 1864.	Left leg and foot and right thigh crushed by railroad accident.	Oct. 29, 1864.	Amp. left leg at tuber. of tibia and right thigh at low. third. Ass't Surg. C. Bacon, U. S. A.	Died three hours after operation.
194	Davis, D., Pt., L, 2d N. Y. Heavy Artillery, age 23.	——— 1864.	Scald of left ankle by boiling coffee; gangrene; hæmorrh.	Dec. 17, 1864.	Circular amp. leg, middle third. Ass't Surg. J. T. Calhoun, U. S. A.	Died December 17, 1864.
195	Dawson, W., Serg't, B, 1st	April 14,	Fractured bones of both legs;	April 16,	Amputation both legs in upper	(Also disl. left shoulder and other
196	Kentucky Cavalry.	1863.	dislocation both ankles.	1863.	third.	injuries.) Died April 18, 1863.
197	Dennis, J., Pt., Signal Corps, age 19.	April 20, 1864.	Gangrene; ulcerat'n following injury by kick of a mule.	Sept. 26, 1864.	Circular amp. leg at up. third. A. A. Surg. C. Bausch.	Died Oct. 1, 1864, of exhaustion.
198	Dunham, M., Pt., D, U. S. Engineers, age 23.	Jan. 24, 1864.	Necrosis following axe wound of left ankle.	June 6, 1864.	Amputation of leg, upper third. Surg. E. Bentley, U. S. V.	Died June 18, 1864, of pyæmia.
199	Flenner, L. G., Pt., I, 161st Ohio, age 45.	July 10, 1864.	Accidental contusion right foot; extensive sloughing.	Aug. 3, 1864.	Circular amp. of leg, up. third. A. A. Surg. M. B. McCausland.	Died Aug. 8, 1864, of exhaustion.
200	Garrett, G., Pt., F, 16th Colored Troops, age 28.	Sept. 26, 1864.	Comp'd fract. tibia and laceration foot by railroad accident.	Oct. 1, 1864.	Circ. amp. leg at lower third. Surg. H. B. Johnson, 115th O.	Died December 4, 1864.
201	Gellison, G., Pt., E, 65th Illinois.	———	Fracture of bones of leg by railroad accident.	———	Amputation of leg.....	Died August 12, 1863.

[1] Bryan (J.), *A short account of the "Mary Ann" Hospital, Grand Gulf, Miss.*, in *Am. Med. Times*, 1863, Vol. VII, p. 5.

No.	Name, Military Description, and Age.	Date of Injury or Disease.	Nature of Injury or Disease.	Date of Operation.	Operation and Operator.	Result and Remarks.
202	Gilchrist, J., Pt., I, 31st Indiana.	———	Chronic ulcer of left leg becoming gangrenous.	April 20, 1863.	Amputation left leg. Surg. F. Irish, 77th Pennsylvania.	Died April 26, 1863, of gangrene.
203	Gilchrist, W., Corp'l, H, 2d Maine Cavalry, age 24.	May 16, 1864.	Left leg kicked by horse; extensive gangrene over dorsum of foot.	July 10, 1864.	Circ. amput'n leg, junction of upper thirds. A. A. Surg. G. E. Bricket.	Chills and fever and diarrhœa. Died July 22, 1864.
204	Glasgow, G., colored cook, F, 3d New Jersey Cavalry.	Dec. —, 1864.	Feet frostbitten; sloughing of toes, exposing bones.	Feb. 3, 1865.	Amput'n left leg, middle third. A. A. Surg. S. T. Buck.	(Jan. 11, 1865, amp. of toes, both feet sloughing.) Died Feb. 7, 1865, of traumatic pneumonia.
205	Graham, D., Pt., I, 51st N. Carolina.	July 17, 1864.	Comp'd com. fract. of bones of leg by railroad accident.	July 20, 1864.	Amputation of leg.....	Died July 24, 1864, of nervous shock and pyæmia.
206	Harmer, S., Pt., E, 98th Pennsylvania, age 18.	May —, 1864.	Compound fracture right leg by car running over it.	May —, 1864.	Amputation of right leg.....	June, 1864, amput'n thigh above knee. Died August 30, 1864, of epilepsy.
207	Hart, J., Pt., E, 140th New York, age 19.	———	Mortification of both feet from exposure to cold.	Jan. 4, 1863.	Circ. amp. both legs, low. third. Surg. J. H. Baxter, U. S. V.	Died January 16, 1863.
208						
209	Heary, W., freedman, age 22.	May 8, 1864.	Left ankle crushed by railroad accident.	May 8, 1864.	Amputation of leg, lower third. A. A. Surg. B. E. Dodson.	Died May 19, 1864, of gangrene.
210	Holloran, J., Pt., D, 140th New York.	———	Mortification of both feet, extending above ankle joint.	Jan. 7, 13, '63.	Circ. amp. both legs, low. third. Surg. J. H. Baxter, U. S. V.	Died Feb. 18, 1863, of pyæmia.
211						
212	Hutchison, S., Pt., A, 5th Maryland, age 27.	Mar. 10, 1864.	Left leg crushed by railroad accident.	Mar. 11, 1864.	Amp. leg, upper third, lateral skin flaps and circ. sect. muse. Surg. Z. E. Bliss, U. S. V.	Died March 15, 1864.
213	Ivory, J., Pt., D, 2d Tenn. Cavalry.	———	Frostbite of both feet; gangrene.	April 2, 1864.	Flap amp. both legs, low. third. A. A. Surg. E. Herwig.	Died April 30, 1864, of congestive fever.
214						
215	Jackson, J., Pt., K, 9th Massachusetts.	Oct. 15, 1864.	Left leg injured by railroad accident.	Oct. 17, 1864.	Flap amputation of leg. A. A. Surg. T. B. Townsend.	Died October 19, 1864.
216	Kappelman, W., Pt., G, 17th Missouri.	Nov. 8, 1863.	Left leg fractured by wagon wheel.	Nov. 8, 1863.	Amputation of leg, low. third.	Died May 14, 1864, of acute pleuritis.
217	Kenaicott, E. S., Pt., D, 31st Iowa, age 28.	Oct. 27, 1864.	Accidental compound fracture of bones left leg.	Oct. 27, 1864.	Circular amputation of leg, upper third.	Gangrene. Died Dec. 1, 1864, of typhoid fever.
218	King, J., Pt., 2d Battalion Vet. Res. Corps, age 55.	April 27, 1864.	Right foot and leg comminuted by railroad accident.	April 27, 1864.	Circular amp. of leg. Surg. R. S. Kenderdine, U. S. V.	Died May 5, 1864, of tetanus.
219	Kirk, M., Pt., E, 10th Vet. Reserve Corps.	May 20, 1865.	Both legs badly crushed by railroad accident.	May 20, 1865.	Circular amp. of both legs, mid. third. Dr. W. H. White.	Died May 21, 1865, of shock.
220						
221	Kries, F., Pt., H, 1st Missouri State Militia, age 41.	Jan. 6, 1864.	Frostbite of left foot.....	Jan. 12, 1864.	Circ. amp. leg 4 inches above ankle. A. A. Surg. L. H. Callaway.	Died January 18, 1864, of tetanus.
222	Lahay, J., Pt., K, 46th Illinois, age 16.	Feb. 2, 1865.	Right leg injured by railroad accident.	Feb. 2, 1865.	Amputation of right leg.....	Gangrene. Died Feb. 19, 1865.
223	Lee, L., Pt., A, 12th Colored Troops, age 19.	———	Dry gangrene both legs.....	Nov. 25, 1864.	Circ. amp. both legs, up. third. A. A. Surg. J. S. Giltner.	Died Jan. 13, 1865, of gangrene.
224						
225	Lovell, L., Pt., —, 1st Mich. Lt. Artillery, age 52.	———	Necrosis of right tibia; gang. caused by injudicious appli'n of tourniquet to suppress hæm.	Sept. 25, 1864.	Flap amp. of right leg below tuberosity of tibia. Surg. S. D. Turney, U. S. V.	Died September 26, 1864, of exhaustion.
226	Loyd, E., Pt., E, 2d Maryland, age 25.	———	Idiopathic phlegmonous erysipelas of right foot.	Dec. 28, 1864.	Amputation of leg, lower third. Surg. D. W. Bliss, U. S. V.	Gangrene; tetanus. Died February 3, 1865.
227	McAllister, J., Pt., I, 3d Illinois Cavalry.	May 20, 1863.	Fract. of right leg and os calcis of both feet by a fall.	May 21, 1863.	Amp. right leg, mid third, and Syme's amput'n at left ankle.	Chronic bronchitis. Died May 23, 1863.
228	McElroy, D., —, age 27.....	June 19, 1862.	Comm'n met. bones right foot; gangrene; railroad accident.	June 24, 1862.	Lat. skin flap amp. leg. Dr. T. M. Markoe, New York.	Diarrhœa. Died Aug. 28, 1862.
229	McQuaid, R. D., Lieut., K, 29th Michigan, age 30.	Jan. 11, 1865.	Comp'd com. fract. right tibia, upper third, with dislocation.	Jan. 11, 1865.	Flap amput'n leg, upper third. Surg. J. E. Herbst, U. S. V.	Died Jan. 19, 1865, of exhaustion.
230	Marks, J. H., Pt., G, 6th Pennsylvania Cavalry.	Dec. 24, 1862.	Compound fracture left leg by wagon wheel.	———	Amputation of leg.....	Died January 6, 1863.
231	*May, W. A.*, Pt., H, 7th N. Carolina, age 23.	Oct. 17, 1864.	Compound com. fracture left leg by railroad accident.	Oct. 18, 1864.	Circ. amp. of leg, upper third. Surg. W. D. Baylor, C. S. A.	Sloughing. Died Oct. 25, 1864.
232	Meador, F., Pt., K, 26th Colored Troops, age 40.	Mar. 18, 1864.	Frostbite left foot and two middle toes right foot.	April 16, 1864.	Amp. left leg, junct. up. thirds, and 2d middle toes, right foot. A. A. Surg. E. DeWitt.	Died June 23, 1864, of pyæmia.
233	Miller, D., Pt., 145th New York.	Oct. 17, 1862.	Right foot fractured by railroad accident.	Oct. 19, 1862.	Amputation of leg, lower third.	Died October 24, 1862. *Spec.* 781, A. M. M.
234	Mulhatlan, P., Pt., B, 150th Pennsylvania.	Oct. 8, 1864.	Both legs crushed by railroad accident.	Oct. 8, 1864.	Doub. flap amp. left leg, junct. up. thirds, and right leg just below tub. of tibia, skin flap and circ. sect. of muse Ass't Surg. H. S. Schell, U. S. A.	Died October 8, 1864, of shock and loss of blood.
235						
236	Murphy, E., Pt., D, 143d N. York, age 21.	Oct. 12, 1862.	Right tarsal bones comminuted in attempt to jump from railway car; gangrene.	Oct. 17, 1862.	Lateral flap amp. leg at middle third. Dr. G. A. Peters, New York City Hospital.	Gangrene; diarrhœa. Died December 1, 1862.
237	Newton, O., Pt., K, 10th N. York Hvy Art., age 40.	———	Erysip. inflam. of right leg and foot, resulting in gangrene.	July 15, 1864.	Circ. amp. of leg, lower third. A. A. Surg. A. Van Cortlandt.	Died Aug. 24, 1864, of dysentery.
238	Pale, J. H. N., Pt., C, 97th Illinois, age 36.	Nov. 1, 1863.	Compound fracture right leg, mid. third, by railroad accid't.	Nov. 16, 1863.	Flap amputation of leg, upper third. Surg. F. Bacon, U.S.V.	Nov. 18, hæm.; lig. post. tib. art. on face of stump. Died Nov. 25, 1863, of pyæmia.
239	Rudge, L. H., Corp'l, H, 1st New York Artillery.	July —, 1863.	Both legs injured by railroad accident.	———	Amputation of both legs.....	Died July 17, 1863.
240						
241	Sanders, B., Corp'l, 3d Md. Battery, age 37.	———	Mortification of both legs to junction of middle and lower thirds.	Feb. 16, 1865.	Amput'n through middle third, both legs. Surg. B. B. Breed, U. S. V., and A. A. Surg. L. Sinclair.	Died March 12, 1865. (May 13, 1864, shot fracture upper third femur.)
242						
243	Shearer, J., Serg't, A, 11th Maryland, age 28.	May 20, 1865.	Comp'd com. fracture middle third right leg, and double compound fracture left leg in middle and upper thirds, by horse kicks.	May 21, 1865.	Ant. post. skin flap amp. right leg and amp. thro' left knee joint, leaving patella and condyles, by Ass't Surg. G. M. McGill, U. S. A.	Feeble reaction after prolonged primary shock. Died May 22, 1865.
244	Sligh, J. W., Capt., F, 1st Michigan Engineers.	Oct. 23, 1863.	Com. fractur right leg and simple fracture left leg by railroad accident.	Nov. —, 1863.	Amp. right leg 4 inches below knee. Surg. B. Woodward, 22d Illinois.	Died November 15, 1863. *Spec.* 2077, A. M. M.
245	Smith, J., Lieut., I, 65th Ohio.	June 2, 1865.	Comp'd com. fracture left ankle joint and injury of spine.	June 2, 1865.	Amputat'n of leg, lower third. Surg. E. B. Glick, 40th Ind.	Acute meningitis. Died June 10, 1865.
246	*Smith, W. W.*, Pt., I, 17th Alabama, age 19.	Dec. 1, 1864.	Frostbite of toes of both feet; mortification of parts.	Mar. 9, 1865.	Flap amputation right leg in middle third. Ass't Surg. J. C. Thorpe, U. S. V.	(Feb. 11, 1865, 1st 4 toes right foot and 1st 3 toes left foot amput'd.) Died June 16, 1865, of exhaus.
247	Sorter, J. D., Pt., E, 16th Vet. Res. Corps, age 21.	———	Abscess of foot; gangrene and repeated hæmorrhage.	July 18, 1864.	Oval flap amp. of leg, lower third. A. A. Surg. W. C. Wey.	Gangrene. Died Aug. 11, 1864.
248	Thirlway, J., Pt., I, 69th N. York, age 18.	Dec. 26, 1864.	Frostbite of right foot; gang..	Feb. 17, 1865.	Circ. amp. of leg, lower third. A. A. Surg. C. F. Trautman.	Died February 25, 1865, of exhaustion.

No.	Name, Military Description, and Age.	Date of Injury or Disease.	Nature of Injury or Disease.	Date of Operation.	Operation and Operator.	Result and Remarks.
249	Thompson, J. W., Pt., A, 5th Colored Troops, age 22.	Jan. —, 1864.	Frostbite of feet; gangrene ...	Feb. 17, 1864.	Amp. left leg, lower third, semi-circ. method above, flap from below. A. A. Surg. B. T. Crooker.	Died February 20, 1864, of exhaustion.
250	Towne, W. H., Pt., A. 18th Conn., age 30.	Nov. 17, 1863.	Comp'd com. fract. right ankle; crushed by railroad cars.	Nov. 18, 1863.	Flap amputat'n lower third leg. Surg. H. W. Owings, 2d E. S. Maryland Vols.	March 8, 1864, amp. lower third thigh. Died March 28, 1864, of secondary hæmorrhage.
251 } 252 }	Weber, J., Pt., E, 7th New York, age 60.	Jan. —, 1865.	Frostbite of both feet; tetanus.	Feb. 10, 1865.	Amp. both legs, lower third, with lateral closure of stumps. Ass't Surg. H. Allen, U. S. A.	Died February 11, 1865.
253	Westfall, L., Pt., M, 24th N. York Cavalry, age 17.	———	Gangrenous ulcer on low. third left leg, exposing tibia.	Jan. 19, 1865.	Circ. flap amp. of leg, mid. third. Surg. R. B. Bontecou, U. S. V.	Died February 11, 1865, of exhaustion.
254	Wilmot, W., Musician, E, 14th Illinois Cav'ry, age 51.	———	Gangrene of right foot to ankle and of toes of left foot, from exposure.	Feb. 8, 1865.	Ant. post. flap amp. right leg, lower third, and all toes of left foot. Ass't Surg. W. S. Tremaine, U. S. V.	Died March 11, 1865, of exhaustion.
255 } 256 }	Wood, W., Pt., A, 102d N. York.	Sept. 14, 1864.	Both legs injured by railroad accident.	Prim'ry.	Amp. of both legs, mid. third. A. A. Surg. C. C. Lee and Dr. W. C. Way, of Elmira.	Died September 17, 1864.
257	Woody, B. C., Pt., E, 14th Penn. Cavalry, age 18.	July 15, 1864.	Right leg crushed from ankle to middle by railroad accid't.	July 15, 1864.	Ant. post. flap amp. of leg at junct. of upper thirds. Surg. S. N. Sherman, U. S. V.	Died July 26, 1864, of traumatic gangrene.
258	Yancrum, F., Pt., E, 93d Pennsylvania, age 34.	May 10, 1864.	Fracture bones of right leg at junction of lower thirds by mule kick; gangrene.	June 13, 1865.	Amputation of leg at up. third. A. A. Surg. G. K. Smith.	Died June 27, 1865, of pyæmia. *Spec.* 4242, A. M. M.
259	*Michel*, —, Lieut., 14th La..	———	Gangrene	———	Amputation of leg.....	Result unknown.

Of fifty-one partial amputations of the foot for miscellaneous injuries or disease, forty-seven were followed by recovery and four by death:

Table CXII.

Condensed Summary of Fifty-one Partial Amputations of the Foot for Miscellaneous Injuries or Disease.

[Recoveries, 1—47; Deaths, 48—51.]

No.	Name, Military Description, and Age.	Date of Injury or Disease.	Nature of Injury or Disease.	Date of Operation.	Operation and Operator.	Result and Remarks.
1 } 2 }	Bamer, J., Pt., G, 178th New York.	———	Frostbite of both feet.....	———	Partial amputat'n of both feet.	Discharged Oct. 16, 1865; feet blue and cold.
3	Barnhart, M., Pt., H, 50th Pennsylvania, age 28.	——— 1864.	Left foot frozen; slough. of toes. Nov. 22, '64, amp. of toes; necrosis of met. bone of great toe.	Mar. 27, 1865.	Amputation great toe and metatarsal bone. Surg. G. L. Pancoast, U. S. V.	Discharged Aug. 10, 1865. Amp. left ring finger for shot fracture.
4	Bickel, J., Pt., H, 22d Ohio.	Sept. 15, 1864.	Injury of left foot; railroad accident.	Sept. 15, 1864.	Chopart's amputation left foot.	Discharged Nov. 15, 1864; stump remaining sore.
5 } 6 }	Butler, J. R., Pt., H, 10th Kansas, age 18.	Jan. 7, 1864.	Feet frozen; toes slough'd from left foot except 5th and one phalanx of 4th.	Mar. 20, 1864.	Amp. 1st, 2d, and part 3d met. bones left foot, and great toe and head met. bones right foot. Surg. A. C. Van Duyn, U. S. V.	Discharged March 7, 1865.
7	Charles, M., Pt., B, 10th N. Jersey.	———	Frostbite both feet; gangrene. April 28, '62, Syme's amputation at left ankle joint.	May 4, 1862.	Lisfranc's amputat'n right foot. A. Surg. B. E. Fryer, U. S. A.	Discharged August 11, 1862.
8	Clark, C. O. F., Pt., G, 1st Oregon.	Dec. 17, 1865.	Frostbite both feet.....	Jan. 17, 1866.	Chopart's amp. right foot and amp. left leg at middle third. A. A. Surg. M. V. Amen.	Disch'd April 14, '66. Nov. 9, '68, re-amp. left leg. 1870, stump sound. *Specs.* 4198, 4191, A. M. M.
9	Conklin, J., Pt., F, 1st Ohio Cavalry, age 18.	July 10, 1864.	Fract. of metatarsal bones of right foot; railroad accident.	———	Amputat'n through metatarsal bones, flap from sole of foot.	Discharged March 25, 1865.
10	Corcoran, C., Pt., G, 1st Massachusetts, age 22.	Nov. 13, 1864.	Phalanges of great toe cut by an axe; necrosis.	Feb. 14, 1865.	Oval amp. of great toe and met. bone. A. A. Surg. J. Murray.	Mustered out June 27, 1865; doing well.
11	Counter, O. R., Pt., —, 4th New Hampshire.	Feb. 10, 1865.	Frozen feet	Mar. 4, 1865.	Amp. left foot thro' met. bones and of right fifth toe.	Discharged July 11, 1865.
12	Dennison, C. W., Pt., B, 2d Rhode Island, age 18.	Dec. —, 1863.	Frostbite of both feet; loss of all toes. Sept., 1864, left foot contused.	Sept. 17, 1864.	Disarticulation of met. bones of left foot. Surg. St. J. W. Mintzer, U. S. V.	Discharged July 5, 1865.
13 } 14 }	Downey, J., Pt., B, 12th Illinois Cavalry, age 34.	Jan. 1, 1864.	Severe frostbite both feet; caries of metatarsal bones.	April 15, 1864.	Amp. of both feet thro' tarso-metatar. articulation. A. A. Surg. R. N. Isham.	Discharged June 20, 1864; good stump.
15	Dukes, J. R., Serg't, E, 87th Indiana.	Nov. 1, 1862.	Axe cut of left foot	Feb. —, 1863.	Chopart's amput'n of left foot. A. A. Surg. P. Rectanus.	Discharged February 15, 1863.
16 } 17 }	Fletcher, J., Pt., D, 1st Colored Troops, age 25.	Dec. —, 1863.	Freezing of both feet; gangrene.	Jan. 22, 1864.	Amp. both feet thro' met. bones. A. A. Surg. C. B. Fry.	Discharged February 7, 1865.
18	Gardner, J., Pt., F, 65th Indiana.	April 2, 1864.	Laceration of left tarsus and fracture of metatarsus; railroad accident.	June 5, 1864.	Modification of Chopart's amp.; the proximate half scaphoid bone allowed to remain. A. A. Surg. J. G. Harvey.	Mustered out June 22, 1865, with excellent stump.
19 } 20 }	Harris, T., Pt., C, 27th Colored Troops, age 25.	Oct. —, 1864.	Gangrene both feet from wear'g tight shoes; toes dry and hard.	Jan. 19, 1865.	Amp. at tarso-met. articulat'n. Surg. E. Bentley, U. S. V.	Discharged September 2, 1865; ends of bone well covered.
21	Hawkins, E., Pt., B, 9th Indiana, age 21.	Mar. 17, 1865.	Com. met. bones and lac. soft parts left foot; railr'd accid't.	Mar. 17, 1865.	Amputation at tarso-metatarsal articulation.	Mustered out September 28, 1865.
22 } 23 }	Hayes, J. S., Pt., I, 21st N. Jersey.	Jan. —, 1863.	Frostbite of both feet; gang. and mortification.	Mar. 3, 13, '63.	Amputation of both feet thro' metatarsal bones.	One foot healed, small ulcer on the other. Discharged.
24 } 25 }	Hirsch, P., Pt., D, 98th Pennsylvania, age 38.	Jan. 1, 1864.	Both feet frozen; line of demarcation well defined.	Feb. 9, 1864.	Flap amp. right foot at mid. of metatarsus, and of toes and heads of met. bones left foot. Ass't Surg. A. Ingram, U. S. A.	Stump healed and promised to be useful. Discharged September 22, 1864.
26	Horman, W., Pt., H, 18th Kentucky, age 45.	July 21, 1864.	Comp'd com. fract. 4th and 5th metatarsal bones right foot; railroad accident.	July 21, 1864.	Circular flap amp. 4th and 5th toes at tarso-metatarsal articulation.	Transferred to Veteran Reserve Corps May 4, 1865.

No.	Name, Military Description, and Age.	Date of Injury or Disease.	Nature of Injury or Disease.	Date of Operation.	Operation and Operator.	Result and Remarks.
27	Jones, S., Pt., I, 30th Iowa, age 23.	Sept. 30, 1863.	Bone scurvy and hospital gangrene, causing loss of use of both feet.	Nov. 6, 1863.	Chopart's amp. of right foot. Surg. J. Andrews, 3d Michigan Cavalry.	Oct. 16, amp. left leg. Nov. 10, 11, hæm.; inter. plantar artery tied. Disch'd June 3, 1865.
28	Langan, J., civilian, Quartermaster's Dep't, age 25.	July 18, 1865.	Incised wound thro' metatarso-phalangeal joint left 5th toe, extending to tarsal articulat'n.	July 18, 1865.	Amp. of 5th toe at tarso-met. artic. A. A. Surg. W. Balser.	Returned to duty Aug. 27, 1865.
29	Leichley, S., Pt., I, 178th N. York, age 19.	Dec. 30, 1864.	Frostbite of left foot; necrosis.	April 30, 1865.	Flap amputation at tarso-metatarsal articulation.	Discharged February 15, 1866.
30	Messer, G., Pt., B, 7th New	Dec. —,	Frostbite of both feet	Jan. 1,	Chopart's antero-posterior flap	Discharged May 22, 1865; stumps
31	York, age 27.	1864.		1865.	amputation of both feet.	healed.
32	Metzger, A., Pt., B, 19th Penn. Cavalry, age 17.	Dec. 31, 1863.	Toes of left foot frozen; gang. and slonghing.	Jan. 25, 1864.	Flap amp. at tarso-met. artic. Surg. H. Wardner, U. S. V.	Disch'd June 4, '65; good stump, excellent motion of ankle joint.
33	Mitchell, D., Pt., C, 7th N.	Jan. —,	Feet frozen	Feb. 1,	Chopart's amp. both feet. Surg.	Discharged October 14, 1865.
34	York, age 25.	1864.		1864.	J. E. Pomfret, 7th N. Y. H. Art.	
35	Norcross, J. H., Pt., H, 2d New Jersey Cavalry.	Dec. —, 1863.	Both feet frost-bitten; mortification.	———	Amp. left foot thro' met. bones, also right great toe. A. Surg. D. G. Hetzell, 34th N. J.	Discharged June 29, 1864. Died January 9, 1871, of disease.
36	Pollard, R., Pt., D, 21st Ken-	Jan. 24,	Both feet frost-bitten; slough-	Jan. 24,	Flap amp. both great toes and	Discharged July 2, 1865; almost
37	tucky, age 27.	1865.	ing.	1865.	metatarsal bones, also of left third metatarsal bone.	entirely healed.
38	Quillain, J. W., Pt., I, 27th Pennsylvania, age 31.	Sept. 5, 1863.	Compound fracture of toes of right foot by street cars.	——— 1863.	Amp. 1st, 2d, and 3d toes with portion 1st and 2d met. bones.	Discharged August 16, 1864; permanent lameness.
39	Shadel, J., Pt., G, 11th Wisconsin.	May 2, 1864.	Contusion of left foot and comp. fract. of 4th toe; railr'd accid't. May 3, '64, amp. 4th toe; gang. May 15, amp. 3d and 5th toes.	May 30, 1864.	Amputation of 2d toe and removal of 2d, 3d, 4th, and 5th metatars'l bones in continuity. A. A. Surg. S. S. Jessop.	Discharged October 20, 1864. 1877, foot contracted to a point; walks quite lame.
40	Shanley, W. F., Pt., K, 37th Massachusetts, age 42.	April 30, 1863.	Wound of right tarsus and metatarsus by wheel of a wagon.	May 13, 1863.	Chopart's amputation of right foot.	Discharged Aug. 24, 1863. Died Oct. 20, 1865; chronic diarrhœa.
41	Sickler, J., Pt., H, 8th Illinois Cavalry, age 35.	Feb. 28, 1864.	1st, 2d, and 3d toes of left foot crushed and sole lacerated; railroad accident.	Feb. 28, 1864.	First met. bone and phal. of 3d toe exart., middle of 2d matatarsal bone sawed through.	Discharged October 25, 1864.
42	Stephens, J., Serg't, G, 10th Indiana Cavalry.	Mar. 31, 1864.	Left foot injured by railroad accident.	———	Chopart's amputation of the left foot.	Discharged February 25, 1865.
43	*Stone*, W., Pt., E, 10th Tennessee, age 40.	———	Hospital gangrene of both feet from erysipelas.	Mar. 1, 1864.	Amp. 1st, 2d, 3d, and 4th toes left foot at 2d joint, and 5th toe at tarso-met. artic.	Parts healed kindly. Sent to military prison May 18, 1864.
44	Sutton, F., Pt., H, 11th Ohio	Jan. 7,	Both feet frost-bitten; slough-	Mar. 28,	Amp. both feet through meta-	Left for his home September 5,
45	Cavalry (disch'd soldier), age 27.	1864.	ing.	1865.	tarsal bones. Surg. Geo. C. Underhill, 11th Ohio Cavalry.	1865.
46	Watkins, E. D., Pt., H, 5th	Feb. 21,	Frostbite of both feet	April —,	Hey's amp. both feet, tuberos-	Discharged Dec. 6, 1865. March
47	Kentucky Cavalry, age 30.	1864.		1865.	ity right os calcis removed. A. A. Surg. H. McElderry.	18, 1866, amp. right leg. 1877, stump of foot still ulcerating.
48	Parks, T. B., Pt., K, 13th	———	Frostbite of both feet; gan-	Feb. 26,	Amputation of both feet across	Discharged February 24, 1863.
49	New Hampshire.		grene.	1863.	instep. Dr. N. L. Folsom, Portsmouth, N. H.	Died February 27, 1863; congestion of bowels.
50	Tucker, A., Pt., B, 7th Indiana Cavalry.	Feb. —, 1864.	Both feet frost-bitten	Feb. —, 1864.	Amput'n of right foot at tarso-metatarsal articulation.	Died Sept. 30, 1864, of chronic diarrhœa.
51	Williams, H., Pt., B, 59th Colored Troops.	———	Frostbite of right foot; gangrene of toes.	April 2, 1864.	Circular amp. of foot through metatarsal bones.	Died August 26, 1864, of general debility.

One hundred and twenty-two amputations of the toes for miscellaneous injuries were recorded; the results in seven cases were not ascertained; one hundred and nine recovered, six died. An instance of amputation for dry gangrene is here cited:

Case 1005.—*Amputation of toes.*—Hospital Steward R. Schofield, 69th Pennsylvania, aged 49 years, had both his feet frost-bitten while with his regiment in the field near Stevensburg, January 1, 1864. Surgeon R. B. Bontecou, U. S. V., in charge of Harewood Hospital, Washington, gives the following history: "The patient was a man of temperate habits and of good constitution. The tent in which he was sleeping in the field was blown down during the night, when his feet became exposed, the other parts of his body remaining well protected. Although the weather was intensely cold, he slept well during the night, and on waking up in the morning found the forepart of both his feet frozen. He received no treatment until admitted to this hospital on February 1st. At the time of his admission the patient was found to be suffering from dry gangrene of the toes of both feet, resulting from the freezing, and extending to the metatarsal bones of the left foot, with destruction of the soft parts. The patient was in good spirits, and although he was doing well it was deemed advisable to disarticulate the toes. Nourishing diet and stimulants were administered and simple dressings were used." The amputated toes, contributed to the Museum with the description of the case by Surgeon Bontecou, constitute specimen 2163 of the *Surgical Section*, and a representation of the diseased feet appears in the adjoining wood-cut (Fig. 372). The patient was discharged from service for disability January 27, 1865, and pensioned. The Philadelphia Examining Board on November 7, 1877, certified to the pensioner's condition as follows: "He has had all the toes of the right foot amputated through the metatarso-phalangeal articulation except the little toe, which is drawn into the cicatrix. The foot is defective in circulation and there are chronic ulcers of the leg extending from the ankle to within

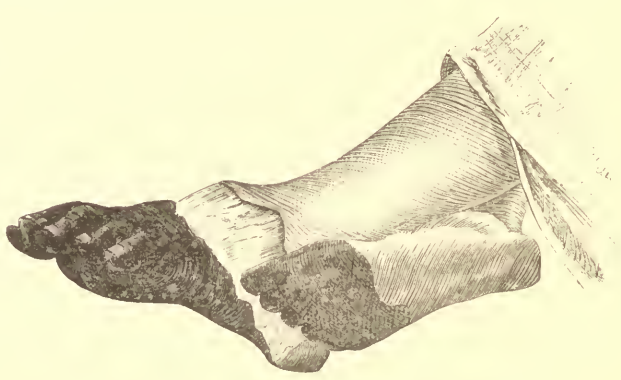

Fig. 372.—Dry gangrene of both feet after frostbite. *Spec.* 2163.

four and a half inches below the knee, being very offensive and requiring constant care and attention. This condition no doubt is due to anæsthesia of the foot and leg. The cicatrices extend around the leg and are constantly scaling. There is also varix above to a slight extent. The toes of the left foot were amputated at the tarso-metatarsal articulation, the stump showing a good horny cicatrix; hyperæsthesia of foot or stump; atrophy of leg; stump alleged to be painful during changes of weather," etc. The pensioner was paid September 4, 1881.

LIGATIONS.—Eighteen instances of ligations of the larger vessels were reported. The injuries in eight cases were incised wounds, in two punctured wounds, and in five aneurisms; in three cases the nature of the injury was not specified. Four of the operations were on arteries of the neck and trunk, four on vessels of the upper and ten on arteries of the lower extremities. Seven were fatal, viz: a ligation of the primitive carotid, of the external and common carotids, of a branch of the mesenteric, of the radial, two of the femoral with subsequent ligations of the external iliac, and one of an artery of the dorsum of the foot. Ten of the cases are here detailed:

CASE 1006.—*Amputation in the arm. Ligation of the axillary and subsequently of the subclavian artery.*—Private H. Rieman, Co. A, 12th Maine, aged 21 years, had his left arm crushed by a railroad accident near New Orleans, January 16, 1864, and suffered amputation at the middle third of the humerus. Surgeon J. B. G. Baxter, U. S. V., reported that the man was conveyed to Barracks General Hospital, where "the axillery artery was ligated, by reason of secondary hæmorrhage from the brachial artery, on January 31st. On February 7th another hæmorrhage supervened and the subclavian was ligated in the third portion, at its point of exit from behind the scalenus anticus muscle. The probable loss of blood amounted to two quarts. The subsequent treatment included tonics, stimulants, and diet as nourishing as possible. Some pyæmia did supervene, but hæmorrhage did not again recur. By February 29th the ligature had come away and the wounds were healing rapidly, the patient's appetite being good and his condition presenting every prospect of recovery. The operations were performed by Surgeon O. M. Humphrey, U. S. V." The patient was subsequently admitted to Central Park Hospital, New York City, where he was discharged from service July 31, 1865, and pensioned. Several months after receiving his discharge he was furnished with an artificial arm by the firm of M. Lincoln, of Boston. The pensioner was paid September 4, 1881. Stump in good condition.

CASE 1007.—*Ligation of primitive carotid for aneurismal tumor.*—Acting Assistant Surgeon W. P. Moon reports the following history of "Private H. Cater, Co. C, 106th New York, aged 37 years, who was admitted to Mower Hospital, Philadelphia, September 12, 1864, on account of a tumor of the neck, situated in the upper portion of the right great anterior triangle and being about an inch and a quarter in diameter. The tumor had first been noticed about a year before, growing slowly, and for two or three months the patient was subject to paroxysms resembling asthma, relief being obtained by inhalations of ether. His general health was good, but the mass was evidently encroaching upon the larynx and œsophagus latterly, and after consultation it was decided to attempt the removal of the tumor. The patient was first allowed a furlough to go home and consult his friends, after which, finding his case growing rapidly worse, he finally consented to submit to an operation. Accordingly, on December 13th, he was thoroughly etherized, and I made an incision over the centre of the tumor down to the cyst. The enveloping membrane was found to be very vascular and the tumor had the feeling of the fibroid class. While we were examining the mass, having partly enucleated it and getting down to its attachment, the patient was seized with vomiting and two superficial veins were ruptured by the retching. As soon as these were tied another seemed to give way, the retching increased, and the hæmorrhage became so profuse that we were compelled to desist from all further efforts for the time being and decided to close up the wound after ligating the open vein, hoping for a favorable termination by suppuration. For some days the case did so well that we had strong hopes of a favorable result. Drs. D. H. Agnew, E. R. Fell, and others were present at the operation, and the patient was carefully attended by Dr. Fell. Two days afterwards the case had become complicated by erysipelas, involving the chest and right side of neck, but being readily controlled by tincture of iodine externally, and tincture of chloride of iron, Dover's powder, etc., internally. On December 18th the wound had closed except at the upper and lower points of the incision, from which openings healthy pus was discharged; but there was an unpleasant odor which excited suspicion; patient's tongue white in centre, but moist. No untoward symptoms exhibited themselves until December 26th, when secondary hæmorrhage suddenly set in to the amount of some thirty ounces, being arrested by charpie and compress. After the wound was opened and a careful examination had been made by Dr. T. G. Morton and myself, we could not determine distinctly from what vessel the hæmorrhage came, owing to the altered condition of the tissues, and therefore concluded to ligate the right primitive carotid as the most likely means to prevent a recurrence of the hæmorrhage. The ligature was applied about an inch and a quarter above its origin from the innominata. The tumor was found to have nearly disappeared, and what remained consisted of a calcareous deposit attached to the thyroid cartilage—the veins covering it, with the entire cyst, having sloughed away. On the next day the patient was apparently doing well; wound dry but disposed to slough; very little pus forming. The parts were dressed with diluted chlorinate of soda. On December 29th there was partial paralysis of the left side; wound showing some disposition to clean out; pulse 108; tongue dry and coated; nausea, with some vomiting; slight delirium, with some tendency to diarrhœa, which was controlled by an enema. Wound dressed with solution of permanganate of potassa. On December 30th the patient seemed to improve—taking his cream, beef-essence, and brandy without difficulty, and having no vomiting nor diarrhœa; pulse 90; wound cleaning out. On the following morning the wound presented healthy granulations, but the patient had a rigor, followed by fever and perspiration, precursors of pyæmia. From this time a decided change for the worse became evident and the patient continued to sink until the morning of January 5, 1865, when he died. The wound was healthy at the time of death. The *post-mortem* examination revealed the ordinary condition of a pyæmic patient, and showed that pus had dissected down the sheaths of the vessels nearly to the pericardium. An organized clot was found above as well as below the ligature. The former

extended down to the point of the ligation, and the latter was found occupying the carotid to within a few lines of the innominata and extending up an inch and a half above the bifurcation. The ligature had ulcerated through the carotid."

CASE 1008.—*Ligation of brachial for aneurism.*—Corporal R. L. Phillips, Co. M, 1st Wisconsin Cavalry, aged 44 years, admitted into City Hospital, St. Louis, September 15, 1862, with an aneurism of the brachial artery, caused by a sprain; had been increasing gradually. October 2d, ligation of artery by Surgeon J. T. Hodgen, U. S. V. October 24th, coldness in hand; ligature removed. Returned to regiment November 20, 1862, quite well; aneurism nearly same size, but no pulsation.

CASE 1009.—*Ligation of brachial for incised wound.*—Private W. Stewart, Co. G, 1st Connecticut Cavalry, aged 23 years, admitted to Douglas Hospital, Washington, July 31, 1865, with an incised wound of the internal aspect of the lower third of the left arm, inflicted with a penknife. July 31st, ligation of the brachial artery (supposed) at its bifurcation in continuity by Surgeon R. B. Bontecou, U. S. V. The radial pulse was almost if not quite as full as on the right side, leading to the conclusion that either the brachial had not been tied or that the bifurcation was high up in the arm. August 6th and 8th, ligatures came away. August 25th, wound entirely healed; slight pain in forearm. Transferred to New Haven August 31, 1865.

CASE 1010.—*Ligation of femoral followed by ligation of external iliac; death.*—Private W. P. Webb, Co. H, 4th Maine, aged 21 years, was admitted to Master Street Hospital, Philadelphia, August 12, 1862, suffering from an abscess resulting from a contusion. Acting Assistant Surgeon P. B. Goddard reported that "the injury was located at the outer and anterior part of lower third of the right thigh, and was inflicted by a blow with the butt end of a musket. The abscess was followed by caries of the femur, and the patient was much debilitated when admitted, but improved until secondary hæmorrhage set in at the seat of the abscess. In order to control this Acting Assistant Surgeon D. Gilbert was obliged to ligate the femoral artery above the profunda on September 21st. The patient did well until the ligature cut through on September 25th, when from the aplastic condition of the blood no coagulation had taken place in the calibre of the vessel and violent hæmorrhage from the divided femoral artery was the consequence. This was controlled by the ligation of the external iliac below the origin of the deep epigastric by Acting Assistant Surgeon W. H. Pancoast on September 25th. The hæmorrhage, however, reappeared at the seat of the first ligation on September 30th, when Dr. Pancoast was obliged to enlarge the former incision, and finding that the lifting up of the external iliac on the groove director just below the bifurcation controlled the bleeding entirely, he ligated the artery at that point. The patient lived several days after the operation; but he could not recover from the effects of the hæmorrhages and sank away gradually till October 3, 1862, when he died. The temperature of the leg continued good after the operation."

CASE 1011.—*Ligation of femoral followed by ligation of external iliac.*—Private D. Britton, Co. C, 5th Indiana Cavalry, aged 34 years, entered hospital No. 2, at Nashville, on September 19, 1864. He was admitted on account of femoral aneurism, located in Scarpa's triangle, for which pressure had been applied, producing an extensive gangrenous slough below Poupart's ligament. Surgeon J. E. Herbst, U. S. V., who described the case, reported that he ligated the femoral artery three-fourths of an inch below Poupart's ligament on October 2d, and that hæmorrhage to the amount of forty-eight ounces occurred four days afterwards, when the external iliac artery was ligated by Acting Assistant Surgeon M. N. Benjamin. Death occurred on October 7, 1864, from exhaustion resulting from the hæmorrhage.

CASE 1012.—*Ligation of femoral artery for popliteal aneurism.*—Private J. Fleming, Co. C, 157th Pennsylvania, aged 47 years, was admitted to Cuyler Hospital, Philadelphia, June 6, 1864, with aneurism of the popliteal artery of the right leg. Assistant Surgeon H. S. Schell, U. S. A., reported that "when first seen the tumor was about the size of a duck's egg; pulsation strong and diffused; bruit loud, but thrill not very well defined. The patient kept his leg in a semi-flexed position and complained of constant pain proceeding from the tumor and ankle of the same side. Below the seat of the aneurism the limb was somewhat œdematous, dusky, and slightly pitting on pressure. He stated that he first observed the tumor some months previously, after a severe exertion in lifting heavy stones, that it gradually though slowly increased in size, and that latterly the pain in the limb had increased in intensity. According to his statement the only treatment to which he had been subjected before his admission to Cuyler Hospital consisted of the application of an ointment and of a liquid, which from his description was the tincture of iodine. Physical examination showed the heart to be perfectly healthy and there appeared to be no disposition to disease of the arteries in any other part of the body. Bearing in mind Mr. Syme's case in which coagulation and a spontaneous cure was effected by the simple application of a bandage to the limb, this plan was tried and the patient was strictly confined to his bed. No success followed this method, and forced flexions were next employed, the leg being bent upon the thigh and firmly fixed by numerous turns of a figure of eight bandage. This mode of treatment likewise proving unavailing, pressure by means of an instrument resembling Signorini's tourniquet was resorted to, but was found equally as ineffective as the means previously employed. Meanwhile the aneurism was steadily enlarging and the risk of venous obstruction became more imminent daily. It was accordingly resolved to tie the femoral artery at the lower angle of Scarpa's space, which was done in the usual manner on June 16th by Acting Assistant Surgeon J. Ashhurst, jr. Anæsthesia was induced by the use of ether, and the vessel was reached by an incision about three inches in length. The hæmorrhage during the operation scarcely exceeded a fluid drachm; pulsation ceased instantly upon the tightening of the ligature. The edges of the wound were then brought together by hare-lip pins and several points of the interrupted suture (lead wire being the material employed), after which a light dressing of dry sheet lint was applied and the entire limb below the wound was enveloped in carded cotton. The temperature of the limb was at first slightly above that of the other, but it soon became normal and remained so. When the state of anæsthesia passed off the patient complained of a burning pain in the heel and ankle. The tumor (which in a few days became hard, showing that a clot had been formed) gradually diminished in size, no recurrent pulsation taking place at any time. The wound healed almost throughout by adhesion. The application of cotton to the limb was discontinued on the fifth day; the ligature came away on the seventeenth day, and the progress of the patient afterwards to recovery was uninterrupted." The patient was subsequently transferred to Mower Hospital, whence he was discharged July 5, 1865, and pensioned. The Philadelphia Examining Board reported, December 7, 1870: "We find the aneurism entirely cured by a ligation of the right femoral artery at Scarpa's space; limb somewhat atrophied and numb; use and power of limb impeded." Several years later the same board certified that the pensioner "complains of numbness down the whole surface of the thigh and leg. There is, however, no evidence of want of

blood-supply in the leg; nor is there any atrophy of the limb. There is no pulsation in the artery below the seat of the ligation." The pensioner was paid December 4, 1879.

CASE 1013.—*Ligation of femoral artery.*—Private Jerry Hart, Co. B, 2d Kentucky, was admitted into hospital No. 9, Nashville, with an injury received in a quarrel at Shiloh, Tennessee. Femoral artery ligated. Discharged January 30, 1863.

CASE 1014.—*Ligation of superior profunda for incised wound.*—Private J. Shaw, Co. D, 4th Minnesota, aged 23 years, was admitted into Crittenden Hospital, Louisville, June 26, 1865, with an incised wound of left arm, inflicted with a knife. The superior profunda was ligated in the wound. He was mustered out July 19, 1865.

CASE 1015.—*Ligation of an artery of the foot.*—Surgeon T. H. Squire, 89th New York, reports: "Private T. P. Barrows, Co. G, 35th Massachusetts, aged 18 years, accidentally wounded by an axe, which slipped from the handle while he was using it, making a transverse cut across the dorsum of the left foot, injuring the metatarsal bones, dividing the tendons and one artery, which required a ligature. The wound has been painful, the foot is badly swelled, the wound is ugly, and, for aught I know, the boy will eventually lose his limb or life from it; now being poulticed. Died November 1, 1862."

Details of the remaining eight cases of ligation belonging to this group have already been given in the preceding chapters.[1]

OPERATIONS ON THE EYE OR ITS APPENDAGES.—Seventy-six operations for diseases or injuries of the eye were reported. They include operations on the conjunctiva, for pterygium, symblepharon, anchyloblepharon, gonorrhœal ophthalmia; on the cornea, for staphyloma and leucoma; operations on the iris and the ciliary body; operations for cataract, for strabismus, for lacrymal fistula, and, on the eyelids, for blepharitis, entropion, ectropion, etc. In seven instances the eyeball was extirpated. Brief abstracts of all the cases are given in the appended table:

TABLE CXIII.

Condensed Summary of Seventy-six Operations on the Eye or its Appendages.

No.	NAME, MILITARY DESCRIPTION, AND AGE.	INJURY OR DISEASE.	OPERATION AND OPERATOR.	RESULT AND REMARKS.
1	Adams, J., Pt., B, 1st Louisiana, age 35.	1863, inflammation right iris, encephaloid tumor size of horse-chestnut.	June 8, 1863, removal of eyeball and contents of socket by knife.	Recovery in three months. Disch'd Jan. 2, 1864. Died in 1866.
2	Anderson, G. H., Pt., D, 15th Vet. Reserve Corps, age 22.	August, 1864, staphyloma involving entire cornea of right eye, result of variolous postules.	Rapidly increasing in size. Nov. 20, excision of staphyloma. Surg. J. S. Hildreth, U. S. V.	Discharged July 22, 1865; pens'd.
3	Barry, C., Pt., H, 58th Illinois, age 23.	Attachment of fold of conjunctiva to cornea, right eye; nebulous and imperfect condition left cornea, result of ophthalmia, March, 1863.	Oct. 13, 1864, flap dissected. Staphyloma involved whole cornea. Dec. 31, excision staphyloma right eye. Feb. 18, iridectomy. Surg. J. S. Hildreth, U. S. V.	Discharged April 13, 1865; pens'd. Total loss of sight of right eye; disease of left eye, resulting in almost total loss of sight.
4	Beach, J. W., citizen, age 47...	Lenticular cataract on both eyes, producing total blindness.	Oct. 19, 1864, incis'n thro' left cornea, forming semi-lunar flap; capsule of lens opened and lens extracted. A. A. Surg. F. Strube.	Eyes closed with plaster and bandage. Oct. 25, able to read with a bicornous lens. Recovery November 2, 1864.
5	Bendon, T., Serg't, D, 170th New York, age 26.	May, 1864, injury left side of head; staphyloma of left cornea.	Jan. 10, '65, removal of whole cornea; a portion of humor evacuated.	Discharged May 17, 1865; received artificial eye.
6	Blakeman, A., Pt., A, 10th Wisconsin, age 29.	November, 1863, staphyloma of left cornea.	Aug. 10, 1864, operation for staphyloma. Surg. A. Hammer, U. S. V.	Disch'd Oct. 13, 1864; loss of sight left eye, threatened loss right eye.
7	Boas, H., Pt., B, 8th Veteran Reserve Corps, age 20.	Central leucoma of left eye, result of gonorrhœal ophthalmia; vision null.	June 3, 1865, artificial pupil at upper and int. margin of cornea. Surg. J. S. Hildreth, U. S. V.	Recovery of vision of large objects. Discharged July 2, 1865.
8	Brandy, F. M., Corp'l, C, 42d Indiana, age 31.	Pterygium of right eye.....	Dec. 24, 1864. Desmarres's process. Surg. J. S. Hildreth, U. S. V.	Adherent in a few days. Disch'd August 7, 1865.
9	Brown, B. L., Pt., H, 84th Illinois, age 25.	Large pterygium of both eyes.....	March 4, 1865, Desmarres's method. Surg. J. S. Hildreth, U. S. V.	Flap united, pterygium disappeared. Disch'd April 13, 1865; pensioned.
10	Butler, H., Seaman, Gunboat Mound City, age 23.	Penetrating wound of left eyeball; large protrusion of humor.	Sept. 15, 1862, extirpation of ball of eye. Surg. E. C. Franklin, U. S. V.	Duty Dec. 7, 1862; pens'd. "Sympathetic affection of right eye."
11	Callaghan, J., Pt., C, 45th Illinois, age 21.	Severe strabismus, sing. convergence, result of cereb. affect. in childhood.	Dec. 19, 1863, strabotomy. Surg. M. K. Taylor, U. S. V.	Accord of optics nearly normal. Discharged November 19, 1864.
12	Chandler, T., Pt., E, 7th Illinois Cavalry, age 33.	Leucoma of both eyes from purulent ophthalmia.	March 11, 1865, iridectomy by process of déchirement; both eyes. Surg. J. S. Hildreth, U. S. V.	Can see large objects. Discharged June 17, 1865; totally blind; pensioned.
13	Cornell, R. A., Pt., H, 103d Illinois, age 25.	1863, entropion left eye, result of granular ophthalmia; lashes in perpetual contact with the globe.	May 6, 1865, elliptical section of external integument of upper lid; new position maintained by three sutures. Surg. J. S. Hildreth, U. S. V.	Complete remedy, eyelashes all preserved and in their proper position; eyes weakened. Disch'd June 6, 1865; pensioned.
14	Crippen, J. H., Pt., E, 161st New York, age 26.	Cornea right eye ulcerated; slightly panniform and somewhat anæsthetic; neuralgic pains.	April 17, 1865, division of ciliary muscle. Surg. J. S. Hildreth, U. S. V.	Pain relieved, ulceration speedily modifying. Discharged June 19, 1865.
15	De Arcey, J., Pt., I, 1st Michigan Engineers, age 30.	Cornea of both eyes ulcerated; panniform and anæsthetic; repeated paracentesis on both eyes without relieving pain.	May 19, division of ciliary muscles of both eyes between external and inferior recti-muscles. Surg. J. S. Hildreth, U. S. V.	Disch'd Sept. 1, 1865; pain relieved, condition of eyes improved; right eye permanently destroyed; pensioned.

[1] For a ligation of the thoracica longa for an incised wound see *First Surgical Volume*, page 556, case of D. Hughes, 13th N. Y. Artillery. The instance of ligation of the branches of the mesenteric artery for a punctured wound will be found on page 62, CASE 206, of the *Second Surgical Volume*. Details of a case of ligation of the radial and also one of the ulnar artery, for incised wounds, are given on page 436 of the same volume; and three cases of ligation of the tibial artery are cited on page 7, CASES 5, 6, 7 of this volume. For ligation of iliac see CASE 978, p. 336, *Second Surgical Vol.*

No.	Name, Military Description, and Age.	Injury or Disease.	Operation and Operator.	Result and Remarks.
16	Doran, J. E., Pt., E, 3d Illinois Artillery, age 17.	Purulent ophthalmia with moderate chemosis of both eyes.	Aug. 29, 1864, division of ciliary muscle, right eye. Surg. J. S. Hildreth, U. S. V.	Cornea improved for a few days and then sloughed away; cornea of other eye also destroyed; blind. Discharged Aug 28, 1865.
17	Dunlap, G. S., Pt., B, 1st Missouri Cavalry, age 21.	Central leucoma of both eyes, caused by ophthalmia; right eye quite useless.	Dec. 31, 1864, operation for artificial pupil. Feb. 25, 1865, iridectomy of both eyes. Operator: Surg. J. S. Hildreth, U. S. V.	Disch'd April 13, 1865; has good vision.
18	Edward, J., contraband, age 25.	Protrusion and destruction of eyeball by sharp edge of hoe.	Feb. 2, 1864, excis. eye ball, edges of palpebral wound brought together by sutures. A. A. Surg. C. Pelaez.	Recovery March 6, 1864.
19	Elliott, J. M., Pt., H, 30th Kentucky, age 29.	Pannus covering cornea of right eye; total obscurity of vision.	Aug. 25, syndectomy. Pannus connecting necessitated re-operation. Sept. 9, disease reproducing itself. Hancock's operation performed Oct. 7. Surg. J. S. Hildreth, U. S. V.	Left hospital Oct. 16, 1865; pens'd. Totally blind; complete opacity and staphyloma of both cornea.
20	Ellsworth, J., Pt., A, 1st Michigan Artillery, age 24.	Gonorrhœal ophthalmia with large chemosis of both eyes.	Jan. 21, 1865, division of ciliary muscles of both eyes. Surg. J. S. Hildreth, U. S. V.	Discharged July 28, 1865; vision of right eye good, left eye lost from central leucoma.
21	Essing, R., Pt., B, 58th New York, age 40.	Entropion; both low. lids well marked.	Feb. 4, 1865, excision of triangular flap on both eyes. Surg. J. S. Hildreth, U. S. V.	Discharged May 17, 1865; defective vision; lids entirely recovered, natural condition.
22	Finn, A., Pt., A, 8th Veteran Reserve Corps, age 23.	Purulent ophthalmia with chemosis of both eyes.	Oct. 19, division of ciliary muscle. Surg. J. S. Hildreth, U. S. V.	Cornea sloughed away. Discharged Jan. 23, 1865; total loss of sight left eye; pensioned.
23	Flint, J. D., Pt., K, 13th Wisconsin, age 20.	Entropion caused by superabundance of integument.	April 18, 1865, removal of integument beneath lower lid right eye. A. A. Surg. M. L. Herr.	Discharged Nov. 28, 1865; claims pension for moon-blindness and loss of sight of right eye.
24	Frank, P., Pt., E, 58th Illinois, age 33.	Trichiasis right upper lid, caused by blepharitis and granular ophthalmia.	Sept. 9,'65, transposit'n "by a new process adopted for the first time, so far as known, in this case." Surg. J. S. Hildreth, U.S.V. Trichiasis left up. lid; same operation, same operator.	Disch'd Nov. 11, 1865; pensioned. Deformity and induration of both upper lids.
25	French, D. S., Pt., A, 70th New York, age 39.	Double entropion, caused by catarrhal inflammation of eyes.	Oct. 4, 1863, Janson's operation, Desmarres's modification. Surg. J. S. Hildreth, U. S. V.	Disch'd March 14, 1864; pensioned. Structural changes left eye, causing almost total loss of vision.
26	Furrow, W. P., Pt., E, 51st Illinois, age 29.	Cornea panniform and superficially ulcerated.	April 13, 1865, division of ciliary muscle left eye. Surg. J. S. Hildreth, U. S. V.	Disch'd June 19, 1865; eye greatly improved; pens'd. Loss of sight of left eye.
27	Garrett, D. J., Serg't, C, 9th Iowa, age 24.	Staphyloma	May 1, operated on by A. A. Surg. — Blickhalm.	Discharged Feb. 28, 1866; pens'd. "Total blindness left eye."
28	Getz, B., Pt., L, 4th Cavalry, age 24.	Staphyloma left eye, result of gonorrhœal ophthalmia; leucoma of right, result of purulent ophthalmia.	July 25, 1864, exc. of staphyloma, left eye. Jan. 7, '65, iridectomy of right eye, Desmarres's method of déchirement. Surg. J. S. Hildreth, U. S. V.	Discharged Aug. 10, 1865; pens'd. Total loss of left eye, imperfect vision of right eye.
29	Grieshaber, U., late Pt., K, 30th Missouri, age 37.	Artificial pupil of right eye; complete blindness.	July 12, 1864, operation for artificial pupil. Surg. A. Hammer, U. S. V.	Sight partially restored.
30	Haight, F. G., Corp'l, K, 15th Vet. Res. Corps, age 26.	Aug., 1864, purulent ophthalmia with chemosis of both eyes.	Oct. 2, 1864, division of ciliary muscle of right eye. Surg. J. S. Hildreth, U. S. V.	Cornea destroyed by ulceration. Disch'd June 4, '65; sight of right eye lost, left eye impaired.
31	Hamilton, W. W., Pt., A, 95th Illinois, age 21. (Discharged soldier.)	August, 1865, central hernia iris, left eye, from sloughing of cornea, result of purulent ophthalmia.	Sept. 16, 1865, iridectomy by déchirement. Oct. 11, Hancock's operation. Surg. J. S. Hildreth, U. S. V.	Nov. 8, 1865, extent of opacity of cornea disappearing; pens'd. Total loss of left eye.
32	Hayne, P., Serg't, C, 60th New York, age 33.	Defective vision right eye from central albugo, result of ulceration following fever.	Feb. 11, 1864, excision of portion of iris. Surg. J. S. Hildreth, U. S. V.	March 15, 1864, vision improving,
33	Hicks, W., Pt., I, 107th Illinois, age 30.	Large pterygium left eye.....	Jan. 14, 1865, Desmarres's operation. Surg. J. S. Hildreth, U. S. V.	Pterygium entirely displaced. Discharged May 22, 1865.
34	Hixon, H. A., Corp'l, H, 18th Massachusetts, age 23.	Strabismus internus (double); blepharitis, granular lids.	Sept. 16, 1863, Graefe's operation on rectus internus dexter. Dec. 1, '63, same operation on sinister. Surg. J. S. Hildreth, U. S. V.	Strabismus not completely corrected. Transferred March 9, 1864.
35	Hoffstetter, J., Pt., 48th Co. Vet. Reserve Corps, age 34.	Glaucoma of both eyes.....	Iridectomy both eyes. Surg. J. E. McDonald, U. S. V.	July 27, 1865; doing well.
36	Howard, M. H., Serg't, C, 1st Missouri Cavalry.	Small vascular tumor, upper eyelid.	May, 1863, tumor exc., its bed plugged with lint saturated with liq. ferri persulp. Surg. H. Culbertson, U. S. V.	Duty June 7, 1863.
37	Hughes, J. C., Pt., C, 1st Missouri Engineers, age 23.	Irido-choroiditis right eye; permanent contraction of pupil.	March 11, 1865, division of ciliary muscle. Surg. J. S. Hildreth, U. S. V.	Discharged June 19, 1865; claim for pension rejected.
38	Johnson, H. J. N., Pt., K, 14th Illinois Cavalry, age 19.	Partial staphyloma of right cornea from ulceration following erysipelas of face.	Oct. 15, 1864, excision of staphyloma, leucoma followed. March 4, 1865, iridectomy by process of déchirement. Surg. J. S. Hildreth, U. S. V.	Disch'd May 25, 1865; sight very imperfect, owing to atrophy of optic nerve; pensioned. Blind in right eye, left impaired.
39	Kennedy, J. M., Pt., K, 119th Illinois, age 23.	January, 1864, panniform cornea, surface covered with exudations.	April 13, 1865, divis. of ciliary muscle. Surg. J. S. Hildreth, U. S. V.	Disch'd June 27, 1865; panniform condition to a great extent disappeared; pens'd. Defective vision.
40	*Kenner, J.*, civilian prisoner, age 19.	Disorganization of right eye.....	Feb. 5, 1864, extirpation of right eye. Surg. J. H. Curry, U. S. V.	Escaped Feb. 24, 1864. Movement of muscles of eyeball preserved.
41	Knapp, C., Pt., K, 65th Illinois, age 56.	Moderate sized pterygium returned after previous operation.	Feb. 4, '65, Desmarres's meth. on left eye. Surg. J. S. Hildreth, U. S. V.	Pterygium entirely displaced. Disch'd Mar. 15, '65, cornea nebulous; pensioned. Impairment of sight.
42	Lamont, J., Pt., K, 8th Veteran Reserve Corps, age 49.	Cornea of left eye; ulceration; pain, which was not relieved by repeated paracentesis, etc.	April 26, 1865, divis. of ciliary muscle. May 13, operation repeated. Surg. J. S. Hildreth, U. S. V.	Cornea clean and in good condition; an artificial pupil will give him an excellent vision.
43	Long, Z. V., Pt., D, 9th Illinois Cavalry, age 22.	Ant. chamber both eyes nearly obliterated; irides attached to capsules, result of ophthalmia.	May 6, 1865, attempted excision of irides; division of ciliary ring of each eye; excision impracticable. Surg. J. S. Hildreth, U. S. V.	Discharged June 2, '65; total blindness both eyes; pensioned.
44	Mernin, J., Pt., F, 7th Minnesota, age 43.	Spurious cataract and occlusion of pupil right eye; total blindness.	Nov. 10, 1864, operation for artificial pupil by Surg. A. Hammer, U. S. V.	Disch'd June 2, 1865; complete and permanent loss of vision from ophthalmia and iritis; pensioned.
45	*Merritt, J. A. J.*, Corp'l, I, 6th Florida.	Complete staphyloma of cornea, result of confluent small-pox.	May 11, 1864, removal of eye.....	Recovery, with good stump for artificial eye.
46	Morris, O., Pt., F, 5th Maine, age 26.	November 4, 1863, splinter perforated cornea and wounded lens, left eye; splinter extracted.	Nov. 21, fragments of crystalline extracted, protruding parts of iris excised. Surg. J. S. Hildreth, U. S. V.	Transferred March 15, 1864; form of eye well preserved but vision lost.

No.	Name, Military Description, and Age.	Injury or Disease.	Operation and Operator.	Result and Remarks.
47	Myers, F. J., Pt., K, 11th N. Y. Cavalry, age 22.	Gonorrhœal ophthalmia of both eyes, ulceration, chemosis.	July 25, Hancock's operation; divis. of ciliary muscle. Surg. J. S. Hildreth, U. S. V.	Discharged Feb. 6, 1864. Pen. Ex. 1881, sight greatly impaired, etc.
48	Neville, C. W., Pt., E, 21st Missouri, age 17.	Staphyloma	Extirpation left eye.	Contracted small-pox; remain'g eye ulcerated, sloughed away. Disch'd Jan. 26, '64; pens'd; totally blind.
49	Nichols, A., Pt., L, 3d Michigan Cavalry, age 30.	March, 1864, ectropion of right eye.	July 12, operation by Surg. A. Hammer, U. S. V.	Duty Sept. 12, 1864; claims pension for disease of eyes resulting from measles.
50	O'Brien, D. J., Pt., C, 28th Massachusetts.	Congenital convergent strabismus of right eye.	June 8, 1863, operation by A. A. Surg. J. W. Cushing.	Result good; Veteran Res. Corps. Discharged December 13, 1864.
51	Oliphant, W. J., Pt., B, 132d New York, age 16.	Double divergent strabismus	Division of both externi recti. A. A. Surg. J. H. Hinton.	No change by operation; Veteran Reserve Corps January 31, 1864.
52	Oppelcust, G., Pt., K, 112th Illinois, age 35.	Staphyloma both cornea, and iris of right eye, from ophthalmia.	Sept. 10, '65, exc. of staphyloma, right eye, Desmarres's process. Surg. J. S. Hildreth, U. S. V.	Disch'd Oct. 16, 1865; pens'd. Operation of no benefit; can distinguish nothing. Died Sept. 11, '76; ch. diar.
53	Patterson, S. B., Pt., G, 8th Vet. Reserve Corps, age 34.	Chronic choroiditis of both eyes.	April 26, 1865, division of ciliary muscle, right eye. June 17, same operation on left eye. Surg. J. S. Hildreth, U. S. V.	Discharged July 3, 1865; defective vision; pensioned.
54	Pemberton, J., Pt., A, 5th Kentucky Cavalry, age 29.	Irido-choroiditis of right eye.	March 8, 1865, division of ciliary muscle, right eye. Surg. J. S. Hildreth, U. S. V.	Discharged June 17, 1865; affected with granular ophthalmia; pens'd; blind in left eye.
55	Plowman, A. J., Pt., A, 6th Maryland, age 27.	Pterygium, double at internal angle of either eye.	Dec. 11, 1863, displacement right eye by Desmarres's process. Feb. 11, 1864, same operat'n on left eye, using one stitch only to maintain position. Surg. J. S. Hildreth, U. S. V.	March 15, 1864, recovery; about ⅔ disappeared from right eye; left eye much more satisfactory owing to absence of second stich.
56	Scheming, A., Pt., G, 8th Vet. Reserve Corps, age 20.	Purulent ophthalmia with chemosis of both eyes.	Aug. 29, 1864, division of ciliary muscle, left eye; abscess; cornea finally sloughed away. Jan. 7, '65, staphyloma excised. Aug. 23, '65, iridectomy of right eye. Surg. J. S. Hildreth, U. S. V.	Discharged Aug. 26, 1866, and pensioned; no vision in left eye; right eye affords enough sight to enable him to go about alone.
57	Shafer, W., Pt., F, 123d Illinois, age 39.	Purulent ophthalmia, large chemosis of both eyes.	Sept. 2, division of ciliary muscle of right eye. Surg. J. S. Hildreth, U. S. V.	Discharged March 6, 1865; pens'd. Right eye totally blind, left eye can only discern light.
58	Smith, A., Pt., F, 8th Veteran Reserve Corps, age 25.	Nebulous condition of cornea of both eyes.	March 8, 1865, iridectomy of both cornea. Surg. J. S. Hildreth, U.S.V.	Disch'd May 24, '65. Sight improv'g, bids fair to become good enough to enable him to read fine print.
59	Street, G. S., Pt., M, 1st Conn. Artillery, age 34.	Excessive myopia of both eyes	June 15, Hancock's operation, right eye. Surg. J. S. Hildreth, U. S. V.	Myopia disappeared. Disch'd Dec. 13, 1863; pensioned. Amblyopia; right eye useless, sight feeble.
60	Sullivan, J., Pt., G, 2d Mass. Cavalry, age 21.	Staphyloma of cornea and iris, result of ulceration.	Feb. 2, 1864, excision of tumor with staphyloma. Surg. J. S. Hildreth, U. S. V.	Disch'd August 12, 1864. Loss of vision of left eye; sight of right eye impaired; pensioned.
61	Tibbitts, W., Pt., H, 147th N. York, age 25.	Staphyloma of cornea of left eye; catarrhal ophthalmia.	June 1, cornea removed by Surg. J. E. McDonald, U. S. V.	Discharged July 19, 1865; pens'd. Loss of sight of left eye.
62	Toomey, J., Pt., G, 18th Missouri, age 21.	Internal strabismus	May 6, 1865, Graefe's operation, separating digitations of tendons from sclerotic. Two-thirds of error corrected. Surg. J. S. Hildreth, U.S.V.	Operation on other eye will correct deformity. Discharged July 24, 1865.
63	Ulrich, H., Pt., K, 63d Illinois, age 25.	Purulent ophthalmia; large chemosis of both eyes.	Sept. 25, 1864, division of ciliary muscles of both eyes. Feb. 11, '65, excision staphyloma, left eye. Surg. J. S. Hildreth, U. S. V.	Discharged April 27, 1865. Loss of sight left eye, cornea of right eye nebulous; pensioned.
64	Unknown	Chronic inflammation of lachrymal sac, with mucous discharge.	May, 1863, sac opened and tent introduced to obliterate sac and set up new action in lining membrane. Surg. H. Culbertson, U. S. V.	Doing well.
65	Unknown	Chronic inflammation of lachrymal sac attended with mucous discharge.	May —, same operation as in case 64. Surg. J. H. Culbertson.	Doing well.
66	Van Curen, C., Pt., E, 17th Wisconsin, age 46.	Staphyloma cornea; sight obliterated.	June 27, division of cornea with cataract knife, removal of lower section with scissors. Surg. H. C. Culbertson, U. S. V.	Active conjunctivitis and corneitis resulted. Duty Nov. 28, 1864; pensioned. Loss of left eye and chronic ophthalmia right.
67	Van Tassel, E., Pt., A, 120th New York, age 19.	Fistula of lachrymal's left eye; abscess at internal canthus.	Feb. 5, 1864, introduction of style by the usual method. A. A. Surg. J. M. McGrath.	March 6, active inflam. set in; style removed, tinct. chlor. iron injected. Discharged July 31, 1865.
68	Vosburg, J., Pt., K, 3d Minnesota, age 43.	April 6, 1864, purulent ophthalmia; large chemosis of both eyes.	Oct. 7, division ciliary muscle, right eye. Surg. J. S. Hildreth, U. S. V.	Cornea sloughed away. Discharged June 13, '65; sight of right eye lost, central nebulosity of left; pens'd.
69	Welch, J., Pt., B, 17th Michigan, age 43.	Large ulceration of cornea following chronic ophthalmia; sloughing.	Dec. 31, '64, divis. ciliary muscle, left eye. Surg. J. S. Hildreth, U. S. V.	Discharged June 28, 1865; pens'd. Sight of left eye lost.
70	Welsh, P., Pt., D, 28th Kentucky, age 35.	Entropion left eye, upper lid	Dec. 30, 1863, excision of oval piece of integument sutures. A. A. Surg. G. P. Hackenburg.	Duty, and discharged Feb. 8, 1865; pensioned for wounds.
71	Whipple, H. L., Pt., E, 77th New York, age 30.	Cataractous lens dislocated into ant. chamber of left eye; blow, September, 1862.	Dec. 29, 1862, lens extracted by superior section of coroca. Surg. D. P. Smith, U. S. V.	Disch'd March 23, 1863. Very tolerable vision; pension claim rejected. *Spec.* 1195.
72	Williamson, J., Pt., D, 174th New York, age 20.	Symblepharon left lower lid with cornea.	Nov. 2, '63, symblepharon dissect. up, conjunctiva of globe drawn together by sutures A.A.Surg. J.H. Hinton.	Duty January 6, 1865.
73	Wycoff, D. E., Serg't, F, 108th New York, age 20.	Anchyloblepharon both eyes from inflammation of lids.	Jan. 25, 1864, separation of lids from globe of right eye with probe-pointed scissors. Feb. 24, same operation on left eye. Surg. J. S. Hildreth, U.S.V.	Recovery, with ability to use eyes and read some. Disch'd Aug. 12, 1864; pensioned. Died April 9, 1866; phthisis pulmonalis.
74	Young, A. W., Serg't, L, 12th Tennessee Cavalry, age 29.	Large central leucoma both eyes, result of purulent ophthalmia; only a small part of each cornea remained transparent.	July 27, 1865, iridectomy both eyes by process of déchirement. Aug. 25, operation on left eye to enlarge pupil. Surg. J. S. Hildreth, U. S.V.	Vision of both eyes improving. Discharged October 20, 1865; pens'd. Nearly blind.
75	Curtis, J., Pt., E, 12th Indiana, age 42.	Sarcoma, right eye entirely destroyed, inflamed, ulcerated, and protruding from orbit.	May 15, 1865, whole diseased eye removed with bistoury. A. A. Surg. E. Seyffarth.	No pain after operation. June 30, eye healed. Died July 5, 1865; debility.
76	Wolf, J. H., Musician, E, 12th Penn. Reserves, age 26.	Pterygium, double	Dec. 11, 1863, displacement of pterygium, right eye. Desmarres's method. Surg. J. S. Hildreth, U. S. V.	Doing well; injured in a street affray and died December 27, 1863.

OPERATIONS ON THE MOUTH AND ITS APPENDAGES.—Three plastic operations for disease have been detailed in the *First Surgical Volume.*[1] One operation for hare-lip will be added:

CASE 1016.—Private Morell Seely, Co. F, 103d Ohio, aged 21 years, was admitted into Cumberland Hospital, Nashville, March 7, 1864, with gunshot wound of left leg, middle third, with injury to tibia. Patient also had congenital hare-lip. On March 15, 1864, Surgeon C. McDermont, U. S. V., operated for hare-lip, without anæsthesia. Two interrupted sutures, one uniting mucous membrane on inner border of lip, used with dressings of adhesive plaster. Union by first intention within five days; patient fed on liquid food. The wound of the leg did well. The patient recovered and was furloughed April 13, 1864.

OPERATIONS ON THE AIR PASSAGES.—To the six cases of laryngotomy for disease, recorded on page 417 of the *First Surgical Volume*, should be added a fatal operation performed for sore throat following typhoid fever, making seven cases of this operation with only one recovery:

CASE 1017.—Private Samuel Mitchell, Co. C, 12th Infantry, was admitted into hospital No. 1, Frederick, September 19, 1862. Acting Assistant Surgeon W. W. Keen, jr., reported: "Had had typhoid fever followed by sore throat. On October 5th, 3 P. M., the respiration became somewhat embarrassed and grew rapidly worse, till at 4 P. M. Dr. G. L. Potter, the officer of the day, was hurriedly summoned. The neck was observed to be swollen, especially on the right side; there was great dyspnœa, both in inspiration and expiration, coldness of the extremities, and insensibility. Laryngotomy, on examination of the epiglottis, was immediately resolved upon, but the patient revived scarcely at all, although the respiration through the artificial opening was free, and in about fifteen minutes ceased to breathe. *Post-mortem* twenty-four hours after death: The tonsils are deeply eroded, the epiglottis erect and firm, not from œdema but from effusion of lymph about the vocal cords. There is a marked plastic effusion, especially on the right side. The lungs are congested and somewhat filled with œdema; other organs healthy, save Peyer's patches, which are ulcerated to some extent."

OPERATIONS ON THE CHEST AND ABDOMEN.—For the cases of thoracentesis, herniotomy, and paracentesis, the reader is referred to pp. 573–598 of the *First*, and pp. 187–191 of the *Second Surgical Volume.*

OPERATIONS ON THE GENITO-URINARY ORGANS.—With the exception of ten instances of removal of testes, the operations on these parts have been fully discussed in the *Second Surgical Volume.*[2] Two of the ten cases proved fatal:

CASES 1018–1027.—*Removals of the testes.*—Private J. B—, Co. F, 77th New York, age 23; bruise of right testicle against pommel of saddle, September 1, 1864. Testicle and spermatic cord greatly enlarged; three fistulous openings through scrotum discharging pus. December 10th, right testicle removed by Acting Assistant Surgeon H. Pearce. Returned to duty March 19, 1865.—Private *J. S. D*—, conscript, C. S. A., age 33. October 28, 1863, incision at superior portion of scrotum, testicle forced through the aperture and exscinded by himself. November 2d, serious hæmorrhage, which recurred on November 6th, when artery was ligated. Furloughed November 23, 1863.—Private E. G—, Co. H, 30th Illinois, age 24. January 8, 1864, excision of left testicle by Assistant Surgeon W. Feland, 30th Illinois, on account of scirrhus. Gangrene, secondary hæmorrhage from spermatic artery. June 30th, wound nearly healed and doing well. Mustered out September 8, 1864.—Lieutenant G. W. H—, 173d Ohio, age 28; sarcocele of right testicle of nine months' duration; tumor a little larger than an ordinary goose egg. February 6, 1865, testicle removed by Acting Assistant Surgeon J. A. Hall. Mustered out May 15, 1865.—Private D. P. H—, Co. E, 30th Colored Troops, age 20; chronic orchitis; right testicle much enlarged and painful. Testicle removed and spermatic artery tied by Acting Assistant Surgeon O. Shittler. Discharged July 31, 1865.—Private J. M. J—, Co. D, 146th New York, age 24; injury to right testicle by fall from horse. Excision of right testicle. Discharged September 25, 1865.—Captain G. McP—, 8th Tennessee Cavalry, age 36; cystic sarcocele; right testicle enlarged to the size of a goose egg. July 7, 1864, right testicle removed by Surgeon J. E. Herbst, U. S. V. Returned to duty August 10, 1864.—W. S—, colored civilian, age 50; left testicle enlarged to the size of a small cocoanut; dragging pain when walking. November, 1864, removal of left testicle by Assistant Surgeon S. J. Bumstead, 29th Illinois. The organ when removed weighed two and a quarter pounds. It was contributed to the Army Medical Museum by the operator, and is numbered 3654 of the *Surgical Section*. The patient recovered.—Private J. C—, Co. B, 3d East Tennessee Vols.; cystic enlargement of left testis. March 29, 1864, extirpation of left testicle by Assistant Surgeon B. E. Fryer, U. S. A. Erysipelas attacked the parts, extending to the abdomen. Died May 31, 1864, of peritonitis.—Captain E. D. L—, 43d Wisconsin, age 32; sarcocele of right testicle, the result of injury. March 16, 1865, removal of right testicle by Surgeon J. E. Herbst, U. S. V. Furloughed April 9, 1865. Died June 2, 1865, cause not stated.

[1] Cases of E. E. Sadler, Co. C, 9th Iowa Cavalry, p. 369; H. Kennedy, citizen, p. 370; and Pt. C. Burgan, Co. B, Purnell Legion, p. 375.

[2] Cases of lithotomy, page 282; operations for *fistula ani*, page 321; operations for removal of piles, page 322; operations for phymosis, page 343; external perineal urethrotomy, page 400; operations for hydrocele, page 420. Two cases of extirpation of the testes on account of contused wounds have been cited: P. W. Lucas, 1st Virginia Battalion, page 414, and Recruit H. D. Taner, page 418.

CHAPTER XII.

WOUNDS AND COMPLICATIONS.

The subject of injuries affecting the several regions of the body having been thoroughly discussed throughout the preceding portions of this history, the present chapter will be devoted to a general consideration of wounds and complications, in the course of which the endeavor will be made to use, to the best advantage, the large amount of material accumulated during the late war, illustrative of facts of general interest and of statistical value relating to wounds; of the nature, peculiarities, and effects of missiles and projectiles used in warfare; of the conditions affecting the course and result of wounds, with especial reference to the graver complications of secondary hæmorrhage, erysipelas, pyæmia, gangrene, and tetanus.

During the late war there were treated two hundred and forty-six thousand seven hundred and twelve (246,712) cases of wounds by weapons of war. Of these, two hundred and forty-five thousand seven hundred and ninety (245,790) were shot wounds, and nine hundred and twenty-two (922), or 0.37 per cent., were sabre and bayonet wounds. The average percentage of sabre and bayonet wounds in the European Wars during the last twenty years was 2.4, as shown in the following table:

TABLE CXIV.

Frequency of Sabre and Bayonet and Shot Wounds on Occasions named and from Authorities quoted.

OCCASIONS.	INJURIES.			Percentage of Sabre and Bayonet Wounds.
	Total.	Sabre and Bayonet.	Shot.	
English in the Crimean War, 1854–57 (MATTHEW[1])	10,129	158	9,971	1.5
French in the Crimean War, 1854–57 (CHENU[2])	26,811	818	25,993	3.0
French in the Italian War, 1859 (CHENU[3])	15,966	565	15,401	3.5
Austrians at Verona, 1859 (RICHTER[4])	18,521	543	17,978	2.9
Austrians at Montebello, 1859 (RICHTER[5])	281	54	227	19.2
Germans in Schleswig-Holstein War, 1864 (LOEFFLER[6])	3,232	61	3,171	1.8
French in Mexico, 1864 (BINOT[7])	85	19	66	22.3
Six Weeks' War in Germany, 1866, Bavarians (RICHTER[8])	1,697	56	1,641	3.3
Six Weeks' War, 1866, Italians (CORTESE[9])	2,903	92	2,811	3.1
Six Weeks' War in Germany, 1866, Prussians and Austrians (RICHTER[10])	8,527	333	8,194	3.9
Franco-Prussian War, 1870–71, Germans (FISCHER[11])	54,268	786	53,482	1.4
Aggregates	142,420	3,485	138,935	2.4

In comparison with the large number of shot wounds, the number of sabre and bayonet wounds seems insignificant, offering a striking commentary upon the advance of

[1] MATTHEW (T. P.), *Medical and Surgical History of the British Army which served in Turkey and the Crimea, etc.*, London, 1858, Vol. II, pp. 257, 259. [2] CHENU (J.-C.), *Rapport au Conseil de Sant' des Armées, etc., pendant la Campagne d'Orient en* 1854–1855–1856, Paris, 1865, p. 627. [3] CHENU (J.-C.), *Statistique Méd. Chir. de la Campagne d'Italie en* 1859 *et* 1860, Paris, 1869, T. II; the figures here given were obtained from a compilation of the

modern military science, and showing that with the general adoption of long-range repeating fire-arms the sabre and bayonet are rapidly falling into disuse, and that the time is coming, if it has not already arrived, when these old and honored weapons will become obsolete;[1] and when such wounds from these sources will be regarded rather as incidents of battle than as the results of regular tactical manœuvres.

SABRE AND BAYONET WOUNDS.—Of the nine hundred and twenty-two (922) cases of these injuries reported in detail throughout the history, and grouped together in the following table, a large proportion had their origin in private quarrels or broils, or were inflicted by sentinels in the discharge of their duty:

TABLE CXV.

Summary of Nine Hundred and Twenty-two Sabre and Bayonet Wounds recorded during the American Civil War, 1861–65.

SEAT OF INJURY.	TOTAL NUMBER OF CASES.	SABRE.					BAYONET.				
		Cases.	Recoveries.	Fatal.	Undetermined Results.	Mortality.	Cases.	Recoveries.	Fatal.	Undetermined Results.	Mortality.
Sabre and Bayonet Wounds of Scalp	300	282	276	6	.....	2.1	18	16	2	.....	11.1
Sabre and Bayonet Fractures of Cranium	55	49	36	13	.....	26.5	6	1	5	.....	83.3
Sabre and Bayonet Wounds of Face	64	37	33	1	3	2.9	27	22	1	4	43.4
Sabre and Bayonet Wounds of Neck	9	5	4	.....	1	.....	4	3	1	.....	25.0
Sabre and Bayonet Wounds of Chest	38	9	8	1	.....	11.1	29	18	9	2	33.3
Sabre and Bayonet Wounds of Abdominal Parietes	18	2	2	.....	.....	.....	16	16	.....	.....	.....
Penetrations of Abdominal Cavity without injuring Viscera	10	1	.....	1	.....	100.0	9	6	3	.....	33.3
Penetrations of Abdominal Cavity with injury to Viscera	7	4	2	2	.....	50.0	3	2	1	.....	33.3
Sabre and Bayonet Wounds of the Pelvis	9	1	1	.....	.....	.....	8	6	2	.....	25.0
Sabre and Bayonet Wounds of the Back	34	13	13	.....	.....	.....	21	21	.....	.....	.....
Sabre and Bayonet Flesh Wounds of Upper Extremities	149	80	75	1	4	1.3	69	61	1	7	1.6
Sabre and Bayonet Fractures of Clavicle or Scapula	7	4	4	.....	.....	.....	3	3	.....	.....	.....
Sabre and Bayonet Wounds of Elbow Joint	9	6	6	.....	.....	.....	3	3	.....	.....	.....
Sabre Wounds of Bones of Forearm	7	7	6	1	.....	14.2	.....	.....	.....	.....	.....
Sabre and Bayonet Flesh Wounds of Lower Extremities	198	22	22	.....	.....	.....	176	171	5	.....	2.8
Bayonet Wounds of the Knee Joint	7	.....	.....	.....	.....	.....	7	7	.....	.....	.....
Bayonet Wounds of the Metatarsals	1	.....	.....	.....	.....	.....	1	1	.....	.....	.....
Aggregates	922	522	488	26	8	5.0	400	357	30	13	7.7

The fatality of these wounds as indicated in the table is small, perhaps exceedingly so when it is considered that these injuries derive their importance from their tendency to excite inflammatory action in deep-seated tissues and cavities, with the danger of forma-

tabular statements on pp. 424 to 836 of the second volume of Dr. CHENU'S work; the summary on p. 849 of his work includes the injuries of a miscellaneous character, which have been eliminated in this calculation. [4] RICHTER (E.), *Chirurgie der Schussverletzungen im Kriege, etc.*, Breslau, 1874, I, Theil, I Abth., p. 905. [5] RICHTER, *loc. cit.*, p. 905. [6] LOEFFLER (F.), *General-Bericht über den Gesundheitsdienst im Feldzuge gegen Dänemark*, 1864, Erster Theil, Berlin, 1867, p. 36. [7] BINTOT, *Observations de Blessures de Guerre*, in *Rec. de Mém. de Méd. de Chir. et de Phar. Mil.*, 1866, 3e sér., T. XVI, p. 42. [8] RICHTER (E.), *loc. cit.*, p. 905. [9] CORTESE (F.), *Ulteriori ragguagli sulle perdite dell'escreito italiano sofferte nella campagna del* 1866, in *Annali Universali di Medicina*, Milano, 1868, Vol. CCV, p. 506. [10] RICHTER, *loc. cit.*, p. 905. [11] FISCHER (G.), *Statistik der in dem Kriege* 1870–71, *vorgekommenen Verwundungen und Tödtungen, etc.*, Berlin, 1876, p. 7. The total number of sabre and bayonet and shot wounds cited by FISCHER is 61,959; but this number includes 7,691 killed on the battlefield, which have been dropped in this tabulation, as the killed are not included in any of the authorities quoted.

[1] The following is an extract from a letter on file in this office from General ROBERT WILLIAMS, Assistant Adjutant General, in reply to inquiries made by the late Surgeon G. A. OTIS, U. S. A.:

"ADJUTANT GENERAL'S OFFICE, WASHINGTON, *March* 24, 1868.

"DEAR DOCTOR: Yours of the 18th instant, containing certain queries, has been received; in reply to your questions I would say . . . hand to hand skirmishes between cavalry during the late rebellion were not at all infrequent; but the pistol and carbine were more commonly relied upon. Sabre wounds were slight and generally harmless, as the sabre was in few instances sharpened, and the men were almost totally uninstructed in its use. Hand to hand combats between cavalry mounted and infantry were, I believe, of rare occurrence; in almost every case the cavalry was dismounted and fought as infantry. . . . Owing to the present long-range and repeating weapons, with which both cavalry and infantry are now armed, it is my belief that the lance may be regarded as obsolete and that the sabre will soon become so. Yours truly, ROBERT WILLIAMS, *Ass't Adjutant General.*"

tion and confinement of pus; from the chances of injury to blood-vessels, nerves, and viscera, and the possibility of pyæmia, gangrene, and tetanus.

As might be anticipated, wounds by the sabre involve chiefly such parts of the body as are especially exposed to blows in the ordinary use of this weapon; thus injuries of the head and upper extremities are more largely represented, while wounds from the bayonet show a decided preponderance in the lower extremities.[1]

Wounds from sabre blows[2] were not of a grave character, except in cases involving the cranial cavity, where the mortality attained its highest percentage. Seven cases recorded in previous chapters of the history show fractures of one or both bones of the forearm by sabre blows; in one case primary, and in another secondary amputation became necessary.[3] One fatal case of tetanus is reported as following an incised sabre fracture of the cranium; also one case of pyæmia from a similar cause. Epilepsy, insanity, loss of vision and hearing, and impairment of mental faculties seem to have been among the remoter effects of injuries of the cranium from this cause.

The fatality of bayonet wounds exceeds that of sabre wounds by 2.7 per cent., and is chiefly due to injuries of viscera and large blood-vessels. The heart, lungs, diaphragm, liver, stomach, jejunum, and spleen are noted as having been punctured; and of the blood-vessels, the common iliac, femoral, internal pudic, and brachial were involved.

The fatal cases of bayonet wounds of the lower extremities, five in number, resulted from gangrene in three cases, and from primary hæmorrhage and pyæmia in one instance each. The median and sciatic nerves were lacerated in two cases, and the penis punctured in one. No case of tetanus is reported as following a bayonet wound.

SHOT WOUNDS.—The consideration of generalities on shot wounds, their nature, frequency, fatality, and principal complications will be preceded by a tabular summary of all shot wounds of which records are found in this Office. In the introductory memorandum of the *Second Surgical Volume* and in the various sections throughout the work the total number of wounds of the portions of the body under consideration, so far as known at the time, were indicated. Since then additional reports and records of hospitals, especially field hospitals, frequently subjected to the varying fortunes of a successful or unsuccessful campaign, records which in some instances were supposed to have been lost or destroyed, have been received at this Office, as the work on the surgical history progressed, increasing somewhat the total number of injuries. There undoubtedly remain, even at the present time, quite a number of casualties of which there are no histories on file, especially of the early part of the war in 1861, when each regiment and sometimes each detachment of troops, before the establishment of base and general hospitals, continued to find shelter for its more seriously injured patients in tents or buildings temporarily occupied which offered no facilities for keeping records, and when volunteer officers and also enlisted men were allowed to proceed from the battle-fields to their homes to be treated by their family physicians. A few special reports of some of the most interesting of these cases have been received at this Office; but undoubtedly quite a large proportion failed to be recorded at all. Furthermore, after general engagements many circumstances interfered with the efforts of medical

[1] Of 522 sabre wounds, 368 were wounds of the head and 97 of the upper extremities, making a total of 465, or 89 per cent. of the whole number. Of 400 bayonet wounds, 184, or 46 per cent., were in the lower extremities.

[2] Examples have been cited in the *First Surgical Volume*, on pp. 1 to 30, of sabre wounds of the head; on p. 322, of the face; on p. 399, of the neck; in the *Second Surgical Volume*, on pp. 3, 4, of the abdominal parietes; on p. 32, of simple perforations of the abdominal cavity without visceral injury; on pp. 61, 62, of the small intestines; on p. 76, of the large intestines; on p. 129, of the liver; on p. 429, of the back; on pp. 435, 436, of the upper extremities; on p. 473, of the clavicle and scapula; on pp. 828, 829, of the elbow joint; and in the *Third Surgical Volume*, on p. 7, of sabre flesh wounds of the lower extremities.

[3] CASES: 1845, 1846, on page 919, *Second Surgical Volume*, of Privates William Billows and Corwin Davis.

officers to obtain accurate details of the number of wounded, and no record could be made of the wounded among those reported as captured and missing. The shot wounds now recorded number two hundred and forty-five thousand seven hundred and ninety (245,790). They have been grouped in three tables, the first containing shot wounds of the head, face, and neck, the second those of the trunk, and the third those of the extremities:

TABLE CXVI.

Tabular Statement of the Shot Wounds of the Head, Face, and Neck recorded during the American Civil War.

NATURE AND SEAT OF INJURY.		RESULTS. Totals.	Recoveries.	Deaths.	Undeterm'd Results.	Percentage of Fatality.
SHOT INJURIES OF THE HEAD.[1]	Flesh Wounds of the Scalp	7,739	4,865	162	2,712	3.2
	Contusions of the Bones of the Skull	328	273	55	.....	16.7
	Fractures of the Outer Table	138	128	10	.....	7.2
	Fractures of the Inner Table	20	1	19	.....	95.0
	Fissures of the Bones of the Skull	19	12	7	.....	36.7
	Fractures without known depression	2,911	960	1,826	125	65.5
	Fractures with depression	364	232	129	3	35.7
	Penetrating Fractures	486	84	402	.....	82.7
	Perforating Fractures	73	17	56	.....	76.7
	Smash	9	.....	9	.....	100.0
	Contre-Coup	2	1	1	.....	50.0
	Total Shot Injuries of the Head	12,089	6,573	2,676	2,840	28.9
SHOT INJURIES OF THE FACE.[2]	Flesh Wounds of the Face	4,914	3,706	58	1,150	1.5
	Fractures of the Bones of the Face	4,502	3,700	404	398	9.8
	Total Shot Injuries of the Face	9,416	7,406	462	1,548	5.8
SHOT INJURIES OF THE NECK.[3]	Flesh Wounds of the Neck	4,789	3,450	570	769	14.1
	Wounds injuring Trachea	41	19	21	1	52.5
	Wounds injuring Larynx	30	10	10	10	50.0
	Wounds injuring Pharynx	13	5	7	1	58.3
	Wounds injuring Œsophagus	10	4	6	.....	60.0
	Wounds injuring Trachea and Larynx	4	4	.....	.....	.....
	Wounds injuring Trachea and Pharynx	2	2	.....	.....	.....
	Wounds injuring Trachea and Œsophagus	2	.....	2	.....	100.0
	Wounds injuring Larynx and Œsophagus	1	1	.....	.....	.....
	Wounds injuring Pharynx and Œsophagus	1	1	.....	.....	.....
	Wounds injuring Pharynx and Larynx	2	.....	2	.....	100.0
	Total Shot Injuries of the Neck	4,895	3,496	618	781	15.0

Aside from flesh wounds of the scalp, and slighter forms of contusion and fracture, shot wounds of the head were of a very fatal character, the ratio of mortality following closely upon the degree of injury inflicted upon the brain and its appendages. Fractures of the inner table of the cranial bones were of difficult diagnosis, and could in general be substantiated only after *post-mortem* inspection. Perforating gave slightly more favorable results than penetrating fractures; this may have been due to the fact that less vital portions were involved, or that these wounds were more satisfactorily treated, being freed from the complications attending the lodgement of foreign bodies. The results of shot injuries of the face confirm the opinion that these wounds commonly do well, notwithstanding the amount of destruction apparent at the time of injury. The records have furnished sufficient

[1] See *First Surgical Volume*, p. 308, TABLE VII. [2] See *First Surgical Volume*, p. 382, TABLE XIV. [3] See *First Surgical Volume*, p. 414, TABLE XVII.

material, already alluded to in a previous chapter, to show a remarkable degree of success in the treatment of such cases. The high mortality of shot wounds of the neck is almost necessarily to be expected from lesions of parts of great vital importance, placed in close relation with the great nervous and vascular trunks found in this region.

TABLE CXVII.

Tabular Statement of the Shot Wounds of the Spine, Chest, Abdomen, Pelvis, and Back recorded during the American Civil War.

NATURE AND SEAT OF INJURY.		Totals.	Results.			Percentage of Fatality.
			Recoveries.	Deaths.	Undetermined Results.	
SHOT WOUNDS OF THE SPINE	Fractures of Cervical Vertebræ	91	27	63	1	70.0
	Fractures of Dorsal Vertebræ	137	50	87	.....	63.5
	Fractures of Lumbar Vertebræ	149	79	66	4	45.5
	Fractures of Cervical and Dorsal Vertebræ	2	1	1	.....	50.0
	Fractures of Dorsal and Lumbar Vertebræ	3	.....	3	.....	100.0
	Fractures of Vertebræ, region not stated	260	122	129	9	51.3
	Total Shot Injuries of the Spine	642	279	349	14	55.5
SHOT WOUNDS OF THE CHEST	Flesh Wounds of the Chest	11,549	10,778	113	658	1.0
	Fractures of Ribs	446	362	68	16	15.8
	Penetrations of the Cavity of the Chest	8,269	2,781	5,192	296	65.1
	Total Shot Injuries of the Chest	20,264	13,921	5,373	970	27.8
SHOT WOUNDS OF THE ABDOMEN	Flesh Wounds of the Abdomen	4,469	2,881	253	1,335	8.0
	Contusions of the Abdomen	238	120	5	113	4.0
	Injuries to Viscera without external Wound	41	21	20	.....	48.8
	Penetrations without Visceral injuries	19	12	7	.....	36.8
	Wounds of the Stomach	79	19	60	.....	75.9
	Wounds of the Intestines	653	118	484	51	89.4
	Wounds of the Liver	173	62	108	3	63.5
	Wounds of the Spleen	29	2	27	.....	93.1
	Wounds of the Pancreas	5	1	4	.....	80.0
	Wounds of the Kidney	78	26	51	1	66.2
	Wounds of the Blood-vessels, Omentum, and Mesentery	54	7	47	.....	87.0
	Wounds of the Supra Renal Capsules	1	.....	1	.....	100.0
	Penetrations, extent not determined	2,599	186	2,226	187	92.2
	Total Shot Injuries of the Abdomen	8,438	3,455	3,293	1,690	48.7
SHOT WOUNDS OF THE PELVIS	Fractures of the Bones of the Pelvis	1,494	918	544	32	37.2
	Penetration of the Cavity without injury to Viscera	38	25	13	.....	34.2
	Wounds of the Bladder	185	89	96	.....	51.8
	Wounds of the Prostate	8	4	4	.....	50.0
	Wounds of the Rectum	103	59	44	.....	42.7
	Wounds of the Nerves and Blood-vessels	179	94	85	.....	47.4
	Wounds of the Penis	309	268	41	.....	13.2
	Wounds of the Urethra	105	83	22	.....	21.9
	Wounds of the Testes	586	520	66	.....	11.2
	Wounds of the Spermatic Cord	32	30	2	.....	6.6
	Wounds of the Genital Organs indefinitely described	120	104	13	3	11.1
	Total Shot Injuries of the Pelvis	3,159	2,194	930	35	29.7
SHOT WOUNDS OF THE BACK	Reported as Shot Wounds of the Back	3,486	3,024	172	290	5.3
	Specified as over the Posterior Thoracic Region	990	886	51	53	5.4
	Specified as over the Posterior Abdominal Region	698	620	51	27	7.6
	Specified as wounds of Hips, Buttocks, Nates, etc	7,507	6,353	526	628	7.6
	Total Shot Injuries of the Back	12,681	10,883	800	998	6.9

The great fatality of undoubted shot penetrations of the abdomen alluded to on page 204 of the *Second Surgical Volume* is apparent in the preceding table; of three thousand four hundred and eighty-nine (3,489) determined instances of such lesions, three thousand and thirty-five (3,035) had fatal terminations, a mortality rate of 86.9 per cent., exceeding that of the shot fractures of the cranium with penetration of the brain, which, as indicated in TABLE CXVI, was 82.7 per cent.; even the large fatality of shot fractures of the hip, 84.7, in the succeeding table, is in some measure due to complications with injuries of the viscera of the abdominal cavity.

TABLE CXVIII.

Tabular Statement of the Shot Wounds of the Upper and Lower Extremities recorded during the American Civil War.

NATURE AND SEAT OF INJURY.		Cases.	Results.			Percentage of Fatality.
			Recoveries.	Deaths.	Undeterm'd Results.	
SHOT WOUNDS OF THE UPPER EXTREMITIES.	Flesh Wounds of the Upper Extremities[1] 54,729	54,801	53,095	1,634	.....	2.9
	Periarticular Wounds of Shoulder Joint[2] 72		66	6	.....	8.3
	Fractures of the Clavicle and Scapula[3]	2,280	1,936	314	30	13.9
	Fractures of the Bones of the Shoulder Joint[4]	1,378	916	449	13	32.8
	Fractures of the Bones of the Shoulder Joint in Confederate Army (excisions)[5]	201	32	43	126	57.3
	Fractures and Contusions of the Shaft of the Humerus[6]	8,245	6,249	1,639	357	20.7
	Fractures of the Bones of the Elbow Joint[7]	2,678	2,130	513	35	19.4
	Fractures of the Bones of the Elbow Joint in the Confederate Army (excisions)[8]	138	81	19	38	19.0
	Fractures and Contusions of the Bones of the Forearm[9]	5,194	4,636	482	76	9.4
	Fractures and Contusions of the Bones of the Wrist Joint[10]	1,496	1,292	193	11	12.9
	Fractures of the Bones of the Wrist Joint in the Confederate Army (excisions)[11]	13	13	.....	.....	.....
	Fractures and Contusions of the Bones of the Hand[12]	11,369	9,644	316	1,409	3.1
	Total Shot Wounds of Upper Extremities	87,793	80,090	5,608	2,095	6.5
SHOT WOUNDS OF THE LOWER EXTREMITIES.	Flesh Wounds of the Lower Extremities[13] 58,702	59,139	55,914	2,788	.....	4.7
	Periarticular Wounds of the Hip, Knee, and Ankle Joints[14] 437		305	132	.....	30.2
	Fractures of the Bones of the Hip Joint[15]	386	59	327	.....	84.7
	Contusions of the Shaft of the Femur[16]	162	120	42	.....	25.9
	Fractures of the Shaft of the Femur[17]	6,576	2,995	3,392	189	53.1
	Contusions of the Bones of the Knee Joint[18]	43	24	19	.....	44.1
	Fractures of the Bones of the Knee Joint[19]	3,355	1,542	1,800	13	53.8
	Contusions of the Bones of the Leg[20]	183	157	26	.....	14.2
	Fractures of the Bones of the Leg[21]	8,988	6,334	2,376	278	27.2
	Contusions of the Bones of the Ankle Joint[22]	11	8	3	.....	27.2
	Fractures of the Bones of the Ankle Joint[23]	1,711	1,239	457	15	26.9
	Contusions of the Bones of the Foot[24]	27	26	1	.....	3.7
	Fractures of the Bones of the Foot[25]	5,832	4,942	450	440	8.3
	Total Shot Wounds of Lower Extremities	86,413	73,665	11,813	935	13.8

With two exceptions the generally accepted rule in fractures of the extremities, that the ratio of fatality diminishes with increased distance of the injury from the trunk, is

[1] *Note* 1, page 435, *Second Surgical Volume.* [2] Page 502, *Second Surgical Volume.* [3] TABLE XVI, page 474, *Second Surgical Volume.* [4] On page 503, *Second Surgical Volume*, 505 shot fractures of the shoulder joint treated conservatively are accounted for. To these should be added 640 cases of excisions after fractures of the shoulder joint (not 670, as erroneously stated on page 519, as 245, not 215, were for fractures involving the humerus near the shoulder joint) and 203 instances of amputation following fractures of the shoulder joint. The total number of amputations at the shoulder was 852; but of this number only 203 were for fractures of the bones of the joint. The remaining 649 cases were: 621 for fractures of the arm (TABLE LV, p. 666), 17 for fractures of the elbow (TABLE CV, p. 829), 6 for fractures of the forearm (TABLE CXXIV, p. 922), 3 for fractures of the wrist (TABLE CXLI, p. 996), and 2 for fractures of the hand (TABLE CXLIV, p. 1019). [5] Page 601, *Second Surgical Volume.* [6] TABLE LV, p. 666, *Second Surgical Volume.* [7] TABLE CV, page 829, *Second Surgical Volume.* [8] TABLE CXIX, pp. 898-9, *Second Surgical Volume.* [9] TABLE CXXIV, page 922, *Second Surgical Volume.* [10] TABLE CXLI, page 996, *Second Surgical Volume.* [11] Pages 1012-13, *Second Surgical Volume.* [12] TABLE CXLIV, page 1019, *Second Surgical Volume.* [13] Pages 8-60, *ante.* [14] Pages 24-32, *ante.* [15] TABLE IX, page 65, *ante.* [16] TABLE XIX, page 170, *ante.* [17] TABLE XX, page 175, *ante.* [18] Pages 363-367, *ante.* [19] TABLE LII, page 367, *ante.* [20] Pages 427-432, *ante.* [21] TABLE LXI, page 432, *ante.* [22] Pages 577-578, *ante.* [23] TABLE LXXXVII, page 578, *ante.* [24] Pages 617-619, *ante.* [25] TABLE XCV, page 619, *ante.*

verified in this table. In the upper extremities the fractures of the wrist had a greater fatality than those of the forearm (12.9 and 9.4 per cent. respectively), and in the lower extremities the results of the injuries of the knee joint were slightly less favorable than those of the femur, the fatality rate being in the former 53.8, in the latter 53.1 per cent., although the difference 0.7 per cent. is very trifling. That the wounds of the joints are of a more serious nature than those of the long bones immediately above them has been shown in numerous tabular statements throughout the preceding volumes, yet the percentages of fatality do not seem to have been proportionally increased. But the joint wounds were far more frequently followed by excision and amputation, and it would seem therefore that the increased ratio of operation had tended to reduce the percentage of fatality.

Longmore[1] cites from Albinus, Liharzik, Marshall, and from measurements of the Pythian Apollo and Farnesian Hercules, the relative amounts of superficial area presented by the principal divisions of the human body, and gives as the mean of these measurements the following percentage of the whole target area of the body: For the head, face, and neck, 8.51 per cent.; for the trunk, 28.91; for the upper extremities, 21.14; for the lower extremities, 41.41. If battles were fought and decided on level and unobstructed ground we might find that the percentages of the injuries inflicted on the various sections of the human body would correspond with the proportional percentage of the area; but it is evident that the nature of the field of operations, whether fortified places or the open plain or rolling wooded districts, must necessarily change the relative regional frequency of injuries. Of the wounds that came under treatment in the American civil war, as shown in the following table, 10.77 per cent. were injuries of the head, face, and neck, 18.37 of the trunk, 35.71 of the upper extremities, and 35.15 of the lower extremities.

TABLE CXIX.

Table indicating Percentage of Fatality and Relative Frequency of Shot Wounds recorded during the War of the Rebellion.

SEAT OF INJURY.	Total Cases.	RESULTS.			Percentage of Fatality.	Relative Frequency.	
		Recoveries.	Deaths.	Undeterm'd Results.			
Shot Injuries of the Head	12,089	6,573	2,676	2,840	28.9	10.77	14.91
Shot Injuries of the Face	9,416	7,406	462	1,548	5.8		3.87
Shot Injuries of the Neck	4,895	3,496	618	781	15.0		1.99
Shot Injuries of the Spine	642	279	349	14	55.5	18.37	0.26
Shot Injuries of the Chest	20,264	13,921	5,373	970	27.8		8.24
Shot Injuries of the Abdomen	8,438	3,455	3,293	1,690	48.7		3.43
Shot Injuries of the Pelvis	3,159	2,194	930	35	29.7		1.28
Shot Flesh Wounds of the Back	12,681	10,883	800	998	6.9		5.16
Shot Injuries of the Upper Extremities	87,793	80,090	5,608	2,095	6.5	35.71	
Shot Injuries of the Lower Extremities	86,413	73,665	11,813	935	13.8	35.15	
Aggregates	245,790	201,962	31,922	11,906	13.6	00.00	

According to this tabular statement the injuries of the extremities form 70.86 per cent. of the total number of wounded, and the proportion of the wounds of these parts would therefore appear disproportionately large. But it must be borne in mind that the figures here given only constitute a portion of the injuries received, as the large number of killed are not included in these calculations. The records in this Office show the seat of

[1] LONGMORE (T.). *Gunshot Injuries*, London, 1877, page 595.

injury in only one thousand one hundred and seventy-three cases of soldiers killed on the battle-field. Of these, four hundred and eighty-seven (487) were of the head and neck, six hundred and three (603) of the trunk, thirty (30) of the upper extremities, and fifty-three (53) of the lower extremities. In the Introductory to the *First Surgical Volume*, at page XXVI, it has been stated that the total number of killed, according to the Adjutant General's Report, was not less than forty-four thousand two hundred and thirty-eight (44,238). Applying the proportions of the one thousand one hundred and seventy-three (1,173) cases, viz: four hundred and eighty-seven (487) of the head, six hundred and three (603) of the trunk, thirty (30) of the upper extremities, fifty-three (53) of the lower extremities, to this total of forty-four thousand two hundred and thirty-eight killed, we would have eighteen thousand three hundred and sixty-seven (18,367) killed from wounds of the head, twenty-two thousand seven hundred and forty-one (22,741) from injuries of the trunk, one thousand one hundred and thirty-one (1,131) from wounds of the upper extremities, one thousand nine hundred and ninety-nine (1,999) from casualties in the lower extremities. Adding to these the cases of wounded according to the above table, viz: twenty-six thousand four hundred (26,400) of the head, forty-five thousand one hundred and eighty-four (45,184) of the trunk, eighty-seven thousand seven hundred and ninety-three (87,793) of the upper extremities, eighty-six thousand four hundred and thirteen (86,413) of the lower extremities, we have a total of injuries according to regions of body, including killed and wounded, of forty-four thousand seven hundred and sixty-seven (44,767) head, sixty-seven thousand nine hundred and twenty-five (67,925) trunk, eighty-eight thousand nine hundred and twenty-four (88,924) upper extremities, eighty-eight thousand four hundred and twelve (88,412) lower extremities; or, according to percentages, of 15.44 per cent. injuries of the head, 23.42 per cent. injuries of the trunk, 30.66 per cent. injuries of the upper extremities, 30.48 per cent. injuries of the lower extremities, making a total of 61.14 per cent. of injuries of the extremities.

Whether we take into consideration the percentage of the injuries of the upper extremities derived from the total wounded and killed, 30.66 per cent., or that obtained from the number of soldiers treated for wounds only, 35.71, the regional proportion of these injuries is very large. The same is to be said of the relative frequency of the wounds of the head, face, and neck, amounting to 10.77 per cent. of the wounded and 15.44 per cent. of the wounded and killed. But the protection afforded to the lower extremities and the trunk in the many siege operations, by parapets, and in field operations, especially during the severe and extended campaign beginning with the battles of the Wilderness, Spottsylvania, Cold Harbor, and ending with the siege of Petersburg, by trenches, ditches, behind trees, etc., screened those parts to a large extent from injury, while the head and upper extremities were continually exposed to the practised eye of a vigilant foe.

The influence exerted by the nature of the military operations on the regional percentage of injuries is well illustrated in the next table, in which it has been attempted to give the proportions of the injuries of the head, face, and neck, the trunk, and the extremities, from the most reliable accounts of European and other campaigns. The percentages of the injuries of the head varies from 20.2 per cent. among the French in the Crimean campaign in 1854–57, to 6.4 per cent. in the Revolution in Paris in 1830; the percentage of the trunk from 31.2 in the New Zealand Campaign in 1863–65, to 9.3 in the Mutiny in India in 1859; the percentages of the upper extremities from 39.3 per cent. in the Russo-Turkish War, 1876–77, to 18.8 in the campaign in the Kabylie in 1854–57; and the

percentages of the lower extremities from 48.2 in the same campaign, to 27.1 in the New Zealand War in 1863–65, and it will be noted that the fluctuations are the largest in campaigns confined to a limited territory. But of the entire number of two hundred and sixteen thousand three hundred and forty-eight (216,348) cases here referred to, thirty-one thousand one hundred and eighty-four (31,184), or 14.4 per cent., were injuries of the head, face, and neck; forty-five thousand five hundred and eighty-three (45,583), or 21.1 per cent., injuries of the trunk; sixty-six thousand four hundred and seventy-five (66,475), or 30.7 per cent., injuries of the upper, and seventy-three thousand one hundred and six (73,106), or 33.8 per cent., injuries of the lower extremities, nearly approaching the percentages derived from the injuries of the American civil war.

TABLE CXX.

Tabular Statement of the Relative Frequency of Shot Wounds of the Different Regions of the Body.

OCCASIONS AND AUTHORITIES.	CASES.	HEAD, FACE, AND NECK.		TRUNK.		UPPER EXTREMITIES.		LOWER EXTREMITIES.	
		Cases.	Percentage.	Cases.	Percentage.	Cases.	Percentage.	Cases.	Percentage.
Revolution in Paris, 1830 (MÉNIÈRE,[1] JOBERT (DE LAMBALLE[2])	627	40	6.4	117	18.7	193	30.8	277	44.1
Revolution in Paris, 1848 (BAUDENS, HUGUIER, JOBERT (DE LAMBALLE[3])	413	46	11.1	77	18.7	116	28.1	174	42.1
Schleswig-Holstein War, 1848–51 (SIMON,[4] DJÖRUP[5])	6,355	949	14.9	1,006	15.8	1,804	28.4	2,596	40.9
Crimean War, 1854–57, English (MATTHEW[6])	9,971	2,000	20.1	1,500	15.0	3,089	31.0	3,382	33.9
Crimean War, 1854–57, French (CHENU[7])	25,993	5,263	20.2	4,937	19.0	8,238	31.7	7,555	29.1
Campaign in the Kabylie, 1854–57 (BERTHERAND)[8]	1,422	220	15.5	249	17.5	267	18.8	686	48.2
Mutiny in India, 1858–59 (WILLIAMSON[9])	558	60	10.8	52	9.3	212	38.0	234	41.9
Campaign in Italy, 1859, Austrian (DEMME[10])	17,095	2,050	12.0	3,750	21.9	6,047	35.4	5,248	30.7
Campaign in Italy, 1859, French (CHENU[11])	15,401	1,514	9.8	2,265	14.7	5,378	34.9	6,244	40.6
Campaign in New Zealand, 1863–65 (MOUAT[12])	48	8	16.7	15	31.2	12	25.0	13	27.1
French in Mexico, 1864 (BINTOT[13])	66	11	16.7	10	15.1	20	30.3	25	37.9
Schleswig-Holstein War, 1864 (LOEFFLER[14])	3,171	458	14.4	614	19.4	925	29.2	1,174	37.0
Austro-Prussian War, 1866, Germans (MAAS,[15] BIEFEL,[16] STROMEYER,[17] BECK[18])	2,282	218	9.5	410	18.0	591	25.9	1,063	46.6
Austro-Prussian War, 1866, Italians (CORTESE[19])	2,811	333	11.8	529	18.8	761	27.1	1,188	42.3
Revolt in Montenegro, 1869 (RIEDL and EBNER[20])	108	17	15.8	16	14.8	40	37.0	35	32.4
U. S. Army, 1865–70 (OTIS[21])	387	83	21.4	145	37.5	79	20.4	80	20.7
Franco-German War, 1870–71, Prussians (FISCHER[22])	53,482	7,880	14.7	8,835	16.5	17,795	33.3	18,972	35.5
Franco-German War, 1870–71, Bavarians (BECK[23])	4,344	611	14.1	772	17.8	1,174	27.0	1,787	41.1
Franco-German War, 1870–71, French (CHENU[24])	71,443	9,376	13.1	20,243	28.4	19,588	27.4	22,236	31.1
Russo-Turkish War, 1876–77 (TILING,[25] KADE[26])	371	47	12.7	41	11.1	146	39.3	137	36.9
Totals	216,348	31,184	14.4	45,583	21.1	66,475	30.7	73,106	33.8
War of the Rebellion in United States of America, 1861–65	245,739	26,400	10.7	45,184	18.4	87,793	35.7	86,413	35.1
Aggregates	462,087	57,584	12.5	90,767	19.6	154,268	33.3	159,519	34.5

The excessively large percentage of wounds of the hands and fingers, frequently noticed by writers on military surgery, was also observed in the American civil war. Of thirty-

[1] MÉNIÈRE (P.) (*L'Hotel-Dieu de Paris en Juillet et Aout*, 1830, Paris, 1830, pp. 273 to 339) records 272 cases; 33 of head and neck, 80 of trunk, 51 of upper and 108 of lower extremities. [2] JOBERT (A.-J. DE LAMBALLE) (*Plaies d'Armes à Feu*, Paris, 1833) records, according to the tabular statement of L. SERRIER (*Traité de la nature, des complications et du traitement, des plaies d'armes à feu*, Paris, 1844, p. 30), 7 cases of head and neck, 37 of trunk, 142 of upper and 169 of lower extremities; total 355. [3] *Des plaies d'armes à feu. Communications faites a l'Académie Nationale de Médecine*, Paris, 1849: BAUDENS (pp. 224 *et seq.*), head and neck 15, trunk 26, upper extremities 40, lower extremities 51; total, 132. HUGUIER (p. 131), head and neck 24, trunk 31, upper extremities 36, lower extremities 41; total 132. JOBERT (A.-J. DE LAMBALLE) (p. 150), head and neck 7, trunk 20, upper extremities 40, lower extremities 82; total 149. [4] SIMON (G.) (*Ueber Schusswunden*, Giessen, 1851, p. 3), wounds of head and neck 15, of trunk 24, of upper extremities 37, of lower extremities 80; total 156. [5] DJÖRUP (M.) (*Om den relative Hyppighed af de forskjellige Skudsaar efter deres Sæde, og om deres Dödelighedsforhold*, in *Hospitals-Meddelelser*, Kjöbenhavn. 1852, Bind V, pp. 360–363), head and neck 934, trunk 982, upper extremities 1,767, lower extremities 2,516; total 6,199. [6] MATTHEW (T. P.) (*Medical and Surgical Hist. of the British Army, etc., in the years* 1854–55–56, London, 1858. Vol. II. pp. 257, etc.), and MCLEOD (G. H. B.) (*Notes on the Surgery of the War in the Crimea*, London, 1858. p. 414). [7] CHENU (J.-C.) (*Rapport, etc., pendant la Campagne d'Orient en* 1854–55–56. Paris, 1865. p. 657). LONGMORE (*Gunshot Injuries*. London, 1877. p. 607) erroneously cites the number of shot injuries of the lower extremities among the French in the Crimean War as 11,413, and of the upper extremities as 8,803; these numbers include shot

three thousand and sixty-four (33,064) instances of fracture and contusion of the upper extremities, including the articular portions of clavicle and scapula, eleven thousand three hundred and sixty-nine (11,369), or above one-third, were fractures of the bones of the hands and fingers. It has already been stated in *Note* 4, on page 435 of the *Second Surgical Volume*, that 27.8 per cent., or over one-fourth of the fifty-four thousand seven hundred and twenty-nine (51,729) shot flesh wounds of the upper extremities, were flesh wounds of the hand. It is possible that this large percentage is due to the increased exposure of the hand from almost constant movements over a considerable area, thus increasing the chances of intercepting missiles in their flight.

DEFINITION OF SHOT INJURIES.—All injuries caused directly or indirectly by missiles and projectiles impelled by the force of gunpowder or other explosive compounds have been included in the term "shot" injuries. They differ from the accidents common to ordinary life not so much in their essential character as in the peculiarity of the conditions and circumstances attending them, and on this account invite especial attention to the producing causes, to the dangers and complications liable to arise in their course, and to their management and treatment under conditions generally less favorable than are found in the practice of civil surgery.

A gunshot wound is essentially a contused wound, yet the character of the missile and the circumstances relating to the individual at the time of injury may impress upon it the additional features belonging to incised, lacerated, and penetrating wounds. In degree, it may range from trivial simplicity to all the terrible gravity of injury seldom seen but on the battle-field, yet in all its phases, simple or complicated, the application of the sound principles of general surgery forms the basis for treatment and marks the advance in the surgical science of the present day.

The great superiority of the rifled arm and cylindro-conoidal projectile, as compared with the smooth-bore arm and round ball, had been fully established by the experience of foreign nations in the great wars of Europe between the years 1848 and 1860. An interesting field of inquiry had thus been opened to the military surgeon regarding the modification of the nature of wounds resulting from the use of the improved firearms, and quite an extensive bibliography[1] on this subject had already been presented to the European pro-

as well as miscellaneous injuries. [8] BERTHERAND (A.) (*Campagnes de Kabylie*, Paris, 1862, p. 314). [9] WILLIAMSON (G.) (*Military Surgery*, London, 1863, pp. XXIV–XXVI). [10] DEMME (H.) (*Militär-Chirurgische Studien*, Würzburg, 1861, pp. 19, 20). [11] CHENU (J.-C.) (*Statistique Med.-Chir. de la Campagne d'Italie en* 1859 *et* 1860, Paris, 1869, T. II). The figures here given were obtained from a compilation of the tabular statements on pp. 424 to 836 of the second volume of Dr. CHENU'S work; the summary on p. 849 of his work includes the injuries of a miscellaneous character, which have been eliminated in this calculation. [12] MOUAT (*The New Zealand War of* 1863-64-65, in *Stat. San. and Med. Reports, for the year* 1865, London, 1867, Vol. VII, p. 477). [13] BINTOT (*Observations de blessures de guerre, etc.*, in *Recueil de Mémoires de Médecine de Chirurgie et de Pharmacie Militaires*, Paris, 1866, T. XVI. p. 42). [14] LOEFFLER (F.) (*General-Bericht über den Gesundheitsdienst im Feldzuge gegen Dänemark* 1864, Berlin, 1867, Erster Theil, p. 54). [15] MAAS (H.) (*Kriegschirurgische Beiträge aus dem Jahre* 1866, Breslau, 1870, p. 72), head and neck 12, trunk 41, upper extremities 50, lower extremities 109; total 212. [16] BIEFEL (R.) (*Im Reserve-Lazareth. Kriegschirurgische Aphorismen von* 1866, in LANGENBECK'S *Archiv für Klin. Chir.*, Berlin, 1869, B. XI. p. 371), head and neck 38, trunk 77, upper extremities 82, lower extremities 185; total 382. [17] STROMEYER (L.) (*Erfahrungen über Schusswunden im Jahre* 1866, Hannover, 1867, pp. 10, 11), head and neck 139, trunk 250, upper extremities 392, lower extremities 610; total 1,391. [18] BECK (B.) (*Kriegschirurgische Erfahrungen während des Feldzuges* 1866 *in Süddeutschland*, Freiburg I. Br., 1867, pp. 25, 26). [19] CORTESE (F.) (*Ulteriori ragguagli sulle perdite dell'esercito italiano sofferte nella campagna del* 1866, in *Annali Univ. di Med.*, Milano, 1868, Vol. CCV, p. 506). [20] RIEDL *und* EBNER (*Aus dem K. K. Truppen-Spital in Cattaro*, in *Wiener Med. Wochenschrift*, 1870, p. 155). [21] OTIS (G. A.) (*Circular* No. 3, War Department, Surgeon General's Office, Washington, 1871, p. 86). [22] FISCHER (G.) (*Statistik der in dem Kriege* 1870-71, etc., Berlin, 1876, p. 64) tabulates the seat of injury in 61,146 killed and wounded. To make a fair comparison with the statistics here cited it will be necessary to deduct the number of killed, 7,664, leaving 53,482 cases to be considered here. [23] BECK (B.) (*Chirurgie der Schussverletzungen*, Freiburg i. Br., 1872, p. 160). [24] CHENU (J.-C.) (*Aperçu hist. stat. et clin., etc., pendant la guerre de* 1870-71, T. I, pp. XXVII, XXVIII, XXIX, XXX). [25] TILING (G.) (*Bericht über* 124 *im Serbisch-türkischen Kriege im Baracken-Lazareth des Dorpater Sanitäts-Trains zu Swilainatz behandelte Schussverletzungen*, Dorpat, 1877, pp. 18–97), head and neck 10, trunk 21, upper extremities 31, lower extremities 62; total 124. [26] KADE (E.) (*Das temporäre Kriegslazareth der Anstalten der Kaiserin Maria im Kloster Mariahimmelfahrt bei Sistowa*, in *St. Petersburger Medicinische Wochenschrift*, 1877, No. 45, p. 383), head and neck 37 trunk 20, upper extremities 115, lower extremities 75; total 247.

[1] *Des plaies d'armes à feu. Communications faites a l'Académie Nationale de Médecine*, Paris, 1849. This volume contains articles by BAUDENS, ROUX, MALGAIGNE, AMUSSAT, BLANDIN, PIORRY, VELPEAU, HUGUIER, JOBERT (DE LAMBALLE), BÉGIN, ROCHOUX, and DEVERGIE. SIMON, *Ueber Schusswunden verbunden mit einem Berichte über die im grossherz. Militair-Lazareth zu Darmstadt behandelten Verwundeten vom Sommer* 1849,

fession. American surgeons had had but little opportunity to familiarize themselves with the active practice of military surgery, and were obliged to draw upon the authorities abroad for their early information, upon which was largely based the practice of the later surgery of the war.

FIREARMS AND THEIR PROJECTILES.—The reports of medical officers on the early engagements of the rebellion allude to the great diversity of missiles,[1] showing that every available weapon had been seized upon to arm the troops hastily thrown into the field; this was especially true of the Confederate troops. The northern forces were, perhaps, from the beginning, better, or at least more uniformly armed. Previous to the war a rifled musket adapted to the use of the minié projectile had been issued to the troops of the regular army, and distributed among the arsenals in the several sections of the country. Many of these fell into the hands of the Confederate government on the commencement of hostilities, and were appropriated to the use of their troops. Large numbers of arms of modern manufacture were purchased from abroad, principally of the Austrian, Belgian, and Enfield pattern, but inventive ingenuity, roused by the exigencies of war, soon superseded these by arms of domestic manufacture of great power and precision, among which breech-loading and magazine guns occupied prominent positions.[2]

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[1] *Appended Documents*, Part I, Vol. I, p. 7; Assistant Surgeon C. C. Gray, U. S. A., in report of services at the first battle of Bull Run, Va., July 18, 1861, says: "The greater number of our wounded were injured by round musket balls; the wounds inflicted on the Confederates were of a graver character, a large proportion of them being caused by conoidal rifle balls and canister shot." At p. 10, Surgeon C. F. H. Campbell, U. S. A., in record of services at Falling Waters, Va., July 2, 1861, says: "Wounds were all from gunshot and principally of the lower extremities, produced by round musket balls, buckshot, and in one or two instances by sphero-conoidal balls." At p. 15, Assistant Surgeon Philip C. Davis, U. S. A., in report relative to the battle of Wilson's Creek, Mo., August 9, 1861, says: "The fire to which our men was exposed was principally from musketry at short range. The Confederates used the minié rifle, while the Missouri State Guards and the irregular troops were armed with smooth-bore muskets, western rifles, and double-barreled shot-guns—the last being very effective at short range." At p. 12, Surgeon A. B. Crosby, U. S. V., in report of the engagement at Ball's Bluff, Oct. 21, 1861, says: "Their [Confederate] cartridges generally contained a round ball and three buckshot." At p. 12, Surgeon J. A. Lidell, U. S. V., in a report of the same engagement, says: "The enemy had no artillery, and most of the wounds of our men were inflicted by round musket balls." At p. 22, Surgeon H. P. Stearns, U. S. V., in a report of the battle of Belmont, Mo., Nov. 7, 1861, says: "The enemy used both the smooth-bore muskets with round ball, shot-guns with ball and buck, and also rifles with conoidal ball." At p. 31, Surgeon J. H. Brinton, U. S. V., in an account of the campaign of the Army of the Tennessee from February to June, 1861, including the battle of Shiloh, says: "The nature of the wounds caused by the fire to which the troops were exposed at the battle of Shiloh was of the most varied kind; at times they were exposed to that of artillery both light and heavy, from which almost every species of projectile was thrown—solid shot, round and conical, grape and canister, spherical case and shell; at other times the fire was from musketry. The small arms used by the enemy were the improved rifle throwing conical balls, the western rifle, and the old-fashioned smooth bore musket; the cartridges for the latter were generally composed of ball and buckshot."

[2] The collection of missiles in the Army Medical Museum at Washington indicates the progress made in the United States during the years of the war in the improvement of firearms. Though by no means complete the series of unused missiles and projectiles on exhibition affords an interesting and

For the purpose of this history, projectiles common to warfare may be divided into those used with small arms, as rifles, muskets, pistols, etc.; those discharged from heavy ordnance, as cannon, both rifled and smooth-bore, mortars, torpedoes, etc.; those which acted indirectly in the causation of injury, as splinters, stones, and fragments, detached or set in motion by projectiles in their flight, and missiles of an unusual or eccentric character. By far the larger number of shot injuries were inflicted by missiles from small arms, as indicated in the following table:

TABLE CXXI.

Table indicating the Seat of the Injury and Nature of the Projectile in the Cases of Shot Wounds reported during the War.

SEAT OF INJURY.	Solid Shot.	Fragments of Shell.	Grape, Canister, etc.	Conoidal Ball.	Round or Musket Ball.	Pistol or Buck-shot.	Explosive Musket Balls.	Nature of Missile not ascertained.	Total Cases.
Shot Flesh Wounds of Scalp	3	867	15	2,612	521	119	2	3,600	7,739
Shot Injuries of Cranium	9	567	27	1,437	506	66	3	1,735	4,350
Shot Flesh Wounds of Face	5	572	19	2,632	296	160	31	1,199	4,914
Shot Injuries of Facial Bones	1	190	20	1,845	309	65	9	2,063	4,502
Shot Flesh Wounds of Neck	3	171	11	1,982	343	84	.....	2,301	4,895
Shot Injuries of Spine	1	59	5	380	108	16	1	72	642
Shot Flesh Wounds of Thoracic Parietes	7	1,034	41	2,963	911	106	1	6,486	11,549
Shot Injuries of Ribs	4	35	7	259	68	.....	3	70	446
Shot Penetrating Wounds of Chest	10	148	23	2,873	1,789	134	3	3,289	8,269
Shot Flesh Wounds of Abdominal Parietes	10	270	21	1,836	375	51	.....	2,185	4,748
Shot Penetrating Wounds of Abdomen	3	64	8	1,217	217	67	1	2,113	3,690
Shot Injuries of Pelvis	4	78	15	738	269	13	.....	377	1,494
Shot Flesh Wounds of Genito-Urinary Organs	.....	47	6	589	144	37	.....	842	1,665
Shot Flesh Wounds of Back	5	1,798	50	7,260	1,080	140	2	2,346	12,681
Shot Flesh Wounds of Upper Extremities	18	1,660	180	22,023	2,868	625	27	27,400	54,801
Shot Injuries of Clavicle and Scapula	5	160	19	1,236	273	18	.....	569	2,280
Shot Injuries of the Bones of the Shoulder Joint	6	79	17	822	131	12	1	511	1,579
Shot Injuries of the Shaft of the Humerus	28	401	83	4,156	599	56	9	2,913	8,245
Shot Injuries of the Bones of the Elbow Joint	8	101	12	930	175	12	.....	1,578	2,816
Shot Injuries of the Radius and Ulna	14	206	25	1,863	391	32	7	2,656	5,194
Shot Injuries of the Bones of the Wrist	4	29	12	285	61	8	.....	1,110	1,509
Shot Injuries of the Bones of the Hand	8	279	47	2,699	549	74	2	7,711	11,369
Shot Flesh Wounds of the Lower Extremities	22	2,150	215	32,301	2,474	880	20	21,077	59,139
Shot Injuries of the Bones of the Hip Joint	1	20	4	185	104	6	.....	66	386
Shot Injuries of the Shaft of the Femur	28	164	63	2,496	567	19	4	3,397	6,738
Shot Injuries of the Bones of the Knee Joint	27	201	54	1,725	482	25	1	883	3,398
Shot Injuries of the Tibia and Fibula	79	593	86	4,968	634	81	.....	2,730	9,171
Shot Injuries of the Bones of the Ankle Joint	26	177	32	570	152	13	3	749	1,722
Shot Injuries of the Bones of the Foot	20	400	36	3,167	346	89	.....	1,801	5,859
Aggregates	359	12,520	1,153	108,049	16,742	3,008	130	103,829	245,790

The nature of the missile was ascertained in one hundred and forty-one thousand nine hundred and sixty one (141,961) cases, of which one hundred and twenty-seven thousand nine hundred and twenty-nine (127,929), or 90.1 per cent., were caused by missiles from small arms. The projectiles or missiles used with small arms resolved themselves into spherical balls, usually discharged from smooth-bore muskets, and those of an elongated form, adapted to rifled arms; the latter were either conical, cylindro-conoidal, or ovoid, varying in size, weight, and volume. The materials composing the missiles were usually lead

instructive study as to their varying forms, size, weight, and volume; this in connection with a series of over 500 projectiles extracted from wounds, together with the numerous preparations of fractures and wounded viscera in which the missiles producing the injuries have been preserved, affords opportunity for a comparison of the effects of the several missiles as well as for the study of the modification in gunshot wounds resulting from modern improvements in ordnance.

or lead hardened by an alloy of tin or antimony. The superiority of the elongated missile thrown from the rifled barrel over the spherical ball rests upon the fact that the elongated bullets usually have an expansive base, either plain or hollowed, which by the explosion of the charge is intended to fill the grooves of the rifle and give the projectile, as it is driven forward, rotation on its long axis, thus increasing its range and precision.

The cuts appended (FIG. 373) are designed to illustrate the general appearance of the more common and typical varieties of small-arm missiles used during the war by both contending parties:[1]

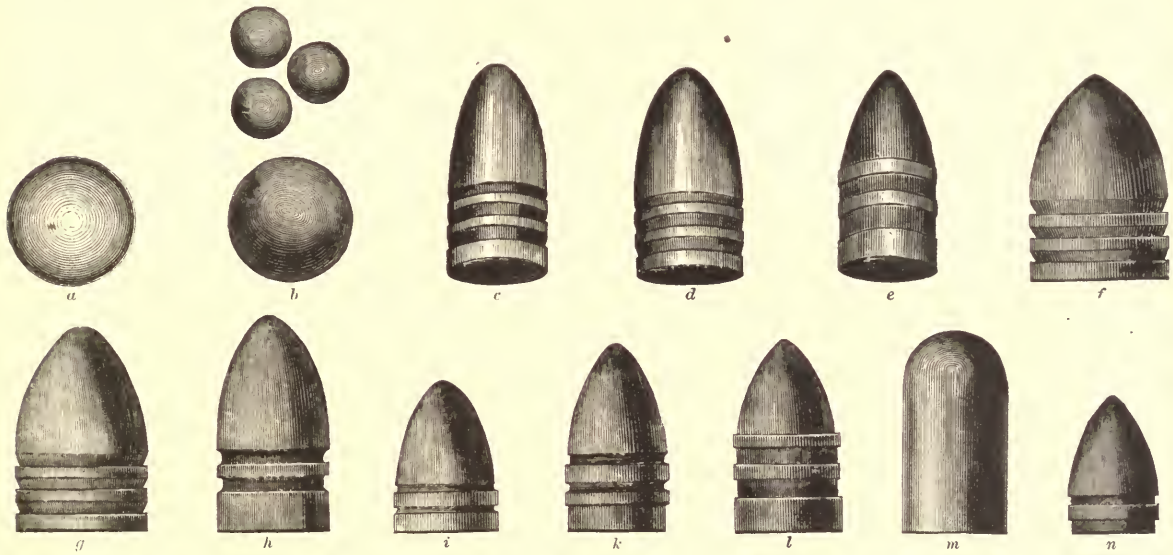


FIG. 373.—*a*. U. S. round musket-ball, calibre .69, weight 387 grains; *b*. Buck and ball, calibre .69, weight of ball 387 grains; *c*. Springfield rifled musket-ball, calibre .58, weight 500 grains; *d*. Enfield rifled musket-ball, weight 450 grains; *e*. Austrian rifle-ball, weight 460 grains; *f*. Elongated bullet, calibre .71, weight 675 grains; *g*. Elongated bullet, calibre .69, weight 760 grains; *h*. Elongated bullet, calibre .577, weight 517 grains; *i*. BURNSIDE rifle bullet, calibre .54, weight 400 grains; *k*. SPENCER rifle bullet, calibre .56, weight 434 grains; *l*. SHARP'S carbine ball, calibre .52, weight 450 grains; *m*. GREEN'S rifle ball, calibre .53, weight 575 grains; *n*. COLT'S army pistol bullet, weight 207 grains.

The large projectiles used with ordnance may also be classified under the headings spherical and elongated, the former being generally used with smooth-bore, the latter with rifled guns. Round shot are solid spheres of cast-iron varying in size and weight. A grape-shot (FIG. 374) is composed of a number of cast-iron balls (in the U. S. service generally nine) arranged in layers of three each and kept in position by a series of tables or plates which are held together by a vertical rod secured by nuts on each end; these missiles vary in calibre to fit guns of various sizes; at the discharge the several parts become separated and each part acts as a distinct projectile. They have a considerable range.

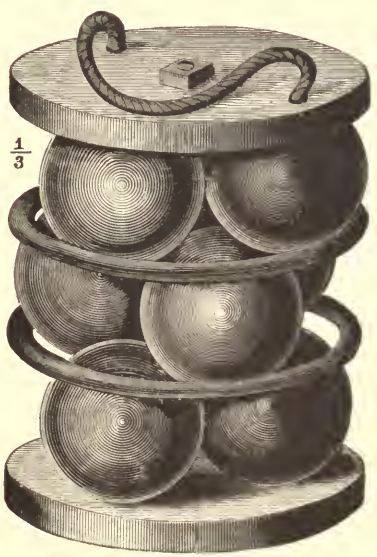


FIG. 374.—Grape-shot. *Spec.* 4596.

A canister shot is a projectile made by enclosing a large number of iron or leaden balls of less size than grape in a cylinder of tin, which is torn asunder at the discharge of the gun; the contents are scattered, assuming in their onward course something of the area of a cone; when used against masses of troops and at short range the canister shot is very destructive. Shrapnel shots are spherical or elongated.

[1] The number of varieties of missiles and projectiles on exhibition in the Army Medical Museum exceeds one hundred, embracing specimens of nearly all the latest inventions. Some of these were tested in actual warfare, while others, although constructed upon theoretical principles, were laid aside after a few trials; a detailed description of all these would be impracticable.

according to the character of the gun in which they are used, and when adapted to smooth bores they are designated spherical case shots. They are shells of considerable thickness, filled with musket balls consolidated into mass by a composition of sulphur and resin (Figs. 375, 376, 377), and are exploded by a charge of powder fitted into their interior, which is ignited, as may be desired, by a time or percussion fuze. They have a long effective range and are calculated to inflict serious injury by the great number of fragments set loose at their explosion.

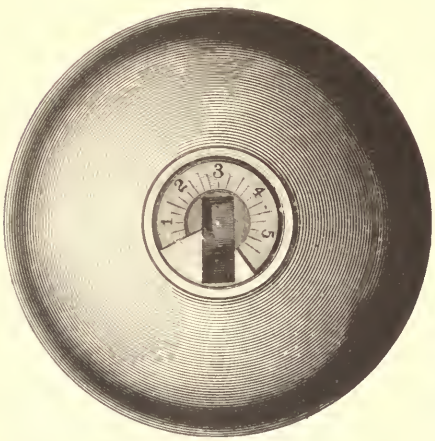


Fig. 375.—A 12-pounder spherical case-shot, outer and upper view. *Spec.* 4594. Half size.

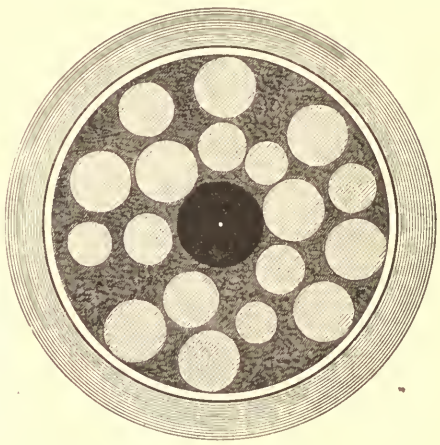


Fig. 376.—The same sawn in half, showing the bullets and composition. *Spec.* 4594. Half size.

The projectiles used in rifled guns exclusively combine with the properties and character of the projectiles just described those which pertain particularly to guns constructed on the rifled principle; they differ greatly in size and weight; their velocity varies with the calibre from 1,100 to 1,550 feet per second, and their range has exceeded five miles. The 10-pounder percussion Parrot case-shot illustrated in Fig. 378 is a missile of this nature. By the explosion the shell is rent into many fragments, varying in weight from a few grains to many pounds; these fragments are driven in all directions with great force and inflict injuries of the gravest character. The Museum collection is particularly rich in specimens of fragments of exploded shells of all sizes and descriptions, showing the great diversity of shape and form which these fragments may take.

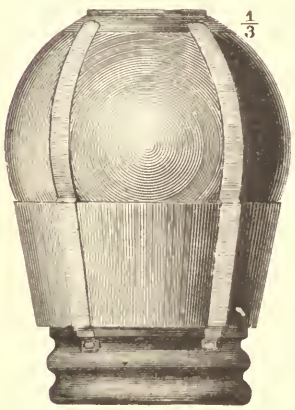


Fig. 377.—A spherical case-shot strapped for howitzer or gun. *Spec.* 4582.

Rifled projectiles are also cast solid, and are used for breaching or battering purposes.

Bolts, so called, are solid metal projectiles of elongated form, with surfaces so cut as to fit corresponding surfaces in the barrel of the gun; they are made to fit with great exactness, so that a greater proportional effect is attained with a smaller charge of explosive compound. The Whitworth gun and projectile may be taken as the type of this class. Its projectile has been thrown nearly six miles. It is probable that the extreme care necessary to preserve the surfaces of the gun and missile clean and smooth will render it practically less effective than many of the ordinary patterns of rifled ordnance which possess almost equal power, range, and precision.

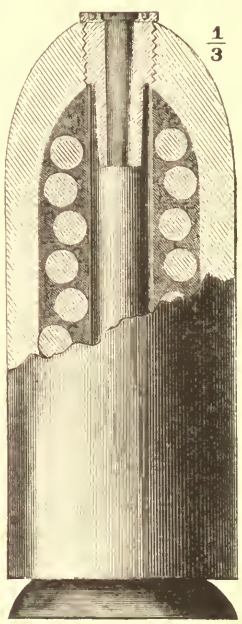


Fig. 378.—A 10-pounder percussion Parrot case-shot. *Spec.* 4587.

With this general knowledge of the more common forms of ordnance projectiles it will be unnecessary to enter more fully into a detailed account of the improvements made from time to time with the object of perfecting these agents of destruction.

Shells thrown from mortars differ little if any from ordinary spherical shells except in size and in the manner of projection. Their use is generally restricted to sieges. Under the same circumstances hot solid shot were used during the war, but with the intention of destroying property rather than human life.

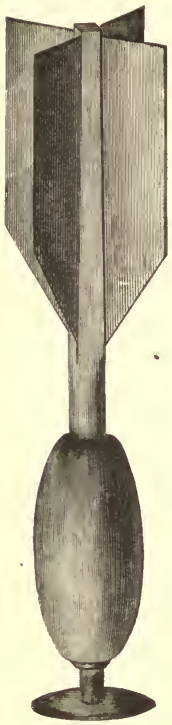


FIG. 379.—Ketchum's 1-pound hand grenade. *Spec.* 4593.

Hand grenades (FIG. 379) are small iron shells filled with powder and discharged by percussion; they were used in sieges and assaults at close quarter, and their effects are similar to ordinary shells; as their name indicates, they are carried and thrown from the hand.

Torpedoes, or more properly *fougasses*, were largely used as a means of defence during the late war; they were, as a rule, simply large shells arranged with levers connected with a percussion fuze and sunk below the surface of the ground in the supposed path of an assailing party. A pressure of the foot upon the concealed lever was sufficient to explode the shell, resulting in effects similar to the bursting of a like projectile under ordinary circumstances. Torpedoes of more complicated construction and of far greater power were employed in the defence of rivers and harbors and proved important and effective agents of destruction. In an article on torpedo wounds, Dr. S. W. Gross[1] describes a formidable engine of this character, containing about sixty pounds of gunpowder and capable of being exploded by a pressure of four pounds only. Dr. Gross adds that "its effects can readily be imagined."

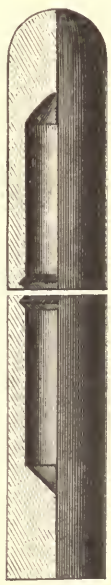


FIG. 380.—McCallum's bridge torpedo. *Spec.* 2569.

Surgeon J. B. Brown, U. S. A.,[2] Medical Director of the Fourth Army Corps, in an extract from a narrative of his service at Williamsburg, Virginia, reports that the enemy "had planted torpedoes in the works and along the road leading to Williamsburg, designing that they should explode by the pressure of the foot of those passing over them. A casualty occurred in General Casey's division from the explosion of one of these torpedoes and one man was killed and five wounded. The wagon track and the side paths for a mile were studded with these buried shells; but they were guarded, as soon as discovered, by men detailed to remain near them to point them out to passing troops. I passed near several of them and observed the ingenuity with which they were concealed." Surgeon D. W. Hand, U. S. V.,[3] in an extract from a report relative to operations in North Carolina, relates that on "June 4, 1864, two large torpedoes were accidentally exploded at Bachelor's Creek, an outpost of New Berne, instantly killing thirty-six soldiers and eight negroes and seriously wounding twenty-nine men attached to the 132d New York Volunteers."

A bridge torpedo, devised by McCallum, designed to be placed in an auger hole in the beam of a bridge, is represented in FIGURE 380. The two sections are joined by a percussion cap connected with a lever placed under one of the planks of the bridge; slight pressure is sufficient to explode the torpedo.

In a third division of missiles and projectiles are included such as cause wounds and injuries indirectly: splinters, stones, fragments, or foreign bodies set in motion or driven by the force of projectiles in their course, and which frequently by their action or lodgement

[1] GROSS (S. W.), *On Torpedo Wounds*, in *American Journal Medical Science*, 1866, Volume LI, page 370.
[2] APPENDIX to Part I, Vol. I, *Medical and Surgical History of the War of the Rebellion*, page 67.
[3] APPENDIX to Part I, Vol. I *Medical and Surgical History of the War of the Rebellion*, page 239.

complicate direct shot wounds, and which are themselves sources of danger and of uncertainty in diagnosis. The most common examples of this class are fragments of stone and splinters of wood torn from the earth or from trees, and from structures forming defensive works, scraps of iron or metal from ordnance, firearms, or from articles of equipment; or indeed from any object with which projectiles come in contact.

In the class of unusual or eccentric projectiles the missile illustrated in FIGURE 381 may be placed; it is a conoidal leaden shell two inches in length, one and a half in calibre, weighing nine and three-quarter ounces. The missile was cut out of a horse killed while the rider was reconnoitering with General Kearney on the day of the second battle of Bull Run. No report was heard from the direction in which it came. It was subsequently learned that such missiles were fired from globe-sighted rifle-guns of some thickness. FIGURE 382 represents what is known as a ricochet shell, picked up on the battle-field of the Wilderness in 1865 by Captain James M. Moore, U. S. A., and presented to the Army Medical Museum; it is of peculiar form, weighing nine and one-half pounds; it has a shallow narrow excavation at the head, apparently designed for a charge and percussion cap, which charge seems to have proved insufficient to burst the missile. They are said to have been commonly used by the Confederates at the battle of Fredericksburg, at the battle of the Wilderness, and on other occasions.

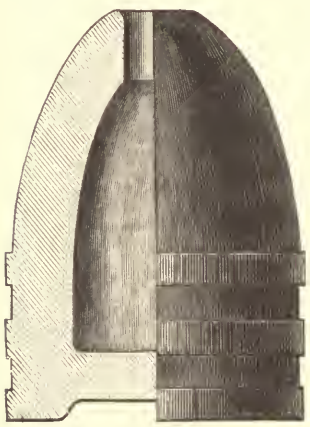


FIG. 381.—Leaden shell 2 ins. in length, 1½ inch calibre, weighing 9¾ ounces. *Spec.* 3294. [Natural size.]

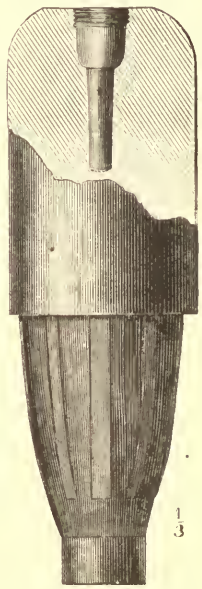


FIG. 382.—Elongated percussion shell. *Spec.* 4765. ⅓

It is stated that railroad iron cut into suitable lengths, spikes, and scrap-iron were used by the Confederates in lieu of regular projectiles. No specimens of such missiles are in the Museum collection to substantiate this statement.

Shaler's sectional bullet, represented in FIGURE 383, is drawn of natural size and weighs 608 grains; it is designed to part in its flight, forming three separate missiles; whether it was ever used on the field is not known.

The ordinary "buck and ball," FIGURE 373, *b*, p. 697, a compound missile, was very extensively used during the early part of the war; it consists simply of the ordinary round ball, calibre .69, and three buckshot enclosed in the same cartridge. Cartridges made up entirely of buckshot were common and at close range made very effective missiles. Slugs and fowling-piece ammunition are also noted as having been occasionally used.

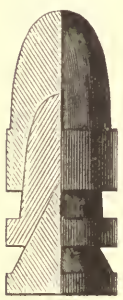


FIG. 383.—Shaler's sectional ball. *Spec.* 4621. No. 36.

A peculiar missile, said to have been thrown into the prison camp at Johnson's Island with a message attached, is shown in FIGURE 384. It is a conoidal bullet with a spade-shaped appendage twice its length, designed to render the course of the projectile more accurate. It is believed to be a pattern rejected by the Ordnance Department about the year 1860; its history is not positively known.

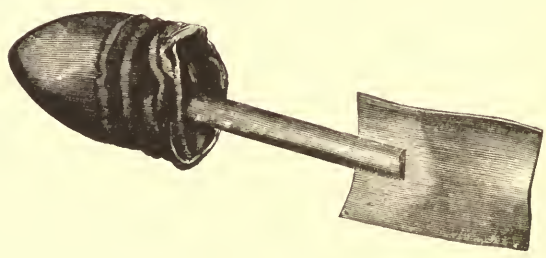


FIG. 384.—Bullet with guiding (?) attachment; actual size. *Spec.* 4610.

"Greek fire" for incendiary purposes was employed, probably by both sides in a few instances. It was used at the siege of Charleston, in 1863;[1] but its employment led to such representations respecting its barbarity that the use of it was but little resorted to, if at all, during the remainder of the war.

A small quantity of composition, a portion of the contents of a fire-ball used by the Confederates and captured at Morris Island, was contributed to the Army Medical Museum by Acting Assistant Surgeon H. K. Neff. It is specimen 572 of the *Surgical Section*, and is described as "a mixture of nitre, sulphur, and antimony, and when used is made into a paste with sand and rosin. The missile was wrapped on the outside with three layers of heavy canvas, tarred and pitched without, with a network of twine over it. The bottom was cast-iron covered only with pitch. Within the ball was a tin cup to which the canvas and twine were fastened, and which contained the composition, and near the base was embedded a 6-pounder shell. Three pins in the top are withdrawn before loading in the gun to allow ignition previous to its exit from the muzzle. The composition burns slowly with intense heat. The missile was designed to be thrown from a mortar." Except in the instances quoted it is doubtful if the use of this agent was at all common.

EXPLOSIVE BALLS.—The subject of the employment of explosive missiles in warfare between civilized nations has been largely discussed from an ethical point of view, particularly since the civil war in the United States. While their use is acknowledged to savor of barbaric warfare, there is still a manifest reluctance to place them entirely beyond the pale of legitimate employment.

By an agreement between the principal nations of Europe, signed by their representatives at an international military conference held at Saint Petersburg in October, 1868, it was resolved to abstain from the use of explosive projectiles under the weight of four hundred grammes. In commenting on this agreement, Dr. Longmore[2] remarks that "notwithstanding the International agreement just referred to, there is great misgiving on the part of many as to the abandonment of explosive bullets in time of war. The government of the United States has not joined the convention, and the treaty is only obligatory upon the contracting parties when at war between themselves; it also ceases to be obligatory in case of a power which has not joined the convention allying itself to either one or other of the belligerents. The English government of the day was greatly blamed by the press and by many military men for joining the treaty."[3]

One hundred and thirty cases of wounds attributed to explosive missiles were recorded on the returns (TABLE CXXII, page 696, *ante*). The records of the Ordnance Office, U. S. Army, show that thirty-three thousand three hundred and fifty (33,350) Gardner's "explosive bullets" or "musket shells" were issued to the troops in the early part of the war; that

[1] LONGMORE (T.), *Treatise on Gunshot Wounds, their history and treatment*, London, 1877, page 51. [2] *Ibid*, page 48.

[3] For the information of those who have never seen the treaty alluded to above the text is here reproduced from the work just quoted: "Considering that the progress of civilization ought to have the effect of lessening as much as possible the calamities of war: That the only legitimate object that states ought to propose to themselves during war is to weaken the military strength of their enemies: That for this purpose it is sufficient to put *hors-de-combat* the greatest number of men possible: That this end would be overpassed by the employment of arms which would uselessly aggravate the wounds of men placed *hors-de-combat* or that would render their death inevitable: That the employment of such arms would be consequently contrary to the laws of humanity: The undersigned having received the orders of their governments in this respect are authorized to declare as follows: § 1. The contracting powers mutually bind themselves to renounce, in case of war among themselves, the employment by their land or sea forces of all projectiles charged with explosive or inflammable matters of a less weight than 400 grammes. § 2. They will invite all the states which have not sent delegates to the military international commission at St. Petersburg to accede to the present engagement. § 3. This engagement is only obligatory upon the contracting or acceding parties in case of war between two or more of themselves: it is not binding in regard to parties who have not joined the convention. § 4. It will equally cease to be obligatory from the moment when in a war between powers which have joined the convention, another power, not a party to the convention, shall join one of the belligerents. § 5. The contracting and acceding parties will come to a further understanding among themselves every time that a precise proposition shall be made on the subject as regards future improvements that science may make in the arms of troops, so that the principles which they have laid down for reconciling the necessities of war with the laws of humanity may be maintained."

of these over ten thousand (10,000) were abandoned on the field for want of transportation. It is probable that the latter fell into the hands of the Confederates, accounting in a measure for the wounded before alluded to; but many reports of wounds attributed to explosive balls were made in which it is doubtful if the missile was really of this nature, as under certain circumstances the ordinary ball is capable of great distortion and of inflicting severe injury.

The extent of the damage from explosive missiles is greater than that ordinarily caused by the simple projectile; bony structures are more extensively shattered and the area of destruction in soft parts is larger; hæmorrhage, both primary and secondary, is more common; extensive sloughing follows, and the course of repair is slow and tedious.

The Gardner "explosive bullet" or "musket shell" (FIG. 385), referred to as having been issued to the United States troops, is a cylindro-conoidal projectile of lead, made in two sizes; the larger of calibre .58, weighing 451 grains, the smaller of calibre .54, weighing 363 grains. Within the interior is placed an accurately fitting acorn-shaped chamber filled with fulminate, and communicating with a one and one-quarter time-fuze, which is exposed to the charge at the rear of the missile; the fuze is ignited by the discharge of the piece. The bursting charge is sufficient to rend the bullet and transform it into a jagged dangerous missile. Should it have penetrated the body before exploding its effects are still more destructive. It is claimed that other forms of projectiles of this nature were used provided with a percussion cap which would explode upon contact with even soft tissues. No specimens of this kind are *found* in the collection of the Army Medical Museum.[1] The appearance of an exploded musket shell extracted from the thigh of a private of the 120th New York Volunteers is shown in FIGURE 386. The wound resulting was a flesh wound of the muscles of the thigh, and the bullet was removed by enlarging the opening of entrance.[2]

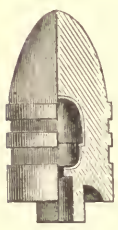


FIG. 385.—Gardner's explosive ball. *Spec.* 4621.

FIG. 386.—Explosive ball extracted from thigh. *Spec.* 4561.

Six well authenticated cases of injuries from explosive balls have already been cited;[3] accounts of sixteen cases of alleged injuries from similar cause are here appended:

CASES 1028–1043.—Private Joseph Baker, Co. B, 29th New York, wounded at Bull Run, August 29, 1862. Acting Assistant Surgeon W. L. Hammond reported the patient's admission into Baptist Church Hospital, Alexandria, September 1, 1862.

[1] There are, however, on exhibition several specimens of centre-fire metallic cartridges for a breech-loading rifle .35 calibre, loaded with explosive bullets, contributed by Major-General M. C. MEIGS, Quartermaster General U. S. A., and Surgeon H. R. TILTON, U. S. A., and found in the camp of Chief Joseph's band of Nez Perces, in 1877, after their surrender to General Miles. The projectile is represented in FIG. 387. A copper shell nearly three-tenths of an inch in length, loaded with fulminate, is enclosed in a boring at the head of the bullet; the end of the shell projects sufficiently to act as a percussion cap by which the missile is exploded. The following extracts from a letter from Surgeon H. R. TILTON, U. S. A., give some interesting facts in connection with this and another form of explosive missile: "Fort Riley, Kansas, April 3, 1881. Surgeon D. L. HUNTINGTON, U. S. A., Washington, D. C. DEAR DOCTOR: In reply to your note of enquiry about explosive balls used by the Nez Perces, I will give you such information as I have. During the siege, which lasted five days, I was disposed to doubt that the Nez Perces had any explosive balls, although several men insisted that they had been struck by them, as they distinctly heard the explosion. One man of the 9th Cavalry was shot through the thigh in front of the femur; the skin was discolored, and the hole was large enough to admit the thumb; there was only a bridge of skin. After the surrender and discovery of explosive balls in the village, I was convinced that a number of the wounds had been caused by explosive balls. . . . I was curious to know how the Indians had obtained these explosive balls, and heard upon enquiry that in passing through Idaho they had made a raid upon a 'ranch' of an Englishman who had hunted in all parts of the world, and who was well supplied with rifles and ammunition, including explosive balls, and the Nez Perces had captured his outfit although he escaped. . . . I have an impression that explosive balls, like other balls, cause a larger wound at the point of exit than at the point of entrance, although explosive balls and 'Express' rifle balls greatly lacerate the tissue before their exit. My attention having been drawn to the subject, I found that a citizen employé with the 7th Cavalry had explosive balls for use in hunting. The Winchester rifle ball was cast with a cavity of proper size to receive a .22 calibre cartridge in its apex; the .22 calibre cartridge required a portion of its ball to be removed in order to fit into the .44 calibre ball. I saw the effect of these on antelope, and the laceration was beyond the point of entrance. Very respectfully, H. R. TILTON, Surgeon U. S. A."

FIG. 387.—Explosive bullet *Spec.* 914.

[2] The case has already been referred to, as a case of flesh wound of the lower extremities, in *Note* 1 of page 24, *ante*.

[3] See Cases of: Pt. W. Gritzmacher, C, 5th Wisconsin; Spottsylvania, May 12, 1864; explosive musket ball struck frontal bone and fractured outer table; recovery: *First Surgical Volume*, p. 129. Pt. J. F. Singer, E, 24th Wisconsin; Dallas, Ga., May 27, 1864; explosive bullet fractured external table of the occipital bone; recovery; *idem*, p. 217. Lieut. T. E. Maley, 5th Cavalry; Deep Bottom, July 28, 1864; ball exploded in left antrum of Highmore; recovery; *idem*, p. 352. Pt. P. T. White, I, 7th Michigan; Antietam, Sept. 17, 1862; ball exploded in belly of pectoral muscle; recovery; *idem*, p. 494. Corp'l A. Burlingame, 64th New York; Fair Oaks, June 1, 1862; missile exploded in left forearm; recovery; *Second Surgical Volume*, p. 923. Corp'l S. P. Keller, 1st Maryland; Weldon Railroad, August 18, 1864; missile completely shattered right knee; recovery; *Third Surgical Volume*, p. 250.

with a wound of the right thigh, inflicted by an explosive ball, which entered the internal femoral region, centre of the middle third, fracturing and comminuting the femur; ball extracted on the battle-field, under the fascia lata, between the rectus and the vastus externus, almost in the line of its direction. Treated in Smith's anterior splint; union of bones with considerable curvature externally; limb shortened 2½ inches and foot inverted. Discharged February 29, 1863.—Lieutenant C. M. Ball, Co. G, 141st Pennsylvania, aged 35, wounded at Chancellorsville, May 3, 1863, by what he thought was an explosive ball, which entered the left leg in the upper portion of its lower third, inner and posterior aspect, and produced two wounds in its exit, one on the posterior and the other on the anterior aspect of the leg; fragments of bone discharged. This officer was discharged from service December 9, 1863, and pensioned, and paid in September, 1866, since which time he has not been heard from.—Private M. Conner, Co. D, 102d Pennsylvania, aged 30, wounded at Cold Harbor, June 3, 1864, by an explosive ball, which injured the right malleolus; extraction of missile; admitted into Third Division Hospital, Alexandria. Discharged from service Jan. 7, 1865.—Private W. Bohmer, Co. D, 26th Wisconsin, wounded at Resaca, June 22, 1864, by an explosive ball, causing transverse fracture of alveolar process of superior maxilla, removing teeth of left side to molar and on right to bicuspids; fistulous opening into nose. Treated at Harvey Hospital, Madison, and returned to duty November 19, 1864.—Sergeant D. S. Durell, Co. E, 3d New Jersey, was admitted into Turner's Lane Hospital, Philadelphia, August 28, 1863, with a wound of the right leg, caused by an explosive conical ball, at Chancellorsville, May 3, 1863. The ball struck the upper third of the right tibia anteriorly, making but one orifice. Portions of the missile were said to have been extracted in camp at Washington and at West Philadelphia hospital. Discharged from service January 23, 1864. Reported by Acting Assistant Surgeon George Hutton.—Sergeant J. L. Fenton, 9th Massachusetts Battery, aged 28, was admitted into Jarvis Hospital, Baltimore, July 10, 1863, with a wound of the right leg, inflicted by an explosive ball at Gettysburg. Acting Assistant Surgeon B. B. Miles reported that when admitted the patient had typhoid symptoms, and on the night of July 27th had a slight hæmorrhage. He died on July 28, 1863, with supposed pyæmia. An autopsy revealed the knee joint and thigh infiltrated with pus, and a compound comminuted fracture of the tibia. The specimen of the upper third of the right tibia, showing superficial necrosis around the injury on its posterior aspect, was contributed to the Army Medical Museum by Assistant Surgeon D. C. Peters, U. S. A., and is numbered 1613 of the *Surgical Section*.—Sergeant O. V. Gingrass, Co. A, 29th Missouri, wounded at Ringgold, Georgia, November 24, 1863. At the general field hospital at Chattanooga the wound was recorded as a gunshot fracture of left malar bone and superior nasal bone by a conoidal ball. He was subsequently treated at hospitals in Nashville and Louisville, and on June 25, 1864, was admitted into the hospital at Jefferson Barracks, Missouri. Surgeon J. F. Randolph, U. S. A., reported that an explosive ball entered two inches forward and one and a half inches above angle of inferior maxilla, emerging at nose, exploding as it passed out, tearing away body of superior maxilla and entire nose and destroying left eye. The patient was transferred to St. Louis and discharged July 14, 1865.—Private Charles G. Hall, Co. G, 5th Maine, aged 36, was wounded at the Wilderness, May 10, 1864. On May 14th he entered Carver Hospital, Washington. Surgeon O. A. Judson, U. S. V., reported: "Gunshot wound of left side of pelvic region, flesh. Explosive ball entered body near anterior inferior spinous process of ilium and lodged in the same side near the sacrum. May 10th, extraction of ball on field; simple dressings. Doing well June 26, 1864, when he was returned to regiment to be mustered out."—Acting Assistant Surgeon D. C. Owen reported that Private James Kenney, Co. I, 100th Illinois, aged 18, was admitted into the hospital at Quincy, Illinois, December 26, 1863, with a gunshot wound of the right shoulder by explosive ball, received at Missionary Ridge, November 25, 1863. Ball entered half way between the shoulder joint and neck and penetrated the flesh two and a half inches; extracted from place of entrance; wound healed. Returned to duty February 16, 1864.—Private T. P. McElroy, Co. F, 81st Pennsylvania, aged 46, wounded at Spottsylvania, May 12, 1864. Treated in Washington and Annapolis hospitals, and admitted, on August 18, 1864, into hospital at York, Pennsylvania. The following record of the case appears upon an unsigned case-book: "An explosive ball struck the lower jaw on the left side of the chin, bursting and comminuting the bone. The ball was removed by Dr. Vanderkieft, surgeon-in-charge of the Naval Academy Hospital, on May 21, 1864. Several fragments of bone were removed at the same time and several had come away before. The wound is now healed externally but discharges slightly into the mouth." McElroy deserted from hospital October 14, 1864.—Private P. F. Moore, Co. B, 83d New York, aged 40, wounded at Tolopotomy Creek, Virginia, May 30, 1864. On June 4, 1864, he was admitted into Mt. Pleasant Hospital, Washington, where the injury was diagnosed as "arm poisoned by explosive ball." He was afterwards treated in hospital at Bristol and Philadelphia, but no subsequent allusion is made to the character of the missile.—Medical Cadet E. D. Mitchell reports: "Bugler Jack Robinson, 1st U. S. Cavalry, was killed at Brandy Station, August 1, 1863, and by order of General Buford his body was sent to Washington for interment. Autopsy August 2d, one hour after admission into Douglas Hospital. The ball entered over inner third of right clavicle, fracturing it, wounding the apex of the right lung, and passed out obliquely, striking the seventh cervical vertebra, and was cut out underneath the skin near the inferior angle of the scapula. The lung was too much decomposed to make a preparation of. The ball had evidently exploded after it struck him. There was a great amount of hæmorrhage, but the body was too much disorganized to allow of finding its seat. The specimens are the clavicle and ball." The specimens were received at the Army Medical Museum, and the clavicle is numbered 1644 of the *Surgical Section*, but the missile is not attached and a careful search failed to discover any trace of it.—Private John Ryan, Co. E, 114th Illinois, aged 21, wounded at Guntown, Mississippi, June 10, 1864, and admitted into Adams Hospital, Memphis, June 13th. Surgeon J. G. Keenon, U. S. V., reported: "A lacerated wound, from explosive shot, of calf of right leg. June 17th, extraction of ball through extension of opening; calf of leg appeared as if peppered by buckshot. Ball had exploded after entering limb. June 30th, gangrene attacked the wound and was checked with bromine. On August 25th the patient was transferred to Quincy, Illinois, and discharged June 22, 1865."—Private W. H. Stanley, Co. C, 1st Maine, aged 21, was admitted into Chestnut Hill Hospital, Philadelphia, June 7, 1864, with a gunshot wound of left foot, received at Spottsylvania May 19, 1864, said to have been inflicted by an explosive ball. Simple dressings were applied, and the patient was returned to duty July 11, 1864.—Acting Assistant Surgeon Louis Fassitt reports: "R. C. Wright, 1st U. S. Chasseurs, was wounded on the skirmish line at Malvern Hill, July 1, 1862, by an explosive ball, which entered about the middle of the right clavicle, fracturing the bone, passed through the cavity of the thorax, and was extracted four days after below the spine of the right scapula. Large amount of hæmorrhage from the lungs. Sensation at the time of receiving the

wound was like that of a 'blow from a man's fist.' Admitted into hospital at Chester, Pennsylvania, July 29th. Several pieces of brass were extracted by me from the anterior wound near the clavicle, and others from the posterior wound near the scapula. (He had no scales on his shoulders or any metal about his person.) These form a portion of an explosive cap attached to a conical ball, which I have no doubt ignited at the moment it struck the clavicle, and these fragments were driven through the lung." Wright was discharged from service November 30, 1862.—Private A. Farey, Co. C, 183d Pennsylvania, aged 35, wounded at Cold Harbor, June 3, 1864. Acting Assistant Surgeon J. A. McArthur reported from South Street Hospital, Philadelphia: "Wounded by an explosive ball, which entered the right side of the thorax one and a half inches from the acromion. On June 12th a large abscess which had formed over the biceps muscle was opened and the ball extracted." Erysipelas attacked the wound and the patient died July 22, 1864. At the autopsy the ball was found to have passed through the glenoid cavity of the scapula, partially fracturing the head of the humerus, and passing around the bone lodged beneath the fascia covering the biceps muscle. The upper half of the right humerus was forwarded to the Army Medical Museum by Dr. McArthur, and constitutes specimen 3669 of the *Surgical Section*. There is a double longitudinal partial fracture of five inches on the inner side of the shaft. The head is carious, and necrosed bone borders the lines of separation in the shaft.

EFFECTS OF LARGE PROJECTILES.—The effects of these projectiles depend on their weight, size, and momentum. At high velocities they virtually encounter no resistance from a single human body and their force is but slowly expended on masses of soldiery. Their form is of little importance, as similar results follow the use of spherical and elongated solid shot and shell; their impact is followed by instant death or by wounds of great severity.

When the injury is not immediately fatal, as is not rarely the case when a limb is carried away by a projectile of considerable size striking directly, the surface of the stump will be found to be somewhat "cleanly cut," the skin and muscular tissues contused and dark with but little retraction; the bone fractured with not much splintering or comminution above the seat of injury; the arteries retracted and the hæmorrhage slight. If the projectile strikes obliquely or with somewhat diminished force, the resulting wound resembles a deeply grooved furrow corresponding to the size of the projectile and influenced by its direction; the skin, fasciæ, and deeper soft parts are extensively lacerated or removed entire, the surface is covered with blood clots and shreds of connective, muscular, and aponeurotic tissue; if penetrating cavities, disorganization and destruction of the parts will follow, resulting in death either immediately or in a very short time. Should a large projectile come in contact with a limb under these circumstances, it may carry it away entire or leave it partially attached by fragments of skin and muscular tissue; in its midst will be found fragments of shattered bone, the whole forming a mass devoid of form and life. An illustration of a laceration of the leg from a cannon ball is given in PLATE LXXVI, opposite page 478, *ante*. The lithograph is copied from a sketch made on the field.

A solid projectile whose velocity is so greatly diminished as to seem harmless is still capable of doing great damage through its acquired momentum; it may not possess the force necessary to carry away any part of the body, but a contusion or wound resulting from its impact is generally serious and not infrequently fatal. It may be that no outward evidences of injury are manifest beyond some discoloration, but subsequent symptoms indicate the existence of grave internal lesions, rupture of viscera, concussion of the brain or spinal cord, and sometimes fracture of bones with extensive comminution and disorganization of the surrounding soft parts. The following case of fracture of the humerus in three places, leaving the skin intact, taken from a report of his personal service at the battle of Bull Run, is related by Assistant Surgeon B. E. Fryer, U. S. A.:

CASE 1044.—"A Sergeant of Rickett's Battery walked from the field to the hospital after having been struck by a round shot, *en ricochet*, on the arm, fracturing the humerus in three places and producing great contusion without breaking the skin. The case is interesting from two facts—the great injury to the bone without laceration of the surrounding soft parts, and from the fact that disorganization of the tissues did not take place in this, as it nearly always does in all parallel cases. The result of the treatment of this man was doubtful, and the question of amputation was raised by the other medical officers of the hospital, but I strenuously opposed it, and had the satisfaction of seeing this useful soldier recover and return to duty with no other deformity than a slight shortening, and with a perfect use of the arm. The treatment in this case was to lay the arm on a pillow; cold water until all swelling had subsided, after which I ordered a plaster of Paris splint."

In the next case the femur was fractured at the neck and the soft parts were severely bruised, but the skin was not broken:

CASE 1045.—Surgeon James T. Stewart, 64th Illinois, aged 40 years, was wounded at Decatur, Georgia, July 19, 1864. The following history of his case was kindly furnished by this officer: "While acting in the capacity of Surgeon-in-Chief of the 4th division, Sixteenth Army Corps, near Decatur, I was struck by a spent shell on the right hip. The shell came from the side, struck me fairly on the hip and fell down, not exploding. It crushed the soft parts dreadfully and broke the thigh bone in the neck. The skin was not broken, but everything underneath it was bruised into a jelly. I was laid on my left side as I could not lie on my back, the wounded leg resting on the sound one with a pad between them. In this position I lay for two or three months, with no extension or counter extension or apparatus whatever, as I could not bear any. I remained on the field for three days and was sent in an ambulance to the field hospital a distance of about four miles. I lay there three or four days, and had to be moved about four miles further to the right. This time four men carried me on my cot, and while on the way the end of the cot came off suddenly and threw me off in the road. I survived the shock, but it was all I could do; I lay in this field hospital perhaps about ten days, when I was put in an ambulance and carried back to Marietta, some twenty-two miles. Here I lay, I think, about a month. At the end of this time, there being no union of the bone whatever, I prevailed on them to start me for St. Louis for the purpose of getting under the care of Professor Pope. I went as far as Nashville, but could ride no further, hence I was put in the hospital there. After a week they put me on a train for Louisville. In consequence of exhaustion I was obliged to stay in Louisville, in hospital, probably ten days, when I was put on a steamboat for Cairo, but the boat was stopped at Evansville in consequence of a raid the Rebels had made on the river below; but after a week or so went on, and finally arrived safely at Cairo, was transferred to another boat, and eventually reached St. Louis. Professor Pope examined the leg, and told me the bone was uniting and that he would not advise any change in the treatment. On this advice I came to Peoria. As to the result, the leg is shortened one inch. There is quite a hollow where the trochanter major should be. The leg is weak and most of the time sore and tender in the hip. It does not often give me pain. I can walk with a cane pretty well, but without a cane it gives out in a few squares. For six or seven years after the injury it improved, since then it has rather grown worse and gives me more trouble now than it did ten years ago." Dr. Stewart was mustered out December 22, 1864, and pensioned. Examiner G. L. Lucas, of Peoria, reported September 4, 1877: "That no improvement had taken place since last examination."

Slighter contusions very generally destroyed the vitality of the skin and soft tissues and resulted in extensive sloughing and slow repair. The occurrence of simple fracture and dislocation was noted, but these complications were infrequent.

Probably the largest class of injuries attributable to heavy projectiles is that resulting from fragments of exploded shells. The nature and character of these wounds are largely influenced by the weight, form, and velocity of the fragments. Pieces of great weight moving with high velocities inflict injuries similar to and not less severe than those caused by the large projectiles already mentioned. As their velocity diminishes, which is rapidly the case, owing to the great resistance offered by the air to the passage of irregularly shaped bodies as well as to gravitation and modification of the original impetus, the factor of weight alone assumes importance, as even with slow motion the momentum of such masses is almost irresistible. Form may determine the severity of a wound—especially when the fragment is of a small size, the sharply outlined edges becoming sources of danger to blood-vessels, nerves, and viscera.

Wounds from large shell fragments are attended with great laceration and destruction. When the force has been insufficient to carry away a portion of the trunk or an extremity, the resulting wound is deeply contused with ragged and irregular edges; there may be a loss of more or less substance; bony structure exposed to the force of the blow is shattered and comminuted; not infrequently the missile will be found lodged in the wound. In other cases a large fragment will pierce the skin without destroying the vitality and sink deep into the cavities or soft parts; the skin retracting will present so small an opening as to obscure the diagnosis until subsequent symptoms disclose the true nature of the injury. As in cases of solid shot, contusions of little or no outward significance beyond slight bruising, but attended with extreme internal disorganization, are met with. Shell fragments striking obliquely, as often happens when the missile explodes on the ground, generally produce superficial wounds only, though covering an extensive area. A curious case of

lodgement of a 12-pound unexploded shell in the gluteal muscles appears upon the records of the field hospital of the Eighteenth Army Corps:[1]

CASE 1046.—Private B. D. Thayer, Co. D, 25th Massachusetts, aged 21 years, was wounded at Petersburg, June 30, 1864, and was taken to a field hospital of the Eighteenth Corps, where it was reported that Surgeon H. N. Small, 10th New Hampshire, removed a 12-pound round shell from the left gluteal region, the patient surviving the operation some forty-eight hours. The missile, which was retained by the operator, was entirely concealed behind the gluteal muscles.

Wounds by grape-shot partake of the general nature of injuries from cannon balls. The velocity of these projectiles is, however, generally lower, and their weight less, so that their destructive power is somewhat limited. Case and canister shot, as well as small fragments of shell, produce effects not materially differing from those of small-arm missiles.

The effects resulting from the explosion of torpedoes, though somewhat dependent upon their size, nature, and proximity, are extremely terrible. Not only is the violent action of fragments and splinters hurled at their initial velocity to be considered, but also the consequences of exposure to the flame and gas of the exploding charge. Should life be not immediately extinguished, fearful mangling and mutilation results, and limbs may be entirely torn away or shattered almost beyond recognition, while the presence of burns and the effects of the inhalation of gases serve to complicate and obscure the condition.

Although it has been previously stated in this history (see *Second Surgical Volume*, page 28) and elsewhere that "reports of alleged traumatic effects from the wind of balls * * * do not seem to merit serious consideration," it would appear by the number of reports of cases of this character during the late war, that there is still a lingering belief that injuries from this source are not of infrequent occurrence. After a careful consideration of these reports the evidence unmistakably points to effects produced by actual contact of the missile causing severe concussion, or to the accident known as the "brush of a ball," in which the missile passes so near as to actually touch the clothing or skin without tearing the one or the other, and producing apparent paralysis, swelling, inflammation, and sloughing.

The several theories of vacuum,[2] of foreign bodies carried along with the ball,[3] and of electricity,[4] which have from time to time been suggested to support the idea of injuries

[1] Descriptions in detail of injuries caused by solid projectiles or large fragments of shell, together with illustrations, have been given in the preceding parts of the history. On page 91 of the *First Surgical Volume* it was pointed out that, "without any attendant injury to the skull or concussion of the brain, the scalp may be wounded by the largest projectiles from artillery," and that "cleanly-cut furrows were made . . . by fragments of shell in rapid flight." A case of contusion of the occipital by a 6-pound iron cannon ball is cited on page 99, and instances of crash or smash produced by cannon balls or explosion of large shells are given on pp. 212–214. On pp. 476–477, remarks on and cases of injuries to the contents of the chest by large spent shot and fragments of shell will be found; see also case of H. B——, on p. 487, and on p. 486 the case of C. P. Betts, injured by grape-shot. In the *Second Surgical Volume* visceral injuries without external wounds are referred to on pp. 15–28. The cases of Howard, p. 16; Charles G——, p. 18; Loveland and Dulephn, p. 20; five cases on p. 21; cases of Bishop, Bence, Brown, Rand, and Bowditch, on p. 23; of Williams, on p. 24; and the cases on pp. 25, 26, were all from solid shot or shell fragments. Case 649, p. 223, of fracture of the os innominatum by a shell fragment, is illustrated by a plate. *Specimen* 4457, a fragment of shell extracted from the ischiatic region, is illustrated by a wood-cut and referred to at p. 240. An illustration of a shell fragment extracted from the sacrum is given on p. 250, CASE 732. A portion of hand grenade, extracted from bladder by lithotomy, is illustrated in PLATE VII.

[2] FORBES (P.) (*Observations on the Cause of Death from what is called the Wind of a Ball*, in *The Edinburgh Medical and Surgical Journal*, 1812, Vol. VIII, p. 310) is of the opinion "that there is a mechanical cause for the effects produced by a ball passing close to the human body which will sufficiently account for them. This is the vacuum produced by the rapid motion of the ball through the air, which though of itself partial, yet when we combine with it the condensation of air taking place immediately before the ball, may, I suppose, have fully the same effect as if the vacuum behind it were complete. When a ball then passes close to the stomach, there is, in the first place, a great addition to the pressure on that viscus from the condensation of the air; as soon as the ball is passed, this pressure, with a great part of that of the atmosphere, is taken off; the consequence of which is a sudden expansion of all the fluids in the stomach and the blood in its blood-vessels, and the rupture of both. The rupture of the stomach is the cause of death, and the extravasation of the blood, of the black appearance, externally, . . . on the same grounds an easy answer is afforded to the question proposed by Dr. SPENCE, why the passage of ball has not always the same effect in battle? This arises from want of the necessary velocity to produce the condensation and vacuum which has been considered as the cause of the effects produced, as great velocities we know from the experiments made with cannon balls are rapidly destroyed by the resistance of the air."

[3] SPENCE (J.) (*Observations on those Accidents commonly ascribed to the Wind of a Ball*, in *London Medical and Physical Journal*, 1812, Vol. XXVIII, p. 142) states that "there are many substances, comparatively light of themselves, on board ship, such as canvas, rope-yarns, part of the bedding, etc., which, when carried along with the velocity of a ball, or even driven but a short way with that force, are apt to do considerable injury by hitting the body, and, by occupying a large or small bulk, may or may not produce external marks of injury."

[4] ELLIS (D.) (*Observations on the Nature and Cause of certain Accidents which sometimes occur in battle and have been usually ascribed to the wind of a Ball*, in *Edinburgh Medical and Surgical Journal*, 1812, Vol. VIII, p. 1) says that it is sufficiently proven that the peculiar facts ascribed to the wind of a ball "are likewise occasioned by the varied operation of atmospheric electricity, for, in both cases persons are suddenly struck down with loss of sense and motion, vision is impaired or irreparably injured, the body is discolored, the nerves paralyzed, the bones broken, and even life destroyed without any visible external injury or breach of parts, or any appearance of the body from whence the injury proceeded."

from the "windage of balls," have all been disproved, and it is now conceded by modern surgeons that without the actual contact of the projectile injuries cannot occur; on the other hand it is admitted that slight contact from the "grazing" or "brushing" of a projectile, or the rolling motion of a cannon ball over the surface of the body, may, by the weight and momentum, aided by the elasticity of the skin, effect most serious results, while little or no external evidence of such contact is left.[1] Instances of injuries attributable to the explosion of shells near at hand, without wound or contusion, are numerous, and generally well authenticated. They are,[2] for the most part, cases of partial or complete paralysis, deafness, blindness, loss of voice, rupture of superficial blood-vessels, and mental prostration.[3]

CASE 1047.—Private William C. Goodell, Co. A, 6th Vermont, aged 37 years, was admitted into Satterlee Hospital, Philadelphia, August 12, 1862, suffering from shock resulting from the explosion of a shell at White Oak Swamp, Virginia, June 30, 1862. The missile exploded a few feet behind the patient, the fragments tearing off his knapsack and the clothing from the upper part of his body, but producing no visible wound. The shock was very severe, producing a sensation of "sinking into the earth," followed immediately by total loss of power and consciousness, which, however, lasted but for a short time. Upon their return he found himself unable either to hear or speak. Immediately after the reception of the injury he was sent to Harrison's Landing, and thence to Satterlee Hospital, where he came under the care of Acting Assistant Surgeon Francis West, who reports: "On examination no external lesion of the head or spine was discoverable, and he had no paralysis anywhere of ordinary motion or sensation. He could move his tongue perfectly in every way, but *he could not speak*, and he was totally insensible to all sound; he was, in a word, simply *deaf and dumb*. He complained of some uneasiness in his head, which was hot and his face flushed. His pulse was active but not very full. Respiration very little if at all disturbed; no vomiting, bowels regular. The case was regarded as one of probable congestion of the brain at or about the point from which the proper nerves of speech and hearing arise, or, if more general in its character, manifesting itself by particular pressure at the deep origin of these nerves; in other words, that the part of the fourth ventricle giving rise to the glosso-pharyngeal and auditory nerves was compressed, and thus the functions of speech and hearing destroyed. The treatment employed was depletory and revulsive. Blood was taken by cups applied to the nucha and behind the ears, and active purgation was kept up by calomel and other cathartics. Cold applications were made to the head with derivatives to the feet, and a low diet was enjoined. This plan of treatment was pursued for several days, and until all evidence of local or general excitement had disappeared. The only manifestation of disease which then remained was the deaf-dumbness, which did not in any degree diminish. A blister was now applied to the nucha and a discharge kept up for several days. No change was observable in the deaf-dumbness, but the patient was otherwise doing well. Still viewing his disease as dependent upon local hyperæmia, or perhaps non-inflammation of the brain at the point already indicated, which after some weeks of primary treatment had refused to yield, it was determined to try the alterative effect of small doses of calomel. This was given in quantities of an eighth of a grain every three or four hours and continued for several days. No better success was the result. After a short time the calomel was repeated and pushed to a slight ptyalism, but still without any favorable effect. The strength of the patient in a short time began to decline, but without any change in his intelligence or spirits, which all along had been remarkably good. Communication with him was kept up by means of a slate. Quinine in moderate quantities was given, and his general health seemed to improve, but still the deaf-dumbness remained. On mentioning his case to some of my colleagues it was suggested that, as the patient might possibly be feigning an inability to hear or speak, it would be well to render him unconscious by etherization and then test his powers in these respects. The operation only confirmed the reality of the symptoms. Electricity was also tried, but without any good effect. On December 10th, just four months after admission, it was noticed that the left leg had not full power of motion, and that the face was somewhat drawn to the right side. On the 12th of the same month he was seized with a convulsion which lasted for

[1] In *Note* 2, on page 28 of the *Second Surgical Volume*, a supposed case of the "capability of compressed air or wind from a missile to bruise or inflict visible injury" is referred to. The case is reported by Surgeon B. Rhett in the *Am. Jour. Med. Sci.*, N. S., 1873, Vol. LXV, p. 92: "After a skirmish upon John's Island, in which the besieging gunboats took part, a private entered the Marine Hospital of Charleston, of which I was then surgeon, to be treated for discoloration of the skin, a purple, yellow, and green bruise, extending from the mamma to ilium of right side and from the umbilicus to the dorsum. The discoloration precisely resembled such as I have seen in scorbutic patients among the Andersonville prisoners, an ecchymosis. But the man was in perfect health, no signs of scurvy. I give his account of the cause of the injury: He was standing with his rifle held by the barrel at arm's length and the butt resting on the ground, when a large shot or shell passed between himself and his rifle without touching either or moving him from his position. Immediately after he observed the discoloration, and was sent to the hospital for fear of internal injury. The case rests upon my evidence of the injury and upon the soldier's account of the cause."

[2] *Three Cases of Injuries of the Nervous Centres from Explosion of Shells, without Wound or Contusion*, are given by G. BURR, in *New York Med. Jour.*, 1865, Vol. I, p. 428, and *Five Cases of Injury to the Nervous System by the Explosion of Shell*, by B. RHETT, in *Am. Jour. Med. Sci.*, 1873, Vol. LXV, p. 90. Dr. Rhett's fifth case, with his comments thereon, are as follows: "CASE V. The private injured in the gun chamber with Lieut. Poor was brought into the hospital a frightful object, bleeding at mouth, nose, and ears, his eyes protruding from their sockets. The sutures of the cranium parted, one parietal bone overlapping the other, and the sutures with the occipital and frontal bones loosened. The head dislocated from the neck, the latitude of motion showing either a parting of the ligaments or that the base of the occiput was broken up. The thoracic and cervical regions were bloated, blown up with an escape of air into the cellular tissue; emphysema; yet there was no external wound or injury. The place and time did not admit of a *post-mortem* examination. Now the question arises whence this extensive disorganization? I offer the following suggestion, not professing to affirm its correctness: I think the man was driven by the force of the explosion head foremost into the earthwall of the gun chamber; that the cervical vertebræ were driven through the fractured occiput, and the sutures were forced asunder from within by pressure upon the cranial contents."

[3] One hundred and thirty cases appear upon the field casualty lists of compression of the brain stated to have been caused by the explosion of shells. Twenty-three were discharged. Of this number deafness is alleged in one case, irritability in one, meningitis in one, paralysis of limbs in one, paralysis of optic nerve in one, insanity in two, and spinal affection and nervous prostration in one case each. Seventy-one patients returned to duty. Among these cases the early symptoms were temporary deafness in five cases, momentary loss of sight and hearing in one, loss of speech in one, and cephalalgia in one. One patient deserted, and in thirty-five cases the results could not be ascertained.

nearly half an hour, and was followed by stupor, accompanied at short intervals by startlings of an indistinct gutteral sound. On the next day these symptoms had entirely disappeared and his intelligence was found to be perfectly rational, as it had always been during the whole course of his disease, although he retained no recollection of what had occurred during the previous twenty-four hours. He could only protrude his tongue with great difficulty, and it was drawn, in a marked degree, to the right side. The occurrence of this latter train of symptoms was sufficient to satisfy me of the correctness of my early views of the pathology of his affection. The indications were clear that the original hyperæmia and inflammatory conditions had resulted in softening of the cerebral tissue at about the origins of the proper nerves of audition and speech in the floor of the fourth ventricle. From the period of the subsidence of the graver symptoms just enumerated his condition has been variant from day to day. Sometimes he seems to be better, and then suddenly his symptoms become aggravated, with complaint of severe pain in his head. During the last month he has recovered sufficiently to be able to occupy himself in some trifling mechanical work, but still he remains *perfectly deaf and dumb*. The only other manifestation of paralysis is a slight loss of power, with stiffness in his right leg. His intelligence, spirits, and general health are quite good." Goodell was discharged for disability, February 4, 1863, and pensioned. Examiner O. G. Dyer, of Brandon, Vermont, reported, January 31, 1876: "The pensioner has complete loss of speech and hearing, the result of an injury sustained upon the upper middle third of the spinal column. At this point there is an angular curvature of the spine, and to the right, on a line with the spine of the scapula, between it and the vertebral column, a large circumscribed tumefied swelling, tender and painful on pressure, but without heat or redness. The tenderness and pain also extends to and involves the angle of curvature. Pensioner also has partial loss of sensation of both hands and feet. He has also hectical symptoms and is now totally incapacitated from all labor, requiring the aid of an attendant to supply his daily wants. On September 4, 1877, Dr. Dyer reported that the patient "is quite lame and gets about with difficulty."

The proportion of cases of deafness among officers of the artillery arm, as well as among the cannoniers, has been, since the war, a frequent subject of remark,[1] and on page 385 of the *First Surgical Volume* allusion is made to the frequency of rupture of the membrane of the tympanum from "propinquity to artillery fire."

An illustration of the serious injuries sometimes inflicted by the discharge of heavy artillery on soldiers in the near vicinity is given in the following case:

CASE 1048.—Corporal John S. Terhune, Co. K, 32d Illinois, was admitted into the hospital at Evansville, Indiana, in August, 1862. Assistant Surgeon W. D. Turner, 1st Illinois Artillery, reported: "Case of aneurism of abdominal aorta. Traces his injury to the 1st of March, 1862. While on the gunboat Lexington he was leaning over the side of the boat immediately above an 84-pound gun, when it was discharged. Another man was standing behind him and leaning most of his weight on him. The shock from the discharge caused them both to fall, or threw them back about seven or eight feet. It felt like an electric shock. On the same night he commenced discharging arterial blood from the bowels, which continued about four weeks. He was treated by Dr. Christy, 32d Illinois; took pills of opium. The discharges ceased in the beginning of April, when he first perceived a fluttering above the umbilicus, which has been increasing in extent and severity. It extends at present from four inches above the umbilicus to the bifurcation of the aorta below. He was dizzy part of the night when hurt, but was on picket duty part of the same night at Savannah, Tennessee. Present appearances: Anxious, uneasy; is a tall man, six feet three-fourths inch high; is losing flesh. Has, as he says, a sinking in his stomach. Appetite is very poor. Has orthopnœa, dyspnœa, tinnitis aurium, and throbbing in right side of head and neck and in right hypochondrium. Has considerable tenderness over spine at lower dorsal vertebra and to the right side a space of about the size of the palm of the hand. Bowels at times are costive, at present lax. The last blood he passed was very black. Has sensations of numbness when he lies on his back. Feet do not swell. Sleeps at night but two or three hours. Has bad dreams at night of falling off precipices and into water. In the supine position the abdominal aorta is felt to the left and partly over the spine, and is much increased in size. The pulsations at and immediately below the umbilicus for one-half inch are much stronger than at the apex of the heart. The same extends to about one and one-half inch above in the mesial line. One-half an inch above the umbilicus is the most powerful pulsation. Pulse 80, and very weak, feeble, and compressible. Extremities cold and numb. Circulation very defective; least noise causes violent excitement and palpitation. Has paralysis agitans almost constantly; sometimes cannot hold a pen from trembling in his hand. There is general numbness in right side; in stepping on any elevation always puts the left foot forward, as the right is deficient in power. Treatment: Purgatives, rest, anodynes." This man was discharged October 2, 1862, for "aneurism of the abdominal aorta; by compressing the aorta above, the tumor becomes soft and also is reduced in size." He was pensioned. Examiner J. W. Lee, of Majority Point, Illinois, August 9, 1871, certified to diaphragmatic hernia with considerable tenderness on pressure, with slight rupture of the abdominal artery, causing an enlargement of the capillary blood-vessels of the right leg. He is very much emaciated, presenting the appearance of one whose nervous system was gradually giving way, rendering him unfit for manual labor." Dr. W. H. Edson, of Willow Hill, Jasper County, Illinois, states that Terhune died June 24, 1877, from inflammation of the lungs superinduced by his internal injuries. No autopsy.

EFFECTS OF MISSILES AND PROJECTILES FROM SMALL ARMS.—By reference to TABLE CXXI, p. 696, it will be seen that of the aggregate of shot wounds reported during the war, by far the greater number was due to projectiles from small arms. In considering the effects of large projectiles, size, weight, and velocity constituted the principal factors; in the case of missiles and projectiles from small arms, form, both original and that acquired by

[1] LONGMORE, in his treatise upon *Gunshot Injuries, etc.*, London, 1877, p. 118 *et seq.*, graphically describes the effects produced by a terrific explosion of the French and English magazines of gunpowder and munitions of war during the Crimean campaign in 1855.

accidental causes, assumes importance, as well as the relation of the individual injured to the impinging projectile, the direction of the ball, position, structure, and power of resistance of the parts, and course of missile through the tissues. With reference to the projectile itself, form and velocity are of principal importance; size, weight, and volume modify the character and extent of the wound, while the remaining factors have an especial subjective relation. The great disparity in the number of wounds by round balls as compared with those by conoidal balls, indicated in TABLE CXXI, on page 696, shows that the greater effectiveness of the latter was early recognized by the combatants in the late war.

Aside from the influence which the improvements in modern small arms may have had in increasing the general effectiveness of projectiles, the adaptation of the conoidal missile to the rifled gun has unquestionably wrought a change in the surgical relations of wounds, the opinion being generally expressed by surgeons that wounds caused by the elongated missile are more severe and dangerous than those resulting from the spherical ball.

The cylindro-conoidal projectile attains a great range with effective power; it opposes less frontage to the resistance of the air and its velocity suffers less retardation than that of the spherical ball. Rotation upon its long axis tends to give it a steadier flight and a more direct course. Its pointed apex, aided by its rotation, gives it the mechanical advantages of the wedge and screw, enabling it to pierce more easily the structures of opposing bodies while it suffers a proportionately less diminution of force; adding the factor velocity, we have a missile endowed with tremendous force, maintaining for a long time and over great distances a steady flight, not easily deflected, piercing and rending opposing obstacles, and preserving, even at immense range, a momentum sufficient to render it deadly in its effects.

It is probable that the effects produced by round bullets at very close quarters are equally if not more destructive than those produced by elongated missiles; the initial velocity in the two cases does not vary greatly, and, in short distances, the advantage of form as a destructive element is on the side of the round ball; but as the peculiar power of the rifled bullet mainly lies in its destructive effects at long range, the change of military tactics, based on this fact, has compelled the general use of weapons of greater power and has thus lessened the opportunities for comparison on any extended scale.

The size and weight of small-arm missiles vary within such narrow limits as to make practically but little difference in the effects produced by them, though, in the question of the extraction of a ball from between bones or in joints, dimension may be of importance, as well as in the consideration of the gravity of penetrating wounds of the chest, as pointed out on page 615 of the *First Surgical Volume*.

Missiles from carbines, pistols, and from fowling pieces, when used as weapons of war, produce injuries very analogous to those of the ordinary small arms; but, being of smaller size and impelled with less force, their wounding power is generally less:

CASE 1049.—"Sergeant Stephen M. Harper, Co. D, 4th Ohio Cavalry, aged 25 years, while acting as a picket guard, nine miles from Nashville, February 28, 1862, was wounded by seven different bullets, fired simultaneously from a rebel ambush. The missiles were buckshot of the largest size. One shot passed through the biceps muscle of the right arm, entering the skin three lines outside of the cephalic vein, passing upward and inward, and emerging just anteriorly to the nerves and to the brachial artery. Another entered the right deltoid muscle, passing backward, and emerging at a point over the scapula two-thirds of the distance between the acromion process and the inferior angle of the bone. Another grazed the skin two inches above the insertion of the left *flexor biceps cubiti*. Another entered the flesh over the seventh intercostal space, on a line perpendicular from the left nipple, and, passing backward and outward three inches and three-fourths, emerged through the skin over the ninth intercostal space. Another entered over the ninth rib at a point on a line drawn from the right nipple to the right anterior superior spinous process of the ilium. This ball glanced around the body under the integuments, and was arrested by contact with the right lateral surface of the spinous process of the second lumbar vertebra, from which place it was afterwards removed through an incision made for the purpose. Another entered the right thigh two inches below Poupart's ligament, at the

outer margin of the quadriceps extensor muscle, and emerged over the posterior superior spinous process of the ilium upon the same side. The seventh grazed the skin over the body of the hyoid bone. The quantity of blood lost was inconsiderable. Only water dressings were applied to the wounds. There was very little ecchymosis and swelling. Suppuration was slight. The wounds were all healed by the 1st of April; but an attack of diarrhœa, which supervened while in the hospital, so depressed the general health of the patient that he was unable to resume active service after recovery from his wounds." Surgeon E. Swift, U. S. A., reported the case. The patient died in hospital No. 8, Nashville, on April 6, 1862.

At close range the "buck and ball," used extensively in the late war, was considered very effective, for, besides the effect of the round ball, the buckshot had sufficient force to place a man, temporarily at least, *hors du combat.*

The accidental forms and distortions which leaden projectiles are liable to assume by contact with opposing obstacles both within and without the body form a curious and interesting feature in the study of missiles and their effects. The illustrations given in PLATE LXXVIII, opp., are taken from the collection of missiles in the Army Medical Museum.[1]

If the distortions of bullets were of all imaginable forms, their courses were frequently no less erratic, as shown in the following example:

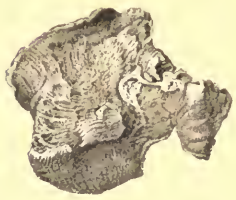
CASE 1050.—Private John R. Smith, Co. G, 22d Illinois, was wounded at Belmont, November 7, 1861. Surgeon J. H. Brinton, U. S. V., who saw this soldier at the time of being wounded on the field, describes the erratic course of the missile as follows: "A small conical ball entered *behind* the left shoulder and passed underneath the skin across *lower part of left side of neck*, across median line, and then upward immediately beneath the base of jaw of *right* side, emerging just below the angle of the maxilla. The man was shot in front of a fence, and the ball lodged in the fence and was removed and returned by his comrade. It was probably a small rifle projectile, or possibly, although unlikely from the time and circumstances, a revolver projectile. The track was superficial, for days discolored olive and yellow, as if painted by a camel's-hair pencil; there was little extravasation and almost no pain; no injury to either clavicle or maxilla. On the 26th of November, nineteen days after the injury, the patient was discharged from the hospital well. I could not obtain the ball. I watched this case almost from the moment of wounding." Smith was promoted sergeant and lieutenant, and mustered out July 7, 1864, at the expiration of his term of service, and pensioned. Examiner T. S. Hening, of Springfield, reported, July 8, 1864: "Smith received a gunshot missile beneath the jaw on the right side; it crossed the median line to the left side and then down the neck and outward to the acromial extremity of the vertebral portion of the spine of scapula. Considerable injury was done to the tissues of the left shoulder, the motion and power of which, together with those of the elbow joint, are much impaired. The left arm is somewhat wasted and its circulation defective." Examiner J. Bowman, of Flora, Illinois, certified, March 31, 1880: "Physical signs of disability are loss of hearing in left ear, paralysis of left arm and hand, extreme tenderness of left scapula and clavicle—in fact the whole left shoulder is disabled. Applicant states that the whole left shoulder and left arm have no power of feeling except a constant tingling and numbness of the muscles of left shoulder and arm, and that he is not able to perform any kind of manual labor." This pensioner was paid to March 6, 1881, and since reported "dropped from Roll because of death."

[1] Of the 20 missiles in PLATE LXXVIII, 15 are conoidal and 5 round balls. Brief abstracts of the conditions under which the missiles were found will be given; fuller details of the cases will be found in the *Catalogue of the Surgical Section of the U. S. Army Medical Museum*, Washington, 1866: *Spec.* 4557 (*Cat.*, p. 607), a conoidal ball split and flattened by the inferior maxilla; nearly one-third of the body is smoothly and obliquely split off from the apex and turned back, forming a plane surface with ragged edges.—*Spec.* 209 (*Cat.*, p. 614), a conoidal ball with the base split on the tibia into three equal parts, two of which are curled outwardly upon themselves. The second groove is almost obliterated.—*Spec.* 4279 (*Cat.*, p. 614), a conoidal ball split on the tibia from the apex to the second rim, with the two halves turned backward. The bullet lodged astride of the middle third of the tibia, and was discovered by the Nélaton probe after an unavailing search by ordinary means.—*Spec.* 4403 (*Cat.*, p. 612), the greater part of a conoidal ball which entered the meatus auditorius externus of the left ear to the depth of an inch and lodged in the mastoid process, whence it was extracted nearly three months after the injury.—*Spec.* 4483 (*Cat.*, p. 605), a conoidal ball much distorted and curved against a vertebra; the apex is obliquely flattened; a piece of bone is held in the base.—*Spec.* 4411 (*Cat.*, p. 611), a conoidal ball flattened by contact with the femur. The apex is undisturbed in shape; impact evidently occurred when the ball was revolving on its short axis, and probably at a low velocity.—*Spec.* 4400 (*Cat.*, p. 604), a conoidal ball, slightly rounded at the apex, with a deep longitudinal groove its entire length, from contact with a clavicle.—*Spec.* 2645 (*Cat.*, p. 610), a conoidal ball extracted from the sole of the foot, laterally and smoothly flattened somewhat like a fan. The smooth surface has a multitude of shallow parallel grooves.—*Spec.* 693 (*Cat.*, p. 606), a conoidal ball flattened from the apex backward, with body curved over the base to a diameter of nearly an inch and one-fourth; ball entered the front of the knee below the patella and passed upward and inward through the inner condyle of the femur.—*Spec.* 1236 (*Cat.*, p. 609), a conoidal ball removed from the knee joint, apparently split longitudinally and expanded and flattened laterally; the missile probably struck in the act of longitudinal rotation.—*Spec.* 4558 (*Cat.*, p. 606), a conoidal ball detected by NÉLATON'S probe and extracted, 20 months after injury, from the sternum. The missile is flattened upon itself from the apex to the second ring, with jagged borders.—*Spec.* 4151 (*Cat.*, p. 593), an elongated rifle ball, very little disfigured, with an ordinary military coat button inverted, together with the cloth to which it was sewn; the missile had passed through the liver and lodged beneath the diaphragm.—*Spec.* 2241 (*Cat.*, p. 615), a conoidal ball with the apex somewhat driven into the body, and the whole laterally compressed with a flattened fragment projecting from one side. The missile was found lodged against the femur behind the trochanter major.—*Spec.* 3028 (*Cat.*, p. 595), a conoidal ball, beaten into nearly a triangular pyramid with very sharp edges, extracted from the lower third of the thigh. It probably ricochetted from a stone before wounding.—*Spec.* 4423 (*Cat.*, p. 612), a conoidal ball smoothly flattened over a surface of one by one and a half inches by contact with femur, without producing fracture. The flattening is lateral, as if by being rolled out after splitting.—*Spec.* 2813 (*Cat.*, p. 600), a spherical bullet flattened and halfway split, with ragged edges, removed from near the fifth lumbar vertebra.—*Spec.* 4564 (*Cat.*, p. 600), a spherical ball, somewhat flattened and smoothly split near the centre, with the smaller portion bent down at right angles; extracted from above the condyle of the humerus.—*Spec.* 4533 (*Cat.*, p. 591), a flattened round ball, which passed subcutaneously from one thigh to the other.—*Spec.* 4435 (*Cat.*, p. 600), a round ball, grooved in one side to the depth of a quarter of an inch, with a fragment bent outwardly, removed from the superior maxilla. It had penetrated the brain through the opposite temple.—*Spec.* 4565 (*Cat.*, p. 600), a spherical ball, irregularly flattened on one side, in which is embedded a fragment of an iron nail as though from the heel of the shoe; missile was extracted from against the bone near the centre of the plantar surface of the foot.

Spec 4537

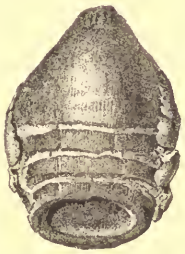
Spec 209

Spec 4279



Spec 4403

Spec 4483



Spec 4411

Spec 4400.

Spec 2645

Spec 693

Spec 1236

Spec 4558

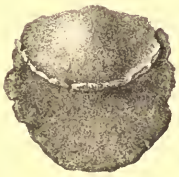
Spec. 4151.

Spec 2241

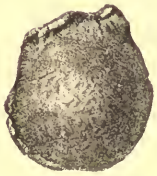
Spec. 3028

Spec 4423

Spec. 2813



Spec 4364



Spec 4553

Spec 4435

Spec 4565

T. Sinclair & Son, lith. Phila.

PLATE LXXVIII. DISTORTED BULLETS.

Specimens in the Army Medical Museum.

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Entrance and Exit Wounds.—Small projectiles impinging upon the human body and penetrating the skin inflict what is known as the wound of entrance; if preserving sufficient force to perforate, the opening last made is called the wound of exit.

These wounds of entrance and exit, which have for years been the subject of lengthy discussions, are believed to possess certain diagnostic values, as indicating in a general way the form and variety of missile, its velocity, its probable course through the tissues, and, to some extent, the nature and character of the wound. Under the force of ever varying conditions they are very diverse in appearance and extent, and their significance is largely dependant upon the experience and acuteness of the observer.

In general, a bullet preserving its integrity, impinging at ordinary range and at a right angle upon a portion of the body well covered with soft tissues and not unnaturally put upon the stretch, leaves, as it passes through the skin, an opening more or less regularly rounded in form, often perhaps a little less in diameter than the missile, with the edges inverted and livid in hue, due to the contusion and to the discoloration from the burned powder carried upon the missile. In the case of a spherical ball there is generally some loss of substance, a portion of the integument being carried away before its obtuse surface. A cylindro-conoidal bullet will probably cause a more irregularly outlined opening, either stellate or slit-like, with serrated edges.

The wound of exit may closely resemble that of entrance, but is usually larger and more irregular, with everted edges, bearing fewer evidences of contusion, but often showing a greater loss of substance.

From this simple uncomplicated form of wound we find an almost infinite variation, dependent upon the peculiar circumstances which impress their characteristics upon each case.

If the missile has carried before it a foreign body, or has become distorted before impact, or has suffered a diminution of velocity and force, the wound of entrance will be modified accordingly. The resistance offered by the tissues to the passage of a missile through any part of the body and the reciprocal effect of the tissues upon the missile will largely influence the character of both entrance and exit wounds. Obliquity of the course of a projectile to the plane of the surface of the body will result in merely a superficial grazing of the skin or penetration and perforation, in which case the appearance of the wounds of entrance and exit will depend on the angle of impact. Fragments of shell produce irregularly shaped wounds, with contusion and considerable loss of substance; should their force be sufficient to perforate a part, the wound of exit is lacerated and ragged, with portions of muscular and connective tissue thrust out of the opening. The differential diagnosis between these and bullet wounds is usually not difficult.

A single wound of entrance may have two or more wounds of exit; as, for example, when a missile is divided upon a bone. A projectile may be split into fragments before striking the body, in which case the fragments may each enter and leave separately, or one or more fragments may lodge. Multiple wounds of entrance and exit are common, resulting from a missile perforating two or more parts of the body successively, as two arms, two legs, the body and one or more extremities, or parts of the same extremity when flexed. Cases are recorded in which the projectile has entered and made its exit by the same opening.

Plate XXXIX, opposite p. 712, and PLATE XL, opposite p. 714, give typical representations of wounds of entrance and of exit made by spherical and conoidal balls and small fragments of shells under varying circumstances. The drawings were made from

recent wounds, at field hospitals, during the war, by the late Hospital Steward E. Stauch, U. S. A., and present faithful delineations of the early appearances of these wounds.[1]

EFFECTS OF PROJECTILES ON MUSCULAR TISSUE AND TENDONS.—The differences of structure and density of the muscular tissues of the body encountered by a missile in its passage are found to influence the directness of its course, unless its velocity, *i. e.*, force, is sufficiently great to overcome the resistance offered, as in the case of conoidal missiles at high velocities, the course of which is generally direct.

Round balls presenting an obtuse frontage part more easily with their force, and are readily deflected by fasciæ and aponeurotic expansion, pursuing curious and devious courses until they either find exit or make lodgement:

CASE 1051.—Corporal S. S. Walker, Co. F, 51st Illinois, aged 26 years, was wounded at Chickamauga, September 19, 1863. He was treated in hospitals in Nashville and Louisville, and on December 2d was admitted into the hospital at Quincy, Illinois. Acting Assistant Surgeon F. K. Bailey reported: "A round leaden bullet entered one inch to the right of the third dorsal vertebra and gives no indication of having passed out, but seems to have passed round the body and lodged in the pectoralis muscle; wound healed." He was returned to duty March 9, 1864, and discharged from service June 16, 1865, and pensioned. Pension Examiner T. S. Hening, of Springfield, Illinois, reported, August 22, 1865: "Applicant received a ball on the right side of the second dorsal vertebra, which entered the back, lodged, and is concealed in the tissues, probably on the inner side of the front portion of the right third rib, where there is tenderness, though the ball did not, I think, pass through the lung; complains of pain in chest and difficult breathing on exertion and in damp weather; also weakness of the right arm and muscles between the shoulders. Has also a buckshot lodged over the right parotid gland, and one on the outside of the left shoulder which only produces slight soreness." The pension examining board at Springfield report, under date of February 18, 1880: "Ball remains unextracted." His pension was paid June 4, 1881.

The effects of missiles of different character upon muscular structures are not dissimilar; the track of a small conoidal ball passing swiftly through a muscle is generally more cleanly cut than that made by a large or round ball; but in all shot wounds there is usually found an irregular channel with contused and lacerated walls, more or less devitalized by contact with the missile, the area of injury gradually shading off by concentric layers until lost in healthy tissue; there is always more or less loss of substance dependent somewhat upon muscular tension or relaxation, also upon the direction of the missile through the muscle, whether transversely or obliquely to its long axis. Fasciæ and aponeurotic tissues are torn and lacerated or simply perforated, according to their condition of tension at the time; their openings seldom correspond with the openings in muscular tissue, owing to the ever constant change in the relations of parts due to movement and muscular action. Hence it is frequently difficult to follow the course of the missile with accuracy; when, for the pur-

[1] The drawings in PLATE XXXIX represent: FIGS. 1 and 3, the entrance and exit wounds of the left foot and the right thigh in the same subject by a conoidal bullet. The soldier at the time of the injury was in a sitting posture on the ground, with the left leg well flexed. The left drawing of FIG. 3 shows the wound of entrance just behind the joint of the great toe; the right drawing the wound of exit diagonally below; the upper sketch of FIG. 1 shows the entrance wound of the right thigh, in which the ball lodged; the missile after inflicting the wound of the foot had probably lost part of its force and had possibly suffered some change in rotation, not striking the thigh directly with its apex. The lower drawing of FIG. 1 shows the entrance wound inflicted by a conoidal ball that flattened on the right clavicle and lodged beneath the scapula. FIG. 2 represents the wounds of entrance and exit in a shot fracture of the ankle joint by a conoidal ball; entrance wound to the left, exit to the right. FIG. 4, a penetrating wound of the abdomen by a conoidal ball; the upper drawing shows the wound of entrance, the lower the wound of exit. FIG. 5, simple flesh wound of thigh by spherical ball; upper drawing represents the wound of entrance, lower, that of exit. FIG. 6, a simple flesh wound of lower third of arm by a conoidal ball; wound of entrance to the left, exit to the right. FIG. 7, flesh wound of arm by a small fragment of shell; wound of entrance to the left, exit to the right. FIG. 8, shot wound of neck by a conoidal ball; wound of entrance to the left, exit to the right, by a missile travelling with high velocity. FIG. 9, shot wound of thigh by a minié ball, large calibre; entrance wound to the left, exit to the right. FIG. 10, flesh wound of hand by fragment of shell. FIG. 11, flesh wound of shoulder by a fragment of shell. FIG. 12, slight flesh wound of leg by fragment of shell. FIG. 13, gunshot wound through body from right to left, between ninth and tenth ribs, by a conoidal ball; the figure represents the wound of entrance. FIG. 14, shot wound of left thigh, fracturing trochanter, from a spherical musket ball. The wounds on PLATE XL represent: FIG. 1, shot wound of left hand, fracturing bone, by a conoidal ball; wound of entrance to left, of exit to right—both very characteristic. FIG. 2, shot wound of foot, fracturing bone, by a conoidal ball; wound of entrance to left, of exit to right. FIG. 3, flesh wound of right arm, making exit from forearm, by conoidal ball; left drawing represents wound of entrance, right, wound of exit—somewhat oblique. FIG. 4, flesh wound of shoulder by a conoidal ball; upper figure shows wound of entrance, lower of exit. FIG. 5, shot wound of leg, involving bone, by conoidal ball; here the right figure represents the wound of entrance and the left the exit wound. FIG. 6, shot wound of foot by conoidal ball; left figure wound of entrance, right, of exit. FIG. 7, shot wound of left shoulder, fatal, by conoidal ball; entrance to left, exit to right. FIG. 8, shot fracture of ilium by conoidal ball; entrance wound to left, exit to right. FIG. 9, flesh wound of leg by conoidal ball; entrance wound above, exit below. FIG. 10, shot wound of arm, involving bones, by a conoidal ball; entrance to left, exit to right. FIG. 11, shot wound of left leg, fatal, by a conoidal ball; entrance to left, exit to right. FIG. 12, shot flesh wound of foot by conoidal ball; entrance wound to left, exit to right—a typical representation of the effects of a conoidal ball at high velocity.

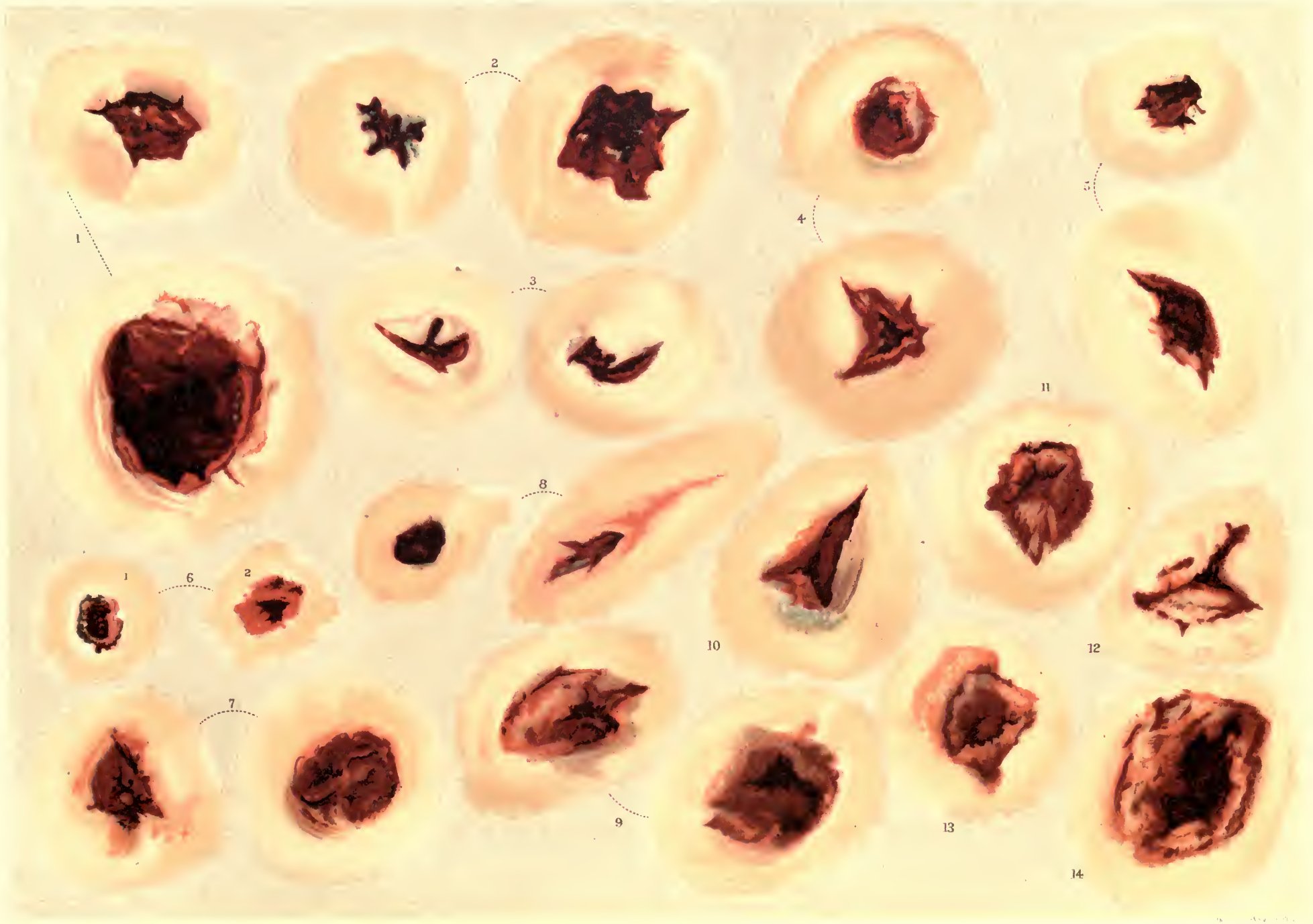

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PLATE XXXIX EARLY APPEARANCES OF ENTRANCE AND EXIT SHOT WOUNDS

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pose of diagnosis, it becomes necessary to do so, the relation of the individual to the impinging projectile becomes of great importance.

Contusions of muscular tissue are found as the result of the impact of "spent balls," or where the force of the missile has been retarded upon some obstacle, as on a part of the equipment, or on objects upon the person, as books, money, buttons, etc. The contusion may present all degrees of severity from simple ecchymosis to the loss of vitality of the part struck; this may be limited to the skin, in which case an eschar of rounded form and of about the size of the missile is thrown off, or it may affect deeper structures, as the contents of the great cavities.[1] Contusions result more frequently from round than from conoidal balls.

Wounds by distorted bullets, by fragments of shell, by foreign bodies, or by elongated bullets revolving on their lesser axis, are more destructive in their nature than the usual wounds from intact balls; the irregularity of a bullet track, due to the causes mentioned, constitutes one great source of danger in flesh wounds. The cavities and irregular pouches formed along the track give lodgement to foreign matters driven in with the missile, as shreds of clothing, etc., causing irritation, inflammation, and abscess, with the retention and burrowing of purulent accumulations, and exposing the patient to the danger of septicæmia, or, at least, prolonging convalescence and retarding cicatrization.

Many cases attended with extensive destruction of skin, muscular tissue, tendons, and ligaments resulted fatally or in very serious disability from contraction and rigidity of parts, and from the formation of extensive cicatrices impairing motion and becoming the seat of pain and inconvenience.

Gangrene, tetanus, and pyæmia were not infrequent complications, and in a number of lesions of the muscular structure of the extremities life was only preserved by recourse to amputation. Instances of this nature have been cited among the flesh wounds of the extremities.

A few instances of repair of shot wounds of muscles by first intention have been noticed, but they were very rare and presuppose a cleanly cut wound, a sound constitution, and a temperate habit of life.

EFFECT OF MISSILES AND PROJECTILES ON BONY STRUCTURE.—The effects of missiles and projectiles upon the bony structure of the human body have been so thoroughly illustrated in their practical relations that little more than a brief general consideration of the subject is here necessary.

Gunshot injuries of bones may be classified as contusions, simple fractures, partial fractures, penetrations, perforations, and complete fractures, with varying degrees of comminution and destruction of substance. Nearly every form of gunshot missile and projectile used in warfare is liable to cause these various injuries. The properties inherent to the missile, as velocity, size, form, and weight, and the conditions pertaining to the individual at the time, as posture, part wounded, etc., will determine the nature, extent, and severity of the injury. Slight forms of injury *may* result from the impact of a solid shot, a fragment of shell, or from a leaden bullet; injuries of the gravest character may equally be inflicted by these missiles. Between the extremes are found wounds of all degrees and grades, but they are all simply the manifestation of mechanical force acting in accordance with established laws.

[1] A soldier found an iron breast-plate, probably thrown aside by some Confederate, on the field at Kingston, N. C., and put it on. He was struck by a minié ball on the breast-plate over the region of the third rib and severely contused. He expectorated a full pint of blood and suffered from dyspnœa; the next day he was able to walk about. Since the reception of the wound a round excavation about the size of a Belgian minié bullet has sloughed out at the point where he was hit, laying bare the rib. The same breast-plate was worn by another soldier at Whitehall, with less fortunate result. A minié ball struck it near its lower border and passed through it, carrying fragments of it into his abdomen, causing death.

Discussion upon the comparative effects of round and conoidal missiles has been virtually put at rest by the general adoption of arms of precision and some form of elongated conoidal bullet. Writers on modern military surgery agree in conceding to the conoidal missile greater force and more destructive power.[1]

There is no doubt that at very close range the damage inflicted by the round ball is hardly less than that resulting from the conoidal bullet, but beyond this point, and to extreme ranges, the conoidal missile is by far the more efficient engine of destruction:

CASE 1052.—Private G. R. Packard, Co. F, 3d Maine, aged 21 years, was wounded at Fair Oaks, May 31, 1862. Acting Assistant Surgeon S. Teats contributed the following history: "The patient, a farmer by occupation, of temperate habits, having no strumous or other hereditary disease, was wounded by a round ball and buckshot, both coming from the same musket at close range, the ball fracturing the left humerus and the buckshot wounding the left shoulder. The arm was amputated about the middle, a few hours after the injury, on the field. On admission to DeCamp Hospital, June 8, 1862, the whole stump was swollen and painful; the end was nearly cicatrized. Anteriorly, just below the left clavicle and at its external third, there was a small opening from which thin bloody pus was discharging; posteriorly, on the same side, at about the lower angle of the scapula, there was a circular cicatrix the size of a buckshot. About the cicatrix there was a fluctuating tumor, with heat and pain of the part. No aneurismal thrill or bruit. He was much debilitated and anæmic. On passing an exploring needle into this tumor no pus could be detected. July 1st, arterial hæmorrhage to the amount of one pint from the anterior wound, which ceased spontaneously, after which pus was again discharged. July 20th, hæmorrhage again about the same amount as before, again followed by discharge of pus. July 28th, hæmorrhage again amounting to one and a half pints, but this time it did not cease spontaneously as in the two previous cases. On consultation it was decided to ligate the axillary artery. This was done by enlarging the wound and passing the ligature around it near its origin, without, however, seeing the artery, the pulsation of the vessel being the guide. The hæmorrhage ceased as soon as the ligature was tightened. With each occurrence of hæmorrhage the tumor posteriorly diminished in size somewhat. Some two or three days after the operation an organized clot was discharged from the wound about the size of a hickory nut. Two days after this another clot of like size and appearance was discharged. Subsequent to this laudable pus was discharged until August 5th, when the patient died from another recurrence of hæmorrhage. The ligature could not be found; it was supposed that during sleep he had pulled it away. Autopsy sixteen hours after death: On tracing up the axillary artery it was found that about two inches of it had almost entirely disappeared. Commencing just below the first rib a cavity, containing several ounces of moré or less organized clot, existed around this deficiency of the artery, which cavity extended downward into the axilla and backward under the scapula. No pus was found in the shoulder joint. The head of the humerus was very soft, and on cutting through the softened articular cartilage a pasty substance was found beneath it, taking the place of much of the spongy extremity of the bone. This pasty substance was the broken down spongy structure. Other organs normal. In the specimen it will be seen that about one-third of the border of the cartilage of incrustation is detached from the bone. This is due to manipulation and maceration." The specimens were forwarded by Dr. Teats, together with a wet preparation, in two portions, of parts of the aorta, innominata, left common carotid, subclavian and axillary arteries. (See *Cat. Surg. Sect.*, 1866, p. 459, *Spec.* 4339.)

Contusions of bone more commonly result from the impact of missiles under low velocity, as a spent ball or fragment of shell, or when the force of the missile has been nearly expended in overcoming the resistance of overlying tissues, or when the line of direction has been oblique to the bone, causing a glancing or grazing blow. Round balls, parting rapidly with their force after their initial velocity is diminished, will generally contuse rather than fracture; the same is true of shell fragments, unless their weight is sufficient to cause fracture by crushing. Contusions of bone *may* be followed by no very serious results; such cases undoubtedly occurred during the late war, and recovery followed without bad symptoms. Instances of this nature have been reported on pp. 817 and 920 of the *Second Surgical Volume.*

In many cases the contusion was at first unrecognized, until tardy and faulty cicatrization and discharge of bone proved the existence of caries and necrosis:

CASE 1053.—Private C. C. Mulford, Co. K, 6th New York Artillery, aged 42 years, was wounded in the right thigh, at Spottsylvania, May 19, 1864, and entered Fairfax Seminary Hospital six days afterwards. Assistant Surgeon H. Allen, U. S. A.,

[1] MATTHEW (T. P.) (*Medical and Surgical History of the British Army which served in Turkey and the Crimea in the years* 1854-1856, London, 1858, Vol. II, p. 263) found that "the conical bullets used so extensively in this campaign inflict a much more severe and dangerous wound than the old round ball." ERICHSEN (J. E.) (*The Science and Art of Surgery*, Philadelphia, 1878, Vol. I, p. 236) declares: "On the bones especially, the modern conico-cylindrical bullet produces the most destructive effects; not only comminuting the part struck, but often splitting up the shaft of the bone by its wedge-like action, in fissures many inches long leading into contiguous parts." MACLEOD (G. H. B.) (*Notes on the Surgery of the War in the Crimea*, London, 1858, p. 98) asserts that: "The greater precision in aim, the immensely increased range, the peculiar shape, great force, and unwonted motion imparted by the new rifles to their conical balls, have introduced into the prognosis of gunshot wounds an element of the utmost importance." ASHHURST (J., jr.) (*The Principles and Practice of Surgery*, Philadelphia, 1871, p. 158) finds that: "Bullet wounds have increased greatly in severity since the introduction of rifled muskets and of conoidal balls. The old round musket ball, fired from a smooth-bore, produced a comparatively slight wound."

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PLATE XL. EARLY APPEARANCES OF ENTRANCE AND EXIT SHOT WOUNDS

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described the injury as follows: "The wound was caused by a musket ball, which entered at the upper part of the middle third of the thigh and lodged. The case was treated as a simple flesh wound; patient doing well. On June 14th the missile was found and extracted. A severe diarrhœa came on June 19th and continued till June 25th, when it was controlled. Four days afterwards diarrhœa again appeared, and brandy and opium were prescribed. During the night of June 30th the patient had a severe chill, followed by fever, dry tongue, and collections of sordes upon the teeth. I saw the patient for the first time on July 1st, when he was in a dying condition, being bathed in a copious clammy sweat, though his mind was quite clear, and he complained of no pain. There was discoloration of the skin. He died on the following day, July 2, 1864. Autopsy: Emaciation extreme; affected thigh very little swollen: wound open, and the integuments for some distance above and below it of a purplish red color; femoral vein entirely healthy; internal organs healthy. The bone was found to have been grazed by the ball. Upon removing the femur its walls immediately opposite the track of the ball were found to be stripped entirely of periosteum, and that covering the bone above and below this region was thickened and stained of a grayish hue from contact with a dark colored offensive pus, which laid both in the wound and around the bone. At the great trochanter an abscess of about the size of a hen's egg was discovered. This was entirely distinct from the collection before mentioned, being separated from it by a track of comparatively healthy tissue. The pus contained therein was more laudable than that found elsewhere. When the bone was sawed open, which was accomplished with some difficulty on account of the increased thickness and density of its walls, its entire interior was found filled with pus, the fluid being of an ochre-yellow, with large oily globules floating upon the surface. No trace of the original structure could be seen anywhere. The spongy tissue at the head of the bone was completely discolored with a uniform grayish yellow stain, while that of the condyles was perfectly healthy. The walls of the bone were of great thickness and the sawn surface presented a white, glistening, eburnated appearance. No vascularity was seen, and the haversian canals were found not to be enlarged." The greater portion of the injured femur, contributed to the Museum by Surgeon D. P. Smith, U. S. V., constitutes specimen 2675 of the *Surgical Section*, showing necrosis at the point of contusion on the inner surface in the middle third, above and below which the bone is greatly roughened by suppuration in nearly its whole extent.

Unhappily a very considerable percentage of cases of contusions of bone proved to be far from innocent, and were followed by a train of most serious complications. In discussing shot contusions of the cranial bones in the *First Surgical Volume*, at page 101, hæmorrhage, gangrene, periostitis, and exfoliation were mentioned as early complications, and among the later results vertigo, chronic irritation of the brain, mental imbecility, and impairment of the special senses. Surgeon John A. Lidell, U. S. V., in an article on shot contusions of bones[1] enumerates ecchymosis of the osseous tissue, ecchymosis of the medullary tissue, osteomyelitis of a simple character, necrotic osteitis, and suppurative osteomyelitis, as consequences of contusion of bone, and says: "Any injury of bone in the nature of a bruise, however trivial it may appear to be at the time of infliction, may be followed by serious consequences, which it is the duty of the surgeon to anticipate and ward off if possible."

Stromeyer[2] describes contusions of bones as follows: "They [bullets] strike the bone without breaking it and flatten themselves against its surface; the bone struck becomes necrotic from the destruction of its periosteum. In crowded hospitals such injuries of the larger long bones cause suppuration of the medullary canal, which extending itself, at last by the passage of pus into the veins, gives a fatal termination. In the autopsy (the bone being sawn in its long axis) the marrow is found filled with pus from the wounded part upward, and the same morbid product in the neighboring large veins; as in the femoral vein after contusion of the femur. The spot struck by the ball is colorless and exsanguine; in its circumference appears the commencement of a line of demarcation. Contusions of this kind, which up to the present time have been little attended to in the long bones, are well known in the bones of the skull, where caused by a blow or fall they have the same dangerous consequences if not properly treated, as suppuration occurs in the diploe and purulent inflammation in the sinus, with its usual results." Dr. Lidell[3] is of the opinion that, owing to their better blood-supply and consequent greater vitality, shot contusions of upper portions of the body give more favorable results than similar lesions of the lower extremities. The results as tabulated on the next page from the records of this Office seem to favor this conclusion.

[1] LIDELL (J. A.), *On Contusion and Contused Wounds of Bone, with an Account of Thirteen Cases*, in *Am. Jour. Med. Sci.*, 1865, Vol. L, p. 17.
[2] STROMEYER (L.), *On the Fractures of Bones occurring in Gunshot Injuries*, STATHAM'S translation, London, 1856, page 2.
[3] LIDELL (J. A.), *On Contusion and Contused Wounds of Bone, etc.*, in *American Journal of Medical Sciences*, 1865, Volume L, page 20.

TABLE CXXII.

Numerical Statement of Shot Contusions of the Bones of the Head, Trunk, and Extremities.

SEAT OF INJURY.	CASES.				Percentage of Fatality.	TREATED BY CONSERVATION.			TREATED BY EXCISION.		TREATED BY AMPUTATION.	
	Total.	Recovery.	Fatal.	Unknown.		Recovery.	Fatal.	Unknown.	Recovery.	Fatal.	Recovery.	Fatal.
Shot Contusions of the Bones of the Skull	328	273	55	.....	16.7	261	51	.....	12	4	.....	
Shot Contusions of the Pelvic Bones	30	25	3	2	10.7	25	3	2	.....	.....	.....	.....
Shot Contusions of the Humerus	22	18	4	.....	18.1	18	4	.....	.....	.....	.....	.....
Shot Contusions of the Forearm	10	8	2	.....	20.0	7	1	.....	1	.....	.....	1
Shot Contusions of the Femur and Knee	205	144	61	.....	29.7	140	46	.....	.....	.....	4	15
Shot Contusions of the Leg and Ankle	194	165	29	.....	17.5	157	15	.....	.....	.....	8	14
Shot Contusions of the Foot	27	26	1	.....	3.7	26	1	.....	.....	.....	.....	.....
Aggregates	816	659	155	2	19.0	634	121	2	13	4	12	30

Structure has undoubtedly a great influence in determining the severity of the effects of contusion. Such lesions in the spongy bones or cancellated portions of long bones, attended with extravasation of blood, are very liable to result in extensive and dangerous necrosis, inasmuch as the blood confined within the unyielding structure interferes by compression with the nutrient blood-vessels, or acting as a foreign body destroys the vitality of the bone by setting up inflammatory action.

CASE 1054.—Private J. Tetlow, Co. F, 23d New Jersey, was wounded at Fredericksburg, December 13, 1862. Surgeon G. Burr, U. S. V., reported his admission to the field hospital of the 1st division, Sixth Corps, with "shot wound of leg." Acting Assistant Surgeon G. F. French reported the following result of the injury: "The patient was admitted to hospital at Alexandria on December 19th. He had been wounded by a ball entering on the outer side of the right popliteal space and not emerging. He was a strong and healthy man, his pulse being 90 and full; appetite fair; knee tender, very little inflamed, and slightly swollen. By December 22d the inflammation about the knee was increasing; pulse 98; appetite flagging. On the next day there was high constitutional fever with great swelling and pain about the knee; patient hectic and had a chill. On December 24th a round ball was found lying loose in the wound and was extracted without incision; under portion of internal condyle felt to be bare. December 29th, knee more inflamed and swelled; constitutional fever about the same; pulse 100 and weak. Pus was detected and let out by a free incision, giving much relief. Egg-nog ordered for the patient. On the following day he was more comfortable but seemed exhausted, and was delirious at times; pulse weak. On December 31st he had a chill with pain in the stomach, and two days afterwards he was delirious; pulse very feeble and slow. His death occurred at 5 P. M. on January 2, 1863. Autopsy: External condyle bared of periosteum; joint full of pus; external portion of articular surface of tibia bared also; lower third of femur dissected up with pus; periosteum gone on the inner side and end of internal condyle; bone beginning to necrose. The missile had impinged upon the under side of the internal condyle, doing no further injury to the bone than killing the periosteum over a space the size of a half dime."[1]

CASE 1055.—Private S. F. Blanchard, Co. D, 17th Michigan, aged 25 years, was wounded in the left knee, at the battle of Antietam, September 17, 1862. He was conveyed to the Big Spring field hospital, near Sharpsburg, where Surgeon T. H. Squire, 89th New York, recorded the following description and result of the injury: "The wound was caused by a musket ball which struck just at the inner side of the triceps extensor of the left knee, passed backward, grazing the side of the inner condyle in its course, and came out between the tendons of the inner hamstring. In an early examination of the joint it would have been possible for a good surgeon to conclude that the cavity of the joint had just escaped; but at this date (October 16th) there are all the bad symptoms of such cases—pus in the joint and up the thigh, hectic, diarrhœa, etc. The case presented but little encouragement for the knife since the time I first saw the patient, though he had scarcely failed any for some days. His death occurred on November 1, 1862." The bones of the wounded knee, contributed by Surgeon Squire, and exhibiting destruction of the joint by ulceration, constitute specimen 3580 of the *Surgical Section* of the Museum.

The following case of simple osteomyelitis affords an illustration of one of the frequent and grave results of bone contusions observed during the late war:

CASE 1056.—Private John Anderson, Co. G, 76th New York, aged 30 years, was wounded at Cold Harbor, June 6, 1864. He was at once conveyed to the depot field hospital of the Fifth Army Corps, and on June 12th was transferred to Stanton Hospital, Washington. Surgeon John A. Lidell, U. S. V., reported: "Was admitted for a gunshot wound of the left thigh in the

[1] An abstract of this case was published by J. B. BELLANGER (*Report of five cases of Gunshot Injury of the Knee Joint*) in *American Journal Medical Sciences*, New Series, 1863, Vol. XLVI, p. 44.

upper third, inflicted by a conical musket ball, which penetrated the front of the limb at the inner side of the femoral vessels, and, passing backward and outward through the limb, lodged beneath the skin. It was extracted by an incision from behind. When he came to the hospital, six days after the injury, it was thought that the wound was only a flesh one. His general condition was fair, or rather below par at that time. Simple dressings to wound were ordered, and nutrients and stimulants were allowed. Subsequently the wound did well, and he appeared in a fair way to recover for a time. July 1st, it was observed that he was failing in strength and emaciating. Stimulants and the supporting treatment were continued with tinct. ferri muriat. Afterwards he sank into a typhoid condition, the skin becoming warmer than natural, but without sweats, the pulse frequent and feeble, the tongue dry and red, with almost entire loss of appetite. He also became somnolent, and toward the last it was difficult to rouse him. He did not have any chills. He died July 18th. The amount of discharge from the wound was at no time great, but the thigh remained swelled and inflamed all the while. On making an autopsy it was found that the bullet had struck the shaft of the femur on its postero-inner side, two or three inches below the trochanter, *grazing and bruising it*. The aperture of exit had healed. There was an abscess about the place of injury of the bone as large as an orange, and pus had also burrowed among the muscles of the thigh. There was a large deposit of new bone about the contused portion of the femur. A longitudinal section was made with a saw. New osseous tissue was also found deposited in the medullary canal. The marrow presented the 'red inflammatory' appearance described by Virchow. There was no thrombosis, nor any lesion whatever of the veins and arteries. The cadaver was considerably emaciated and resembled in its general appearance that produced by typhoid fever. There was no lesion of the intestines or any other of the internal organs. For an account of the autopsy and for much other interesting information concerning this case, the writer[1] is indebted to Assistant Surgeon George A. Mursick, U. S. V."

A case of gangrenous osteomyelitis following shot contusion of the femur has been cited on page 171, *ante*, and a similar case is here detailed:

CASE 1057.—Private G. Cole, Co. A, 91st New York, aged 35 years, was wounded in the right thigh, at Petersburg, March 31, 1865. From a field hospital he passed, on April 3d, to the Fifth Corps Depot Hospital at City Point, and two days later he was transferred to Washington. Assistant Surgeon W. F. Norris, U. S. A., contributed the following history: "The patient was admitted to Douglas Hospital, April 6th, with a wound inflicted by a minié ball, which caused a severe contusion of the femur at the middle third without producing fracture. His constitutional condition at the time of his admission was good and the wound looked healthy. On April 12th a very much flattened bullet was extracted by Acting Assistant Surgeon H. Gibbons. On the 17th, erysipelatous inflammation appeared about the wound, which increased on the following day in spite of the application of poultices and tincture of iodine. On the 20th there was a slight attack of erysipelas of the nose, and the following day the patient had two severe chills, which were repeated on the 22d, 23d, and 24th. On the 25th he again had two chills, and one on the next day. The conjunctivæ now had assumed a yellow tinge, and he had pain in the chest; pulse 132. On the 27th there was another chill, the constitutional condition remaining as before, and on the following day there was one more repetition, and secondary involvement of the knee joint manifested itself. The skin and conjunctivæ were now deeply jaundiced, and the discharge from the wound unhealthy, fetid, and bloody. On the 29th there was hiccough, delirium, and vomiting, and the patient sank rapidly. He died on the following day—April 30, 1865. At the autopsy, both lungs were found to be covered posteriorly with an offensive greenish flaky lymph and to contain a number of small pyæmic abscesses. There was about five ounces of effusion in the thoracic cavities. The other organs were but slightly affected. On removing the femur the periosteum was found to be wanting for five inches in length and one-third of the circumference of the bone, the part so bared showing evidence of absorption of its tissue except at the point struck by the bullet. On sawing open the shaft of the femur longitudinally the lower half was discovered to be in a gangrenous condition, the medulla being greenish, soft, and offensive, and the cancellated structure of the condyles presenting the same appearance. There was about two ounces of thin brownish-yellow fluid in the knee joint, and the femoral vein near the joint as well as the small articular veins were filled with clots, their inner coats in some places being reddened and in others of a greenish hue."

A leaden bullet coming in contact with a bone presenting a smooth flat surface, as one of the faces of the tibia, may flatten itself against it, contusing without fracturing the bone:

CASE 1058.—Private W. B. Donkersley, Co. I, 2d New Jersey, was wounded at Chancellorsville, May 2, 1863. He was admitted, on May 8th, into Douglas Hospital, Washington. Acting Assistant Surgeon Carlos Carvallo reported: "This patient received a flesh wound of the right inguinal region; ball extracted on field; doing well, wound suppurating." At the end of a week Donkersley was transferred to Satterlee Hospital, Philadelphia, whence Acting Assistant Surgeon J. H. Hutchinson reported: "This man received a wound from a conical ball which entered the right groin and flattened itself on the bone without producing fracture. He lay upon the field all night, and was removed Sunday morning and the ball extracted. From the time of the wound on Saturday afternoon until Sunday morning he was entirely insensible, and remembered nothing from the time of receiving the shot until he roused to consciousness in an ambulance on Sunday. After reaching this hospital on May 17th, he did well, and went on duty as clerk in the Commissary Department on June 1, 1863." The patient was transferred to the Veteran Reserve Corps in September, 1863, and discharged from service May 31, 1864. He is not a pensioner.

In the next case a conoidal ball struck the angular surface of the tibia with full force. The missile split to within a few lines of its base without seriously contusing the bone:

CASE 1059.—Private Henry C. Mallory, Co. G, 36th Indiana, aged 20 years, was wounded at Murfreesboro', Tennessee, December 31, 1862. He was admitted, on January 3, 1863, into hospital No. 3, Nashville. Surgeon Alexander Ewing, 13th Michigan, reported: "Was struck by a large conical leaden bullet, at about the distance of two hundred yards, at the battle of Stone River, on the 31st day of December, 1862. He was standing in an open plain in the act of loading his gun. The interest in the case is that the centre of the *apex* of the bullet struck directly on the spine of the right tibia, between the middle and

[1] LIDELL (J. A.), *On Contusion and Contused Wounds of Bone, etc.*, in *Am. Jour. Med. Sci.*, 1865, Vol. L, p. 26.

lower thirds, and split the missile to within a few lines of its base, overlapping the bone, where it was firmly held by the tissues. Remarkable as it may appear, the bone was not injured, and in a very short time the wound healed up. It was evident, as well from the distance as the injury done to the bullet, that it struck with full force." Mallory was discharged from service September 21, 1864, and pensioned. Examiner H. H. Deming, of Pana, Illinois, reported, June 23, 1879: "Ball struck tibia on anterior surface, splintering it so that quite a large piece of bone came out. There is left quite a depression and a very large tender cicatrix. If he walks too much the leg swells up. The pain at times is severe."

Instances in which the missiles split upon the bones of the forearm and on the zygoma are here adduced:

CASE 1060.—Private A. Wilson, Co. L, 1st Minnesota, aged 30 years, was wounded at Antietam, September 17, 1862. He was treated in Carver Hospital, Washington, and on December 12th was admitted into Satterlee Hospital, Philadelphia. Surgeon I. I. Hayes, U. S. V., reported: "The ball, the precise character of which is unknown, struck at the outer side of the lower part of the left arm; part of it passed through the member and came out at the posterior surface. Next day a portion of the ball, about the size of a dime, was cut out from the front part of the arm toward the inner side. On his admission into this hospital his arm seemed nearly well, but a small ulcer, scabbed over, marked the point of entrance of the ball, and a probe passed into this discovered a sinus extending several inches upward, a piece of metal being discovered and clearly felt at its upper extremity. His general condition was perfectly good. January 3d, having administered chloroform, I laid open the sinus before mentioned for about three inches and readily extracted a piece of ball. Its concave surface was closely applied to the outer edge of the lower flat portion of the humerus; the bone beneath was roughened and apparently bare of periosteum. On several subsequent occasions I convinced myself that the bone was dead and looked for a tedious process of exfoliation; but on January 15, 1863, thinking to pass a probe, I found the wound firmly united, and the healing process has gone on most favorably. There is no swelling, no tenderness, no orifice through which the smallest probe could be inserted, and the wound has the aspect of a healthy and rapidly healing ulcer." Wilson was returned to duty April 22, 1863, and discharged from service November 24, 1865, and pensioned. The Williamsport Examining Board reported, July 6, 1881: "The projectile penetrated the left arm at the insertion of the triceps and passed inward and upward. Fragments were extracted from two places in the belly of the biceps. Some fragments of bone were removed. The arm has every motion free except tensile strength." His pension was paid December 4, 1881.

CASE 1061.—Corporal Julius Relham, Co. K, 1st Kansas, aged 21 years, was wounded at Wilson's Creek, August 10, 1861, and entered the "House of Refuge" Hospital, St. Louis, on August 16th. Assistant Surgeon S. M. Horton, U. S. A., reported: "The following is an interesting case of a minié ball splitting in two by the resistance offered by the zygoma of the left side of the face. One-half of the ball was found embedded in the corresponding cheek beneath the middle portion of the masseter muscle; the other half was found and extracted from beneath the outer portion of the platysma myoides of the same side. The zygoma was not broken. The case was that of Corporal Julius Relham, of Co. K, of the 1st Kansas regiment, who was wounded at the battle of Wilson's Creek, August 10, 1861. He left the hospital for his regiment, well, November 15, 1861. The inertia of a spongy zygoma splitting a minié ball of lead is similar to that of a tallow candle resisting the woody fibres of a pine board when shot through it from a gun." Relham was mustered out May 31, 1864, and pensioned. Examiner W. Jewell, of Philadelphia, reported, December 27, 1864: "Ball passed through his left cheek, lodging near the angle of the lower jaw. The ball was extracted. The wound continues to discharge and is probably connected with the duct of Steno. The jaw is contracted, preventing the opening of the mouth more than half an inch." The Philadelphia Examining Board, January 3, 1872, certified: "Ball entered through middle of superior maxillary bone of right side; a part of it was extracted in the mouth and another part in the neck below the angle of the lower jaw. All the back teeth of upper jaw of right side decayed in consequence. He has occasional discharge from wound through mouth and nose. Motions of jaw limited and painful; can chew on one side only." The same board reported, September, 7, 1877: "Scar of entrance is puckered to a point and adherent. Exit is fast to muscles of neck and drags badly."

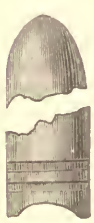

FIG. 388.—Conical ball broken upon the radius. [After BRINTON.]

CASE 1062.—Captain James Ferguson, Co. I, 4th Ohio, was admitted into Seminary Hospital, Georgetown, December 20, 1862, with a shot wound of the left forearm, received at Fredericksburg. Surgeon J. H. Brinton, U. S. V., who examined this officer's injury, reported: "A conical ball entered below the inner condyle of the humerus, traversed the forearm obliquely downward and outward and split on the radius, one portion emerging on either side." Four and one-half inches of the left ulna were removed by A. A. Surgeon H. W. Ducachet. Captain Ferguson was attacked with confluent small-pox and removed to Kalorama Hospital, Washington, February 8, 1863. Acting Assistant Surgeon R. J. Thomas, U. S. A., reported: "The condition of the arm when admitted was bad; no disposition to heal, with strong gangrenous tendency. He died February 15, 1863." Surgeon Brinton furnished a drawing of the divided missile, which is copied in the wood-cut (FIG. 388).

In other cases bullets were found wedged between bones without serious injury.

Simple Fractures, following shot injuries, are infrequent, and generally result from the impact of projectiles of the larger class, as solid shot, grape-shot, or large shell fragments of which the momentum is nearly expended. The examination of the cases of shot injuries of the lower extremities has confirmed the opinion expressed on page 815 of the *Second Surgical Volume*, "that shot fractures of the long bones without injury of the soft parts are more infrequent than visceral ruptures without external wounds."

Hamilton[1] observes: "When the bones of a limb are broken by a solid shot and the

[1] HAMILTON (F. H.), *Treatise on Military Surgery*, Philadelphia, 1865, p. 194.

integuments are not torn the fracture is seldom simple, but almost always the comminution is excessive. Five cases of simple fractures have been reported on pp. 815, 816 of the *Second Surgical Volume*, and three cases are given on p. 440 (CASE 693) and pp. 704, 705 (CASES 1044, 1045) of this volume. To these may be added the following:

CASE 1063.—Private H. Emerson, Co. I, 88th Illinois, aged 34 years, was wounded at the battle of Franklin, November 30, 1864, and was admitted to Cumberland Hospital at Nashville the following day. Surgeon B. Cloak, U. S. V., recorded that "the patient stated that he was struck by a spent cannon ball. There was no external indication of the injury except a small bruise on the left knee and a general ecchymosed condition of the surrounding part. The skin was not broken, but the limb was very much swollen, with pulsation in the popliteal region. The patient's general health was good. The limb was amputated on December 1st, at the lower third of the thigh, by the circular method, by Acting Assistant Surgeon J. C. Thorpe, when it was found that the popliteal artery had been ruptured at its lower portion and that the condyles of the femur, tibia, and fibula were fractured. The patient seemed to do well for twenty-four hours after the operation, when the wound became unhealthy and gangrenous irritative fever set in; pulse 130, skin dry and jaundiced. He continued to sink, and died on December 13, 1864."

Partial Fractures.—Several instances of partial fracture of bone in which a portion of its substance had been cut without complete solution of the continuity were met with. This lesion is more commonly seen in spongy bones or in the parts of long bones well supplied with cancellated structure. In *Specimen* 1998 (FIG. 389) the external portion of the surgical neck of the left humerus is partially fractured, but the continuity of the bone is not destroyed. The patient, Private John G. Levering, Co. A, 5th Michigan, was wounded at Mine Run, November 27, 1863. On account of the extremely unhealthy condition of the soft parts, the head of the humerus was excised December 14th by Surgeon D. P. Smith, U. S. V. Profuse suppuration followed; the patient died of pneumonia January 3, 1864. *Specimen* 1991 (FIG. 390) shows a comparatively clean-cut passage in the outer and upper portion of the internal condyle of the right femur. Private F. Johnson, Co. A, 10th New York, aged 45, wounded at Reams's Station, August 25, 1864. On August 30th symptoms of inflammation of the knee joint presented themselves, and the limb was amputated at the lower third by Surgeon N. R. Moseley, U. S. V.; death from exhaustion and diarrhœa occurred on January 23, 1865. In the following case a conoidal ball had gouged out the anterior surface of the left tibia:

FIG. 389.—Head and 1½ ins. of left humerus. *Spec.* 1998.

FIG. 390.—Lower third of right femur. *Spec.* 1991.

CASE 1064.—Private Joseph Stacey, Co. I, 27th North Carolina, was wounded at Antietam, September 17, 1862, receiving a compound fracture of the left tibia; conoidal ball entered inner side of spine of tibia and emerged one and a half inches below on the outer side. Patient had double pneumonia and pericarditis. Stimulants and supporting treatment: large bedsore. Died of exhaustion November 13, 1862. *Post-mortem:* Left lung almost altogether involved, the lower and middle lobes returning to the first stage; lower lobe of right lung congested. The specimen, consisting of the upper portions of the bones of the left leg, was contributed to the Army Medical Museum, with the notes of the case, by Assistant Surgeon Philip Adolphus, U. S. A. The missile has gouged out the anterior surface of the tibia just below the tubercle. The specimen is numbered 815 of the *Surgical Section*, and is figured in the wood-cut (FIG. 391).

FIG. 391.—Upper portion of left tibia. *Spec.* 815.

Penetrations of Bone.—Small missiles, as bullets and small fragments of shell, often penetrate a bone and remain fixed, with little splintering and fissuring. Instances of this nature are met with in spongy bones or in parts of bones whose structure is cancellated. A unique illustration of such an injury is found in *Specimen* 2590 (FIG. 392). An excavation at the base of the great tuberosity of the humerus, the shape and a little greater than the size of a conoidal ball, one inch deep, extends into the head of the bone. The walls of the cavity are perfectly smooth, as if formed by design, and there is no

FIG. 392.—Head of right humerus with symmetrical bullet groove. *Spec.* 2590.

fissuring or comminution connected with the injury. The case has been detailed on page 543 of the *Second Surgical Volume* (CASE 1513), accompanied by a cut which only imperfectly indicates the nature of the penetration. In FIGURE 392 the nature and depth of the excavation are more clearly illustrated. In the following case the missile lodged in the cancellated structure of the femur, but no fissuring or splintering were observable:

CASE 1035.—Private J. Gleason, Co. B, 2d New Hampshire Heavy Artillery, aged 18 years, was accidentally wounded at Washington, May 10, 1864, by a pistol ball, which entered the upper third of the left thigh anteriorly. He was conveyed to Douglas Hospital, where pyæmia subsequently appeared, the first chill occurring on May 26th, and being preceded by marked icterus. The ball could not be discovered. Secondary hæmorrhage from the femoral artery to the amount of fourteen ounces occurred on May 31st, and to the amount of fifteen ounces on the next day, still further adding to the patient's depression. His death occurred on June 1, 1864. At the autopsy the whole body was found to be deeply tinged with bile. No metastatic abscesses were discovered. The knee joint was found to be disorganized, as was also the hip joint on the wounded side, and a large dark-colored cavity existed in the injured thigh, which had been an immense abscess. No secondary deposits were seen in the lungs. On dividing the femur longitudinally, the medullary canal and cancellated portion of the bone were found in a diseased condition. The medulla was softened, of a dark red color, and in the early stage of that change which is seen in well-marked cases of pyæmia after amputation, when this material is found of a dark green color and in a state of advanced decomposition. Before death the patient had wandering delirium for days, profuse perspiration, chills, a rapid feeble pulse, and icteroid hue. The upper third of the injured thigh, longitudinally bisected, and showing an impacted pistol ball, which penetrated the base of the neck and lodged in the cancellated portion, constitutes specimen 3540 of the *Surgical Section* of the Museum (FIGS. 393, 394), and were contributed, with the history of the case, by Assistant Surgeon W. Thomson, U. S. A.

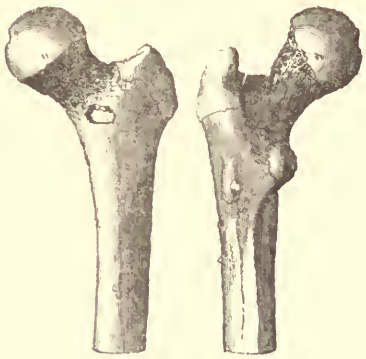

FIG. 393.—Outer view of upper third of left femur. *Spec.* 3540.

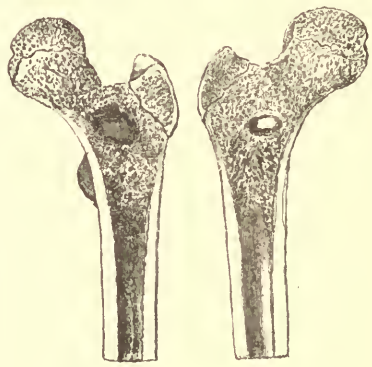

FIG. 394.—View of *Spec.* 3540, after bisection.

FIG. 395.—Lower third of left femur. *Spec.* 406.

FIG. 396.—Lower third of right femur. *Spec.* 405.

More frequently penetrations were accompanied by fissuring and splintering. *Specimen* 406 (FIG. 395) represents the lower third of the left femur with a conoidal ball embedded just above the patella. A fissure extends upward three and a half inches, and another and independent fissure occupies the outer surface. The patient, a Confederate soldier of Morgan's Cavalry, had been wounded in a skirmish in front of Winchester by a minié ball, which perforated the quadriceps femoris close above the left patella and lodged one inch above the articular surface of the knee joint. The limb was amputated by Dr. V. B. Thornton. The patient recovered. *Specimen* 405 (FIG. 396) shows the lower third of the right femur with a conoidal ball embedded, point downward, in the anterior surface, just above the articulation; a fissure extends upward the length of the specimen. Private *Joseph J. Shelley*, 2d Tennessee (Confederate), was wounded at the battle of Middle Creek, Kentucky, January 10, 1862; the limb was amputated by Dr. G. H. Higgins, in the lower third of the thigh. The patient died a few hours after the operation from loss of blood. In those two instances as well as in specimens 4179 and 3228 (FIGS. 397, 398), received without history, the former from the battle-fields of the Wilderness, the latter from in front of Petersburg, the fissures do not extend into the knee joint, although

FIG. 397.—Lower third of left femur. *Spec.* 4179.

FIG. 398.—Lower extremity of left femur. *Spec.* 3228.

the point of impact was close to the articulation. Illustrations of similar injuries in the humerus will be found on page 584 of the *Second Surgical Volume*, FIGURES 461 and 462.

Perforations of Bone.—The illustrations show the manner in which bones may be more or less cleanly pierced. When shafts of long bones are perforated there is commonly much splintering, as illustrated in *Specimen* 7069 (FIG. 399). A Colt's revolver ball passed through the upper third of the femur from behind forward, comminuting the femur; amputation was performed about twelve hours after the injury; death three hours after the operation. In *Specimen* 1662 (FIG. 400), the tibia had been perforated below the head, causing longitudinal fissures: Private Frank B. Robinson, Co. H, 7th New Hampshire, wounded at Fort Wagner, Morris Island, July 11, 1863. The posterior tibial artery was injured. Secondary hæmorrhage ensued, and on August 1st the limb was amputated in the lower third by Surg. R. B. Bontecou by the circular method. The patient died August 11, 1863. In the following case the perforation was in the lower third of the femur, with fissures extending upward:

FIG. 399.—Section of left femur. *Spec.* 7069.

FIG. 400.—Upper portion of left tibia perforated. *Spec.* 1662.

FIG. 401.—Lower third right femur perforated. *Spec.* 76.

CASE 1066.—Private S. S. Kopp, Co. E, 10th Pennsylvania Reserves, aged 21 years, received a shot fracture of the right femur, at Bull Run, August 28, 1862. He was admitted, one week after the injury, to Judiciary Square Hospital at Washington, where the thigh was amputated at the middle third by Surgeon C. Page, U. S. A., on September 20th. The patient survived the operation two days. The amputated portion of the femur, perforated just above the patella by a musket ball, was contributed by the operator, and forms specimen 76 of the *Surgical Section*. It is represented in the wood-cuts (FIGS. 401, 402); two longitudinal fissures extend upward and a slight one enters the joint.

In the next case the shaft of the femur is perforated in its centre. A longitudinal fissure on the anterior surface extends into the joint and for four inches upward, ending in a slight transverse fissure; on the posterior surface an oblique fracture runs upward for nearly four inches.

FIG. 402.—Posterior view of the same specimen.

CASE 1067.—Private Reuben Donnelly, Co. A, 25th Ohio, was wounded at Bull Run, August 30, 1862. Acting Assistant Surgeon Thomas C. Barker reported: "He entered King Street Hospital, Alexandria, on September 3d, suffering with a wound of the right thigh. A round ball entered the front part of the thigh just above the patella and passed directly through the limb from front to rear, dividing the condyles and splitting the bone up the shaft several inches. On September 5th Surgeon J. E. Summers, U. S. A., amputated the thigh at the junction of the lower and middle thirds by the antero-posterior flap operation. The case progressed favorably. Union had taken place throughout the whole of the flaps, with the exception of one point, about one-eighth of an inch in diameter, over the end of the bone, which lay at a depth of three-fourths of an inch below the orifice of the aperture. Patient's health, appetite, and general vigor had been good up to the night of October 3d, when, during a cold rain, he was attacked with a severe chill. The next day, in the afternoon, he had another chill, and although tonics and stimulants were sedulously used with him, he sank in general vigor and his appetite failed. Absorption of the new granulations took place around the aperture which had remained ununited, and the opening increased to nearly an inch in diameter, the integuments retracting and leaving the end of the bone nearly on a level with the external surface. Suppuration occurred in the medullary canal of the bone. Emaciation was extreme; debility was rapidly increasing, with indisposition and incapacity of taking and retaining food, or even stimulants to any appreciable amount; and the patient gradually sank, and died of exhaustion and debility October 20, 1862." The specimen, consisting of the lowest third of the right femur, perforated by a round ball directly through the centre of the shaft, just below the upper margin of the patella, was forwarded to the Museum by Dr. Barker, and is represented in the wood-cuts (FIGS. 403, 404). The shaft is split longitudinally in its anterior surface for four inches, and posteriorly obliquely for the same distance. The condyles are also separated by a fissure.

FIG. 403.—Shot perforation of right femur; anterior view. *Sp.* 319.

FIG. 404.—Posterior view of the same specimen.

In a case of transverse perforation of the tibia just below the head no fissuring was noticeable six months after the injury, when the patient died from exhaustion:

CASE 1068.—Private *J. W. Sailor*, Co. K, 48th North Carolina, aged 23 years, was wounded in the right leg, at Hatcher's Run, March 13, 1865. He was treated in Confederate hospitals until May 6th, when he was admitted into hospital at Point Lookout. Subsequently he was transferred to Armory Square, and lastly to Douglas Hospital, Washington. Assistant Surgeon W. F. Norris, U. S. A., in charge of the latter, made the following report: "The wound was caused by a ball perforating the tibia at the upper third without involving the knee joint. The patient was cachectic and much emaciated, the wound indolent and discharging a thin unhealthy pus. Stimulants, tonics, and good nutritious diet were freely exhibited. On September 3d the wound was carefully examined and a considerable quantity of carious bone was removed. On the next day the patient had a severe chill which recurred on the 6th. He had been subject to periodical chills and fever, and this attack of intermittent yielded readily to a full dose of quinine. On September 10th slight diarrhœa came on and continued for nine days, the patient growing much weaker. The wound, which had improved in appearance after the removal of the dead bone, again looked unhealthy, small abscesses having formed along the line of the tibia, which, when opened and examined by the probe, showed extensive necrosis of the bone. Subsequently the patient had a slight chill, which was followed by an attack of erysipelas of the leg, and from this period he steadily declined. He died, apparently of exhaustion, on October 1, 1865. The autopsy showed a dirty yellowish clay color of the skin. The thoracic and abdominal organs were apparently healthy, except the liver and the spleen, the former being enlarged and the latter much softened and weighing fourteen ounces." The perforated tibia, contributed with the history by Assistant Surgeon Norris, and constituting *Specimen* 1444 of the *Surgical Section* of the Museum, exhibits the deposit of a large quantity of callus on the outside of the bone, and shows the cavity of the passage of the ball to be enlarged by ulceration, the lower portion of the shaft being superficially necrosed. Posterior and lateral views of the specimen are copied in the wood-cuts (FIGS. 405, 406).

FIG. 405.—Posterior view of upper portion right tibia. *Spec.* 1444.

FIG. 406.—The same specimen; lateral view.

Complete Fractures.—In by far the greater number of shot fractures of bones the solution of continuity is complete, the degree of comminution depending upon the attending circumstances. In rare instances fractures, transverse or oblique, but simple as regards comminution, occur. They are commonly due to the impact of partly spent missiles or to glancing or grazing blows. *Specimen* 1148 (FIG. 407) shows an oblique fracture in the upper third of the left femur, with a minute fissure extending to the lesser trochanter and a small portion chipped from the anterior surface at the point of impact. The case has been fully detailed on page 131 of this volume. *Specimen* 1210 (illustrated in the *Second Surgical Volume* on page 475, and a history recorded, in detail, on page 482 of the *First Surgical Volume*) shows the left clavicle transversely fractured directly in the middle without comminution. The missile, which is attached, was a conoidal ball which entered near the third dorsal vertebra, fractured the corresponding rib at its angle, and was found after death encysted immediately beneath the fractured point of the clavicle. Another illustration of this rare fracture is given in FIGURE 408. The *Specimen*, number 1412, shows the lower half of the right humerus apparently amputated for a nearly transverse fracture through both condyles; it was received without history from Surgeon C. S. Wood, 66th New York. In these cases the missile is usually found in close apposition to the fractures.

FIG. 407.—Fracture of the upper third of the left femur by a conoidal musket-ball. *Spec.* 1148.

FIG. 408.—Transverse fracture in lower humerus. *Spec.* 1412.

A form of injury is referred to in *Circular* No. 6,[1] in which the bones are fractured and comminuted, though less than common at the point where the ball impinged, while at a short distance above or below this point an oblique or transverse fracture is produced. When point of impact is above the middle of the bone, the fracture is below; when below

[1] OTIS (G. A.), *Circular* No. 6, War Department, Surgeon General's Office, Washington, November 1, 1865.

the middle, the oblique fracture is found above. *Specimen* 4703 (FIG. 409) shows a nearly transverse fracture in the middle of the left tibia, communicating with the point of impact by a longitudinal fissure. *Specimen* 1064 (FIG. 410) exhibits the lower portion of the left femur, amputated in the middle third for a perforation with oblique fracture above the seat of injury: Lieutenant F. M. Wells, Co. D, 132d Pennsylvania, received, at Chancellorsville, May 2, 1863, a comminuted fracture of the left femur just above the condyles. He was at once removed to the field hospital, and on May 6th was transferred to Washington and admitted into Armory Square Hospital. Shortly after admission he was placed under the influence of chloroform and the injured limb examined. It was decided to amputate the thigh at the middle, which operation was performed by the antero-posterior flap method, by Assistant Surgeon C. C. Byrne, U. S. A. The patient gradually sank, and died June 2, 1863.

FIG. 410.—Lower half of left femur. *Spec.* 1064.

FIG. 409.—Upper half of left tibia.—*Spec.* 4703.

In the following case the transverse fracture is connected with the point of impact by several fissures. Fractures of this nature are principally found in the long bones of the lower extremities, and are probably the result of the direct impact of a missile at high velocity upon the bones somewhat firmly fixed by the weight of the body:

FIG. 411.—Lower half of left femur. *Spec.* 42.

CASE 1069.—Private J. Scanton, Co. A, 3d Maryland, was wounded at Cedar Mountain, August 9, 1862, by a musket ball, which entered above the external condyle of the left femur and passed directly through from front to rear, badly comminuting the shaft to the extent of four inches. He was admitted into the Mansion House Hospital at Alexandria several days afterwards. Infiltration of the soft parts from the anterior superior spinous process of the ilium to the spine of the tibia followed the injury. Amputation of the thigh at the middle third by the circular method was performed by Assistant Surgeon P. Adolphus, U. S. A., on August 15th, and the case resulted fatally on August 20, 1862. The history of the case, with the amputated portion of the femur, was contributed by Surgeon J. E. Summers, U. S. A. The bone is numbered specimen 42 of the *Surgical Section* of the Museum, and exhibits an extensive longitudinal fracture implicating the joint, and being complicated with an oblique fracture in the lowest third (FIG. 411).

Commonly a bone is broken into many fragments, some of which are entirely detached and driven into the surrounding tissues, while others remain connected with one or more of the fragments by shreds of periosteum. Over and above this shattering and comminution, effects common to all forms and varieties of missiles, the extensive splintering and fissuring so often found is unquestionably due to the wedgelike form and great force of the conoidal bullet:

FIG. 412.—Bones of left leg shattered by a conoidal ball. *Spec.* 3273.

FIG. 413.—Same specimen; posterior view.

CASE 1070.—Corporal S. Forrester, Co. E, 67th New York, aged 37 years, was wounded in the left leg, at the battle near Winchester, September 19, 1864. He was admitted into the Sixth Corps hospital several days afterwards, whence Assistant Surgeon J. G. Thompson, 77th New York, described the injury as follows: "A minié ball entered the posterior edge of the outer tuberosity of the tibia, taking a downward direction through the medullary canal, comminuting the bone and becoming impacted beneath its anterior surface, at the junction of the middle and upper thirds. On the morning of September 24th I performed amputation through the lower third of the thigh, being assisted by Acting Assistant Surgeons W. L. Hammond and W. D. Henderson. The operation was done by a modification of the ordinary flap method, making the incision the same as for skin flaps, as described in Smith's *Operative Surgery*, which obviates the redundancy of muscle characteristic of the ordinary flap method, and still gives enough to preserve the even contour of the stump. The patient suffered considerable pain previous to the operation, which was subsequently relieved, and by September 28th he was doing well, the stump healing by first intention. Toward October 8th, however, traces of phlebitis appeared in the stump, thrombosis in the femoral and internal saphenous vein, and the patient was troubled with hiccough and vomiting. Stimulants, tonics, and nutritious diet were administered. Death resulted from pyæmia on October 13, 1864. At the autopsy

the face of the stump was found to be granulating and surrounded with provisional callus; femoral vein filled with thrombus; pus oozing from both the femoral and iliac veins; metastatic abscesses under the integument covering the lower portion of the pectoralis major muscle; fatty degeneration of the liver. In the left ventricle of the heart an embolism was found adherent to the valves." The bones of the amputated leg, contributed to the Museum by the operator and shown in the wood-cuts (FIGS. 412, 413), constitute specimen 3273 of the *Surgical Section*.

When the shaft of a long bone is fractured about equidistant from the epiphyses the fissures extend upward and downward in about equal proportion; but as the point of fracture approaches the ends the tendency is to split in the direction of the longer fragment. This is particularly noticed in fractures of the humerus near the head, where the general tendency of fissuring is downward. *Specimen* 1726 (FIG. 414) is the excised portion of the left humerus, including the head and four inches of the shaft. The fracture is at the surgical neck, and extends with comminution obliquely down the shaft. Excision of the head and four inches of the shaft was performed and the specimen contributed by Assistant Surgeon George M. McGill, U. S. A. *Specimen* 2160 (FIG. 415) shows the upper half of the right femur; the missile struck the anterior surface of the bone a little below the trochanter minor and shattered and fissured the femur downwards. In *Specimen* 2176 (FIG. 416) the comminution extends upward and downward in about equal proportion. The weapon was discharged at close range. The soldier, John Watson, Co. F, 83d Indiana, while on duty at Convalescent Camp, Nashville, became enraged from some cause, threw his musket from him, causing its discharge. The missile, a minié ball, entered the right thigh, greatly lacerating the soft parts and extensively comminuting the femur. He died on the same day. The specimen is a fair illustration of the effects of a conoidal ball at short range.

FIG. 414.—Upper portion of left humerus. *Spec.* 1726.

FIG. 415.—Upper portion of right femur. *Spec.* 2160.

FIG. 416.—Lower two-thirds of right femur. *Spec.* 2176.

From a careful examination of a large number of specimens of long bones in the collection of the Army Medical Museum it would seem that the statement made by Esmarch is correct, that "in comminution of a long bone the fissures almost never extend into the epiphyses; in the same manner injuries of the epiphyses, only in rare cases, extend into the shaft, unless the bullet strikes the adjoining border of both parts, in which case both are usually more or less severely comminuted." This is probably due, in the greater number of cases, as Esmarch says, "to the soldier being generally young and the parts not consolidated." The Museum possesses several specimens showing this kind of injury, some of which have been illustrated on the preceding pages (see FIGURES 409, 410). The few exceptions to this rule seem to be cases in which the consolidation is complete, or in which the direction of the missile was such as to necessarily cause this effect, as in *Specimen* 2564 (FIG. 417), where fissures extend through the head and into the shaft.

FIG. 417.—Upper third of right humerus. *Spec.* 2564.

It has been shown that cases of penetration and perforation of bones may occur without complete fracture; but the contrary is the more general rule, and even in spongy bones,

where we naturally look for such lesions, it will usually be found that complete destruction of the bone has resulted.

EFFECTS OF MISSILES AND PROJECTILES ON NERVES.—Shot wounds and injuries of nerves afforded a wide field for study and observation during the late war.

Wounds of this class, not implicating the great nerve centres and not complicated by severe lesions of other tissues and parts, show a very small percentage of mortality, but comprise a class of injuries which result too often in great and permanent disability, attended with intense suffering and misery, and are often but little amenable to treatment.

In May, 1863, under the direction of the Surgeon General, U. S. A., a hospital for the treatment of diseases and injuries of the nervous system was organized in Philadelphia, under the charge of Acting Assistant Surgeons S. Weir Mitchell, George R. Morehouse, and W. W. Keen, jr., U. S. A.[1]

The results of the experience of these gentlemen in the study and treatment of the large number of cases under their charge have been incorporated by them in several publications which form most valuable contributions to the literature of a much neglected subject, and constitute an admirable digest of the typical forms of nervous lesions resulting from shot injuries.[2]

The immediate effects of shot injuries of nerves were pain—not generally felt locally, but at some point in the distribution of the nerve—in completely divided nerves; total loss of sensation in the parts supplied by it; shock more or less profound, proportionate to the reflex disturbance; and paralysis of motion and sensation, complete or partial. Of forty-eight cases of severe gunshot injuries of nerves selected with a reference to the study of the immediate effects of injuries, Drs. Mitchell, Morehouse, and Keen (*loc. cit.*, p. 14) found that "by far the larger number felt, when shot, as though some one had struck them sharply with a stick," and that "about one-third experienced no pain nor local shock when the ball entered. * * More rarely, the pain of the wound was dagger-like and intense, while a few, one in ten, were convinced for a moment that the injured limb had been shot away; * * in two instances of neck wounds the pain at the moment of wounding was intense, and was referred to the insertion of the deltoid muscle."

In a case of shot wound of the leg the patient felt no pain, but had so vivid an "impression" of a wound in the other leg that he found it difficult at first to get rid of the erroneous idea. With reference to the shock from wounds of nerves the same authorities (*loc. cit.*, p. 15) say: "Every case of wound of nerve trunks in the legs fell instantly, and not one of the whole twelve lost consciousness; yet in gravity and in the size of the nerves injured these were among our worst cases. Of the remaining thirty-one, seven fell instantly, unconscious; one only of these bled very largely. All of the seven were wounded in the neck, face, or arms. Of the total number of arm cases (eighteen in all) two were of the class described above as falling senseless. Of the remainder, two only fell, but with entire con-

[1] The following is a copy of the order organizing this hospital: "SURGEON GENERAL'S OFFICE, *May* 23, 1863. Surgeon W. S. KING, U. S. A., Medical Director, Philadelphia. SIR: The Surgeon General directs that a ward be set apart in either the South or Christian Street Hospital for the exclusive treatment of diseases of the nervous system, and that contracts be made with Doctors S. W. MITCHELL and MOREHOUSE, and that they be assigned to the charge thereof. . . . Very respectfully, your obed't serv't. By order of the Surgeon General. J. R. SMITH, Surgeon U. S. A." Acting Assistant Surgeon W. W. KEEN, jr., U. S. A., was subsequently assigned to duty at this hospital as resident physician, and the scope of the hospital enlarged to include patients suffering from injuries of the nerves.

[2] MITCHELL (S. W.), MOREHOUSE (G. R.), and KEEN (W. W.) (*Gunshot Wounds and other Injuries of Nerves*, Philadelphia, 1864, p. 9) remark upon the number and variety of the cases presented for treatment in the Philadelphia hospital as follows: "Among them were representatives of every conceivable form of nerve injury—from shot and shell, from sabre cuts, contusions, and dislocations. So complete was the field of study that it was not uncommon to find at one time in the wards four or five cases of gunshot injuries of any single large nerve. It thus happened that phenomena, which one day seemed rare and curious, were seen anew in other cases the next day, and grew commonplace as our patients became numerous."

sciousness and in full possession of their senses; fourteen continued standing, or walked away. * * Of the wounds of the lower neck and axilla, brachial plexus, or axillary nerves, one fell senseless, four fell conscious, and the remaining eight suffered no immediate fall. * * If, then, we regard the fall with loss of consciousness as the most marked expression of the condition known as shock, we shall have some right to infer that it is most likely to be severely felt in wounds about the upper third of the body."

In paralysis of nerves, motion is more frequently impaired than sensation. Mitchell, Morehouse, and Keen remark (*loc. cit.*, p. 18): "It would be natural to suppose that a ball striking a nerve, or passing near it, would equally damage its motor and sensory fibres. Practically, it is the motor filaments which suffer most severely, most often, and most extensively. Nor is this less true of the case in all stages, for we find that the lesions of motion are always the least readily relieved and the last to improve."

Of the forty-eight cases studied by these gentlemen (*loc. cit.*, p. 17) with reference to paralysis, five were rejected as being wounds affecting nerves of single function; of the remaining forty-three, "thirty-two exhibited total loss of motion with defective sensation or entire loss of that function. In the remaining eleven there were partial loss of motion and usually slight loss of sensation." In defining total loss of motion "it is to be understood that the whole limb became powerless at once."

Of injuries resulting from shot wounds of the great centres, those of the cranium have been fully considered in the previous parts of the history; it may be stated in general terms that the greater percentage of such injuries proved fatal at once or within a short period. Those who survived the original injury most generally became the victims of insanity, epilepsy, or chorea.[1]

CASE 1071.—Private W. T. White, Co. D, 84th Indiana, aged 20 years, was wounded at Chickamauga, September 19, 1863. Surgeon W. M. Chambers, U. S. V., noted his admission into hospital No. 15, Nashville, with "gunshot wound of upper jaw, with injury of infra-orbital nerve; simple dressings applied." The patient was discharged from service at Madison, Indiana, May 16, 1864, and pensioned. Examiner George W. Mears, of Indianapolis, reported, June 21, 1864: "Ball entered left side of nose one-half inch below the inner corner of the eye, and ranging backward and outward escaped on the posterior and outer or left side of the neck two inches from the ear. The wound is healed except at a point forward of the ear, where an abscess formed. The sight of the left eye is nearly extinct. The under lid is somewhat deformed and the cheek much swollen. There is also a constant discharge of saliva from the left corner of the mouth, which is also slightly deformed." Examiner J. C. Helm, of Muncie, Indiana, reported, November 10, 1868: "The sight of the left eye is much injured, and what there is, is in my opinion worse than useless, as the eyeball is so much turned outward as to destroy the axis of vision and confuse the mind with other objects. The ball passed through the base of the skull, evidently injuring the cerebellum, and as a consequence he suffers from vertigo, dizziness, blindness, faintness, etc., and has frequent spells of severe pain in the head, which are increased by exercise or excitement. These symptoms are growing worse, and he is in great danger of insanity, which I fear will ultimately be his lot. The deformity is also growing worse; the eyeball is turned out and is constantly red, part of the face is paralyzed and twisted over so as to be quite hideous, and is getting worse, as are all these symptoms, so that altogether his disability is equal to or worse than the loss of a limb." Later reports do not show any improvement in the condition of the pensioner. The pensioner was paid December, 1881.

A reference to TABLE CXVII, page 689, *ante*, will indicate the large number of wounds recorded as affecting in some manner the spinal column and its contents. The percentage of mortality will afford some evidence as to the varying extent and gravity of these wounds. Where the spinal cord was severed or involved, a fatal issue seems to have ensued more or less remotely.

Aside from these there were innumerable cases of lesions in which it was evident that there had been damage done to the nervous centres by concussion, compression, or contusion, or in which were presented the phenomena of reflex paralysis.

[1] Instances of epilepsy following injuries of the skull will be found in the *First Surgical Volume*, at pp. 22, 48, 50, 54, 55, 59, 118, 119, 176, 177, 187, 193, 194, 196, 198, 215, 218, 221, 228, 230, 235, 237, 238, 257, 270, 282, 284, 287, 288, 289, 293, 319, and 341, and of impairment of the mental faculties at pp. 12, 30, 53, 117, 118, 119, 120, 164, 166, 171, 172, 173, 174, 175, 176, 181, 185, 193, 194, 217, 221, 226, 228, 231, 232, 234, 236, 237, 238, 244, 253, 294, 310, 340, 350.

The following cases will serve to illustrate these lesions and injuries of the spine:

CASE 1072.—Private C. C. Thomas, Co. A, 2d Wisconsin, aged 23 years, was wounded at Gettysburg, July 1, 1863. He was admitted into the hospital at York, Pennsylvania, on July 17th. Surgeon H. Palmer, U. S. V., reported: "Minié ball entered the back at the point of the right shoulder blade, passed across, and was extracted three inches below the left shoulder blade, deeply situated. Patient complains of numbness and loss of power of the legs. There is no displacement or tenderness of the spinal column. Cold-water dressings; orifice of entrance filled with granulations, that of exit discharging some pus." He was discharged from service January 6, 1864, on account of partial paralysis of the lower extremities, the result of the injury, and pensioned. Examiner L. S. Thompson, of Shackopee, Minnesota, reported, September 23, 1875: "Ball entered just below inferior angle of right scapula, and passing across the back lodged about two inches below the inferior angle of the left scapula, from whence it was removed. The missile injured the spine to such an extent that the patient has but a limited control over the inferior extremities, and from this cause, together with the consequent weakness of the spine, he is incapacitated for all manual labor." Examiner H. H. Kimball, of Minneapolis, reported in September, 1877, that the pensioner "has only partial control over the bladder and rectum."

CASE 1073.—Lieutenant J. F. Moreland, Co. C, 17th Indiana, was wounded at Hoover's Gap, Tennessee, June 23, 1863. Assistant Surgeon S. J. F. Miller, 5th Kentucky, reported, from the Officer's Hospital, Murfreesboro', Tennessee: "The patient entered this hospital June 27th, wounded by a minié ball. It struck him two inches to the left of the spinal column, opposite the first lumbar vertebra, and followed up the spinal column until it reached the spinous process of the first cervical vertebra, when it turned to the left, and was cut out just beneath the skin over the middle third of the sterno-cleido mastoideus muscle; the lower half of his body was paralyzed. He passed his feces unconsciously and we had to draw his urine with a catheter. He died July 12, 1863; for want of time no autopsy was performed."

CASE 1074.—Color Sergeant James S. Schermerhorn, Co. F, 127th Illinois, aged 33 years, was wounded at Vicksburg, May 19, 1863. He was treated in the field and at Webster Hospital, Memphis, and Marine Hospital, Chicago, and discharged from service December 9, 1863, for "gunshot wound of spine with fracture of the spinous and transverse processes of the ninth, tenth, and eleventh dorsal vertebræ. There is partial paralysis, but also severe pain of the whole column, producing severe nervous spasms." Examiner J. P. Lynn, of Chicago, reported, January 23, 1864: "The ball struck the crest of the left ilium three inches back of the anterior superior spinous process, passed through near the sacrum and lumbar vertebral articulation, and was cut out two inches to the right. The wound of entrance is discharging, the other is healed, but an opening over the spine is discharging pieces of vertebra and pus. There is nearly complete paraplegia." On July 24, 1865, Dr. Lynn reported: "Since he received his wound he has been and is now wholly deprived of the use of his legs. His bladder is paralyzed and his urine has to be drawn by a catheter. He has also only partial use of his arms, and is unable to sit upright." Being an applicant for a chair in which to propel himself, he was examined at Chicago by Assistant Surgeon Thomas J. Asch, U. S. A., January 17, 1871, who states: "There is complete paralysis of the lower extremities below the seat of the injury; locomotion is utterly impossible, and the trunk cannot be maintained in an upright position except with the aid of a supporting apparatus consisting of two steel rods with crutch-shaped extremities to support the arms, fastened to a belt buckled around the body. * * * He was confined to his bed from the date of his wound until the Spring of 1870, during which time portions of the vertebræ were removed by Dr. Isham of this city." Examiner L. H. Robbins, of Lincoln, Nebraska, reported, August 5, 1874: "The pensioner is wearing an apparatus to support the upper part of the body, without which he has no power to sit erect. The legs are wholly useless. He requires the regular personal aid and attendance of another person." The pensioner was paid December 4, 1880.

In the next case[1] it is supposed that the spine was wounded or that the missile lodged within the vertebral column in such close proximity to the nerve centres as to cause compression of the anterior branches:

CASE 1075.—"Private S. Johnson, Co. I, 8th Pennsylvania Cavalry, aged 18 years, enlisted in August, 1861. Health good previous to enlistment, except a typhoid fever four years before. Six months after enlisting he had a fever, probably of a malarious character. Three weeks before he was wounded he suffered with pain in the right leg, made worse by movement, but unaccompanied with any rheumatic swelling of the joints. May 3, 1863, he was wounded by a small ball in the left cheek while riding at a trot. It entered at the middle of the ramus of the jaw a little below the level of the teeth. From his position as well as the after evidence, it seems that the ball passed backward and inward and finally lodged in the spinal column. The edge of the jaw was somewhat injured, and probably was the source of the small fragments of bone which afterward escaped from the neck. When shot the man fell forward on his horse's neck; says he was confused though conscious, and felt as if he had been struck in the ear and then lifted up in the air. He also felt instant pain in the back of his neck and in all of his limbs. There were no spasms. He was removed from his horse and carried to a house near by. The motion increased his pain, especially any movement of the neck. He now became aware of the total motor paralysis of the arms and legs. He is not sure whether sensibility was also extinct or not. Two days after being wounded he became delirious, but gradually recovered his senses after three or four days. He was finally sent to Douglas Hospital, Washington, then under charge of Assistant Surgeon W. Thomson, U. S. A., and was transferred to our own wards July 19, 1863. The wound healed in nine weeks, after the discharge of a few small fragments of the jaw. Meanwhile his left leg improved slightly. July 19, 1863; present state: A more wretched spectacle than this man presents can hardly be imagined. He lies in bed motionless, emaciated to the last degree, and with bedsores on both elbows and both hips. His hands lie crossed on his chest, perfectly rigid, the fingers extended, the skin congested and thin, the nails curved, false anchylosis of all the joints of the upper limbs, the head and neck rigid, with acute pain in these parts on movement. The right leg has motion of a feeble nature in all of the joints; the left only very slight voluntary movement. The hands, the appearance of which has been already alluded to, present certain characteristics which belong

[1] MITCHELL, MOREHOUSE, and KEEN, *Gunshot Wounds and Other Injuries of Nerves*, Philadelphia, 1864, p. 22 *et seq*

usually to cases in which there have been wounds of the brachial nerves. In the present instance, as in many others, these peculiarities have been modified by the long continued rest of the limbs in one posture. The results of the nerve injury and its consequent effects on the nutrition of the part may, however, be partially discriminated, so that what is due to them and what is due to mere rest may be discerned to some extent. Thus, the shining palm, the slight eczema, the burning pain, the atrophy, and the swollen joints, whose appearance simulates subacute rheumatism,—these, with the contraction of certain muscles, are all owing to the nerve lesion; while the anchylosis and the peculiar flattening of the hand are perhaps owing to this and to the long rest and disuse, the arms meanwhile lying crossed on the chest, the fingers in extension. The disuse alone would have caused anchylosis, but never to such a degree as occurs when the joints have been subacutely inflamed at the same time. The loss of the lateral palmar arch is owing to both causes, and the monkey-like appearance of the hand, the thumb rotated outward, and its nail looking upward and even toward the forefinger, is caused first by the subluxation of the metacarpo-phalangeal articulation, and secondly by the weakening and atrophy of the adductor and short flexors of the thumb. The nerve lesion, affecting the muscles and the general nutrition of the part, has so relaxed the unused tissues of the limb as to make the pressure of its own weight an effective aid in thus altering its form. Specimen 6693 of the Army Medical Museum represents casts of both arms, and exhibits admirably their condition soon after they began to improve. *Sensation:* Tactile sense enfeebled equally in both arms, worse in the left. Feeble in both legs, worse in the left. Confused power of localizing sensation in the legs. Mistakes right for left, but not left for right. There is muscular hyperæsthesia of the upper members, shoulders, and neck; none in the legs. The left brachial plexus is sensitive to pressure and this causes pain in the left arm and hand. The palms prickle and burn a little, the feet not at all. Every attempt at passive motion causes exquisite pain in the arms, hands, and shoulders; but most of all the back of the neck, about the first and second vertebræ. This is due, first, to the hyperæsthesia of the muscles, and secondly, to the state of false anchylosis, owing to rest in one fixed posture. He either is too weak to move the body or is really paralyzed in the spinal muscles. The biceps flexors and wrist muscles are very rigid as well as the trapezius, and the atrophy of the muscles throughout the upper limbs is singularly well marked. His condition was too grave to allow of an electric examination. There was no inflammatory swelling about the neck, and it was therefore resolved to treat him with free passive motion, breaking the adhesion and forcing him to exert himself as far as he could. Tonics, porter, and liberal diet were ordered, and the shampooing and passive movement was vigorously carried out, despite his pain and most earnest supplications to be let alone. The bedsores were treated with alternate applications of iced water for ten minutes, followed by a poultice as hot as could be borne. This local means, recommended by Brown-Séquard, succeeded marvelously, as it always does, the bedsores healing easily within ten days. August 25th, still losing flesh; great pain in the neck; moves head and legs a little better; no change in the arms. Despite his prayers and protestations the shampooing was continued, and on October 15th he was greatly improved. He is fatter; the legs can be voluntarily crossed; appetite voracious. December 7th, great gain; can move right arm freely; can raise his head, bend and turn the neck; sits up daily. December 29th, motion returning in right hand; no gain in left; but in both the malpositions have been relieved and the hyperæsthesia reduced. From this time the improvement was manifest and rapid. On January 7, 1864, the case was carefully reviewed with the following results: *Nutrition:* Much fatter; atrophy lessened. The hands have lost their smooth, shining look, so expressive to us of a nerve lesion. The nails are less curved. The temperature is better. *Sensation:* Right arm and hand, tactility and localizing sense good; left arm rather less perfect; tactility and localizing sense in legs normal or nearly so. Sense of pain more perfect than at first, but even now a pinch causes a feeling of prickling only, rather than the usual sensation. There has been some burning of the right face, neck, and arm within the past week. *Voluntary motion:* Left leg normal in extent of action, but still feeble; right leg healthy. The right arm has regained all the shoulder and elbow motions except that, owing to a remnant of contraction in the biceps, extension is not quite entire. Flexion, pronation, and supination are perfect. Extension of wrist incomplete, owing to contracted state of flexors. Flexion of wrist perfect. The thumb has lost abduction, owing to contraction of the abductor. Fingers, extension perfect, as also flexion of first phalanges; the joints being still stiff and swollen, the second and third joints possess but two-thirds of their healthy extent of flexion. *Left arm:* For ten days past the shoulder has begun to exhibit voluntary power; elbow, no movement; pronation and supination slight; flexion and extension of wrist also slight; fingers, feeble, tremulous movements. For the first time we now examined the electric state of the muscles. The electro-muscular contractility was good in the right biceps, feeble in the left; good in the right supinator longus, feeble in the left; good in the extensors of both hands; good in the flexors of the right hand, feeble in the left. The interossei on both sides showed great loss of this property. The abductor policis on the left had no electro-muscular contractility. As a rule, this property was lessened in the left arm and shoulder, while the electro-muscular sensibility was scarcely altered in the two members, except, perhaps, some diminution in the thumb muscles of the left hand and in the flexor group of the left forearm. The whole left arm was still very stiff. Ordered the patient to be etherized daily, and the adhesions to be forcibly broken. Passive motion to be continued, and the limbs to be faradized daily. The future progress was inconceivably rapid. On January 20th he could rise to his feet, and by February 20th could walk a few steps. March 20th, walks well without a cane or any aid; the left hand alone has not gained to any great extent, although the malposition of the hand has been much relieved. The patient was discharged in March, slightly shuffling in his walk, but with nearly entire use of all his limbs except the left hand and forearm." Johnson was pensioned. The Philadelphia Board of Pension Examiners reported, October 23, 1873: "Total paralysis of left leg so as to cause foot to trip at times." In November, 1877, the same board reported: "Suffers no pain in arm, but has to move arm in different positions. Is anchylosed at shoulder and partially so at elbow. Toes are drawn up and use impaired; paralyzed. Has evidently progressive nerve trouble from ball, no doubt, lodged near spine in cervical region. Has weakness of hand, right side, and is cold almost all the time. There is atrophy of arm, forearm, and leg, left side."

The following case illustrates what is known as concussion or "commotion" of the spine; it is not supposed that any large nerve could have been touched:

CASE 1076.—Thomas Carroll, aged 21 years, plumber, of New Jersey. Enlisted November, 1863, in Co. D, 3d New Jersey Cavalry. Healthy to date of wound. December 15, 1863: While seated on a fence rail, a pistol ball, accidentally fired, took

effect on the back of his neck. It entered at the middle line, exactly over the interspace between the spinus of the sixth and seventh cervical vertebræ, and was cut out on the left side of the neck one inch below the angle of the jaw. No bone escaped at any time, and the surgeon who explored the wound at the time of the injury felt assured that there was no fracture. The patient thinks that he was looking to the left when hit, but is not sure. If he be correct as to his position, the ball could have come near to no part of importance except the spine, and, in any case, it would be difficult to assert that it could have wounded the cervical and still less the brachial plexus. He fell senseless, was removed to a hospital tent, and finally recovered his reason within two hours. As he became aware of his condition he found that although he could talk, see, and hear, he had neither motion nor feeling in any of his limbs. The trunk was equally powerless. He describes himself as at first unable to feel the bed upon which he lay, but as having good feeling in the head and face. About the second day he had severe pain and tenderness in the right shoulder and neck. Gradually, sensation first, and then voluntary power, returned to the whole right side. Within a month the left side also improved, with the exception of the left arm. Within two months the right side was well and the left leg nearly so. About May 1, 1864, he began to be able to stir the left thumb. Present state, May 14, 1864 (admitted May 12, 1864): General loss of flesh. Left arm exhibits marked atrophy. Measurements: Left biceps, 8¼ inches; right biceps, 9¼ inches. Forearm, left, 8½ inches; right, 9¼ inches. Legs, no notable difference. The left shoulder muscles are fearfully atrophied, especially the deltoid. The arm has dropped, owing to want of support, so that a thumb may be laid in the furrow between the head of the humerus and the acromion process. This subluxation of the bone increases the apparent length of the left arm nearly half an inch. Casts of both shoulders, which exhibit well the deformities, were sent to the Army Medical Museum at Washington. There are no contracted muscles. The hand is swollen and congested, the cuticle thickened and hanging in yellow scales. Nails not curved. No acid sweat. Slight burning of the left palm a recent symptom. Tactile sensation and sense of pain absent in left ulnar distribution, and defective everywhere else in the arm below the shoulder. Normal in right arm. Sensation alike in the legs, and normal in both. The right arm is weak; the left arm powerless, except slight ability to abduct the thumb. The left leg is weaker than the right, and his gait is awkward, from his swinging his right leg outward and forward.

As the subject of reflex paralysis is one of great interest in the study of spinal injuries, and has been thoroughly and exhaustively treated in *Circular* 6, S. G. O., March 10, 1864, it is deemed proper to reproduce the Circular at this point:

"CIRCULAR No. 6.

"SURGEON GENERAL'S OFFICE,
"WASHINGTON, D. C., *March* 10, 1864.

"The following paper on Reflex Paralysis, the result of gunshot wounds, founded chiefly upon cases observed in the U. S. General Hospital, Christian Street, Philadelphia, by S. Weir Mitchell, M. D., George R. Morehouse, M. D., and William W. Keen, jr., M. D., is published for the information of Medical Officers, in the belief that immediate and practical benefit may be derived from it:

"JOS. K. BARNES,
"*Acting Surgeon General.*"

"Since the establishment, in May, 1863, of a Special Hospital for the treatment of diseases and injuries of the nervous system, a vast number of cases of gunshot and other injuries of nerves have been studied by the authors of this paper.

"The great mass of these will be considered in a future essay, upon the history, results, and treatment of gunshot wounds of nerves. We have judged it wise, however, to report separately a class of very infrequent cases, in which paralysis of a remote part or parts has been occasioned by a gunshot wound of some prominent nerve, or of some part of the body which is richly supplied with nerve branches of secondary size and importance.

"So far as we are aware, the Medical Histories which we are about to record stand alone as the first reports of sudden reflex paralysis from mechanical injuries. How they differ from the paralytic affections which result from disease of organs, and which have been so ably treated of by numerous authors, we shall presently consider. That they have thus far escaped notice may be easily accounted for. In the first place they are rare; among some sixty or more carefully studied instances of wounds of nerves, we have met with only seven cases of reflex paralysis of remote organs, in which the influence was prolonged or severe. In the majority of cases the reflex effect is either very slight or very transient, and for one or both of these reasons unlikely to attract notice from surgeons on the battle-field, or in division or Corps hospitals, where their brains and hands are taxed to the utmost by the palpable misery of wounds in the early stages of treatment. Had it been otherwise, we do not doubt that numerous cases of reflex paralysis from injuries to nerves would have been recorded.

"The various effects produced upon the nervous system by gunshot wounds have received, it seems to us, far less attention and far less study than their interest and importance appear to call for. Among them are some which must clearly be classified with the results illustrated by the cases reported in this paper; but there are also others which are far more numerous, in fact very common, and which are signally exemplified on every battle-field. These have been more or less vaguely treated of as shock, commotion, stupor, etc. The larger part of those, who receive flesh wounds involving no important organ, are but little affected at the time, or may even be unconscious of having been hit, and at all events exhibit no well-marked immediate constitutional disturbance. In other cases, and particularly in wounds of graver nature, the patient instantly falls senseless, and so remains during a few minutes, or many hours, reviving again either completely, or suffering from a continued state of depression known as the result of shock, and marked by the usual features of great weakness, feeble circulation, pallor, etc. In other cases these last-named symptoms come on at once, and without the intervention or accompaniment of unconsciousness. These very interesting states of system may be due, it seems to us, either to an arrest or enfeeblement of the heart's action through the mediation of the medulla oblongata and the pneumogastric nerves, or to a general functional paralysis of the nerve centres, both spinal and cerebral, or finally to a combination of both causes. Arrest of the heart movements is producible, as is now well known, by any violent irritant directly addressed to the trunks of the pneumogastric nerves, or to the medulla oblongata, and it is conceivable that such an effect may be brought about by any very severe injury of an external part.

"In fact, it has long been known that the sudden crushing of a limb in inferior animals will stop the heart or make it act slowly for a greater or less length of time. Now if we add to this M. Bernard's experiments, in which he showed that irritation of the posterior roots of spinal nerves suddenly checks the cardiac motions for a time, and that like irritation of the anterior or motor roots gives rise to no such result, we shall be able to see how it is possible that a gunshot wound of a large limb may be competent to effect a like result. We should remember, too, that in nearly all of these cases the hæmorrhage from large vessels, such as are usually opened by accidents of this nature, is sufficient, even during syncope, to add to or deepen, so to speak, the effects of the reflected nerve impression. Where small vessels only have been wounded this might not occur, but it is proper to state that men who have fallen senseless at the instant of the wound, frequently awaken after a time to find themselves drenched with blood. Supposing such an arrest of the heart movements to have taken place, a continuance of their stoppage, even for a brief period, would naturally give rise to cerebral anæmia, pallor, unconsciousness, and the remaining phenomena of shock.

"Again, as we have said, a severe injury, as a gunshot wound of a limb or the neck, may produce its effects of unconsciousness and loss of power by greatly weakening or for a time destroying, with various degrees of completeness, the functions of all the nerve centres and of their conducting cords.

"The influence of shock in thus causing temporary paralysis of nerve trunks is very well known to every experimenting biologist. Thus, after opening the spinal cavity, it is very common to discover that the sensitive nerves are for a time unimpressible by stimuli. But, as a general thing, this is not so as regards the nerve centres within the skull, which are rarely so disturbed by the operation of uncovering them as to refuse all reply to irritations.

"The majority of physicians will no doubt be disposed to attribute the chief share in the phenomena of shock in its various forms to the indirect influence exerted upon and through the heart. There are, however, certain facts, which, duly considered, will, we think, lead us to suppose that in many cases the phenomena in question may be due to a temporary paralysis of the whole range of nerve centres, and that among these phenomena the cardiac feebleness may play a large part, and be itself induced by the state of the regulating nerve centres of the great circulatory organ.

"The loss of consciousness, and the appearance of a state outwardly resembling syncope, prevent us in most cases from feeling sure that the great nerve centres suffer loss of function primarily and not through want of nutrition from feeble or arrested heart action. But there do exist certain cases, more rare, it is true, in which singular affections of the nerve centres, other than those of the heart, occur as a consequence of wounds. These are well described by Legouest in

his *Surgery of the Crimean War*, page 219, and in somewhat varied shapes must have been seen by all who are familiar with the early history of gunshot wounds. The patients to whom we refer do not fall when struck, but become insanely excited or almost hysterical. The author above alluded to supposes that this form of nervous excitement occurs chiefly among those who are already excited by immediate conflict and who are actively engaged.

"One well known instance has been related to one of the authors of this paper as having taken place in the Mexican War, in 1846. An officer of well known courage was wounded in the heel, and was thrown at once into a state of alarm, which caused him to exhibit signs of the utmost trepidation. His character for courage was such that the favorable verdict of a subsequent Court of Inquiry was scarcely needed. No cases, such as the above, or such as Legouest has related, have been met with by us, so that they must be of very exceptional occurrence; yet as they show the possibility of cerebral disturbance without precedent or accompanying feebleness of the heart, it is enough to prove that they do now and then take place. We are tempted to add the following case as a still better proof that cerebral disturbance, the result of a shock other than traumatic, may give rise to the most profound prostration, without any prolonged continuance of cardiac weakness: A well known apothecary in Philadelphia was making a mixture of certain medicines in a large mortar, when they exploded with such violence as to break the windows of the store, crack bottles and jars, and deeply indent the board on which stood the mortar. Both he and his assistant were thrown down. Both suffered rupture of the tympanal membrane of the right and left ear. The assistant felt no marked constitutional effects, and got well with good hearing, but with a constant buzzing in the left ear. The apothecary himself, of a more nervous temperament, and perhaps, also, because he was standing nearer to the point of explosion, was, he thinks, insensible for a moment. When seen by one of us a few minutes later he was lying on a bed, with a pulse of rather remarkable strength, but now and then losing a pulsation, and altogether irregular as to rhythm, beating seventy one minute and eighty the next. His manner was excited and hysterical. He talked incessantly, and his limbs were in continual agitation, with occasional twitching of the facial muscles. The tympanal membrane was split across in his left ear, and on the right side presented a triangular opening. He had no headache, but complained of the roaring, hissing, etc., which seemed to be sources of the utmost annoyance. Despite his desire to move about, his muscles were extremely feeble, and for twenty-four hours he was unable to walk without aid. He recovered readily, both membranes healing completely, and his hearing none the worse for the accident. The patient, it should be noted, was not injured by his fall, and as we have seen, showed no signs of concussion. He, as well as his medical attendant, attributed the phenomena which he exhibited to the shock given to the auditory nerve. This opinion has since been confirmed by the cases reported by M. Brown-Séquard and others.

"Further on we shall show that in rare cases gunshot wounds cause partial or very general paralysis of grave type and prolonged duration in parts not directly injured; we shall also show that these protracted paralyses must be due to an equally permanent affection of the nerve centres. Now, if this be possible, there is every reason to believe that a temporary, though general, paralysis may take place in a large number of gunshot wounds. When the cardiac centres feel the shock most severely the feebleness will of course be greater; but there is much reason to suppose that the cerebral and spinal centres in general suffer *en masse* in every case of loss of consciousness from shock.

"As we proceed we shall have occasion to discuss the mechanism of the more permanent forms of reflex paralysis. Here we desire only to show that the effect of grave wounds is to cause a condition of the centres which gives rise to a general and profound feebleness, and that in rare cases the central effect is so intense as in some way to cause paralysis, which may last for hours, days, or months.

"Another class of nerve affections demands some notice before we discuss the undoubted instances of reflex paralysis from wounds which have fallen under our notice. These are what the French writers call cases of injury from commotion. They differ from those we have described in being due to the mere mechanical effect produced upon the neighboring parts. If, for example, a ball passes near the spinal column, it is conceivable that the roll of its motion and the resistance of the tissues may determine in the spine a brusque and sudden oscillation of the contents sufficient to cause very grave results.

"We have sometimes seen this illustrated in a very interesting shape and in a less dangerous form. Thus, in the case of a soldier who was shot at Gettysburg, July 3, 1863, the ball entered the cheek, and passing outside of the ramus of the jaw was cut out of the trapezius muscle. It struck the ramus, but did not fracture it or interfere with the act of mastication. In October, one or two very minute morsels of bone escaped from the neck in front of and four inches below the jaw. The only injury to the jaw bone must have been on its exterior surface, from which the pieces of bone alluded to worked down the tissues of the neck. The shock caused complete paralysis of the inferior dental nerve, with absolute anæsthesia, analgesia, and loss of sense of temperature in the lower lip and chin of the injured side. The sensation was for the most part rapidly restored by the use of cutaneous faradization after the nerve had been allowed time to recover from the results of the shock it had sustained. A portion of the lip, the skin below it, and the mucous membrane within still remain rebellious to treatment.

"The other case of mechanical shock to a nervous structure we shall report more at length. It is one as to which there may reasonably exist some doubt whether to call it an instance of commotion of the spinal cord from injury of neighboring parts, or to regard it as an impression made upon the spinal centre through the injured nerves, and resulting in a paralysis, as the reflected result of the state into which the centres were thus thrown. It is impossible to be sure that both sets of causes may not have been at work.

"*Flesh Wound of Back of Neck; entire Aphonia and Paralysis of all four limbs; speedy recovery, the right arm remaining weak.*

"Morgan Emory, aged 20, farmer, born in New York, enlisted September, 1861, in company 'C,' 9th New York Cavalry, a healthy man. August, 1862, had typhoid fever, but recovered perfectly. On the seventh of July, 1863, he was wounded at Williamsport. The ball passed through the neck from side to side, posterior to the vertebræ, entering the left side one-half inch below the level of the angle of the jaw and two inches from the posterior middle line of the neck, and emerging on the right side at one-fourth of an inch lower down and two and a half inches from the same middle line. No bone has been discharged from the wound, nor is there any evidence of injury of the spinous processes of the vertebræ. *Effect of wound.*—He fell from his horse, striking upon his right shoulder and bruising it slightly. He was speechless for fifteen minutes, and could neither stand nor move either arm. He acquired partial use of his left arm and of his legs in three or four days, and in a week could walk; his right arm improved very little. *September* 21, 1863; *present condition.*—With the exception of slight numbness of the left hand, his right arm is his only trouble. He has no power to move the right shoulder and elbow joints; the wrist and fingers he can move slightly. He has a burning pain in the fingers, most marked when the hand is cold. Sensation of touch is generally good. The circulation in both hands is bad—the right is colder than the left—the right biceps and pectoralis major are hyperæsthetic. *Galvanic test.*—Electro-muscular contractility and electro-muscular sensibility slightly diminished in all the muscles of the right arm. The shoulder joint is susceptible of passive movement, and seems not to have been injured permanently by the fall; the shoulder muscles are not wasted. It seems that for some days after the wound his skin was hyperæsthetic from the level of the wound down to the waist, so that a fly on the skin gave pain, although deep pressure did not. The muscular hyperæsthesia is of later date. *Treatment.*—Douche to arms; passive motion and electricity to right arm and shoulder. Three weeks later the electro-muscular contractility of the shoulder muscles was as good as on the other side. In the triceps the electro-muscular properties were lessened; in the forearm and hand both were as usual. Continued to faradize daily. The faradization was used up to November 1st, when he was furloughed. At this time the electro-muscular contractility and sensibility of the muscles were as good on the right side as on the left. He has recovered all the motions of the elbow, wrist, shoulder, and hand, but all are more feeble than those of the left arm, which is still a little numb, although far less so than when admitted. The burning pain which at first annoyed him is now rarely felt, and the hyperæsthesia of the muscles is nearly gone. On his return from furlough he was still better, and within a month was returned to duty. The fall upon the shoulder was incompetent to cause all of the symptoms here described, and since, in other cases where this element of doubt was absent, we have seen paralysis caused by commotion, therefore we see little reason to hesitate in assigning it as the producing cause of the paralysis in the present case; moreover, there was no paralysis of cerebral nerves, and the loss of power lay chiefly in the range of those nerves over whose spinal origin the ball passed.

"In many of the cases of injuries of the brachial plexus which we have observed it was quite impossible that the nerve tissue could have been directly injured by the ball, and in some of these at least the resultant paralysis must have been due to brief compression of their trunks during the movement of the missile or to agitation of the nerves through the tearing of tissues more or less remote.

"As we shall return to this subject in a future essay, it is only necessary here to describe cases of commotion so as to separate them from those of true reflex paralysis, with which they might easily be confounded. We have met with another and very interesting form of paralysis which might possibly be mistaken for reflex paralysis by a superficial observer. Men who are forced to use crutches, and to bear heavily upon them, are sometimes affected with numbness of one or both hands, and even with loss of motion in these members. This result is due to pressure upon the axillary nerves. It is most apt to occur in emaciated persons and those of large frame. Where it presented itself early in the case, as it may do, it might readily be attributed to reflected irritation. It is then easily relieved by laying aside the crutches, or by padding them and adding a handle by which to support the weight of the body on the hands. When the cure is delayed, faradization always affords prompt relief.

"We have seen that in all probability the state of shock from gunshot injuries is a state of general paralysis. We have also seen that in the great mass of cases it is temporary. We have now to show that in rare instances the paralysis continues as a more or less permanent evil after the general depression has passed away. When, therefore, a wound occurs, and the patient surviving the first effect is found to have paralysis of a distant limb or limbs, it is impossible to deny to such cases the title of reflex paralysis. All of the following instances seem to us to have fulfilled every condition which would entitle them to be so considered:

"CASE I.—*Ball Wound of Right Side of the Neck, probably involving no important nerve directly; fracture of hyoid bone; wound of throat. Reflex paralysis of left arm; probable reflex paralysis of right arm; early recovery of left arm; partial and remote recovery of right arm.*

"Captain R. N. Stemble, U. S. N., aged 49. While commanding the ram Cincinnati, May 10, 1862, the ship was attacked by two rebel rams. Captain S. was aiming a pistol when a ball entered his right neck, broke the hyoid bone, and traversing the neck emerged three and a half inches from the middle line, above, and to the right of the superior angle of the scapula, through the edge of the trapezius muscle. He fell half conscious and confused, but, soon reviving, felt that both arms were paralyzed. His first impression was that he was shot through both arms. He was carried below in great pain and spitting blood freely. The pain in the arms was made worse by movement and by passive motion. Pressure gave him pain in the right arm and shoulder only, and in the right chest. Sensation was never entirely absent from either arm, but was dull in both. His medical attendant, Dr Judkins, of Cincinnati, who took charge of his case on the 19th of May, 1862, writes as follows: 'When first seen by me the anterior wound was discharging mucus and pus with saliva. His voice was hoarse; deglutition, which returned in part on the third day, was still difficult and painful. He experienced severe pain in the supra-hyoidean group of muscles and in the pharynx. His left arm was still slightly paralyzed, having rapidly improved. On the right side the deltoid, biceps, triceps, and brachialis anticus were completely paralyzed, and up to the date of this account, July 9, 1862, have improved very little. The muscles of the right forearm are nearly as much paralyzed as those of the arm, and the sensibility of the right arm has become painfully acute. Captain S. seems also to have lost to a great degree the use of most of the shoulder muscles on the right side.' The left arm was nearly well in four weeks, the sensibility and movements of both improving equally, so that now, July 18, 1863, he has no loss of function in the member except slight want of tactile sensation in the ultimate distribution of the ulnar nerve. The right arm was but little better at this date, but the forearm had acquired every movement except supination, which seemed to be limited about one-half, not by paralysis, but by contraction of the opponent group of pronating muscles. At this period sensation was entire in the right limb, but there was soreness on pressure in all the anterior arm muscles, and neuralgia in the arm and forearm. The nutrition of both arms was good, but the right was the smaller, measuring at the biceps 9¾ inches, while the left measured 10¾ inches. During the slow progress of his case Captain Stemble lost several small pieces of the hyoid bone, and although hoarse for many months has recovered his voice without serious change in its tone or power. His convalescence, interrupted by many accidents and by an attack of pneumonia, continued up to the summer of 1863, and was largely due to the skill and care of his able medical attendant, Dr. Judkins. When placed under treatment, in Philadelphia, by Dr. Mitchell, July 18, 1863, Captain S. was still suffering from constant pain in the right arm. The left was well except as to the trifling loss of sensation mentioned above. The right forearm, though weak, possessed every movement except supination, as did also the hand, but the arm hung at the side useless, because there was scarce any abducting power and very little flexion at the elbow, both the biceps and long supinator being greatly enfeebled, and the former muscle, as well as the brachialis anticus, almost entirely atrophied and lost to view. Excepting the trapezius and rhomboid muscles, all the shoulder group was nearly useless and partially wasted. From July 18th to September 9th he was faradized, at first every day, and then every third day. Active and passive movements which had already been employed being of course continued. The result was a steady gain, ending in a cure as complete as could be hoped for in a case so severe. He regained every lost motion, and could raise his hand to his chin and abduct the arm about fifty degrees. The pronators alone remained intractable, despite every effort, but as the supinators and biceps developed themselves largely, even pronation gained somewhat, though not to such an extent as the other movements. The pain and hyperæsthesia diminished, but the former still exists. It is believed that a second course of similar treatment, about to be instituted, will further amend this case, in which all other means had utterly failed. Dr. Judkins is of opinion that the entire paralysis was due to reflected irritation. We incline to this belief for anatomical reasons, but even though we admit that the paralysis of the right arm may have been caused by commotion of the brachial plexus, it is impossible to suppose that the loss of power in the left member could have been similarly produced. The only permanent lesion on that side was the loss of feeling on the ulnar side of the palm and fourth finger. With this exception it regained its normal functions within three or four weeks. Whatever may have been the cause of injury to the right arm, it appears to have involved more or less nearly all the strands of the plexus, which is unusual in cases of traumatic injury from a ball. Its results were also more lasting than in the other arm. A year and two months after the accident the right arm was a useless member. Farardization of the muscles affected restored their power very rapidly, so that the patient regained every movement of the limb, which is still improving,—electricity having been temporarily laid aside in September, 1863.

"CASE II.—*Flesh Wound of Right Thigh, without wound of any large nerve; complete paralysis of all four limbs; speedy recovery of the left arm, tardy recovery of the other limbs, subsequent analgesia of the right side.*

"Jacob Demmuth, aged 21, Swiss, enlisted July, 1861, company 'D,' 108th New York Vols., a man somewhat below the average standard of height, of lymphatic temperament and moderate intelligence. Reports himself as healthy up to the date of his wound, which took place at Fredericksburg, December 13, 1862. He was marching at double-quick, when a fragment of shell as large as a musket ball struck his right thigh at the junction of the upper and middle thirds, directly over the femoral artery. The fragment did not enter deeply, but merely lodged in the leg, and was removed a day later without injury to the vessel. *Effect of wound.*—He fell half conscious, and although aware that he was wounded, he could not fix on the site of the injury until he had examined the limb. He felt instantly a burning pain in both feet, in front of the right chest and in the right arm, and in the right thigh about the wound. At first he was entirely powerless, but after a few minutes the power of the left arm returned, leaving him paralyzed as to motion in the right arm and in both legs. He lay on the field twenty-four hours, the weather being very cold. Sensation was defective in all the parts paralyzed as to motion. He had no pain in the back, but the burning pains alluded to above continued for a long time, and were always eased by cold applied to the wound. While the wound was healing he had headache and difficult, painful micturition. The wound closed in four weeks. During this period he regained the power to move the right arm, feebly and slowly, although perfectly as to extent. The pain in the side and feet also diminished, and the former disappeared altogether at a later period. He could not stand, however, or lift his legs from the bed at the time the wound healed, but there was then no headache or difficulty with the bladder or rectum. January 28, 1863, he was sent to Washington, where he improved so as to be able to walk with the help of a cane. His subsequent transfer to West Philadelphia caused a relapse; the pains returned, the paralysis increased, and he walked with difficulty on crutches. June 4, entered Christian Street Hospital. *Present state: Movement.*—The patient is partially paraplegic. He has some power to move the thighs when lying down, but cannot lift the legs from the bed. Below the knee all motion is lost, except a slight power of

flexing the smaller toes in both feet. Pressure upon the cicatrix causes feeble twitching of the anterior muscles of the right thigh; both legs are subject to cramp and twitchings, which increase at night. The left arm is strong, the right arm has all the normal movements, but all are slowly and feebly executed. *Sensation.*—He has shooting pains, which start from the seat of the wound and dart down the thigh to the knee. No other pain exists at present, but there is still a good deal of burning sensation in both feet alike. Localizing sensibility perfect everywhere. Tactile sensation normal, or very nearly so, in all parts of his body; no loss of sense of pain in the skin. Pressure or pinching of the muscles gives him more than the usual pain, so the muscles (of both legs, especially below the knees) may be regarded as affected with hyperæsthesia of common sensation. The left arm is in all respects normal; the right arm is also free from lesions of sensibility. *Nutrition.*—There is no special atrophy of individual groups of muscles, but both legs are slightly wasted, the right arm not at all so. The legs below the knees are relaxed and cold; the feet are congested, but not swollen to any marked extent. Along the edges of both soles there are singular purple and blue mottled spots, which he says existed from the time his boots were first taken off, twenty-four hours after he was wounded. It is possible that these marks are due to frostbite. The muscles of the legs are about equally irritable to induced electric currents. Unfortunately, no very perfect electric examination of their condition was made at this period. *Treatment.*—Regarding the case as one of reflex paralysis chiefly, he was ordered to have rough frictions, with cold to the spine, and to take the twentieth of a grain of strychnia three times a day. Under this treatment the cramps and twitchings increased, so that after three weeks the strychnia was abandoned. Every future attempt to repeat its employment caused the same increase of annoyance, without correspondent benefit, so that it was finally laid aside as useless or worse. About the middle of August a blister was placed on the cicatrix, with the effect of greatly relieving the burning in both feet. At the same time he was ordered to use the hot and cold douche to the spine alternately, and faradized daily. The electricity was persistently employed during two months, and a month later he was also treated with iron and quinine, porter and liberal diet. The electric treatment caused a rapid amelioration of his case, so that he soon left his bed and began to walk on crutches. Early in November he ceased to improve, and the treatment was abandoned. At this time he could use his right arm well and quickly, and walked unaided, although with a little unsteadiness of gait. No close examination was made as to his sensibility until December 3, 1863, because during this time he had been able to give aid in the wards, and made no complaint, except of more or less constant aching in the dorsal and lumbar regions of the spine. About December 3d he was closely inspected for discharge, when the following notes were taken: *Motion.*—Good in left arm; not so perfect in right arm. Both legs somewhat weak, so that he shuffles a little in walking, the worst movement being that of extension in the toes of the right foot. *Sensation.*—Tactile sensibility feeble in the right leg and right arm, but nowhere entirely lost; it is normal in the left leg and left arm. The sense of touch is first found to be feeble below the navel on the right side. It lessens in perfection to the knee, and is better below that part, especially on the inside of the calf, being worse in the foot. Tickling the sole causes no sensation of tickling on either side. *Pain.*—There is absolute loss of sense of pain in the right leg, belly, chest and arm, with somewhat lessened sensibility to pain on the left side also. In many localities he was able instantly to tell by the altered sensibility when the needle point crossed the median line; in others, this was more difficult. So complete was this analgesia that the most intense faradization of the nails of the right hand or of the right nipple caused not the least sensation. The penis remained sensitive, but all over the right side he could be cut or stuck full of needles without evincing the least consciousness of anything but a touch. The sense of temperature was good in the left leg, confused and uncertain at the upper third of the right thigh, and lost below the knee, where a heat of 110° Fahrenheit was felt as a touch only when the sponge wetted with hot water was applied. On the foot of the right side this degree of heat was unfelt in any form. Higher heat caused reflex movements, which did not tend to remove the limb from the irritant, but were merely convulsive in their character. Intense cold also gave rise to these irregular movements. *Electric examination.*—There was some difficulty in determining the state of the muscles as to their electric sensibility, owing chiefly to the want of intelligence in the patient and to the fact that he spoke an impure German patois, which made it no easy task to obtain from him a clear statement of his feelings. The electro-muscular contractility is slightly diminished in the right leg and arm; it is much impaired in the extensors of the toes on both sides; everywhere the muscles respond slowly. The patient was discharged December 14, 1863.

"CASE III.—*Wound of Right Thigh, with probable commotion of right sciatic nerve; partial paralysis of right leg; reflex paralysis of right arm; speedy recovery of arm; history unfinished.*

"William W. Armlin, aged 23, born in New York, farmer, enlisted August, 1862, in company 'D,' 134th New York Vols. Healthy before enlisting, and, except a slight typhoid fever in the fall of 1862, healthy up to the date of the wound, July 1, 1863, at Gettysburg. While kneeling on the left knee, the right knee bent at a right angle, he was shot in the right thigh on a line with the internal condyle of the femur, ten inches above it, and a little anterior to the artery. The ball passed upward, backward, and outward, and emerged two inches below the tuber ischii, and one and a quarter inches external to it, just above the fold of the nates. Dropping his musket he fell on his face, weak, but not insensible; the right leg violently flexed for a moment. He felt very feeble, but especially so in the right arm, with which he vainly tried to aid himself. After a half hour the bleeding, which was not excessive, ceased, and he was able to stand on the left leg, but not on the right leg, and had scarcely any use of the right arm, which, it should be noted, was in no way hurt when he fell. He managed to bind up the wound with a water dressing, and, occasionally renewing it, lay two days on the field. When hit he perceived no pain, but within an hour a burning attacked his instep, and has never left it, remaining neither worse nor better. Sensation, he is sure, was unaltered except on the sole; motion improved slowly, except in the flexors and extensors of the foot and toes. To his surprise the feebleness of the right arm increased after he was put in bed, and indeed notably after the second day. Up to October 28th it improved slowly, but at this time he went home on furlough, and began to use a crutch, which again so weakened the arm as to alarm him and deprive him, as at first had happened, of the power to feed himself. Rejecting a crutch on this side, he used a liniment on the arm, and it has now gained so much as to have about one-fourth the force of the left arm. It did not lose sensation at any time. Present state. December 14, 1863.—General health good. *Nutrition.*—Wounds healed. Leg below knee wasted, foot swollen, toes blue. Contraction of great toe in flexion. Measurements, 8¾ inches above internal condyle the thigh measures, right 16, left 17⅜ inches; middle calf, right 11½, left 13 inches. *Voluntary motion.*—He lifts the right thigh well, but complains of its weight. Knee motions very fair; has no extension or flexion of the foot or toes. *Sensation.*—Tactility absent in sole of right foot, feeble in second toe on its dorsal face, absent on top of third toe, but elsewhere complete. Localization extremely confused, so that a touch on the toes is felt, but is referred to the instep. Surface analgesia of the sole, but deep pricking with a needle is felt in the sole. Hyperæsthesia of the posterior thigh muscles to a slight degree; marked soreness on pressure in the calf muscles, the short extensors of the foot, and its whole dorsal surface as well as the inside of the sole. *Pain.*—The pain lies deep in the calf and extends outside, under and in the peroneal muscles, down the front of the leg, and over the dorsum of the foot, and to the external side. It is intense in the dorsum, but nearly absent in the sole. Water does not seem to ease the pain, which is of a burning character 'like mustard.' Hitherto nothing has aided it. *Electric test.*—The thigh muscles respond well. The right tibialis anticus has no electro-muscular contractility, but its electro sensibility is highly exalted, as is the case in all the muscles down to the foot. In the foot the electro-muscular contractility and sensibility are both lost, except that in some parts of the dorsum the sensibility cannot be tested readily for various reasons. It is certainly lessened. The right arm is still very feeble, especially below the elbow, and has lost in size. It measures comparatively as follows: Dec. 20th, right forearm 8⅝ inches, right arm 9 inches; left forearm 9¼ inches, left arm 9⅝ inches. He is not left handed. The arm is improving; the leg has remained unchanged during some time past. Ordered, first, a blister over the whole dorsum pedis. Dec. 23d.—This has caused great relief and is to be repeated. The complete history of this case will be detailed elsewhere. Up to this present date, February 1, 1864, the burning pain in the foot has been relieved, and the hand and arm have entirely recovered under the use of the douche, active exercise, and electricity.

"The following cases are equally instances of reflex paralysis. We regret that, owing to circumstances not under our control, they are less complete as to their symptoms and history than we should have desired:

"CASE IV.—A Sergeant was shot, during the battle of Malvern Hill, in the right testicle. This organ was nearly entirely destroyed by the ball. He fell without pain, believing himself wounded in the back. A few moments later he became senseless. Recovering after a few minutes he discovered that he could walk, but that the right foot dragged when he attempted to lift it during the effort to get to the rear. This weakness remained permanent for several months, and was relieved by faradization, and shampooing soon after the testicle healed. The flexors of the foot on the left leg were completely paralyzed to voluntary control, but responded to the irritation of the induced electro-magnetic currents. There was no loss of sensibility.

"The next case was observed by one of us in the U. S. A. General Hospital, Sixteenth and Filbert Streets. Unfortunately no notes were taken at the time, which will account for the brevity of the details:

"CASE V.—An officer was struck by a small fragment of shell upon the external side of the left thigh. He felt pains of a smarting character in both thighs at or about the same spot, and was impressed for a time with the conviction that he had been shot through both thighs. The shell wound healed in the course of three or four months. During this time he had occasional smarting on the outside of the sound thigh. This gradually disappeared, and at length he noticed accidentally that there was a space of skin about five inches square, on the outer part of the sound thigh, in which there was neither sense of touch nor of pain. When examined by us, he could indicate the boundaries of the anæsthetic space very readily by the loss of tactile sensations when a body, moved while in contact with his skin, was made to cross the line on to the numb parts. These bounds were always very accurately the same. He returned to his regiment without any improvement having taken place in regard to anæsthesia. It is difficult, as it appears to us, to refer either this case or the last to any cause except a reflex effect. The interest of the case just now recorded lies partly in the fact that at the time of the wound the patient felt a sensation which he referred to the part which afterward became deprived of sensation.

"The following case is a still more remarkable instance of the same peculiarity, and is also instructive from its resemblance to Case III, that of Armlin, in whom a gunshot wound of the right leg also caused reflex paralysis of motion only in the arm of the same side:

"CASE VI.—*Gunshot Wound of Right Thigh; lesions of motion and sensation; reflex paralysis of right arm as to motion.*

"Daniel Kent, aged 24; Pennsylvanian; farmer. Enlisted August, 1862, company 'B,' 145th Pennsylvania Volunteers. Healthy until wounded. At Gettysburg, July 2, 1863, while charging at a full run, the leg raised up, he was shot in the right thigh 10½ inches above the edge of the patella, directly over the rectus. The ball made its exit on the postero-internal surface of the thigh one inch below the fold of the nates. It seems to have passed inside of the bone and could not have hit the sciatic nerve. He fell at once, quite conscious, and feeling an instant stinging pain all over the right side of his body, and especially in the arm. He lost a great deal of blood, and found that he could not sit up without giddiness. His wound was dressed in six hours, and he was on the field thirty-six hours. The leg lost all motion and some sensation, and the tingling pain in the arm left him within twelve hours. He remained in bed six weeks, and then was able to walk on crutches. The sense of touch changed but little during the time which has since elapsed, and the power of movement in the leg has remained unaltered since August 1, 1863. The wound healed in October, with some previous loss of bone. Since October the wounds have twice reopened to give exit to small pieces of bone. Except an attack of ague in October, his general health has been good. Present condition, December 26, 1863: *Nutrition.*—The leg is healthy in color; the foot swells when hanging down. The right thigh, eight inches above the patella, measures 19 inches in circumference; the left measures 19¼ inches. The right calf measures 14½ inches; the left calf measures 15 inches. *Sensation.*—No pain anywhere; tactile sensibility entire; sense of locality healthy. *Motion.*—The thigh is voluntarily flexed very slightly, and only through the agency of the psoas muscle, the anterior thigh muscles refusing to obey the will; abduction and adduction of the thigh normal; extension of the thigh is normal; extension of leg none. The foot is almost moveless, except that the will can cause feeble flexion of the toes and slight eversion and inversion of the foot. *Electric examination.*—The rectus muscle has its electro-muscular contractility somewhat lessened; that of the two vasti muscles is lost until the wet conductors reach the upper parts of the muscles (three inches above the wound), where this properly becomes normal. The sartorius has its electric contractility diminished. Below the knee the peroneus longus responds very well, but, with this exception, none of the leg muscles stir under the most powerful induced currents. The short extensor of the toes and the interossi still possess some power to contract under electrical stimulus. Throughout, the electro-muscular sensibility is diminished in all the muscles which have suffered in their contractile power, and the sense of pain seems also to be materially lessened since dry electric conductors, with strong currents, cause no pain when applied to the bones or nails of the foot. The history of the arm, which was reflectively paralyzed, has been reserved for separate detail here. After three days from the date of the wound the right arm, which had remained feeble, became so completely paralyzed that the patient could no longer raise it to his lips; under the use of a stimulating liniment it grew better until he used crutches. Probably owing to their employment he became much worse, but gradually improved again up to this present date of January 6, 1864. The right and left arms measure nearly the same; power of right arm one-fourth that of left. *Electric examination.*—Electro-muscular contractility normal: electro-muscular sensibility somewhat lessened. *Treatment.*—Faradization of arm daily; alternate hot and cold douche, and active motion. On close examination, soon after admission, some evidence of tubercle was found in the right lung, and the patient was therefore ordered to be discharged January 20, 1864.

"CASE VII.—*Wound of Right Deltoid; sensory and slight motor paralysis of right arm; speedy recovery.*

"Michael Farrell, aged 28; farmer; born in New York; enlisted September, 1861, company 'I,' 20th New York Vols.; a vigorous, healthy looking man—was well up to date of enlistment. At Fredericksburg, December 13, 1862, he was shot in the left shoulder while lying down. The ball entered the erector spinæ mass of muscles on the left side on a level with the lower angle of the scapula, and passing upward and outward, lodged under that bone; the wound healed readily, the ball remaining. February 3d, went to duty. July 1, 1863, a small ball passed through the right deltoid muscle three inches above its insertion into the humerus. The ramrod fell from his hand and the arm dropped. He retired to a hospital, and on examination found that although he had all the movements of the arm he had no sensation. During the next four days he was exposed to the sun a good deal, and the arm, being bare, was blistered, which, he says, to a great extent restored its feeling, which has since gone on improving. There is now, July 25, 1863, some slight paralysis of motion, but all the movements are feeble, and those of the arm painful, owing to the contractions about the ball track; the arm improved, and the man was returned to duty Oct. 22, 1863.

"Before proceeding to discuss the causes which give rise to reflex paralysis, it will be useful to analyze the symptoms of the preceding cases so as to learn how they differ and in what respect they resemble one another.

"*Relation of the seat of the wound to the part or parts paralyzed.*

"CASE I.—The wound involved the muscles of the neck or throat, and the hyoid bone. Result: Paralysis of both arms and of the neck. CASE II.—Fragment of shell; wound of muscles over and external to the right femoral artery. The injury may have caused concussion of the crural nerves, and thus much of traumatic paralysis. Result: Reflected paralysis of the right arm and leg and the left leg. "CASE III.—Probable injury of the sciatic nerve—(commotion). Result: Reflex paralysis of the right arm. CASE IV.—Ball wound of right testicle; paralysis of right anterior tibial muscles and peroneus longus. CASE V.—Wound by fragment of shell in external side of left thigh; paralysis of tact on a corresponding part of right thigh. CASE VI.—Ball wound, probably involving the crural nerves. Result: Paralysis of right arm. CASE VII.—Ball wound of deltoid muscle; sensory and slight motor paralysis of same arm. There is no evidence in this case that the ball struck the bone or directly injured any large nerves, since even the deltoid itself had nearly full power when the patient was first examined by us. In three of these cases the leg was hit, and the arm of the same side was paralyzed. In three cases the paralysis affected the opposite side of the body; and in one the paralysis of tact and pain was observed to have fallen upon a space symmetrically related to the wounded spot as regards position. No general law, therefore, can be deduced from these records, nor, from what we see in the causation of reflex paralysis from disease, should we expect to find any inevitable relation between the part injured and the consequent paralysis. The constitutional condition at the time of the wounding, as to excitement, mental and physical, may possibly have to do with causing the resultant paralysis.

"Of the seven cases above reported, two were in active movement, two were standing about taking aim, one was kneeling, and of two we have no information as to this point. It may prove, upon examining a larger number of cases, that a man wounded when moving violently, or when excited, is more than another liable to reflex paralysis, but as yet we are not entitled to such an inference. In most of our cases the constitutional effects were instant and severe, and could not therefore have been due to the loss of blood, which in some of them was copious. Four of the seven cases had stinging, smarting, or burning pain in the part paralyzed reflectively. The pain was an early symptom, which disappeared in all of them after a time. In three cases no such pains were complained of.

"The after history of these cases is extremely curious. However grave the lesion of motion or sensation, it grew better early in the case, and continued to improve until the part had nearly recovered all its normal powers. In almost every instance some relic of the paralysis remained, even after eighteen months or more from the date of wounding. In some the part remained weak, in others there was still left some slight loss of sensibility, and in two the loss of power and of sensory appreciation was very considerable. In a case of reflex paralysis from a wound we have, therefore, some right to expect that the patient will recover rapidly up to a certain point; then in most cases a small amount of loss of power or sensation may remain. The future history of our own or other cases may determine hereafter whether the recovery is ever quite complete. In CASE I, the more prominent results were only the continued lesions which had been noted early in the case. In CASE II, the permanent lesions were chiefly of secondary character, and were at all events additions to those which were first observed. In no other case were similar phenomena noticed. In two of the seven cases there were lesions of sensation and motion; in three, motion alone was lost; and in two the sense of tact and of pain were affected without other loss of function. The extent and duration of the induced paralysis have already been considered.

"Of the treatment we have very little to say. In Captain Stembel's case the left arm recovered without treatment in four weeks, leaving only a slight loss of touch in the terminal distribution of the ulnar nerve. The right arm, which we also regard as reflectively paralyzed, recovered sensation early, but was useless as to motion, until it was treated and cured by faradization eighteen months after it was first injured.

"Demmuth, CASE II, came under our care seven months after he was wounded; as to his previous treatment we know nothing. In our hands strychnia not only failed to aid him, but did harm. He was rapidly relieved by faradization, active and passive movement, and the douche, with iron, quinine, and liberal diet.

"Armlin, CASE III, used a liniment on the paralyzed arm with some improvement. Faradization has restored it completely. CASE IV.—Relieved by faradization. CASE V.—No treatment; lesion of sensation only. CASE VI.—Kent. A stimulating liniment applied upon the arm seems to have been of use. As in Case III, the employment of crutches caused a relapse. CASE VII seems to have been accidentally benefited through the blistering to which the arm was subjected after exposure to the sun—a useful hint in like cases. No other treatment was employed. Although long periods had elapsed in every case before we examined them, in only one, that of Armlin, Case III, was there any very notable wasting. And even in this patient the loss was generally throughout the member, and may be readily ascribed to mere lack of use. In none was there atrophy, such as characterizes lesions of nerves, and certain rheumatic and other palsies, save, perhaps, in the doubtful instance of the right arm in CASE I.

"The electric examination was made at periods so variable in the several cases as not to permit of any useful comparison of results, and has been stated in each case merely for future use and reference when more cases have been reported. In only one case did the muscles display great loss of contractility when faradized, and in this, No. 1 of the series, the limb in question was the right arm, as to which alone some doubt may exist concerning the cause of the paralysis. The ultimate causation of these very singular and hitherto undescribed affections is the last point which we shall consider. The problem before us may be simply and briefly stated; its solution is a task less easy.

"A gunshot wound occurs, involving large nerves or not, and we have instantly a paralysis of motion and sensation, or of either alone, in some part of the body more or less remote. How shall we explain this? Although we have long been aware that certain forms of disease are capable of causing paralysis of distant organs, of altering secretions and affecting nutrition, we have had no plausible theory of the causation of these effects until M. Brown-Séquard attempted to account for them in a manner equally simple and ingenious. Recalling the fact that irritation of the vaso-motor nerves is capable of producing contraction of the blood-vessels, he inferred that when an external nerve is violently or permanently excited it may be able to produce contraction of the capillary vessels of the nerve centres and thus give rise to paralysis. It seems unlikely, even if we admit his explanation, that the capillaries could remain contracted for any great length of time. But it is possible that the alteration of nutrition, which this temporary anæmia causes, may give rise to one of two results—either a continued disturbance of nutrition, which, however slight, would occasion grave results if it existed in a nerve centre, or secondly, to a paralysis of the capillaries of the nerve centre involved.

"We suppose, first, the existence of an exterior nerve lesion; secondly, a consequent irritation of the vaso-motor nerves in a limited part of the spine; contraction of its capillaries, anæmia, nutritive changes, and finally, a relaxation of these vessels, which would be more apt to be a lasting condition, and would in fact constitute congestion. Such a series of consequences may very possibly occur, and would no doubt be competent to cause a paralysis whose site, extent, and character would depend upon the part of the nerve centres affected by the excitation. With so satisfactory an hypothesis before us in this modified shape, it would seem needless even to suggest any other explanation. But in a region of research so little explored, it may be allowable to point out the fact that another mode of explanation is at least possible, and the more so, since there exist certain objections to M. Brown-Séquard's manner of viewing the subject. It is to our minds improbable that contraction of the capillaries can continue for any great length of time. There is no experiment on record to show that this can be, or that it ever occurs in a nerve centre. We have therefore added the suggestion of consequent, and why may we not say primary, paralysis of these vessels. Here we have firmer ground for opinion, since it has been most distinctly shown that in section of the sympathetic nerve this result does take place, and is singularly persistent. But whether the blood-vessels remain contracted or dilated, nutritive changes would occur, and these the pathologist has failed to find. If now we ask ourselves the question whether it may be possible to blight or exhaust utterly the power of a nerve centre, without the intervening mechanism of contracted or dilated blood-vessels, we are tempted to think that such a result may be producible.

"It appears to us possible that a very severe injury of a part may be competent so to exhaust the irritability of the nerve centres as to give rise to loss of function, which might prove

more or less permanent. A strong electric current, frequently interrupted, is certainly able to cause such a result in a nerve trunk, while a general electric shock, as a stroke of lightning, is, as we well know, quite competent to destroy the irritability of every excitable tissue in the economy. Now if the former of these results can occur in a nerve so insulated as practically to have no circulation, the loss of irritability cannot be set down as due in such a case to a defect of circulation. Reflecting then upon the close correlation of the electrical and neural force, it does not seem improbable that a violent excitement of a nerve trunk should be able to exhaust completely the power of its connected nerve centre. The central change thus brought about would no doubt involve the consequent or immediate occurrence of chemical nutritive changes, which would gradually yield as time went on. While this view seems to us adequate to explain the facts, the notion of vaso-motor irritation and capillary contraction (Brown-Séquard) does not appear to be competent to cover all the facts. We have pointed out that no one has ever shown that capillary contraction can exist as a permanent state in a nerve centre; while, on the other hand, it has been proven that section of a sympathetic nerve involves permanent dilatation of blood-vessels; but in the brain, which is supplied by the sympathetic of the neck, division of this nerve gives rise to no disturbance, although the side of the brain on which the section occurs grows warmer. However, it is probable that the whole supply of vaso-motor nerves to the brain does not come from the neck, while other organs, whose whole supply we can cut off, as the kidneys, do certainly suffer nutritive changes as a consequence of such sections.

"One or other of the two theories we have offered must therefore be called on to explain the central changes which give rise to reflex paralysis. Either the shock of a wound destroys directly the vital power of a nerve centre, or it causes paralysis of the vaso-moter nerves of the centre, with consequent congestion and secondary alterations. But there is no reason why, if shock be competent to destroy vitality in vaso-motor nerves or centres, it should be incompetent so to affect the centres of motion or sensation. Until the causation of these cases is better understood, it is vain to speak confidently as to treatment founded on a conception of the mode of their production. Experience has shown that the removal of the first cause, and in some instances the application of alteratives, as blisters to the cicatrix, prove valuable in relieving such induced pain as may exist. Further, that stimulating liniments or blisters to the affected member are useful, and that the local application of induced electric currents to the muscles is of the utmost service. The question of the use of internal remedies has yet to be decided by larger clinical experience. We, ourselves, have been unfortunate in that no chances have presented themselves of treating these cases in their early stages, when the causes which first produce the paralysis are present and before those later nutritive changes occur which, as we presume, are essential to the continued existence of the state of palsy. We have endeavored to show in this report that the condition called shock is of the nature of a paralysis from exhaustion of nerve force; that it may affect one or many nerve centres, and finally, that it may be so severe as to give rise in certain cases to permanent central nerve changes, productive of paralysis of sensation and motion, or of either alone.

"S. WEIR MITCHELL,
"GEO. R. MOREHOUSE,
"W. W. KEEN, jr.,
"*Act. Ass't Surgeons, U. S. Army.*"

The number of recorded cases of wounds of nerves of special sense caused by missiles is small. The following case of shot wound of the neck is interesting, and is regarded as a case of injury of the sympathetic nerve:[1]

CASE 1077.—Edward Mooney, aged 24 years, enlisted July, 1861, Co. C, 110th Pennsylvania. He was perfectly healthy before and after enlisting, until wounded at Chancellorsville, May 3, 1863. He was standing erect and was looking toward the left side, when a ball entered his right neck one and a half inches behind the ramus of the jaw, at the anterior edge of the sterno-cleido mastoid muscle. The ball passed across the neck, rising a little, and emerged immediately below and a half inch in front of the angle of the jaw on the left side. He fell senseless, and, judging from the movements of his regiment, may have so remained during half an hour. On awaking, he found his month full of clotted blood, which he pulled out. The bleeding did not continue. After a short rest he was able to walk nearly three miles to the rear, where his wounds were dressed with cold water. On his way he discovered that his speech had become hoarse, difficult, and painful, and that deglutition gave rise

[1] MITCHELL, MOREHOUSE, and KEEN (*loc. cit.*, p. 44) are of the opinion that this is a "case of injury of the sympathetic nerve, and if so, that it is the only one on record."

to great uneasiness and to burning pains. He says the sensation of pain was felt as though behind the pomum adami. After five days of great suffering and utter inability to swallow, he obtained some relief, but, for a month or more, was forced to swallow a mouthful of water after every mouthful of solid food. The power to swallow gradually improved, and is now as good as it ever was. A week after he was wounded he became able to articulate without pain, although still hoarsely. This difficulty also lessened by small degrees. At present, July, 1863, his voice is still a little hoarse. During his recovery, which was rapid, the wounds healing within six weeks, he had a good deal of pain in the back of the neck. He says that he had headache whenever, after the injury, he attempted to walk far or exert himself; but he describes the headache as chiefly behind the ear and in the back of the head, with some frontal pain. About one month after he was hurt a comrade noticed the peculiar appearance of his right eye and called his attention to it. A little later it began to be troublesome in bright lights, and has remained so ever since, with of late some change for the better. July 15, 1863: The pupil of the right eye is very small, that of the left eye unusually large. There is slight but very distinct ptosis of the right eye, and its outer angle appears as though it were dropped a little lower than the inner angle. The ball of the right eye looks smaller than that of the left. These appearances existed whether the eye was opened or closed, and gave to that organ the look of being tilted out of the usual position. The conjunctiva of the right eye is somewhat redder than that of the left, and the pupil of the right eye is a little deformed, oval rather than round. In a dark place, or in half-lights, the difference in the pupils was best seen; but in very bright light, as sunlight, the two pupils became nearly of equal size. The left eye waters a good deal, but has the better vision, the right eye having become myopic. In sunlight he sees well at first, but, after a time, observes red flashes of light in the right eye, and finally, after long exposure, sees the same appearances with the left eye also. He complains a good deal of frontal headache at present, and thinks that since the injury his memory has been failing, although of late it has improved. Has lost flesh and strength since he was wounded. About the 30th of August the patient rode to the office of Dr. Dyer, who examined his eyes with the ophthalmoscope, but found no abnormal retinal appearances. Mooney walked from Dr. Dyer's office to the hospital, an unusual exertion, as he was weak, and avoided exercise on account of the headache it caused. An orderly who was with him on this occasion remarked to one of the hospital staff upon the singular appearance which his face presented after walking in the heat. It became distinctly flushed on the right side only, and pale on the left. This fact was afterward observed anew by one of us. The patient had used exercise and had just come in. The right half of the face was very red. The flush extended to the middle line, but was less definite as to its limit on the chin and lips than above these points. He complained of pain over the right eye and of red flashes in that organ. A careful thermometric examination, made during repose, showed no difference in the heat of the two sides within the mouth or the ear. We regret that it did not occur to us to repeat this when the face was flushed by exertion. Under a tonic course of treatment he gained ground rapidly. The eyes became less sensitive, the pupils more nearly alike, the line of the lid straighter. He had several attacks of fainting after exposure to the sun, and these, with occasional diarrhœa, retarded his recovery. He was at last able to return to duty, and left for that purpose in October, 1863, nearly all of his peculiar symptoms having disappeared and his general health having been altogether recovered.

A case of neurosis, involving different branches of the sympathetic nerve, is reported by Acting Assistant Surgeon L. K. Baldwin:

CASE 1078.—Private Hiram Voight, Co. E, 13th Massachusetts, was admitted into ward O of the West Philadelphia Hospital on December 16, 1862, with a cicatrized shot wound of the right arm, producing paralysis of the ulnar nerve. Soon after admission he had congestion of the kidneys, with scanty acid urine, which he passed with difficulty. Of this he was soon relieved by acetate of potassa with sweet spirit of nitre, conjoined by demulcent drinks and fomentations to the spine. On January 16, 1863, he was attacked with palpitation of the heart and violent dyspnœa, coming on in paroxysms, chiefly during the night. He was of German birth, medium sized, with dark complexion and good physical organization, about 24 years old.[1] After the exhibition of a mild laxative he was put upon the use of tincture of assafœtida, with the application of a belladonna plaster to the cardiac regions. No tenderness of the spine was manifested upon pressure. Tincture of valerian was given along with the assafœtida upon the recurrence of the dyspnœa, which resembled spasmodic asthma, and this plan of treatment was pursued for several days. On February 14th the impulse of the heart was so considerable that five drops of tincture of veratrum viridé were given; but its discontinuance was soon demanded, and the antispasmodic treatment, with tincture of valerian in addition, was resumed. On February 17th the dyspnœa was less violent and of shorter duration; but he began to complain of general tremulousness with great nervous irritability. The tongue became furred and yellowish, with slight headache and feverishness, which were relieved by the use of five grains of blue mass at night and slight laxatives in the morning. On the 20th he had great cardiac agitations with some dyspnœa and general nervous tremulousness. His strength was also failing. Pills containing one grain of sulphate of quinine and two grains of extract of hyoscyamus were given four times daily, with a teaspoonful of compound spirit of sulphuric ether at times of paroxysms. On the 24th he felt better, but a repetition of the mercurial was demanded by the state of the tongue, etc. Still had paroxysms of dyspnœa at night, with twitchings of facial muscles and great nervous agitation. Mental functions were also somewhat disturbed. On the 27th he was attacked with vomiting, which caused him great distress. He had no appetite and his stomach rejected everything. His pulse was moderately full and regular, but his countenance and general movement indicated great malaise, and he seemed almost as if insanity were impending. His face became flushed, with general heat of skin, and thirst, and a recurrence of the furred tongue, with constant vomiting. He was again put upon the use of blue mass with aromatic syrup of rhubarb, which soon produced a favorable change of the gastric symptoms as well as his general condition. Paroxysms of dyspnœa had now in a great measure passed away. The pulse had become regular and firmer; but still his stomach remained irritable and non-retentive. On March 5th his symptoms had a little improved, but he was very restless at night, and still gave evidence of great nervous irritability, which were thought to be clearly traceable to an affection of the ganglionic centres of the sympathetic nerve. Endermic applications of morphia to the epigastrium was tried for the relief of gastric irritability, but without apparent benefit. The stomach remained rebellious to the reception of everything which was taken into it, and could not be subdued by any medicinal or dietetic measures which were prescribed. Notwithstanding the obstacle to proper nutrition, his strength was quite well maintained and no

particular emaciation was observed. Being a German, lager beer and hock wine were temptingly offered him; but with no successful result. In this way he continued for several days longer, being fortunately, however, now relieved of all pulmonary and cardiac symptoms. All medicine was suspended, and on March 30th he first expressed a desire to be discharged and sent home. This wish was acquiesced in, and he was discharged from service April 18, 1863, and pensioned. Examiner G. S. Jones, of Boston, reported, December 21, 1867: "He now has partial paralysis of his left hand, which impairs its power and usefulness. There is no evidence of nervous debility or softening of the brain."

The following two cases of shot wounds of the *portio dura* nerve, seventh pair, are copied from Mitchell, Morehouse, and Keen, pp. 47, 51:

CASE 1079.—Private John C. Dyre, Co. E, 71st Pennsylvania, aged 19 years, was wounded at Gettysburg, July 3, 1863. While aiming, a ball entered just behind the left ear at the level of the meatus. It broke the mastoid process slightly, and was said to have gone forward and downward. It has not been found. He fell unconscious, and reviving within about two hours at a hospital, where he had been carried, he found that he could not use the jaw, owing to pain in the ear. There was also pain in the left cheek and brow, left neck, shoulder, arm, and hand, together with the left chest. The left arm was weak for several days. He may have fallen upon it. The pain was a neuralgic ache, not the pain of a bruise. Water dressings were used after a vain search for the ball. Within two days he had pain in the lower teeth and jaw on the left side. After five weeks all the pains grew better rapidly, and at the same time the motions of the jaw returned. The ear was deaf from the first; but he does not know whether blood flowed from it or not, or when pus first came from it. *Present state, February* 14, 1864, *eight months after reception of wound:* The features are slightly drawn to the right in repose, and excessively so during laughter and speech. *Specimen* 1567, in the Army Medical Museum, is a cast of his face in repose. The left side is absolutely paralyzed. The inner canthus of the left eye is a little rounder than that of the right eye. The tears overrun the lid at times. Inability to close the lids on the left side, owing to which he has formed the habit of rolling the eyeball upward so as to cover it with the passive lid. He then supposes that he has closed the eye. Chewing on the left side causes pain in the teeth, which endures for some time. Sensation is perfectly normal on the paralyzed side. Motion is of course utterly lost in all the muscles of expression. *Electric test:* Not the slightest contractility exists in any of the muscles of expression on the left side, with a curious exception. The muscular layer of the orbicularis oris in the upper and lower lips still responds to the current, but more remarkably below than above. There, is, however, no voluntary control over these parts. The buccinator alone of the masticating muscles seemed to have its electric contractility enfeebled but not wholly lost. *Examination of Special Senses—Tongue—Motions:* The upward and backward motion of the base of the tongue is awkwardly performed. In most of its movements the tongue inclines slightly to the right side, and is capable of being drawn to the left side. The palate hangs a little to the right and acts imperfectly, so that *food is apt to enter the nose.* There is some further loss of power in the other muscles of deglutition, for he is often troubled by food entering the glottis, while at times it is thrust back again into the mouth. *Speech:* He pronounces many letters with difficulty or imperfectly, so that his speech may be said to be a little thick, and he so describes it, referring the trouble to his lips and tongue. The labials are of course affected, but the guttural sounds are also imperfectly executed. Taste is apparently impaired over the entire left tongue. It was examined by comparing its appreciations with those of the other side. *Electric state of Tongue:* No loss of its electric properties was detected. Hearing on the left side was destroyed. The back part of the bony meatus was carious and the membrane absent, perhaps from inflammation consequent upon the wound. *Treatment:* The patient was industriously faradized for several months without the least gain in any respect. The nerve may have undergone such changes as might make it impossible to restore to the muscles their lost properties. Dyre was discharged from service July 2, 1864, and pensioned. Examiner T. F. Harper, of Philadelphia, reported, January 30, 1869: "A gunshot wound in petrous portion of temporal bone of left side of head, causing superficial fracture followed by some exfoliation of bone. There has resulted a paralysis of seventh nerve, occasioning an impairment of vision of left eye; also a great deformity of the face, it being much contorted and twisted to the right by loss of power in the muscles of the left side of the face." The Philadelphia Examining Board reported, September 13, 1877: "Paralysis of left side of face, with loss of hearing, left ear, and defective sight in left eye. Deformity, overflow of tears, and inability to close eyelids. Ball supposed to be in temporal bone."

CASE 1080.—J. Gager, Co. M, 14th New York Heavy Artillery, aged 42 years, wounded at Spottsylvania, May 12, 1864. The ball entered the left posterior neck one and three-quarter inches from the spine of the third cervical vertebra, and was cut out immediately behind and below the left ear, about two and a half inches below meatus and a quarter of an inch behind the jaw. Its track is unknown, except that it injured the ear and paralyzed the portio dura of the seventh nerve and splintered the edge of the ramus of the jaw. His head, at the time he was shot, was thrown forward and downward. He fell, conscious, bleeding freely from the ear only. After two minutes he arose and walked away, the blood still *spouting* out from the ear, until it was checked by a bandage over that organ. He had no pain until the next day, when he had the usual inflammatory pains. His eyesight is said to have become affected on the second day, when there was, according to his account, a distinct difference against the left eye. Things appeared hazy to the left eye. This remains the same. The paralysis of the muscles was immediate, and his speech was made difficult. This seemed to him to come from a defect in the tongue and lips. Hearing was lost at once in the left ear. *Present state, June* 8, 1864: The pains in the face and the swelling, which was never great, are now better. The wounds are open but healing. The nutrition is unaltered. The lines of the face are lost, the tip of the nose and the lower mobile portions of the face are drawn to the right. The left eyebrow has fallen a little. The tears run over the edge of the lid. The tongue is perfectly movable and under entire control of the will. Speech perfect, except a slight difficulty in articulating the gutturals, and still more as to the labials. *Special Senses:* The left eye sees only one-third as well as the right. Hearing is lost in the left ear. On washing out the pus a mass of granulations was seen at the bottom of the ear. Possibly the bony meatus may have been fractured by the ball, but no bone escaped except pieces of the jaw, which came out with the ball. *Taste:* There seems to be no marked loss of gustation. Taste is dulled a little on the left side. Tactility is equally good on the two sides, both in the tongue and face. June 20th, the sight is becoming worse. Dr. Dyer is of opinion that it was affected before he received his wound. Induced electric currents give rise to slight movement in the left eyelid and the elevator of the

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PLATE XXXVIII.—FACIAL PARALYSIS CONSEQUENT ON SHOT INJURY.

angle of the mouth. A rapid recovery was predicted, and, in fact, within three days later voluntary power returned in the orbicular muscle of the eye. By July 27th, every motion had been re-acquired.

An illustration of paralysis of the facial nerve with distortion of the face is given in PLATE XXXVIII, opposite. The patient suffered from loss of sight in the left eye and of hearing in the left ear.

Nerve trunks may be completely severed by a missile, or they may be partially divided and lacerated. They may be injured by the near passage of a missile causing concussion or "commotion," or they may be contused by a missile which has insufficient power to divide or lacerate, or which has expended its force on neighboring tissues. As in the case of arteries, their position and surroundings tend to protect them, and it is probable that their mobility and form may enable them to slip aside and escape damage from a passing missile.

Mitchell, Morehouse, and Keen (*op. cit.*, chap. 5, p. 55) add to the above more common forms of shot injury—those from cicatricial pressure, and those from the extension of diseased processes from wounded nerves to those which are healthy. The same authors consider injuries by contusion of a nerve to be those "most apt to be permanent and serious." The following case, taken from their work, illustrates the result of a contusion:

CASE 1081.—James Walton, aged 47 years, Ireland, sailor; enlisted June, 1862, Co. A, 115th Pennsylvania. At the second Bull Run battle, August 30, 1862, while lying on his belly in the woods, a shell, exploding in the air, cut off a large branch, which, falling, struck him on the left shoulder, or rather across the base of the neck. He grew dizzy, felt stunned, and lost consciousness. When he revived he had sharp pains down the arm to the hand. It was totally paralyzed as to sense and motion. Up to September 15, 1862, he was a prisoner. At this date, when exchanged, sensation was still absent, but motion was improving slowly. It gained, however, at the same time that atrophy was taking place in the very muscle whose power was returning. From September, 1862, to September, 1863, the motions grew better, with one exception; sensation returned to a perfect extent, and the muscles ceased to waste. January, 1864: The arms measure alike. The right forearm measures 10¼ inches, the left 9⅞ inches. The supinator longus and the extensor mass of muscles in the forearm are wasted, having lost about one-third of their bulk. The flexor group is still more wasted, and is hard and contracted Tact and localization normal. All the movements of the fingers normal, except extension, which is incomplete, owing to the contraction of the flexors and also to partial paralysis of their extensors. The wrist has loss of extension and of lateral movements, and the thumb has also defective extension. The patient was discharged from service October 3, 1865, and pensioned. Examiner W. Jewell reported, August 16, 1866: "Paralysis of left hand; it is entirely useless, and, at his age, irrecoverable."

A case illustrating an injury of nerve trunks owing to their being involved in a cicatrix has been detailed at page 462 of the *Second Surgical Volume*, and an example of the extension of disease along a nerve trunk to others, with consequent paralysis and atrophy appearing at points of distribution remote from the original injury, is here adduced:

CASE 1082.—Stephen Warner, Co. A, 151st New York,[1] aged 33 years, farmer, New York; enlisted August, 1862. Healthy to day of wounding. At Locust Grove, November 27, 1863, a ball entered the left chest below the first rib, half an inch below the clavicle and two and a half inches from its sternal end. Passing probably under the arch of the subclavian artery, it went backward and downward and made its exit two inches below the inferior angle of the left scapula, three and a quarter inches from the spine. The ball was fired by a skirmisher not twenty yards distant, and was received while the patient was in the act of bending forward to aim. He fell, giddy but conscious; tried to move, but failed, and fainted from loss of blood. After several hours he revived and discovered that the left arm and hand were sensitive throughout. On the radial side of the forearm there was slight numbness, a condition compatible with perfect tactile sensibility; motion appears to have been lost, or greatly lessened during some hours, and within a day to have become restored entirely. No doubt exists as to this point. No dressing was used until the third day, when water was applied. At this date the arm motions were complete below the shoulder, and there had been no pain. Soon after the cold dressing, to which he attributed the segment symptoms, he was seized with neuralgic pain, which was principally in the median nerve distribution, but also on the outside of the arm and shoulder, with a spot of intense pain at the deltoid insertion. The pain was darting and prickling in its nature. Coincidently with the pain the joints of fingers swelled and became sore, and this was especially the case with the thumb and the fore and second fingers. At the same time the shoulder muscles grew weak, flexion of the fingers grew feeble, and the flexion of the forearm was affected. All of those defects increased for several months, and the flexor group in the forearm wasted so much as to attract attention. The biceps, brachialis anticus, and coraco-brachialis were in like manner atrophied. The pectoralis major was also thus altered at a still earlier period. Up to the eighth day the patient spat blood freely. Then it ceased, and he has had no pulmonary difficulties of any kind since his admittance on February 19, 1864. *Nutrition:* Atrophy of pectoralis major great, of shoulder muscles slight, wasting of biceps and other anterior and internal arm-muscles considerable. Arm at biceps measures—left, 10 inches; right, 11¾ inches. Forearm—left, 10 inches; right, 11 inches. Left hand congested, dark, and cold. It grows cold easily. Sensation perfect. The neuralgia has nearly disappeared, except in bad weather, and about the insertion of the deltoid,

[1] Not 18th Pennsylvania Volunteers, as reported by MITCHELL, MOREHOUSE, and KEEN, *loc. cit.*, p. 64.

where there is great tenderness, and a good deal of hardening and deposit in the subcuticular tissues and over the bone. The only muscle which is hyperæsthetic to any marked degree is the biceps. The course of the musculo-cutaneous and the median nerves is acutely tender upon pressure. *Motion:* None in the pectoralis major, scarcely perceptible in the biceps, the supinator longus alone flexing the forearm. Extension of forearm perfect. The fingers act in flexion feebly, but are improving. The thumb motions are also weak but not lost. Motion is now most limited by the state of the finger joints, which, although no longer tender, are stiff and enlarged. So much improvement has taken place very recently that we cannot be sure as to what motions were lost. Probably the principal nerves of the external cord of the plexus, namely, the musculo-cutaneous and the median, were those chiefly affected; certain filaments of the posterior strand, as the circumflex, also sharing in the diseased condition. * * The case was improving when admitted, and it gained ground with increased speed under a course of baths, gymnastics, and faradization. Examiner D. Clarke, of Flint, Michigan, reported, September, 4, 1877: "Suffers most from an affection of the nerves, causing partial paralysis of the arm, and of late extending to the leg, with 'darting' pains. Pressure on the front cicatrix produces numbness, with a prickly sensation down the arm. Same effect produced by rubbing the spine." In March, 1882, the pensioner was an applicant for increase.

The immediate effects of injuries by gunshot missiles upon nerve trunks are characterized by shock, pain, and partial or complete loss of motion or sensation, the latter symptoms being peculiar and diagnostic of such lesions. The persistence and severity of these symptoms and the extent of loss of function vary within very wide limits, and seem to indicate, in some degree, the remote effects generally to be expected.

CASE 1083.—Captain Charles P. Johnson, 17th Iowa, aged 21 years, was wounded, on May 14, 1863, at Jackson, Miss., by a spherical musket ball, which entered the buttock at the left side on a level with the great trochanter, passed through the great sacro-ischiatic notch, traversed the sacrum, and made its exit on the right side through the right great sacro-ischiatic notch one inch above the right great trochanter, cutting the rectum, together with many blood-vessels, nerves, and muscles which supply the pelvis and lower extremities. At the time of the injury he was in perfect good health, weighing 200 pounds, and measuring six feet one inch in height. He fell and was carried to a house near by, where he was taken prisoner, and sent, a month later, to Atlanta. He remained a prisoner for seventeen months, until liberated by General Sherman in 1864. He was then sent to Benton Barracks, and mustered out of service in 1865. He then moved to Alton, Illinois, and finally came to Garden Grove, Iowa. During all this time he was never able to stand erect or turn upon his back or either side; but lay prone upon his face, passing his life upon a couch, from which he could never by any voluntary effort move. Assistant Surgeon John V. R. Hoff, U. S. A., who made a careful examination of the patient in February, 1876, reported: "The following tissues must have been involved to a greater or less extent, either in the wound itself or in the inflammation consequent upon it: most of the muscles arising from posterior aspect of pelvis, external and internal; several branches of external iliac artery; great sciatic nerve and numerous smaller nerves arising from it, and the sacral plexus; also some of those of the sympathetic system, and finally the rectum. I could not discover that any osseous tissue had been primarily involved. The patient remarked that small pieces of what appeared to be dead bone had occasionally been discharged while the wound was open, and from the fact that it re-opened several times it is reasonable to suppose that there was a certain amount of necrosis; but from the direction of the wound, and the fact that no history of bone trouble is given by his medical attendants, I take it that, if there was necrosis, it was due to inflammation, and not to the primary effects of the wound. For six weeks immediately following the injury the fæces were passed through both orifices of the wound, and not at all by the natural opening. After that they were evacuated both by wound and anus; then by anus alone; then from time to time, as the wound re-opened, again by wound; till finally, in 1872, the fistulæ healed entirely and spontaneously. The treatment of this case consisted solely in the administration of anodynes, tonics, and laxatives. No surgical procedure has been attempted further than to keep the wound in the most favorable condition for healing. Much of the time patient has been without professional advice, and while a prisoner often wanted for the bare necessities of life. Present condition: Mr. Johnson informs me that since being wounded his health was best two years ago, from which time it has gradually failed. The face is pale and emaciated, body shrunken till little is left but skin and bones; the muscles of the gluteal region have almost entirely disappeared, giving a peculiar flattened appearance to the buttock. The lower extremities are almost entirely devoid of motion, and, except anterior of the thighs, of sensation; they are cold to the touch, and have little muscular or adipose tissue; leg at lower third measures six inches in circumference; thigh, middle third, twelve inches; joints all stiff (doubtless from want of use). Upper extremities comparatively well developed, due to constant exercise; I judge the weight of body would not exceed seventy pounds. Patient rests alternately on breast and elbow (the body as stated being horizontal, face downward), sleeping in the former position, eating, reading, etc., in the latter. Spinal cord is very sensitive to pressure throughout its whole extent; pain is constant, referred to sacral region, and is only rendered bearable by the habitual use of anodynes. Patient is generally neuralgic. Skin pale but natural in appearance and feeling (at upper portion of the body); perspiration free, sometimes copious; pulse weak and irregular; heart action irregular, with anæmic murmur; respiration normal; tongue coated and fissured; appetite for both solids and fluids capricious; bowels constipated. This has been the case since 1867, necessitating the habitual use of laxatives (probably in a measure due to the opium habit); previous to that time, more especially while a prisoner, there was constant diarrhœa, the dejections often passing involuntarily; now, under the influence of cathartics, the movements are regular, but always accompanied by more or less pain referred to the rectum, especially when the fæces are in the least degree hard, at which time the rectum seems without expulsive power. The rectum has partially recovered its integrity, the wounds (about five inches above the anus) have closed, leaving a slight cicatricial contraction and a certain amount of torpidity, which may be an additional cause of constipation. The sphincter ani muscle is normal. Bladder is somewhat irritable, but when not allowed to become over distended is entirely under control. Other viscera than those mentioned were not examined, for the reason that any movement caused suffering. The patient has several times, with assistance, attempted to stand erect and to change his position to the back and sides; but never succeeded, and has given up all hope of ever recovering the use of his lower extremities.

He has consulted eminent surgical authority, and was advised against resorting to any operative interference, as such offered little promise of successful results." Captain Johnson died in 1879. In a subsequent report, dated December, 1879, Dr. Hoff states: "The general clinical features of this case, so far as I could ascertain, remained unchanged from date of examination up to the autumn of 1877, when, while out driving, Captain Johnson was overtaken by a severe rain storm, from the effects of which, his wife says, 'he never fully recovered.' The exact immediate condition obtaining after this exposure, I regret to say, could not be learned, as the case at that time did not fall under observation of a physician, and the attendants' descriptions were vague and general. I infer that there was no pulmonary complication; in fact, it was stated that the lungs remained remarkably healthy. The exposure to storm seemed to precipitate a condition of general asthenia; patient lost all ambition and hope, refused to take accustomed exercise (in carriage), and failed perceptibly. The circulation in lower extremities, heretofore weak, now became deficient; the limbs were benumbed, and the toes, to borrow the patient's own expression, 'seemed as though they were breaking off.' Pain was always present, and in greater degree after the exposure of 1877. From this time his appetite became more capricious, though digestion was apparently good, 'there being nothing,' his attendant said, that he could not eat at times. The bowels were constipated, the result of causes already described. Micturition frequent and painful, the quantity of secretion estimated as less than normal (no chemical examination of urine was made). There was marked change in the patient's psychical condition: memory failed, he became exacting, demanded constant attention, though not irritable, and suffered continuously from insomnia. In July, 1878, an eczematous eruption appeared on the genitals, spreading upward and downward to epigastrium and knees, covering the entire abdomen. This lesion discharged a copious and exceedingly offensive secretion, continued acutely for nine weeks, and never entirely disappeared. The greatest difficulty was experienced in treating the cutaneous lesion, on account of the necessarily prone position of the patient. A physician, Dr. Todd, was called and attempted to remove pressure by propping the patient on his side with pillows. This posture very soon became unbearable, and the patient urgently demanded to be returned to what he called his 'natural' position, which was done. The eczema, joint offspring of the general asthenia and local nervous conditions, probably excited by the difficulty of absolute cleanliness, added impetus to causes already hastening the final result. 'After the appearance of the eruption,' says Dr. Todd, 'there was a gradual though well-marked decline of powers, the digestive organs losing tone, and vomiting was not infrequent.' The wound never re-opened; there was no abscess and no observable fever. Pain in sacral region, as always, was severe, and in the latter months of life this extended to the lumbar region, causing intense suffering. Alcohol and anodynes were used extensively throughout the whole course of the case—morphia being taken to the average extent of 8½ grains per diem. No *post-mortem* examination was made."

Instances of immediate death from injuries of nerve trunks are probably rare, though it is not difficult to conceive of such disturbance of central ganglia as may induce a fatal result. The records of this office indicate the frequency with which tetanus developed itself in the early progress of wounds of nerve trunks, and how generally fatal it proved. Nervous spasms were of frequent occurrence, but were, as a rule, easily controlled.

The important labors of Mitchell, Morehouse, and Keen in the vast field presented by the organization of a hospital for diseases and injuries of nerves cannot be seen to better advantage or be better appreciated than in their clinical observations upon the remote effects of nerve injuries.[1] "Most of the cases presented phenomena which are rarely seen and which were naturally foreign to the observation even of those surgeons whose experience was the most extensive and complete. Nowhere were these cases described at length in text-books, and, except in a single untranslated French book, their treatment was passed over in silence, while even in the volume in question but a limited class of nerve lesions was discussed. In the great monographs on military surgery this defect is still so complete that wounds of nerves are there related rather as curiosities, and as matters for despair, than with any view to their full clinical study and systematic treatment."

In cases of nerve injury, immediate symptoms, when not severe, may pass away, leaving the patient uninjured, but by far the more common result is that, while there may be a temporary improvement, there is a permanency of certain symptoms, especially those of paralysis of movement and sensation. As time progresses others are added which give the case a hopeless aspect, viz: altered nutrition, changes in calorification, persistent pain, and other sensory phenomena.

On the subject of altered nutrition, Mitchell, Morehouse, and Keen (*loc. cit.*, p. 69) remark: "Atrophy of the muscles of an entire member is sure to follow complete division of its nerves when there is no subsequent repair. In this case the muscles waste alike, the areolar tissue shrinks, the vessels fade from view, and the pulse becomes feeble and

[1] MITCHELL, MOREHOUSE, and KEEN, *Gunshot Wounds and Other Injuries of Nerves*, Philadelphia, 1864, page 10.

small. The rate at which this process goes on varies greatly, but it begins very early in extreme cases, and continues until nothing is left but bone and degenerated areolar structures, covered with skin, whose altered surface tells of the singular blight which has fallen upon the member. * * * Partial atrophy is due, of course, to partial nerve lesions. The filaments which supply a group of muscles may have suffered, or only those of one or more muscles, or, finally, a part only of the nerve fibres of one muscle. In some cases the loss is equal throughout a muscle; in others it affects a lateral or longitudinal part of a muscle. Among the injuries which fail to palsy a limb at once and completely, those which bruise a nerve have seemed to us to be the most likely in the end to cause atrophies." The effects of altered nutrition upon the skin and appendages are thus described by Mitchell, Morehouse, and Keen (*loc. cit.*, p. 77): "Early in the case it is found associated in most instances with œdema of the part, and is one of the remotest effects of the loss of nervous influence. The skin becomes thickened and dry, the epithelium hangs in patches here and there and is yellow or even pale brown in tint. These peculiarities are in part owing to mere disuse; but this in no way applies to the changed form of the nails, which become curved as in tubercular disease, although to a less degree than in the other form of cutaneous affection, which is caused by partial injuries of the nerves. In fact, it may be stated as a rule, that the skin and subcuticular tissues are less strikingly altered in entire paralysis than in cases of lighter nature."

A second form of altered nutrition of the skin was not infrequently seen; it has been noticed by Paget:[1] "Glossy fingers appear to be a sign of peculiarly impaired nutrition and circulation due to injury of nerves. They are not observed in all cases of injured nerves, and I cannot tell what are the peculiar conditions of the cases in which they are found; but they are a very notable sign, and are always associated, I think, with distressing and hardly manageable pain and disability. In well-marked cases, the fingers which are affected (for this appearance may be confined to one or two of them) are usually tapering, smooth, hairless, almost void of wrinkles, glossy, pink or ruddy, or blotched as if with permanent chilblains. They are commonly also very painful, especially on motion, and pain often extends from them up the arm. In most of the cases this condition of the fingers is attended with very distinct neuralgia both in them and in the whole arm, and its relation to disturbance of the nervous condition of the part is, moreover, indicated by its occasional occurrence in cases where neuralgia continues after an attack of shingles affecting the arm. In two such cases I have seen this same condition of the fingers well marked, and only very slowly subsiding, and seeming unaffected by the ordinary treatment of neuralgia." Mitchell, Morehouse, and Keen state that out of fifty partial nerve lesions under their charge, this condition existed in nineteen, and their description of the symptoms agrees with that of Paget just given. An instance has been cited on page 1020 of the *Second Surgical Volume* (CASE 2046), and the appearance of the hand and fingers is faithfully shown in PLATE LII, opposite page 1020 of the same volume. This condition seems to have occurred in cases of injury in which there was not complete destruction of the nerve and during healing. Its duration was variable, in favorable cases disappearing after a few weeks. Pain was an invariable attendant upon these cases. Eczematous eruptions were a frequent accompaniment of this condition of the skin. In many cases of altered nutrition the hair was observed to disappear from the affected region, and a remarkable alteration in the nails was noticed, which is thus described by Mitchell, Morehouse, and Keen (*loc. cit.*, p. 81): "They

[1] PAGET, *Clinical Lecture on Some Cases of Local Paralysis*, in *Medical Times and Gazette*, London, March 26, 1864, Vol. I. p. 332.

[the nails] suffer only in the fingers the neural supply of which has been interfered with, so that the nails in the median distribution may be contorted and those in the little finger be unaffected. The alteration in the nail consists of a curve in its long axis, an extreme lateral arching, and sometimes a thickening of the cutis beneath its extremity. In other instances a change takes place which is quite peculiar, and which, to us at least, was new. The skin at that end of the nail next to the third finger joint becomes retracted, leaving the sensitive matrix partly exposed. At the same time the upper line of union of skin and nail retreats into or under the latter part, and, in place of a smooth edge, is seen through the nail as a ragged and notched border. The patient who presented these changes in the most striking form had also lateral arching of the nail, but no longitudinal curving. It was a case of the most terrible suffering, from a combination of burning pain in the hand and neuralgic pain in the forearm. * * * When the nails of the toes have been attacked, and they are very rarely so, the curving is less marked, but a distressing ulceration is apt to occur at their angles, and to break out again and again, despite of every care and attention."

Of altered nutrition of joints, Mitchell, Morehouse, and Keen (*loc. cit.*, p. 84) observe: "It consists essentially in a painful swelling of the joints, which may attack any or all of the articulations of a member. It is distinct from the early swelling due to the inflammation about the wound itself, although it may be masked by it for a time; nor is it merely a part of the general œdema which is a common consequence of wounds. It is more than these,—more important, more persistent. Once fully established, it keeps the joints stiff and sore for weeks or months. When the acute stage has departed, the tissues about the articulations become hard, and partial anchylosis results, so that in many cases the only final cause of loss of motion is due to this state of the joints. Of all the agencies which impede movement it is the most difficult to relieve."

It was found in the cases of wounded limbs that after complete division of nerves the secretions of the skin were generally absent, while incomplete division led to variable conditions of this function. In some cases there was excessive sweating, which was limited to the area of the surface affected. There were also noted cases of perverted secretion, as acid sweating and perspiration of a disgusting odor. The following cases well illustrate the condition above described:

CASE 1084.—Kilian Grim, aged about 20 years, German, enlisted August, 1861, Co. B, 121st Pennsylvania. Healthy until wounded, but exhausted and ill-fed for three days before being hurt. At Fredericksburg, December 13, 1862, a ball passed through the lower third of the thigh, entering externally four inches above the upper border of the patella, and emerging two inches lower on the inside. It went behind the bone, entered the right leg below and behind the knee, and, traversing the calf obliquely downward, made its exit on the other side. In the right leg no large nerves were injured. In the left the sciatic must have been slightly affected. He was able to walk several miles with his limbs thus wounded. The chief difficulties in his case, when we examined him in July, 1863, were severe burning on top of the left foot, congestion and eczema, without marked redness or thinning of the skin, but accompanied with ulceration on the edges of the nails. This existed also in the great toe of the right foot, which had defective sensibility. He had complete paralysis of all the flexors of the foot, partial of the *flex. com. dig. pedis* and of the calf muscles. He could walk, but dragged the foot, or else carried it in a long sling. All of these muscles improved under treatment; the burning grew better, and the eczema left his foot, but the ulcers proved unmanageable. After five months' treatment he was discharged, with more or less volitional control over all the muscles affected. At no time had he any marked atrophy.

CASE 1085.—Admitted about the same time as the last was another instance of ball wound close to the sciatic nerve. Here also was burning on top of foot. Defective sensation of touch on the outside of the foot and the leg, in the sole and the toes, and part of the instep. Loss of power in the flexors of the foot complete. Eczema coming in crops about every two weeks as high up as to the knee, and with relief to the burning. Foot swelled when dependent, and this increased the pain to an unbearable degree. Nearly total relief of all the symptoms in five months, when he was transferred to the West. Cessation of the electricity at this time. Partial relapse as to movement. No further history.

CASE 1086.—Austin Lawton, machinist, aged 20 years, enlisted April, 1861, Co. A, 4th Ohio. Wounded at Chancellorsville, May 3, 1863, by a piece of shell, which fell on the inside of the arm just below the axilla. The skin was torn slightly and the parts severely bruised. His fingers clutched the ramrod, which he was using, and required force to unlock the grip. Pain

in the hand, of a burning character, came on, he says, within a few minutes, and has remained ever since. So severe was it that he was in bed on account of the pain alone for nine weeks. The hand is now kept in a sling and constantly covered with wet cloths. Sensation impaired in the back of the forefinger and thumb and in the radial half of the palm. The flexor profundus digitorum and the flexor *subl. dig.* were both very feeble, but they soon regained power when faradized, during a few weeks. It was then perceived that the real difficulty lay in the stiffened and painful state of the joints at the second and third digital articulations. Passive motion and the usual treatment of the burning were ordered, with almost total return of normal movement, but without any ease to the burning. After two months he preferred to return to his regiment for light duty as orderly to the colonel.

Besides illustrating the phenomenon of excessive skin secretion, the following case presents with unusual clearness the group of symptoms which may attend lesions of nerve trunks; in many cases one or two of these symptoms may predominate; but here they all seem to be strongly marked, as pain and burning hyperæsthesia of the skin, partial paralysis of sensation and motion, excessive skin secretion and commencing impairment of nutrition. In addition reflex action is well shown.

CASE 1087.—Private William A. Sturdy, Co. I, 18th Massachusetts, aged 22 years, was wounded at Bull Run, August 30, 1862, receiving an injury of the right arm. He was admitted, on September 2d, into Camden Street Hospital, Baltimore, and on September 19th was transferred to West's Buildings Hospital. Here he remained until April 29, 1863, suffering from neuralgia. He was afterwards treated in Lovell Hospital, Portsmouth Grove, and on May 23, 1863, was admitted into Central Park Hospital, New York. Acting Assistant Surgeon M. G. Echeverrio reported: "The ball entered the posterior and superior part of the outer face of the right arm and came out through the union of the two inferior with the superior thirds of the inner border of the biceps brachialis. There was scarcely any inflammation of the wound upon its infliction; the arm became numb, and the first night after he was wounded he had severe pain in the hand which has continued ever since, existing principally in the thumb, index and middle fingers. Sensibility has been impaired in the forearm and hand. Electricity was applied in the beginning for a period of three or four weeks, with very little success. August 16, 1863: There is now hyperæsthesia, and the skin of the hand is constantly wet with perspiration. Pressure of the wound produces a burning pain in the three fingers affected; their movement is likewise very much impeded and the nutrition of their muscles has been diminished; they exhibit a beginning of atrophy. The temperature of the hand is not different from that of the other hand, nor does the pulse in the right forearm exhibit any marked difference to that of the left. The touch of a rough surface with the left hand produces, by reflex action, a more or less severe pain in the paralyzed fingers of the right hand. This phenomenon may be repeated several times, and when discontinued a great deal of the left hand is wet. An ointment composed of four grains each of aconitine and atropine to an ounce of cerate has brought about great relief of the neuralgic pain, but the paralytic condition of the fingers remains always the same." This soldier was discharged from service August 16, 1863, for "neuralgia of right hand, the result of gunshot injury," and pensioned. Examiner J. B. Chase, of Taunton, Massachusetts, reported, May 16, 1877: "The bullet struck the right arm near the junction of the upper and middle thirds of the humerus, on the outer and posterior surface of the arm (it being raised at the time), and passed directly through on the inner side of the humerus without injuring the bone, and emerged near the head of the biceps muscle, injuring the brachial nerve. The circumference of the right arm is 10½ inches, of the left arm 11 inches; of the right forearm 10 inches, of the left 10½ inches. The radial nerve is partially paralyzed. The muscles of the right thumb, particularly the abductor, are very much smaller than those of the left, and the forefinger is smaller than the left. He cannot fully rotate the forearm nor fully extend the elbow. He says his right forefinger and thumb are very weak, and alleges pain in the thumb, index, and side of middle finger next the index, and that they are cold. Pressure at place of exit of bullet causes pain along the course of the radial nerve."

Lesions of sensation were always present in some degree. Hyperæsthesia and anæsthesia were commonly observed. The following case shows how sensation may be preserved while motion is largely impaired:

CASE 1088.—Corporal B. Graham, aged 22 years, enlisted September, 1861, Massachusetts Artillery, 5th Battery. Previously healthy. On May 12, 1864, he was struck on the back and outside of the right arm by a piece of shell which denuded but did not break the humerus. The wound lay immediately below the deltoid insertion, and was five inches wide as it stretched across the arm, and three inches in diameter from above downward. The arm dropped and he had sharp pain in the wound, so that he cried aloud. The after pain was trifling. As he went to the rear he examined the limb and found that he could move his fingers a little, but that there was no notable loss of feeling. The wound healed rapidly, and is now, June 10, 1864, level with the skin. Nutrition is unimpaired. The right forearm measures 9⅝ inches, the left 9½ inches. Outside of the elbow, for a short space, tactility is enfeebled. In the radial distribution touch is slightly less perfect than usual; elsewhere there is no lesion of sensation. The supinator longus muscle, supplied by the musculo-spiral, acts pretty well. The extensors of the wrist and thumb and the extensor communis are completely paralyzed. The interossei act well. The triceps extensor is healthy. The muscles above named as paralyzed have no electric contractility, the currents applied to them always causing contraction of the flexor group. He was discharged September 14, 1864.

Neuralgia was of great frequency and of great persistence, stubbornly resisting treatment. Its favorite seat seems to have been the hand and foot; other parts of the body were rarely attacked. Severe neuralgia was in some instances due to the presence of

foreign bodies, such as fragments of lead from a bullet, splinters of wood, iron, or bone pressing upon or embedded in a nerve trunk; the pain resulting from such causes were always more acute and persistent. "The intensity of neuralgia varies from the most trivial burning to a state of torture which can hardly be credited, but which reacts on the whole economy, until the general health is seriously affected." (Mitchell, Morehouse, and Keen, *op. cit.*, p. 102.) The temperature of affected parts was found to be higher than that of surrounding or corresponding portions of the body. The following case illustrates this painful condition:

CASE 1089.—J. H. Corliss, late private, Co. B, 14th N. Y. S. M., aged 27 years, shingle dresser, enlisted April, 1861, in good health. At the second Bull Run battle, August 29, 1862, he was shot in the left arm three inches directly above the internal condyle. The ball emerged one and a quarter inches higher, through the belly of the biceps, without touching the artery, but with injury to the median and ulnar nerves. He was ramming a cartridge when hit, and "thought he was struck on the crazy-bone by some of the boys for a joke." The fingers of both hands flexed and grasped the ramrod and gun tightly. Bringing the right hand, still clutching the ramrod, to the left elbow, he felt the blood and knew he was wounded. He then shook the ramrod from his grasp with a strong effort, and unloosened with the freed hand the tight grip of the left hand on the gun. After walking some twenty paces he fell from loss of blood, but, still conscious, attempted to walk several times and as often failed. He was finally helped to the rear, taken prisoner, lay three days on the field without food, but with enough water to drink, and had his wounds dressed for the first time on the fourth day, at Fairfax Court House. On the second day the pain began. It was burning and darting. He states that at this time sensation was lost or lessened in the limb, and that paralysis of motion came on in the hand and forearm. His statement is unsatisfactory and indistinct. Admitted to the Douglas Hospital, Washington, D. C., September 7, 1862. The pain was so severe that a touch anywhere, or shaking the bed, or a heavy step, caused it to increase. The suffering was in the median and ulnar distribution, especially at the palmar face of the knuckles and the ball of the thumb. Motion has varied little since the wound, and as to sensation he is not clear. Peter Pineo, Surgeon, U. S. V., now Medical Inspector U. S. A., exsected two or three inches of the median nerve at the wound. (See Army Medical Museum *Specimen* No. 959.) The man states, very positively, that the pain in the median distribution did not cease nor immediately lessen, but that he became more sensitive, so that even the rattling of a paper caused extreme suffering. He "thinks he was not himself" for a day or two after the operation. It seems quite certain that the pain afterward gradually grew better, both in the ulnar and median tracts. Meanwhile the hand lay over his chest, and the fingers, flexing, became stiff in this position. About a week after he was shot the right arm grew weak, and finally so feeble that he could not feed himself. He can now, April, 1864, use it pretty well, but it is manifestly less strong than the other. The left leg also was weakened, but when this began he cannot tell. He gives the usual account of the pain, and of the use of water on the hands and in his boots, as a means of easing it. Present condition, April, 1864: Wound healed; cicatrix of the operation two and a half inches long over median nerve. The forearm muscles do not seem to be greatly wasted. The interosseal muscles and hypothenar group are much atrophied, and the hand is thin and bony. The thenar muscles are partially wasted. The skin of the palm is eczematous, thin, red, and shining. The second and third phalanges of the fingers are flexed and stiff; the first is extended. Nails extraordinarily curved, laterally and longitudinally, except that of the thumb. Pain is stated to exist still in the median distribution, but much less than in the ulnar tract, where it is excessively great. He keeps his hand wrapped in rags wetted with cold water and covered with oiled silk, and even tucks the rag carefully under the flexed finger-tips. Moisture is more essential than cold. Friction outside of the clothes, at any point of the entire surface, "shoots" into the hand, increasing the burning in the median sometimes, and more commonly in the ulnar distribution. Deep pressure on the muscles has a like effect, and he will allow no one to touch his skin with a dry hand, and even then is careful to exact a tender manipulation. He keeps a bottle of water about him and carries a wet sponge in the right hand. This hand he wets always before he handles anything; used dry, it hurts the other limb. At one time, when the suffering was severe, he poured water into his boots, he says, to lessen the pain which dry touch or friction causes in the injured hand. So cautious was he about exposing the sore hand that it was impossible thoroughly to examine it; but it was clear to us that there was sensibility to touch in the ultimate median distribution, although he describes sensation as somewhat lessened in this region, and states that he has numbness on the inner side of the palm and in the third and fourth fingers (ulnar tract). When the balls of the first and second fingers were touched he said he felt it; but, on touching those of the third and fourth fingers, he refused to permit us to experiment further, and insisted on wrapping up and wetting the hand. He thus describes the pain at its height: "It is as if a rough bar of iron were thrust to and fro through the knuckles, a red-hot iron placed at the junction of the palm and thenar eminence, with a heavy weight on it, and the skin was being rasped off his finger ends." (Mitchell, Morehouse, and Keen, *loc. cit.*, p. 109.) The following information was received from Douglas Hospital, under charge of Surgeon Peter Pineo, U. S. Vols.: "The ball passed through the inner and anterior part of the arm at the junction of the middle and upper thirds, apparently involving the median nerve. He entered this hospital September 1, 1862, suffering excruciating neuralgia of the palmar portion of the hand and fingers. The wound healed kindly, but the pain in the hand continued in its intensity, yielding to no treatment, though nervous remedies, both local and constitutional, were resorted to. The extreme suffering produced an exalted sensibility of the entire nervous system which manifested itself in an extraordinary excitability of the patient, he complaining bitterly at the least jar or noise in the ward. This sad condition increased in severity until December 9, 1862, when the operation of resection of the median nerve was performed by Dr. Peter Pineo, in charge of the hospital. The patient being etherized, about two inches of the nerve was removed and the wound closed by adhesive strips. After the effect of the ether passed off the patient still complained of much pain in the hand, but seemed to think it was not so intense as before the operation. The patient's appetite continued good through all this suffering, and he was allowed a liberal diet. For several days after the operation the patient was allowed sulphate of

morphia;. but it was soon entirely withdrawn. The wound healed by first intention, but there seemed to be no positive improvement in regard to the neuralgia until December 14th, five days after the operation, when he was moved to a separate room; after which the hyperæsthesia seemed perceptibly to subside. February 14, 1863, the patient was discharged from the service at his own earnest solicitation. At this time he was able to walk about the room at night, but still suffered very much from the slightest excitement." Examiner J. T. Burdick, of Brooklyn, reported, October 23, 1866: "A ball perforated the arm three and a half inches above the condyles, injuring the median and ulnar nerve trunks. He alleges that two inches of the median nerve were excised by the surgeon; the existence of a longitudinal eschar three inches in length tends to confirm the statement. The fingers are rigidly flexed into the palm. The arm and hand are atrophied. In my opinion the disability is equal to the loss of the arm." The Brooklyn Examining Board, Drs. McCollom and Leighton, reported, September 18, 1873: "Contraction of thumb and fingers into palm of hand. Extreme sensitiveness of the fingers. Arm and hand useless."

Paralysis of motor nerves from gunshot injury was found to vary in all degrees of severity and completeness, resulting from blows, wounds, concussions, and from transferred irritation. In the following instance a slug remained in the left shoulder for twenty years, when it was accidentally disturbed in its resting place by a fall of the patient. Paralysis of the left arm and left leg ensued, but was completely relieved by the removal of the slug:

CASE 1090.—Sergeant C. A. Norton, 1st Maine Cavalry, aged 22 years, while out with a scouting party was wounded, August 7, 1862, by a rebel hid in a cellar, by three leaden slugs, one striking the right hip, another the right arm, and the third lodging in the left shoulder. The wounds in the hip and arm were slight and occasioned but little pain and healed in twenty days; the wound in the left breast and shoulder was deep and produced peculiar sensation. The slug entered just over the third left rib about on a line with the middle of the clavicle, and passed upward and backward, lodging in the deep muscles. When hit the patient instantly fell forward but did not become unconscious, although it was some moments before he could speak. The mind was unusually active and incidents of his childhood, long forgotten, passed rapidly in review. The pain at first was of a sharp tingling kind, accompanied by a beating, throbbing sound in the left ear, and the eyes became very sensitive to the sunlight. All these symptoms gradually disappeared, and in two months he rejoined his command. In about a year his eyesight had so failed that he was compelled to use positive glasses, and he also had frequent attacks of neuralgia of the heart. These conditions remained unchanged for twenty years; the wound in the shoulder occasioned no further inconvenience until May, 1882. But he could at any time, by simply striking the heel of the left foot smartly on the ground, produce a numb feeling on the left side of the body, including the arm and head. In May, 1882, he fell down a flight of steep stairs, striking the left shoulder in the fall. At first he had a faint deathly feeling at the stomach, and a sharp smarting pain in the left hand and arm and down the spine. These symptoms gradually wore off, and the next morning he only felt a slight soreness from the bruise. About noon the day after the fall, while writing, he found he had suddenly lost the power to move the fingers of the left hand, and in a moment the arm became useless. He was writing at the time with the left hand, having lost the right arm at Fort Fisher in 1865. He could not rise from his chair, for the left leg was also powerless. He was at once removed to his home, where it was found that he had paralysis of the whole left side, with complete loss of sensation, not being able to feel the deep prick of a pin. The eyes were very sensitive to the light, and the voice was weak and tremulus. In four days he so far recovered as to be able to walk, but the arm and hand remained almost useless. Feeling that the slug in the left shoulder was the cause of this trouble, he had it removed in June, 1882, twenty years after receiving the wound. It was about as large as a common lead pencil, three quarters of an inch long, flattened at both ends, and weighed at the time of removal 120 grains. After the removal of the slug the numbness and coldness gradually disappeared from the hand and arm, and in three weeks he could hold a pen and write a few moments at a time, and in six weeks, with the exception of a slight weakness, the hand and arm were as well as ever. The eyesight, which for nineteen years had compelled the use of glasses, improved so much that the glasses were not needed or used, and the neuralgia of the heart, of which he had so long suffered, had not made its appearance in September.

In the work of Drs. Mitchell, Morehouse, and Keen, so freely quoted, the diagnosis and prognosis of this class of injuries are succinctly stated (*op. cit.*, p. 120): "The diagnosis of this paralysis is of course easy. A ball cuts a nerve, or, as is more common, stuns or contuses it, and we have certain muscles made powerless. In a few days, if the nerve injury has been partial, some of these muscles improve or recover entirely. In other cases, weeks or months go by without change for the better, and the muscles fall victims to atrophy and contraction." As to prognosis: "Of course every case of partial loss of function is more likely to recover than one of total loss, and if the will has any control over the muscle after the injury we may reasonably look for an increasing gain. But there are varieties of muscular injury outside of the mere palsy of volitional control. Early loss of tone in the muscle is a bad sign; rapid shrinking in size is another; and contraction, when this is a nutrient change and not pure spasm, is worse still. They are all due to lesions of nutritive fibres, and are ominous of ultimate deformities and of permanent loss of power. But these signs, already fully discussed, arrive late in the case. It is possible, at a very early date,

usually within two weeks of the injury, to make a very complete prognosis, by means of electricity, as to the extent of the motor palsy and the probability of its remaining intractable to treatment or not."

As results of motor paralysis are found loss of motion from alterations of joints, contracted muscles, spasmodic affections and tremors. The following cases show the condition and phases of injuries affecting motor nerves:

CASE 1091.—Private Patrick H. Mahoney, Co. H, 13th Iowa, aged 38 years, was wounded at Shiloh, April 6, 1862. On May 7th he was admitted into the hospital at Quincy, Illinois. Surgeon R. Niccolls, U. S. Vols., reported: "Wounded in the left arm; the ball entered near the insertion of the pectoralis major, traversed the axilla, and came out at the lower angle of the scapula, evidently dividing some of the branches of the axillary plexus. Ever since admission he has complained of violent neuralgia of the wounded arm, and especially of the hand, together with exalted sensibility of the whole surface, so that he starts and complains of pain when touched anywhere. His face is flushed. Narcotics seem to make but little impression upon him. September 3d: Neuralgia now confined to the hand. Flush and sensibility of surface nearly gone. Bowels regular; sleeps well. Pulse 112, full and strong. Muscles of forearm somewhat atrophied, of hand completely so. Flexors and extensors of fingers contracted so as to bend the fingers like the letter S. Skin of hand bright red, partially from the constant use of water dressings. Has very little motion of the fingers. The galvanic battery was tried at one time, without effect. September 15th: The pains appearing to be somewhat periodical, a mixture containing quinine 30 grains, tincture of aconite 40 drops, strychnia ¼ grain, aromatic sulphuric acid q. s., and water 4 ounces, was given in tablespoonful doses every six hours. This prescription seemed to aggravate his pain and was discontinued on the 17th." Mahoney was discharged September 22, 1862, and pensioned. Examiner W. H. Walker, of Fond du Lac, Wisconsin, reported, March 15, 1867: "He was wounded through the upper third of the left arm, injuring the axillary nerve and artery. Hand and arm atrophied and entirely useless for practical purposes. He can use the hand as a dead weight to hold a paper when writing. Cannot hold his fork to cut his meat. Cannot take his hat off with the hand; it is absolutely useless for manual labor." He was paid December 4, 1876.

CASE 1092.—J. S. L. Scott, aged 31 years, farmer, New York, enlisted August, 1862, Co. F, 121st New York. Wounded May 3, 1863, at Chancellorsville. The ball entered the right leg a little below its middle, in front of the fibula three-fourths of an inch, and emerged one inch and a fourth behind the tibia, on the same level, without injury to the bones. Total loss of motion below knee; slight of sensation. Pain only on the second day, from inflammation. The after history doubtful, except that sensation improved. Present condition, September 12, 1863: The patient walks with a crutch, the foot being suspended in a long sling, in extension, and quite useless. Attempts at flexion resisted by the pinning of the cicatrix and by shortening of the soleus chiefly. (See *Specimen* No. 6682, in the Army Medical Museum, a cast of the foot and ankle.) Sensation impaired slightly in the foot, but nowhere lost. The leg and thigh muscles slightly tender on pressure. The foot feels warm, the toes are cold and purple. No burning. *Treatment:* Alternate cold and hot douches; splint to correct malposition; faradization daily. October 26, 1863, re-examined: Tactility and localization nearly perfect; cold and heat are appreciated correctly, although slowly; sensibility to pain much impaired below the knee, but lost at the outer head of the gastrocnemius and on the outside of the foot; volitional control lost from the knee downward; electric contractility feeble in the tibialis anticus, extensor longus digitorum com., and extensor proprius pollicis; it is best, though weak, in the peroneus longus. In none of these, nor elsewhere, are the contractions sufficient to stir the parts. None of the calf muscles respond at all, and electro-muscular sensibility is absent in all except at the upper end of the external origin of the gastrocnemius. Withal, there is no atrophy. The electric brush gives little or no pain on the dried skin. The muscles, or, at all events, the subcuticular tissues, are sore when firmly pressed, especially the great toe and the inside of the plantar arch. It is difficult to reconcile this with the analgesia so evident where a needle is used. It is remarkable, but in accordance with M. Duchenne's experience, that above the wound the muscles in general have lost electric contractility as well as below it. December 20, 1863: The anterior muscles have regained sensibility to electricity. A club-foot apparatus was used to flex the foot. January 1, 1864: Contractility under electricity returning in anterior muscles and calf. No voluntary power. January 20, 1864: Calf muscles begin to respond to will. Electro-muscular contractility well marked in tibialis anticus, peroneus longus, common extensor, and interossei. Volition good as to calf muscles; none as to anterior group; but the foot is now flexed to over a right angle, and when it is cased in a stout gaiter he can walk well with a cane; for, although he has no volitional flexion, the weight of the body on the toes and ball of the foot serves to antagonize the calf. The man is anxious to be discharged, although, from the return of electric properties in the tibial group, we feel sure of ultimate cure with the aid of electricity. Under the circumstances we do not feel that it is proper to retain him. Discharged February 12, 1864, and pensioned. Pension Examiner Lanning reported, February 4, 1874, that paralysis of the foot and toes was nearly complete. The pensioner's condition was unchanged in 1876.

Carefully conducted experiments on the condition of calorification in injuries of the nerves were made by Drs. Mitchell, Morehouse, and Keen. The results in a number of grave cases are summed up as follows (*op. cit.*, p. 135): "It was observed that the member the nerves of which were affected was nearly always colder than the other, whether the nerve lesion was extensive or trifling. In two cases there was no difference. One of these was an instance of total motor palsy below the knee, with good tactile feeling preserved and without atrophies. The other was a wound of the portio dura of the seventh nerve; the motor palsy complete, sensation perfect. Five cases had a higher temperature in the

wounded limb than in the sound member. Of these, one was an ordinary nerve wound, with slight loss of sensation and with a good deal of motor paralysis. All of the others were cases of the burning pain so often alluded to. The examination in these was limited to the spot affected. At the time of these observations we had no wounds in which complete division of all the nerves of a part had occurred; and in fact this is a rare accident. The sole exceptions were wounds of the seventh pair. One of these we examined as to temperature, but with no notable result. There was no difference between the two sides."

EFFECTS OF MISSILES AND PROJECTILES ON BLOOD-VESSELS.—Wounds of blood-vessels, the effect of missiles and projectiles, were few in comparison with the total number of shot wounds recorded during the war.

In the general consideration of these injuries the question as to the particular character of the missile does not appear to assume much practical importance; in fact, it is difficult to distinguish the effects of injuries inflicted by one or the other form of more common forms of bullets.

It is probable, from the general nature and conditions pertaining to missiles, that a round ball will more frequently contuse than divide a blood-vessel, while the contrary may be expected to result from an injury by a conoidal bullet; but perforations by round balls have also been noted, as in the following case:

CASE 1093.—Private Henry Owens, Battery A, 5th U. S. Artillery, aged 23 years, was wounded at Suffolk, Virginia, April 15, 1863, by the bursting of a shell over his head. Surgeon T. H. Squire, 89th New York, reported: "A flesh wound, a mere graze across the right ramus of the lower jaw, near the chin; a second wound, penetrating, a slit three-fourths of an inch across the side of the neck, over the middle of the sterno-cleido-mastoid muscle, the opening being near three inches from the median line in front. April 18, 1863, the right side of the neck, extending down toward the subclavicular region, is swelled and somewhat emphysematous to the touch. There is some pain in the chest in the region of the mediastinum; some dyspnœa and cough, and a little spitting of blood on one occasion. Respiratory murmur very distinct, and percussion resonant over the front of both lungs. He died on April 19, 1863. *Post-mortem* examination at 1 o'clock P. M. on April 19th: Countenance livid; mottled appearance of skin on the right shoulder, arm, and chest; frothing at the lips; all of the right chest, save a hand's breadth immediately beneath the clavicle, dull on percussion; left chest resonant on percussion in front. Made one incision through the skin and areolar tissue from the point of the thyroid cartilage down to the umbilicus; one from the point of commencement, about four inches long, just below the ramus of the under jaw; and a third at right angles with the first, from the umbilicus, about six inches to the right. Dissected back this whole flap, including skin, superficial fascia, and platysma myoides. Areolar tissue of the whole right side of the neck injected with dark blood. Discovered the opening caused by the missile to be nearly in the centre of the sterno-cleido-mastoid muscle; the omo-hyoid muscle was also injured by the ball. Sterno-hyoid and sterno-thyroid uninjured, being toward the median line from the wound. Thyroid gland quite large. Arrived at this point, discovered that the ball had passed through the *internal jugular* vein about two inches above the clavicle, the wounds of entrance and exit being on the anterior and posterior walls of the vein, the outer and inner third being entire. The vessel from this wound, upwards in the neck, was occupied with a large clot of blood; par vagum and carotid uninjured; scalenus anticus perforated, the direction of the ball being downward and toward the spine. On opening the chest a great deal of serum escaped from the right pleural cavity. There was extensive adhesions of recent false membrane over the whole of the right lung, or the greater portion of it. The ball, after going through all the soft parts, as narrated, struck and fractured the neck of the first rib, also the neck of the second rib, and finally found a lodgement by the right side of the body of the third dorsal vertebra, in the posterior mediastinum. From the right cavity of the chest, after the lungs were removed, the ball could easily be felt with the fingers, lying in the place where its motion was arrested, with nothing but the costal or mediastinal pleura intervening between it and the cavity of the chest. The ball evidently bruised the mediastinal pleura, injured it, but did not make an opening in it. The lung was not inflamed. The ball was round, the size of a common musket ball, and battered on one side. It may be well enough to remark that there was never any bleeding to speak of in this case. By a further and more careful examination of the injury to the vein I find that the ball actually perforated the vessel instead of biting out a piece on one side." The wounded portion of the right internal jugular vein was forwarded to the Army Medical Museum by Dr. Squire, and is numbered *Specimen* 1055 of the *Surgical Section*. A part of the parietes of the vein is carried away, and in the posterior portion an orifice is seen, through which the contributor considers the missile passed.

Distorted balls, pieces of shell, fragments of stone and iron, and splinters follow the general rule common to all missiles, by contusing, cutting, and puncturing blood-vessels.

The graver lesions due to the impact of large projectiles are so manifest in their character as to need no comment.

The position of the larger trunks of the principal blood-vessels tends to give them

immunity from accident. They are deeply placed, sheltered by the bony frame-work, protected by soft parts and by fasciæ capable of deflecting the course of a missile; their investing sheaths and coats are strong and tough; having a certain degree of freedom of motion they are enabled to slip aside and elude a passing missile; their tubular form and easily compressed fluid contents are also elements of safety. All of these conditions may have their influence in contributing to the many fortunate escapes from severe, perhaps fatal, injury common to the experience of every military surgeon.

CASE 1094.—Private Michael Hussey, Co. D, 37th New York, aged 32 years, was wounded, while on picket, at Occoquan, Virginia, February 24, 1862. Surgeon W. O'Meagher, 37th New York, reported:[1] "The ball entered the right thigh near the lower angle of Scarpa's space, eluded or pushed aside the femoral vessels, passed upward, and escaped posteriorly in the gluteal furrow. Very little hæmorrhage occurred, though he walked a considerable distance back to the picket station. A plug of scraped lint was inserted into each opening and a roller bandage applied, this being kept wet with an evaporating lotion. Next day he was removed to the regimental hospital, and for two weeks following little more was done except to apply a poultice. By this time he was able to walk about, no bad symptom having occurred to mar his speedy convalescence." On March 5, 1862, he was transferred to the Mansion House Hospital, Alexandria, whence he was returned to duty August 7, 1862. He continued in service until June 8, 1865, receiving at Petersburg, on May 9, 1864, a shot wound of the forehead. In February, 1882, Hussey was an applicant for pension.

In the case of Private William McDonald (*First Surgical Volume*, page 397), Co. F, 51st New York, a musket ball lodged between the carotid artery and the jugular vein, pressing the vein forward to such an extent that the vessel was collapsed and little or no blood passed through it. In the case of Captain J. N. Lake (*First Surgical Volume*, page 412), a musket ball passed on a level with the pomum Adami, between the jugular vein and the carotid artery, without injuring either vessel.

Aside from the injuries of large trunks which are immediately fatal, it would appear that the number of cases of wounds of important blood-vessels is small. In the preliminary report (*Circular* No. 6, *Surgeon General's Office*, 1865, page 38) it was stated that "in the campaign of the Army of the Potomac from the Rapidan to the James, in May, June, and July, 1864, of a total of 36,508 gunshot wounds only 27 belonged to this category." Dr. Longmore[2] says: "Out of 4,434 wounds detailed in the British returns of the Crimean War, only 15 wounds of arteries were registered." Surgeon M. Goldsmith, U. S. V., "desiring to learn whether external primary hæmorrhage often occurs as the instant result of shot wounds," placed himself "near the line of battle, and observed only one case, a soldier struck in the neck, severing the carotid," and fatal before he could reach him.

In the following case the common carotid artery was perforated from before backward; death ensued very rapidly:

CASE 1095.—Lieutenant Colonel E. A. Kimball, 9th New York, aged about 40 years, of well-knit frame and in good health, was shot at Suffolk, Virginia, at about 4 o'clock A. M. on April 12, 1863. Surgeon T. H. Squire, 89th New York, reported: "It is said that Lieut. Colonel Kimball uttered a brief ejaculation after he was shot and died almost instantly. A pistol was the arm used; the person firing was on horseback, the person shot standing on the ground very near him. I examined the body at 3 o'clock P. M. Blood was dried on the clothes on the front of his person from the throat to the boots. An opening half an inch in diameter existed in the front of the neck, the edge of it only about a quarter of an inch to the right of the median line, and the centre of the opening being about three-quarters of an inch below the prominent point of the thyroid cartilage. No other opening existed; but the ball was felt beneath the skin just over the posterior border of the scapula. Here I made an incision and removed it with forceps. Putting my finger in the opening I found that the ball had just made a notch in the border of the blade at the point corresponding to the termination of the spine of the scapula. From the point of entrance the ball took its course downward and backward, but nearly in a direct antero-posterior direction. I made one incision in the medium line from the thyroid cartilage to the top of the sternum, another from the point of commencement toward the angle of the jaw about two and a half inches, and a third from the bottom of the first in the direction of the clavicle about two inches. 1st, Laid back the skin and superficial fascia; 2d, the platysma myoides muscle (the areolar tissue was dark with suffused blood near the wound); 3d, divided the lower attachment of the sterno-cleido-mastoid and carried the muscle up and laid it on the reflected skin; the ball went just to the inner edge of this muscle; 4th, divided the omo-hyoid and turned it away; 5th, cut the upper attachment of the

[1] O'MEAGHER (W.), *Cases in Military Surgery; Gunshot Wound of Thigh, narrow escape of Femoral Vessels*, in *American Medical Times*, 1862, Vol. IV, p. 205.

[2] LONGMORE (T.), *Gunshot Injuries*, etc., London, 1877, page 150.

sterno-hyoid and turned it down (the ball hole was right through the middle of the muscle), and also cut the lower attachment and then the muscle away; 6th, did the same thing with the sterno-thyroid; 7th, discovered that the ball had made a notch in the edge of the thyroid gland; 8th, cleared away areolar tissue dark with suffused blood; 9th, found the *common carotid artery absolutely perforated* from before backward, there being a roundish opening in the anterior and a somewhat longitudinal one in the posterior wall, the two lateral portions of the tube being entire; 10th, the par vagum and the vein uninjured; 11th, this ball hole in the carotid was used, without any alteration, to insert the syringe pipe to inject arsenic to preserve the body; 12th, the ball was conical and quite a size larger in diameter than the diameter of the artery."

The passage of a missile through any part of the body will necessarily divide and lacerate many small blood-vessels, but serious results seldom follow, as permanent retraction of the injured vessels takes place at once.

When an artery of size is completely divided by the impact of a large or small projectile at high velocity there may be a gush of blood; but the immediate retraction of the inner and middle coats and the formation of a coagulum will generally prevent further hæmorrhage and secure the patient for the time at least.

In eighty-four of one hundred and eighteen cases of complete division of the larger arteries no primary bleeding was observed, while in thirty-four cases, or 28.8 per cent., the injury was followed by primary hæmorrhage.

TABLE CXXIII.

Summary of One Hundred and Eighteen Cases of Complete Division of the larger Blood-vessels, indicating the number of cases in which primary bleeding occurred.

ARTERIES.	CASES.	RESULTS.		PRIMARY BLEEDINGS.		NO PRIMARY BLEEDING.	
		Recoveries.	Fatal.	Recoveries.	Fatal.	Recoveries.	Fatal.
Complete division of Common Carotid	2	.....	2	.....	1	.....	1
Complete division of Internal Carotid	1	.....	1	.....	.....	.....	1
Complete division of Axillary	6	.....	6	.....	1	.....	5
Complete division of Brachial	15	10	5	3	2	7	3
Complete division of Radial	10	6	4	3	.....	3	4
Complete division of Ulnar	6	4	2	1	.....	3	2
Complete division of Femoral	31	5	26	1	13	4	13
Complete division of Popliteal	20	6	14	3	2	3	12
Complete division of Tibials	24	6	18	.....	3	6	15
Complete division of Peroneal	3	1	2	.....	1	1	1
Aggregates	118	38	80	11	23	27	57

The proportion of primary bleedings to the number of cases in which the blood-vessels were completely divided is rather larger than that observed by Dr. Lidell,[1] who found that in twenty cases the bleeding ceased spontaneously in all but three.

In the following case, in which the posterior tibial was severed, hæmorrhage did not occur until thirteen days after the injury:

CASE 1096.—Sergeant Z. H. Mather, Co. M, 5th Michigan Cavalry, aged 27 years, was wounded near Funkstown, July 8, 1863. He was treated in a field hospital, and was admitted on July 17th to hospital No. 1, Frederick, Maryland. Acting

[1] Dr. JOHN A. LIDELL (*Surgical Memoirs of the War of the Rebellion, collected and published by the United States Sanitary Commission*, Surgical Volume I, p. 26), in commenting upon twenty cases in which important arteries were completely divided, says: "In all but three of these twenty cases the primary bleeding ceased spontaneously. . . Of the twenty cases wherein the wounded vessel was completely divided by the bullet, the femoral artery was the seat of the injury in five instances, of which all died; the popliteal in four instances, of which two died and two recovered; the posterior tibial in two instances, of which both died; the axillary in four instances, of which two died and two recovered; the brachial also in three instances, of which one died and two recovered; the internal mammary in one instance, which proved fatal; and the external carotid in one instance, which recovered. Of the thirteen fatal cases in which the artery was severed, two died of primary hæmorrhage, two of secondary hæmorrhage, five of gangrene, one of gangrene and secondary hæmorrhage, one of pyæmia, and two of exhaustion. . . The analysis of these twenty cases shows that gunshot wounds dividing large arteries are not only very dangerous to life, but that they occasion death in certain determinate ways, the most important of which are primary hæmorrhage, secondary hæmorrhage, and consecutive gangrene."

Assistant Surgeon W. S. Adams reported: "Wounded by a minié ball, which entered the outer and lower border of the popliteal space, passed inward and downward, and lodged beneath the skin on the opposite side, from which point it was cut out upon the field. Patient's condition fair, and wounds present a healthy appearance. Ordered full diet. July 21st, 6 P. M., hæmorrhage has just taken place from the wound of entrance to the extent of about eight ounces. Compression of the femoral was instituted by the patient, and when I reached there the hæmorrhage had ceased. A compress of dry lint was placed over the wound and a nurse directed to watch it. At 1 A. M. slight oozing commenced at wound of exit, and at 4 A. M. it gushed out in a considerable stream, but was again controlled by compression of the femoral artery. At this time about four ounces were lost, and, as no bleeding vessel could be observed, a tourniquet was placed over the femoral artery, but not tightened. July 24th, the compresses have been removed from day to day and the wounds dressed, but there has been no recurrence of hæmorrhage. The patient is taking tonics and generous diet. July 26th, hæmorrhage has just recurred. Compression of the femoral controls it. This time the patient lost about six ounces. He was etherized, and upon thorough examination it was found that the ball had severed the popliteal artery and also wounded the posterior portion of the tibia near its articular surface. Taking into consideration the wound of the bone so near the joint, if not actually involving it, together with the destruction of the soft parts along the track of the ball, it was deemed advisable to amputate rather than ligate the femoral, which would be more than equivalent to a second ligation of the artery. Amputation of the thigh at its lower third was done by flaps of skin and circular of muscles. The patient being quite weak was ordered brandy and beef tea every half hour. July 27th, slept well last night, pulse 120 and quite nervous; has but little disposition to take nourishment; ordered milk punch, iron, and quinine. July 28th, had a slight chill last evening; pulse 125 this A. M.; discharge from stump somewhat unhealthy; syringed it out with acid wash (muriatic acid, one-half ounce to pint of water). July 31st, healthy granulations are being thrown out. The acid has very much improved the appearance of the stump; general condition improving; is very despondent. August 5th, pulse 120 and feeble. Has troublesome diarrhœa; appetite poor; stump discharges quite profusely. Ordered opiate injections after each evacuation, and a wineglassful of milk punch every hour. August 8th, diarrhœa still obstinate and is running the patient down. Ordered Monsel's solution, fifteen drops four times per day. Continued injections and other treatment. August 10th, diarrhœa slightly improved. August 15th, patient has had a troublesome hacking cough for some days; skin is becoming sallow. Has evidence of pyæmia, but has had no chills. August 17th, evidently failing fast; raises pneumonic sputa; countenance anxious, mind wandering. Died August 19, 1863. As the friends wished to embalm the body no *post-mortem* could be obtained." Portions of the femoral, popliteal, anterior and posterior tibial arteries and popliteal vein constitute *Specimen* 3963 of the Army Medical Museum, and were contributed by Dr. Adams. The specimen shows a large well-organized clot near the orifice of the posterior tibial, which is severed at its origin.

In the cases in which the division of the blood-vessel is followed by primary hæmorrhage it is possible that some foreign body may be thrust into the open lumen of the artery which will prevent retraction while insufficient to act as a plug; or that there may be paralysis of the nerves of the arterial coats, preventing their retraction:

CASE 1097.—Major W. F. Smith, 1st Delaware, received a shot flesh wound of the right thigh, at Hatcher's Run, Virginia, October 27, 1864. Surgeon A. N. Dougherty, Medical Director Second Army Corps, reported: "Among the wounded I noticed Major Smith being conveyed on a stretcher to the rear, evidently, from his ghastly pallor, severely hurt, and probably suffering much from loss of blood. I accompanied him as far as the ambulances, where, with the assistance of Surgeon J. M. McNulty, U. S. V., and Assistant Surgeon C. Smart, U. S. A., Medical Inspector, I examined the wound and did what seemed necessary. The ball (minié) passed through the right thigh behind the os femoris, a little below the middle, severing the femoral artery but not injuring the bone. Hæmorrhage had already been profuse, but was partially restrained by a handkerchief and a leather strap which some one had applied. On consultation it was thought imperatively necessary to cut down upon and tie the vessel in the wound, which I accordingly tied with the assistance above mentioned and that furnished by regimental medical officers in compressing the artery at the groin. The enlarging of the wound quickly brought the upper cut end into view and enabled me to cast a ligature around it; but in order to secure the lower end it was necessary to cut across the sartorius muscle. The femoral vein also required tying. There was still considerable hæmorrhage of a dark venous character, which, as its source could not be brought into view, it was judged best to arrest by sponge compresses, the lowest one dipped in solution of persulphate of iron, after which it ceased completely. A bandage was applied and he was sent in an ambulance to the Gurley House, which he reached without molestation. Up to this time (October 30) there has been no return of the hæmorrhage. The pulse, which was scarcely perceptible at the wrist, was quite good yesterday. The leg and foot are pale and cold, with some mottling about the instep, and sensibility is quite wanting below the calf. I directed artificial heat, wrapping in flannel and cotton batting, frictions, etc." An entry on the register of the hospital shows that amputation in the middle third of the thigh was afterwards performed, and that the patient died November 6, 1864.

In the following case the complete division of the femoral artery was followed by severe primary hemorrhage, but the bleeding ceased spontaneously:

CASE 1098.—Private E. H. Clarendon, Co. I, 26th Massachusetts, aged 22 years, was wounded in action at Opequan Creek, September 19, 1864, by a minié ball, which passed through the fleshy part of the left thigh and slightly wounded the right thigh. The wounded man was brought to hospital at Winchester on September 22d. Severe hæmorrhage occurred at the time of receiving the wound, which ceased spontaneously. About eight days after the date of the injury serious hæmorrhage took place, wholly venous in character. After that time there was no recurrence, but a constant and free discharge of dark bloody pus. The patient became anæmic, feverish, and at times delirious, until he sank at length with evident manifestations of pyæmia. He died October 17, 1864. The *post-mortem* examination disclosed a large dissecting abscess beneath the fascia and among the muscles of the anterior portion of the thigh. The missile had entered about the junction of the upper and middle third of the

limb, severing the femoral artery and wounding the femoral vein. Both the proximal and distal portions of the artery were filled with firm coagula, and for about half an inch from the torn extremity of each there was a hard cartilaginous formation surrounding the vessel, which was indeed nearly osseous in character. The crural nerve was inflamed in the track of the ball, but not otherwise injured. The femoral vein was filled with a very thick pus, reaching from the wound to a point some two inches above Poupart's ligament. Above this and to within about an inch of its junction with the internal iliac the vein was filled with a firm coagulum of lymph. The distal portion of the vein contained very little pus. Purulent or lymphatic deposits were found on the peritoneum, covering the hepatic vessels; also on the anterior edge of the right lobe of the liver. Purulent deposits were also found in the spleen, and a small abscess existed at its superior edge containing bloody pus. The treatment of the patient had been of a tonic and stimulating character. The history of the case, together with portions of the injured femoral artery and vein, was contributed to the Museum by Surgeon C. H. Andrus, 176th New York. A wet preparation of the vessels constitutes *Specimen* 3794 of the Surgical Section.

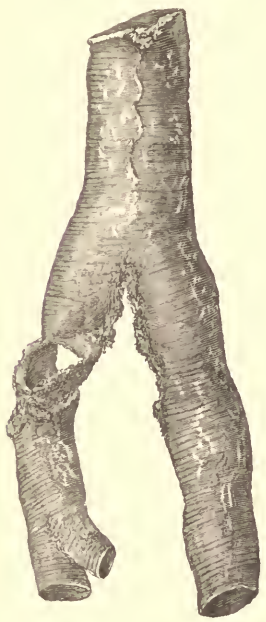


FIG. 418.—Shot perforation of right primitive iliac. *Spec.* 6336.

Cases of partial division of vessels more frequently came under the observation of the surgeon. In these cases it was usually found that only a portion of the calibre of the vessel was carried away or that perforation of the vessel had taken place. Under such conditions the retraction of the vessel is rendered impossible, and hæmorrhage ensues proportionately to the size of the artery and of the wound. A case of shot perforation of the carotid has been cited on page 751, *ante* (case of Kimball); and a perforation of the right primitive iliac by a pistol ball is shown in FIG. 418. The injured man died in twelve minutes. A partial division of the femoral vein is shown in FIG. 419. Profuse hæmorrhage followed immediately after the injury, which was with difficulty arrested by compression. Details of this case are given on page 304 of the *Second Surgical Volume* (CASE 868). If the artery is large the hæmorrhage will be profuse, and attended with speedily fatal results unless help is near at hand, as in the case of Assistant Surgeon R. S. Vickery, detailed on page 16, *ante*. The following additional data, furnished by Dr. Vickery in a letter to the editor, dated April 5, 1882, will be found of interest:

FIG. 419.—Shot laceration of right femoral vein. *Spec.* 2094.

CASE 25 (*Cont. from p.* 16).—"A partially spent rifle bullet struck me on the front of the left thigh. Profuse hæmorrhage ensued and I fell fainting. Recovering consciousness I found myself lying on a stretcher, with the artery secured by a tourniquet. It must have been done promptly, as several surgeons of the brigade and the hospital steward of the regiment were within a few feet of me when I fell, and but for that prompt and timely assistance the hæmorrhage would probably have been fatal. I was then carried by stretcher and ambulance to the division hospital, about three miles to the rear. There, as the operating surgeons were all very busy, I was placed in charge of one of the assistants, to watch that the hæmorrhage was kept in control, until the afternoon, when, having placed me under the influence of chloroform, Surgeon W. B. Fox, of the 8th Michigan Volunteers, cut down in the opening, enlarging it, and ligated the femoral artery above and below the injured part. The wound, fortunately, was well situated for ligation of the artery, being about four inches below Poupart's ligament and about an inch below the profunda, the ball entering in front, passing back close to the bone but not injuring it, and lodging in the muscles of the posterior part of the thigh about an inch below the surface, from which it was extracted at the time. The ligatures came away on the thirteenth day. On the eighteenth day, while at stool, a secondary hæmorrhage came on to the amount of eight ounces. It ceased with the aid of compression and quiet, and there was no return of it. The wound was completely healed by November 3d. On the fifteenth day I was moved from field hospital to City Point by ambulance, and eight days afterwards placed on board steamer and carried to a northern hospital. Some branch of the anterior crural nerve, probably the internal saphenous, must have been injured by the ball, as I suffered severe pain in the wound and along the leg for some days. This caused a want of sensation of the skin of the inner side of the leg from the knee down, which was greatest in the foot, and from the deficient innervation and bad nutrition of the skin gave me much trouble for years, and though it has now much improved it is the chief cause of the lameness which still continues. On March 11, 1865, seeing that I would not be able to resume my duties, I was honorably mustered out of the service at my own request, and returned to Ireland to visit friends there. When the wound healed the muscles of the knee remained contracted, so that when standing erect I could only touch the toes to the ground, and had to use crutches. As this condition did not improve by the modes of extension employed, on June 15, 1865,

Drs. Daniel Donovan and David Hadden divided the hamstring tendons of the leg subcutaneously and forcibly extended the limb. In a few months I was able to get about without crutches. The leg now remains weak, and has not regained its former size or strength; but it has never, during my service in the army, kept me a day off duty."

In the case of Booth, 7th Indiana Cavalry (CASE 21, page 14, *ante*), the femoral artery was perforated. Copious hæmorrhage ensued at once, which was arrested by the application of a tourniquet. Hæmorrhage recurred on the sixth day, which was again arrested by pressure; the wound became unhealthy, and the patient died on the tenth day after the injury. Prompt operative interference would undoubtedly have afforded a chance of life.

Sometimes hæmorrhage will continue though it may be retarded by the formation of a coagulum in the track of the wound, but the tendency is to form a diffuse traumatic aneurism, which, untreated, will exhaust the patient by frequently recurring hæmorrhage. In the case of Melley, 2d West Virginia (CASE 13, page 555, *First Surgical Volume*), the axillary had been almost entirely divided; an enormous tumor of coagulum formed in the axilla. Hæmorrhages recurring, the axillary was ligated; but during the operation the subclavian vein was accidently opened and death ensued in less than ten minutes.

The greater number of cases of injury to blood-vessels were caused by contusion. Missiles with low velocities, or those whose force is partially expended upon tissues previous to striking the artery, seldom divide or penetrate, but contuse the arterial coats, destroying or impairing their vitality, and establishing inflammatory action which results in the removal of a slough at definite periods, accompanied by profuse secondary hæmorrhage. In some cases the resulting inflammation or the injury to the vasa-vasorum effects a partial or complete occlusion of the arterial tube; if the collateral circulation becomes well established recovery may take place; but fatal gangrene of the extremity, deprived of its blood supply, very commonly supervenes.

CASE 1099.—Private Henry Knoble, Co. D, 149th New York, was wounded at Ringgold, November 27, 1863. Assistant Surgeon Norman Teal, 88th Indiana, reported: "Wounded in superior regions of both thighs and posterior part of neck; minié ball entered left thigh on outer anterior aspect six inches below superior spinous process of ilium, dipped beneath the integument and deep fascia, and emerged on inner surface of thigh four inches below pubis; the wound of the right thigh was supposed to have been made by the same ball after passing through the left. I saw the case for the first time on December 11, 1863; removed the ball from the wound of the neck. On examination found the left foot in a state of humid gangrene, with a line of demarcation encircling the ankle at the malleoli. On inquiry learned that this soldier had been brought hither from the battle-field after suffering considerable exposure to cold on the battle ground and during transition; that the foot was cold and insensible at the time of the patient's admission into hospital; that he arrived here hungry and cold on the morning of November 28th, the next day after the injury; that he had diarrhœa at the time the wounds were received, and that he had suffered from this disease more or less during his sojourn in hospital. Know nothing of the treatment previous to December 11th. After this time opiates were exhibited to control the bowels and tonics and stimulants to invigorate and support the system. Amputation of the leg at the junction of the middle with the lower third was performed on December 14th; artery controlled by thumb alone. Very little hæmorrhage; parts at point of section flabby. Treatment mentioned above continued; alcohol, full strength, applied to stump freely from the first; but little inflammation occurred, and but feeble efforts at reparation were made. Granulation sparse and flaccid throughout; appetite pretty good. My connection with this case ceased about the last of December. Dr. Kilbourne then assumed charge. Death took place January 14, 1864, on the 48th day after the injury and the 31st after amputation. Autopsy: Wound in left thigh closed; track of ball occupied by an abscess containing thin fetid pus. The course of the ball appears to have been posterior to the artery, impinging upon its sheath, for the wall of the artery at this point is thickened, of a brownish color, and its calibre diminished one-half. A firm coagulum fills the sheath for one inch below the track of the ball. Bones protruded between the flaps, which were lined with an ash-gray slough. The elaborate *post-mortem* examination in this case is omitted as unnecessary to the description of the specimen, illustrating as it does death by pyæmia. The gangrene in this case was clearly due to the diminution of the calibre of the artery and to the cold and exposure to which the man was subjected; neither cause sufficient of itself to have produced the result." *Specimen* 2114, Section I, Army Medical Museum, consists of a wet preparation of the upper portion of the left femoral artery, with the walls much thickened by a coagulum in the sheath. It was contributed by Dr. Teal.[1]

Not unfrequently spiculæ of bone driven before a missile puncture blood-vessels, and though they may not be productive of instant trouble, they set up inflammatory action, resulting in ulceration and sloughing attended with secondary hæmorrhage.

An example of division of the intercostal artery by the fractured end of a rib has been

[1] An abstract of this case was published by Dr. JOHN A. LIDELL in *U. S. Sanitary Commission Memoirs*, New York, 1870, Surgical Vol. I, p. 27.

cited on page 551 (Case of Butterfield) of the *First Surgical Volume*, and an instance of rupture of the popliteal by a fragment of bone is here adduced:

CASE 1100.—Private Jonathan Wining, Co. A, 125th Ohio, aged 25 years, was wounded at Resaca, Georgia, May 14, 1864. He was at once admitted into the field hospital of the 2d division, Fourth Corps, where the injury was recorded as a flesh wound of the left thigh. He was subsequently treated in hospital at Nashville, and on August 25, 1864, was transferred to "Joe Holt" Hospital, Jeffersonville, Indiana. Surgeon H. P. Stearns, U. S. V., reported: "Compound fracture of lower third of femur by conoidal ball. October 12th: Patient enfeebled and anæmic by constant discharge of pus. Pulse frequent and soft, tongue moist and clean, appetite good, bowels regular. Femur much shattered; ends overlapped and partially united. Soft parts destroyed by gangrene, exposing blood-vessels; rupture of popliteal artery by a fragment of bone. Chloroform administered and antero-posterior flap amputation of the middle third of the thigh performed by Dr. Stearns. The flaps subsequently sloughed, exposing an inch of the femur; repeated hæmorrhages also occurred. Quinine, opium, and whiskey administered and cold-water dressings applied. December 17th: Every indication of recovery; flaps nearly healed. The man is in fine health and spirits; all medicines have been suspended and nourishing diet alone depended upon." Wining was transferred to Cleveland, Ohio, March 24, 1865, and discharged from service May 20, 1865. He is a pensioner.

Wounds closely resembling incised wounds frequently are caused by sharp-edged shell fragments flying with great velocity; but a certain amount of contusion and laceration, always present, separates them from the class of purely incised wounds.

Missiles and foreign bodies lodging sometimes act as plugs, restraining for a time hæmorrhage from a wounded blood-vessel. An interesting case of occlusion of the common carotid by an impacted ball is related by Surgeon John A. Lidell:[1]

CASE 1101.—"At the Washington Infirmary, August 15, 1861, through the kindness of Dr. J. W. S. Gouley, then attached to the medical service of the U. S. Army, the author had an opportunity to examine a very interesting preparation of the left common carotid artery and the parts adjacent to it, which had been obtained on the previous day at the autopsy of a soldier who had died from secondary hæmorrhage following a gunshot wound of the left side of the face and neck. The ball, which, by the way, was nearly spent, struck the lower jaw well forward and was deflected downward, backward, and a little outward in such a manner as to pass obliquely through the left common carotid artery, and to lodge in the tunics and sheath of that vessel underneath the omo-hyoid muscle, pressing somewhat upon the par vagum, and *occluding completely the proximal end of the divided artery.* It was a round ball. The hæmorrhage occurred *fourteen days* after the wound was inflicted and two or three days after his admission into the infirmary. It came on suddenly, without warning, and was very profuse. The patient lost more than a quart of blood, which flowed in a great stream from his mouth. On the supposition that the hæmorrhage proceeded from a lesion of some of the carotid vessels, an effort was made to tie the common carotid above the omo-hyoid muscle, but it had to be abandoned on account of the great profuseness of a flow of blood which took place in the wound of operation, and did not permit the search to be continued in order to secure the bleeding vessel by ligature at the place of injury. It was believed by all the surgeons present that the patient was now so much exhausted by the loss of blood as to make it useless to attempt to tie the common carotid artery below the omo-hyoid muscle, and the next morning he died. Moreover, the source of the hæmorrhage was very obscure until it was revealed at the autopsy. *It was then found that the divided carotid artery was still occluded on the side of the wound toward the heart (proximal) by the impacted ball; that a false aneurism as large as a filbert and elongated in shape had been formed at the distal extremity and on the inner side of the wounded artery just above the omo-hyoid muscle; that the hæmorrhage occurred from rupture or spontaneous opening of the sac of this traumatic aneurism; that the hæmorrhage was not direct, but recurrent in character; and that it could not have been arrested without the application of a ligature to the vessel on the distal side of the wound in it.* The ligation of the common carotid below the omo-hyoid muscle would, therefore, not have done any good, unless the vessel had been tied at the same time at some point beyond the spot where it was wounded and where the traumatic aneurism was situated. A remarkable and, so far as the writer knows, an unique feature of this case was, that the traumatic aneurism was formed in connection with the distal end of the divided common carotid artery, the occurrence of which appears to have been favored by the free anastomosis which exists between the terminal branches of both the external and internal carotid arteries of the two sides of the body." The above has been identified as the case of Corporal Jonathan Calef, 2d New Hampshire. An abstract of this case has been published by Medical Cadet L. H. Bodman, U. S. A.,[2] who states that the man was injured by a sentry, August 7, 1861. There was considerable hæmorrhage at the time of the accident, but when admitted to the hospital a few hours afterwards he was in a comfortable condition, bleeding having entirely ceased. No search was made for the ball, but the edges of the fractured bone were retained in apposition by means of a suitable bandage, and quiet enjoined. Diet consisted of nutritious soups and beef tea. The patient continued in good condition until the afternoon of the 13th, nearly a week after the reception of the injury, when, lying quietly in bed, he was seized with violent arterial hæmorrhage. The blood poured from his mouth, welling up with each pulsation of the heart. Compression over the carotid was instantly resorted to, but a quart of blood had escaped before the hæmorrhage was controlled. The patient being now very weak, stimulants were administered and directed to be given frequently through the night. Continuous compression was kept up over the artery. Bleeding recurred twice during the night and was controlled with great difficulty. He sank rapidly, and died on the morning of August 14, 1861, by syncope, in another and terrible attack of hæmorrhage.

CASE 1102.—Private John Jones, 187th New York, aged 27 years, was admitted into Jarvis Hospital, Baltimore, February 11, 1865, with a gunshot wound of the mouth and throat, received at Hatcher's Run, Virginia, on February 6th. The

[1] *Surgical Memoirs of the War of the Rebellion, collected and published by the U. S. San. Comm.*, New York, 1870, Surgical Volume I, page 172.

[2] BODMAN (L. H.), *Gunshot Wound of Carotid Artery—Secondary Hæmorrhage*, in *American Medical Times*, New York, 1862, Vol. IV, p. 67.

patient, at the time of admission into the hospital, was able to walk about, and a casual observer would have thought him to be in nowise a dangerous condition. The musket ball had entered directly the mouth and in its progress carried away the upper and lower incisors and canine teeth, and passing backward lodged, but where was not discovered until the *post-mortem* revealed the fact. The index finger inserted into the mouth found that it had wounded the right side of the tongue, and from thence the track ran to the right side of the neck and backward through the pillars of the fauces and then could not be further traced. The patient himself thought that he had swallowed the ball. The only inconvenience he suffered was in either talking or swallowing, and when resting on his back; and being so apparently comfortable it was not thought best to trouble him, but orders were given to the nurses to watch him closely. An examination externally revealed no signs of injury, and the only symptom there marked was tenderness over the upper vertebra and general soreness of the muscles of the neck. He had not the least sign of paralysis, and the day previous to his death he was walking about his ward, and even requested his medical attendant to extract for him a tooth which was almost detached by the ball and was giving him some annoyance. On February 12th (six days after the injury was received), at 5.30 P. M., a most furious arterial secondary hæmorrhage occurred through and out of his mouth. Before assistance could reach him (although close at hand) he had bled so copiously as to be in a state of syncope, and while bleeding he had two convulsions, one of which was quite violent. During the active hæmorrhage pressure was made over the common carotids, yet it did not seem to control it to any great extent, and notwithstanding various expedients were employed it only stopped when syncope came on. It is proper to state, also, in this connection, that pressure from within by the fingers did not stay the hæmorrhage, but to his detriment increased the suffering of the patient. The exhausted condition of the patient at this time rendered it inexpedient to resort to any operative interference. The hæmorrhage having entirely ceased through this effort of nature, it was ordered that diffusible stimulants be freely given in such quantities as the stomach could bear, and that ice should be constantly kept applied to the parts, and under this treatment he slowly rallied and rested quietly until 5 o'clock on the following morning, when a gush of blood took place from the patient's mouth and he expired. An autopsy was made twenty-four hours after death, and the track of the wound was thoroughly explored, after both common carotids had been injected with a suitable material, which, on cooling, hardened and distended the principal arteries of the head and neck. On the plan of operating recommended by Mr. Guthrie on the living subject, an angular flap of the integuments was made corresponding with the ramus and body of the lower maxillary bone, and this integument was turned back, and by the saw the bone was divided near the first lower molar tooth and the upper fragment raised. By a little dissection the wound was fully exposed and the first vessel wounded was ascertained to have been the right internal carotid, which was converted into a traumatic aneurism for near its entire length, and its position was occupied by an extensive clot of blood. On introducing the finger into the track of the wound at this point and carrying it almost directly backward and inward, the ball was found loosely resting against the transverse process of the first cervical vertebra, and was easily extracted without the aid of forceps. By further careful exploration of the parts adjacent to where the ball was arrested in its progress it was ascertained that the right vertebral artery had been extensively lacerated at the point where it passes through the foramen of the transverse process of the atlas, and that the ball resting there had probably acted as a plug in preventing hæmorrhage from that artery, and in proof of this assertion no clots of blood were discovered here. The right transverse process of the atlas was completely fractured and comminuted, and the fragments were readily removed *en masse* simply with the fingers and without any force. This fracturing of this process of the atlas was, on further investigation, found to extend through the ring down to the spinal cord, yet the fragments were not driven in upon, or were they apparently causing any pressure on the cord. On examining the brain, heart, and lungs they were found healthy and in a normal condition, but were exsanguinated. Assistant Surgeon D. C Peters, U. S. A.,[1] who transmitted the above report, remarks: "It is somewhat remarkable that this soldier was not killed outright, or having lived so long he should not have suffered from paralysis in some form, and, in fine, that his terrible wound should have given him so little trouble up to the time of his first hæmorrhage. In my humble opinion operative interference at any stage of the treatment would not have saved nor even prolonged his life."

In many cases where both artery and vein are divided the injury of the vein assumes less practical importance at the time from the more serious lesion of the artery; but cases of secondary hæmorrhage from veins which have been contused and subsequently slough are found to be not infrequent, as will be seen hereafter.

LODGEMENT OF MISSILES AND PROJECTILES.—Cases of lodgement of missiles, projectiles, and foreign bodies in the persons of the wounded were of extremely frequent occurrence during the late war. Although it is not possible to give with any accuracy the frequency of such lodgements, it can be confidently stated that the percentage was very large.

Round balls are more prone to lodge than those of a conoidal form, as would naturally be inferred from the rapidity with which the former lose their initial velocity and the resistance offered to their passage through the tissues of the body. Conoidal balls at ordinary range preserve sufficient force to perforate the body; but at long range, or with velocity diminished by contact with intervening objects before reaching the body, or when the posture is such as to compel a long course through the tissues, lodgement very commonly occurs. As a general rule the lodgement of conoidal missiles is deeper than that of round balls.

[1] An abstract of this case was also published in the *American Journal of Medical Sciences*, 1865, Vol. XLIX, p. 373.

Instances of the lodgement of the larger class of projectiles, as solid cannon balls, grape-shot, and fragments of exploded shell, have been cited on pages 240 of the *Second Surgical Volume*, on page 746 (CASE 1040) of the present volume, and elsewhere.

The collection of the Army Medical Museum furnishes many specimens, not only of missiles and projectiles proper removed from the persons of soldiers, but also of foreign bodies, as buttons, coins, pieces of pocket-knives, shreds of clothing, portions of the accoutrements of the soldier, and fragments from objects torn off by a missile in its course, as iron wire from the bail of a tin bucket, a portion of a ramrod, a tompion nearly entire, etc. Not infrequently pieces of bone or teeth from a wounded comrade driven before a missile became themselves wounding missiles. Splinters of wood and iron, stones, and débris from artillery caissons and carriages, from breastworks and defenses, acted in a similar manner. All parts of the body share the liability to lodgement.

The direct effects of lodgement are those common to the presence of foreign bodies generally in the tissues of the human structure; they become the centres and sources of irritation, liable to be followed by symptoms of every degree of severity in nature's effort to rid herself of the offending matter. These symptoms largely depend upon the size, nature, and form of the intruding body; also upon the region of the body involved.

The most serious results follow the lodgement of missiles and foreign bodies in joints and cavities of the body, or in organs necessary to life; even small missiles, with qualities the least irritating, may be the cause of great mischief by the production of tetanus and hæmorrhage, when lodged where they may cause pressure upon nerves or blood-vessels.

Passing from the more immediate or primary effects of irritation and inflammation resulting from the lodgement of foreign bodies, we find that the usual tendency of their continued presence is to prevent or retard the course of healing. Cicatrization is slow and liable to be interfered with by any aggravation of the primary irritation; the wound takes on a condition of chronic inflammation, sinuses form with purulent discharges, sapping and undermining the strength and vigor of the patient, opening the way for the invasion of any of the surgical complications which may be near at hand. Especially does this seem to be true of substances of organic nature, as shreds of wool or cotton, or splinters of wood. Until such substances are removed by nature or art the progress of the case toward health is usually entirely held in abeyance. Foreign bodies of a metallic nature, particularly those with smooth surfaces, seem to act more kindly; they frequently permit the closure of the wound; but if their location is subject to frequent movements the wound is liable to reopen; this process may be repeated until the offending body is removed or discharged.

In many cases of lodged missiles the tendency to move or change place is observed; slowly and gradually the substance will work to the surface of the body, where it will often form an abscess and be discharged, or it may tend toward the internal surfaces of the great cavities, where its presence may be productive of great harm; or, on the other hand, it may be harmlessly ejected from the body. Thus balls lodged in or about the abdominal region and of which the exact position had not been ascertained have finally been passed by stool *per vias naturales*. Scraps of iron and lead have been known to work their way through the coats of the bladder, where they became the nuclei of vesical calculi which were subsequently removed by lithotomy. The collection of the Army Medical Museum contains several specimens of this nature; also of portions of bullets and shell fragments which have been similarly lodged in the bladder and removed by operation. Cases of this nature have been recorded on pages 269–276 of the *Second Surgical Volume*. The Museum collection

also contains missiles which had for years lodged within the cranial bones. The least harmful effects of lodgement are seen in the cases of balls lodged in the muscular or cellular tissues of the body and in regions of little vital importance. Musket balls have remained encysted for years, causing but little trouble or inconvenience. At the Soldiers' Home, near Washington, it is not uncommon to find old soldiers who have carried encysted bullets for long periods in their persons with little more inconvenience than slight neuralgic pains during damp and unpleasant weather. The writer has in mind the cases of two soldiers, one wounded in the lower maxillary region during the Mexican war, the other in the gluteal region during the late war, in both of whom the balls are firmly encysted; the missiles give so little trouble that the suggestion of removal is not received with favor. A most remarkable instance of the encysting of a ball is that of Lieutenant E. B. Blake (CASE 552, on p. 372, *ante*), who carried for fifteen years a full-sized conoidal bullet in the cancellated structure of the condyles of the femur, experiencing but little trouble.

PRIMARY SYMPTOMS COMMON TO GUNSHOT WOUNDS.—The immediate symptoms common to shot injuries are pain, shock, and hæmorrhage. To be duly appreciated in their primary state they must be seen on the battle-field, as they are speedily evanescent, fatal, or merge themselves into conditions pertaining to the later stages of shot injuries.

Shock.—Severe shot injuries, particularly those involving the larger bones and the more important organs and cavities, are followed by a train of phenomena known as "shock," or a general perturbation of the nervous system. Upon the reception of such injuries the person affected turns suddenly pallid, trembles, and, may perhaps fall to the ground; the surface of the body is cool and bathed in profuse perspiration; the features indicate anxiety and distress, the respiration is labored and sighing, the circulation is feeble, the mental condition is often one of agitation resembling fear, or there may be an entire loss of self-control; at times, in severe cases, consciousness is lost, and finally death may ensue without reaction.

The degree of shock seems to bear some relation to temperament, to physical condition, and to the region of body affected. Equal degrees of injury seem to affect individuals differently. While some are apparently overwhelmed by the shock, others maintain their self-control and composure; in some, shock seems to heighten the excitement under which the individual is laboring during a battle; in others, the effect is to produce a sense of fear and panic. As a rule, the more severe the injury the greater will be the degree of shock. Injuries caused by the larger projectiles, as the loss of a limb near the trunk, is generally followed by depressing shock, and this independent of any loss of blood. Generally, shock is more profound and persistent in grave wounds of the abdomen than in wounds of any other part of the body. Profound and even fatal shock has been the occasional consequence of shot contusion of the parietes of the abdomen, as in the case of Major King, British Fusileers,[1] who was killed at the battle of New Orleans, January 8, 1815, by a musket-ball, "which struck him on the pit of the stomach, leaving only the appearance of a contusion, apparently in the same manner as a blow from the hands of a pugilist in the same part."

Wounds producing great splintering and comminution of long bones are generally followed by a severe degree of shock. The duration of shock is very variable, sometimes lasting but a few minutes; at other times showing great persistence, and continuing for hours or days. Here, too, individual temperament and idiosyncracy seem to exert a large

[1] GUTHRIE (G. J.). *A Treatise on Gunshot Wounds, etc.*, London, 3d edition, 1847, p. 5.

influence. When shock is very persistent the prognosis is to be very guarded, as its persistence may depend upon some severe or fatal injury, as was probably the case in the following instance, reported by Surgeon E. Swift, U. S. Army:

CASE 1103.—Private *A. P. Pringle*, Co A, 25th Louisiana, aged 24 years, temperament bilious, occupation farmer; wounded at the battle of Stone's River, near Murfreesboro', Tennessee, December 31, 1862, by a minié ball under the left shoulder, through pectoralis major. The shock knocked him down and he fell across the railroad track on his left hip. He complained more of this than of the wound; suffered intensely from pains in his hip, back, and leg; quieted pains with morphine, and was obliged to use a catheter twice daily as long as he lived. The wound healed very well, but he never recovered from the shock of the fall. He had no appetite from the first. All the nervous symptoms increased in intensity; he had no rest except from morphine, and for two or three days before his death he could not move at all. Died January 11, 1863.

Shock may be the actual cause of death of many cases on the battle-field, especially in severe injuries of the abdomen. Of twenty-seven fatal cases of shock fourteen were found to be shot wounds of the abdomen and eight of the femur. Fatal shock is more frequently a sequel of wounds by large projectiles than by bullets. Longmore[1] found that out of twenty-two deaths from shock only eight were caused by bullets, and in all of these the cavity of the abdomen had been penetrated by the projectile. In the remainder the injuries were from gunshot, shell, or grape.

Pain.—Pain as a primary symptom of shot injury is rarely absent. In degree it may be slight or severe according to the locality of the wound, its nature, and the mental condition of the individual. In simple flesh wounds it is commonly described as stinging or cutting, as from a blow by a cane; it is sometimes likened to the passage of a hot wire through the part; by others it is described as dull, like the blow from some heavy body. When nerves are injured or contused the pain is usually severe, but is commonly referred to parts supplied by the nerve. In some cases the pain is referred to parts distant from the seat of injury, as in the case of Lieutenant William F. Goodwin, 16th U. S. Infantry, who was wounded at Chickamauga, September 19, 1863, by a conoidal ball, which caused a severe flesh wound of the left thigh. He felt no pain of moment in the wounded limb, but had a firm impression that the wound was in the right limb. The case is referred to by Mitchell, Morehouse, and Keen (*loc. cit.*, page 14). When large nerve trunks are divided there is momentarily intense pain, immediately succeeded by loss of sensation in parts depending upon the nerve trunk. In severe wounds generally the pain which accompanies them is lost in the anæsthesia of the shock which soon follows.

Pain resulting from shot contusions of bone is often severe and widespread, especially if the injury is insufficient to cause unconsciousness.

CASE 1104.—Captain A. L. Dearing, Co. H, 5th Maine, aged 28 years, was wounded at Chancellorsville, May 3, 1863. He was admitted into Seminary Hospital, Georgetown, on May 8th. Surgeon H. W. Ducachet, U. S. V., reported: "Gunshot wound of left thigh bone." The following account of the case was furnished by the patient: "I was wounded," says this officer, "on Sunday, May 3d, by a round musket ball in my left thigh, very near the hip joint, the enemy being fifty or sixty yards distant. The sensation produced when the ball struck me was as though a ball of glass had been thrown with irresistible force and shivered to atoms against the bone of my thigh. This sensation was very distinct, and no other was felt for the instant. I have no recollection of falling; but found myself lying on my left side, with a strange feeling of numbness *rushing* through the entire leg. This lasted but a few moments; the blood flowing freely, this *active* numbness soon died away. I believed myself mortally wounded, as I had no doubt the bone was shattered to the hip joint. Dreading to fall into the hands of the enemy I dragged myself from the battle-field about two hundred yards, when some of our men carried me to a place of safety. Taken to the hospital at Falmouth on the 4th, my wound was probed by Surgeon N. S. Barnes, 27th New York, on the morning of the 5th. The probe struck the bone and followed the wound a short distance around it on the inside, without feeling the ball. Surgeon Barnes decided that the ball struck the bone, and, without injuring it, glanced to the right, passing around to the opposite side from which it entered, and probably lay deep in the groin; but my thigh was so much swollen that the ball could not be found. On May 8th I reached Seminary Hospital, Georgetown. At length, after the swelling had subsided considerably, the ball was found near the groin and near the surface. It was extracted by Surgeon Ducachet on May 18th, but this ragged, misshapen piece of lead was so light that doubts were expressed as to its being a whole ball. The wound seemed to be doing well; there was considerable yet no very severe pain, the severest and most continuous being in that region where the ball entered and

[1] LONGMORE (T.) *Gunshot Injuries: their history, etc.*, London, 1877, p. 150.

struck the bone. On May 27th a small piece of bone was discharged from the wound, indicating that the bone was more or less injured. On May 28th I was attacked with a most intense pain on the inside of the thigh, midway between the wound and the opening where the ball had been extracted. This pain brought on fever and a severe headache. Chloroform liniment was freely applied and alleviated the pain. On May 31st a piece of lead made its appearance at the opening where the ball had entered, and was extracted by Dr. Miller, and proved to be very nearly as large as that extracted on the 18th. This second piece of lead is very ragged, and holds a portion of the cloth which it had carried into the wound. About the first of June the nerves of my left foot, mostly in the toes, commenced troubling me, causing many sleepless nights and restless days for two weeks. It was like a continuous nervous toothache. A powerful chloroform liniment was freely applied, but it proved less effectual than cold water in easing the pain. This pain was not constant, but would burn my toes as with boiling water for ten or fifteen minutes, then ease away somewhat for a few minutes, and then return in full force. On June 12th a course of vigorous rubbing with a coarse towel was commenced on the foot and leg to the knee. On the third day the pain began to yield, and has now, June 24, 1863, almost ceased. My leg remains as yet almost perfectly helpless. It cannot support its own weight. My general health is very good." The patient was discharged from service September 15, 1863, and pensioned. The Hartford examining board reported, August 7, 1872: "Ball entered at middle of left nates and passed forward; part of the ball was removed at the junction of the upper and middle thirds of the left thigh at the outer border of the sartorius muscle. In its passage the ball struck the inner side of the femur, and in consequence of which portions of bone, with the remainder of the ball, were discharged through the point of entrance in the nates. The knee becomes swollen and painful from slight use."

Under the stimulus of great excitement, as that prevailing during an active engagement, men may receive wounds without being aware of the fact until their attention is drawn to the blood flowing from the wound, or until they are affected by faintness from the loss of blood. Race and temperament undoubtedly exert a modifying influence on the degree of suffering. The white races, as a rule, seem to be more susceptible to pain and to suffer more acutely. The negro soldiers engaged in the late civil war bore their sufferings with great fortitude and patience; but it is questionable if the actual degree of suffering was as great as that of the white soldiers. The nervous and sanguine temperaments show a greater capacity for suffering than the lymphatic or lethargic temperaments.

Primary Hæmorrhage.—Primary hæmorrhage, or the loss of blood immediately upon the receipt of an injury severing or wounding a blood-vessel, has been alluded to as causing speedily fatal results, or as ceasing spontaneously by the retraction of the coats of the bleeding vessels, by syncope, or followed by such retardation of the flow of blood as to allow assistance to reach the wounded man, rendering him secure for a time at least.

As a result of the experience of the late war it may be stated that primary hæmorrhage, within the bounds of possible succor, was infrequent; yet without doubt many wounded men perished through lack of self-possession, want of coolness, or of sufficient knowledge to save themselves.

It is probable that a large percentage of the "killed in battle" were cases where primary hæmorrhage followed the division of important vessels, death ensuing instantly or before help could be procured. Surgeon John A. Lidell, U. S. V.,[1] was convinced, from his own observation, "that a large proportion of the persons killed in battle perish directly from loss of blood: On the 25th of March, 1865, I examined the bodies of forty-three soldiers as they lay dead where they had fallen on the field of combat at Fort Steadman, in the lines before Petersburg. Of them 23 were wounded in the cranium, 15 were wounded in the thorax, 5 were wounded in the abdomen. The blanched and exsanguinated appearance of the cadaver in every case wounded in the abdomen denoted clearly that death had been produced by hæmorrhage, and the extreme rapidity with which that result had taken place implied that some large blood-vessel had been injured. In all but two or three of the cases wounded in the thorax the body presented a blanched and exsanguinated appearance, occasioned by hæmorrhage. There was much blood in the clothing and on the ground where they had fallen in most of the cases wounded in the trunk. This fact shows that the fatal hæmorrhage generally took place externally. There were, however, some cases wherein

[1] LIDELL (J. A.), *On the Wounds of Blood-vessels, Traumatic Hæmorrhage, etc.*, in *U. S. Sanitary Commission Memoirs*, Surgical Volume I, p. 12.

death had been produced by internal hæmorrhage. While the bodies of these were pallid and wax-like, there was but little blood in their clothing and on the ground where they lay. All the wounds appeared to have been inflicted by cylindro-conoidal bullets."

Primary hæmorrhage from wounded veins is generally regarded as of less imminent importance than that from wounded arteries. It was stated in the preliminary report (*Circular* No. 6, 1865, p. 39) that "no cases have been reported in which the bleeding could not be controlled by pressure." A further examination of the material at hand makes it necessary to somewhat modify this statement. Primary hæmorrhage from large trunk veins lying in cavities and beyond the reach of ligatures appear to be as fatal as that from arteries. A case of this nature is reported on page 71 of the *Second Surgical Volume*. A colored teamster shot in the abdomen died forty-two hours after the injury. At the autopsy the abdomen was found distended with clotted blood from one of the mesenteric veins which had been cut.

Primary hæmorrhage from the jugular and femoral veins would appear to be less amenable to treatment than that from others which yield to pressure or cease spontaneously. A case illustrating primary hæmorrhage from the femoral vein is reported on page 338 of the *Second Surgical Volume* (CASE 981): a private of the 110th Ohio was wounded at Fort Steadman, March 25, 1865; the ball entered the right thigh, cutting across the femoral vein, and lodged in the gluteal muscles; hæmorrhages followed continuously, which were at times checked by styptics. Death occurred April 11, 1865.

Early in the war it was recommended that each soldier should have in his possession some simple form of tourniquet, and in many instances the recommendation was carried out; how far they were of use is not known, as no cases are recorded of life being saved by them; but it is probable that they were little used, and it is very doubtful if, in the excitement and confusion of battle, they could have been applied with any efficacy. Later in the war experience taught the older and more experienced troops to do all that could be done in cases of emergency.

HÆMORRHAGES AND LIGATIONS.

Of the many complications of shot wounds, perhaps none plays a more important part than hæmorrhage. Injuries, apparently trivial, prove fatal in the most unexpected manner, as the lesion to the artery causes at first little or no disturbance; or hæmorrhages occur in cases in which, judging from the direction of the ball, no injury to a blood-vessel could have been surmised. Thus the prognosis of the shot wound becomes exceedingly problematical, and the surgeon not infrequently is suddenly roused from a feeling of security and brought face to face with an unexpected and serious complication, which, under the peculiar necessities of war, is of difficult treatment; and the results thus far have been by no means as satisfactory as could be wished. Too often the surgeon is induced to await developments rather than to resort to prompt action.

It has therefore been thought desirable to give in the following pages as complete a summary of the cases of hæmorrhage, whether primary or secondary, as space would allow. Details of many cases have appeared in this and the preceding volumes, and in a few instances partial tabular statements of ligations of the more important blood-vessels have been adduced. But during the progress of the work many additional cases were ascertained and additional data were found of cases already reported; all will here be grouped together in as concise a manner as possible to aid the student interested in the investigation of this

important branch of military surgery in his researches in this direction. As already stated in the consideration of the effects of missiles and projectiles on blood-vessels, it is difficult to distinguish the injuries inflicted by one or another of the more common forms of bullets; but it would seem, nevertheless, from the large series of bleedings reported during the war, that the introduction of the elongated bullet, thrown from a rifled weapon, has largely increased the number as well as the gravity of the injuries to blood-vessels. The injuries of the arteries will be first considered, and those of the veins unattended by lesions of the accompanying arteries are reserved for a special subsection.

ARTERIES.—The number of arterial hæmorrhages found on the records of the field and general hospitals was three thousand two hundred and forty-five (3,245). One thousand six hundred and forty-nine of these bleedings occurred in the lower extremities, eight hundred and seventy-eight in the upper extremities, two hundred and ninety-one were hæmorrhages of the head, face, and neck, and four hundred and twenty-seven of the trunk. Of the three thousand two hundred and forty-five cases recorded, the blood-vessels involved were not named in one thousand and ten instances; and as the details of these cases are not as complete as those of the remaining two thousand two hundred and thirty-five, in which the bleeding vessels were definitely ascertained, the former will be dropped in the further discussion of the subject.

The cases have been grouped in a tabular statement, adducing: First, the bleedings of the ramifications of the ascending aorta in the chest, neck, head, and upper extremities; and next, those of the descending aorta in the abdomen, pelvis, and lower extremities; and lastly, the few examples of pulmonary hæmorrhages. The tables also indicate the number of cases in which pyæmia, erysipelas, tetanus, and gangrene were recorded as complications, the number of cases in which death was ascribed directly to hæmorrhage, and the proportion of cases in which primary injury to vessels and primary bleedings were observed:

TABLE CXXIV.

Summary of Two Thousand Two Hundred and Thirty-five Cases of Arterial Hæmorrhages of the Head, Neck, Chest, Trunk, and Upper and Lower Extremities, in which the bleeding vessels were indicated by name.

ARTERIES.	CASES.	RESULTS.		PRIMARY INJURY.	PRIMARY BLEEDING.	PYÆMIA.		GANGRENE.		ERYSIPELAS.		TETANUS.		DEATH FROM HÆM.
		Rec.	Fat.			Rec.	Fat.	Rec.	Fat.	Rec.	Fat.	Rec.	Fat.	
Innominata	2	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Common Carotid	96	21	75	31	6	.....	1	.....	2	.....	.....	.....	.....	41
External Carotid	12	4	8	5	2	.....	.....	.....	.....	1	.....	.....	.....	6
Superior Thyroid	3	2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Lingual	7	4	3	5	1	.....	1	.....	.....	.....	.....	.....	.....	1
Occipital	13	8	5	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	3
Auricular	3	2	1	1	1	.....	.....	.....	.....	.....	.....	.....	.....	1
Temporal	30	24	6	6	3	.....	.....	3	1	2	.....	.....	.....	1
Facial	21	12	9	4	1	1	.....	.....	.....	1	.....	.....	1	5
Submental	2	2	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Internal Maxillary	14	6	8	1	1	.....	.....	.....	.....	.....	.....	.....	.....	8
Middle Meningeal	8	4	4	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Internal Carotid	11	2	9	2	1	.....	.....	.....	.....	.....	.....	.....	.....	5
Frontal	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Forward	223	92	131	61	17	1	2	3	3	4	.....	.....	1	76

ARTERIES.	Cases.	Results.		Primary Injury.	Primary Bleeding.	Pyæmia.		Gangrene.		Erysipelas.		Tetanus.		Death from Hæm.
		Rec.	Fat.			Rec.	Fat.	Rec.	Fat.	Rec.	Fat.	Rec.	Fat.	
Brought forward	223	92	131	61	17	1	2	3	3	4	.....	.....	1	76
Subclavian	62	10	52	12	1	.....	6	2	4	1	3	.....	.....	32
Vertebral	2	.....	2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Cerebral	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Internal Mammary	9	2	7	1	.....	.....	1	.....	.....	.....	.....	.....	.....	5
Bronchial	2	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Intercostals	37	11	26	7	4	.....	2	.....	1	.....	.....	.....	.....	13
Thyroid Axis	3	2	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Inferior Thyroid	1	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Superficial Cervical	2	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Suprascapular	12	5	7	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	3
Axillary	87	11	76	26	4	.....	1	.....	6	.....	1	.....	.....	56
Acromial Thoracic (Branch)	10	1	9	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	6
Subscapular	13	4	9	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	5
Circumflex	32	20	12	1	.....	1	2	1	1	.....	1	.....	1	7
Muscular Branch	2	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Brachial	261	162	99	73	22	.....	25	18	11	7	4	.....	.....	33
Muscular Branch	4	2	2	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1
Profunda	14	8	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5
Anastomotica Magna	9	1	8	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	6
Radial	111	76	35	32	5	.....	7	6	4	3	.....	.....	.....	8
Radial and Ulnar	4	1	3	1	.....	.....	2	.....	.....	.....	1	.....	.....	.....
Ulnar	49	37	12	7	1	.....	1	6	1	.....	.....	.....	.....	7
Interosseous	42	33	9	5	1	.....	1	5	1	.....	.....	.....	.....	5
Palmar Arch	23	16	7	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	2
Dorsalis et Rad. Ind	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dorsalis Carpi	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Arc. Vol. Prof	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Digitals	10	8	2	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
Descending Aorta	2	.....	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Phrenic	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Hepatic	2	.....	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Splenic	2	.....	2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Mesenteric	2	.....	2	1	1	.....	.....	.....	.....	.....	.....	.....	.....	2
Colica Media	1	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Spermatic	2	1	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
Common Iliac	7	.....	7	2	1	.....	.....	.....	1	.....	.....	.....	1	3
Internal Iliac	7	.....	7	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	6
Ilio Lumbar	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Gluteal	22	4	18	2	1	.....	3	.....	.....	.....	.....	.....	.....	12
Sciatic	8	.....	8	1	.....	.....	.....	.....	1	.....	.....	.....	.....	4
Pudic	4	1	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3
Hemorrhoidal	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
External Iliac	26	3	23	6	.....	.....	2	.....	2	.....	.....	.....	.....	7
Epigastric	2	2	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Circumflex Iliac	3	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3
Femoral	551	119	432	103	27	2	48	11	53	2	1	.....	2	194
External Pudic	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Profunda Femoris	60	18	42	1	.....	.....	6	2	2	.....	.....	.....	.....	25
External Circumflex	10	2	8	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	4
Anastomotica Magna	7	4	3	.....	.....	1	.....	.....	.....	.....	1	.....	.....	1
Perforating Arteries	6	.....	6	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	2
Muscular Branches	54	15	39	2	.....	.....	13	1	2	1	.....	.....	.....	12
Popliteal	105	26	79	46	9	.....	12	5	24	2	.....	.....	1	32
Articular Arteries	8	3	5	1	.....	.....	.....	.....	1	.....	.....	.....	.....	4
Tibial	270	128	142	76	14	.....	29	19	28	3	3	.....	3	46
Muscular Branches	2	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Interosseous	6	5	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Dorsalis Pedis	3	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Plantar Arteries	8	6	2	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
External Malleolar	2	.....	2	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	2
Peroneal	17	7	10	5	1	.....	2	1	1	.....	.....	.....	1	4
Pulmonary arteries	3	.....	3	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Aggregates	2,235	855	1,380	485	110	5	177	80	148	23	16	.....	11	653

The number of cases of primary lesions of blood-vessels was quite large, comprising four hundred and eighty-five, or nearly one-fourth of the two thousand two hundred and thirty-five cases. Of these, one hundred and ten were immediately followed by hæmorrhage. To what extent the injuries to arteries influenced the mortality rate among the wounded will be seen from the fact that of the two thousand two hundred and thirty-five instances in which bleedings formed an important element, one thousand three hundred and eighty, or 61.7 per cent., proved fatal, while, of the total number of shot wounds, as indicated in TABLE CXIX, page 691, *ante*, only 13.6 per cent. ended in death. Nor can this high rate of mortality be attributed to the presence of other complications, such as pyæmia, gangrene, erysipelas, tetanus, etc., as the fatality of the cases in which these diseases occurred comprised only 20.5 per cent. of the whole number of deaths, while in six hundred and fifty-three instances, or 47.3 per cent., death was ascribed directly to hæmorrhages, and in 22.2 per cent. to exhaustion following severe or continued loss of blood.

Of the two thousand two hundred and thirty-five cases of hæmorrhage in which the bleeding vessels were specified, one thousand one hundred and fifty-five were followed by ligation. Many of these instances of ligation, especially of the larger arteries, have already been cited in this and the preceding volumes, sometimes in detail, sometimes in partial tabular statements. For the convenience of the reader all have here been grouped together in a numerical statement, which will be followed by nominal lists arranged according to the various blood-vessels operated upon.

TABLE CXXV.

Tabular Statement of One Thousand One Hundred and Fifty-five Ligations for Shot Injuries.

ARTERIES LIGATED.	CASES.	RESULTS.	
		Rec.	Fat.
Common Carotid	82	19	63
External Carotid	7	4	3
Superior Thyroid	1	1	.....
Lingual	1	1	.....
Occipital	5	4	1
Auricular	1	1	.....
Temporal	18	14	4
Facial	8	5	3
Submental	1	1	.....
Subclavian	51	10	41
Internal Mammary	2	.....	2
Intercostals	6	2	4
Thyroid Axis	1	1	.....
Superficial Cervical	1	1	.....
Suprascapular	2	2	.....
Axillary	49	7	42
Acromial Thoracic (Branch)	1	.....	1
Subscapular	2	1	1
Circumflex	18	11	7
Muscular Branch	1	.....	1
Brachial	170	119	51
Muscular Branch	3	1	2
Profunda	7	5	2
Anastomotica Magna	1	.....	1
Radial	59	45	14
Ulnar	22	20	2
Interosseous	9	6	3
Forward	529	281	248
Brought forward	529	281	248
Palmar Arch	4	4	.....
Dorsalis and Radialis Indices	2	2	.....
Dorsalis Carpi	1	1	.....
Arch Vol. Profundi	1	1	.....
Digital Arteries	4	3	1
Common Iliac	5	.....	5
Internal Iliac	3	.....	3
Gluteal	6	2	4
Sciatic	2	.....	2
External Iliac	26	3	23
External Spermatic	1	.....	1
Femoral	374	93	281
External Pudic	1	1	...
Profunda	22	5	17
Perforating Arteries	6	.....	6
Muscular Branches	24	6	18
Popliteal	36	8	28
Articular Arteries	3	1	2
Anterior and Posterior Tibials	7	4	3
Anterior Tibial	40	22	18
Dorsalis Pedis	1	1	....
Interosseous	2	1	1
Posterior Tibial	48	29	19
Plantar Arteries	3	2	1
Peroneal	4	1	3
Aggregates	1,155	471	684

Four hundred and seventy-one cases terminated in recovery, and six hundred and eighty-four in death, a mortality rate of 59.2 per cent.

Ligations of the Common Carotid.—Eighty-two cases[1] of ligation of the common carotid were reported; nineteen recovered and sixty-three proved fatal, a mortality of 76.8 per cent. The operations were performed for hæmorrhages from the common carotid in four cases—two recoveries, two fatal; for hæmorrhages from the internal carotid in four cases—all fatal; for injuries of the external carotid in eleven cases—one recovery, ten fatal; and in twenty-eight instances, with eight recoveries, for hæmorrhages from branches of the carotids—the lingual in seven, the auricular in one, the temporal in two, the facial in five, the maxillary in eleven, the middle meningeal in two cases. In one case it was found at the autopsy that the hæmorrhage had occurred from the vertebral artery. In the following the bleeding occurred from the internal carotid on the eighth day:

CASE 1105.—Sergeant P. B. Messenger, Co. A, 111th Pennsylvania, aged 33 years, was wounded at Lookout Mountain, November 24, 1863. He was admitted to a field hospital of the Twelfth Corps and transferred to the General Hospital at Tullahoma five days afterwards. Surgeon B. Woodward, 22d Illinois, in charge of the latter, described the case as follows: "The injury consisted of a compound comminuted fracture of the right lower jaw, the ball passing in at the angle of the mouth, going backward through the neck, and making its exit close by the cervical column. Water dressings were applied and opiates were administered. By December 2d the wound was discharging freely, no attempt having been made to remove any portion of the fractured bone by reason of the great amount of swelling. At noon the patient fed himself with soup; but at 1.30 P. M. I was called to him and found four quarts of blood collected in a large tin basin. Arterial blood was also pouring in torrents from his mouth. On introducing the finger it was found that the internal carotid had sloughed, when I pressed lint soaked with solution of persulphate of iron firmly back against the bleeding artery, and, holding it there with my finger, directed Assistant Surgeon H. Pearce, 150th New York, to cut down and take up the common trunk, which he did. Before the artery was taken up the patient had a severe convulsion from the loss of blood, rendering the operation very difficult. The lint was left in situ, though the blood ceased to pour from the artery immediately after the operation; pulse at the wrist imperceptible; breathing gasping. The patient was allowed to lie on the table for four hours, being wrapped in hot blankets. At 9 P. M. the pulse was perceptible but very weak; patient made to swallow pure extract of beef in teaspoonful doses every fifteen minutes and through the night. After he was removed to his bed extreme vigilance was kept up, and at 11 P. M. I gave him one-fourth of a grain of morphia. The following morning his pulse was 160 and very feeble. He had not slept any, but his bowels had moved well and he had urinated. There had been no bleeding, and at 10 A. M. the lint was removed and his mouth cleaned out. By 8 P. M. he had slept two hours, his pulse was 130 and fuller, and he was given one drachm of wine with two drachms of extract of beef every two hours. During the next night he slept well; pulse 120 and growing fuller; no hæmorrhage; wound in neck suppurating well; patient sitting raised in bed and takes nourishment freely; feels well but weak; no cerebral symptoms; bowels moved; urinates freely. At 2 P. M. his pulse was 110 and he felt well enough to dictate a letter to his wife. At 8 P. M. on December 5th he was still doing well, his head feeling clear; pulse 98 and growing full; appetite good; craves oysters, which are given as freely as he wishes. No change took place until the night preceding December 8th, when his pulse become 120 and very soft; evidences of cerebral symptoms beginning to show themselves, such as hebetude and listlessness; breathing very feeble; slight but perceptible divergence of the right eye. His appetite, which had been good, was now failing. At 5 P. M. there was great hebetude and he could hardly be roused, though rational when roused; eyes winking; pulse 120, very soft and feeble. Coma came on at 8 P. M. and complete paralysis of the left side. Death occurred at 1 A. M. on December 9, 1863. The autopsy showed every part of the brain to be covered with lymph. The right side seemed to be more pallid than the left, though this might be imaginary. Dissecting out the carotid from its origin at the innominata to its entrance into the skull we found a firm clot at the point of the ligation, extending one-half inch below and one and three-fourths inches above the ligature. The internal carotid was completely filled with a firm fibrinous clot as far as the entrance of the skull, so that in no event could hæmorrhage have taken place. The jaw was a mass of putrilage and pus had followed down the sheath of the common trunk, bathing all the parts to a full inch below the ligation and dissecting out the descendens noni nerve." In addition to the history of the case Surgeon Woodward has contributed a wet preparation of the ligated artery (*Spec.* 2018), a representation of which appears in the adjoining wood-cut (FIG. 420).

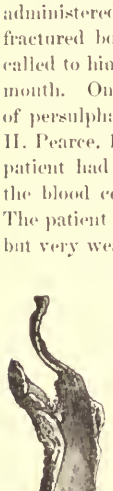


FIG. 420.—Right common carotid ligated 1½ inches below bifurcation. *Spec.* 2018.

Reviewing the above case Surgeon Woodward remarks: "Here was a case in which, according to Guthrie,[2] the internal carotid should have been ligated in the back of the throat. If allowed to differ from so great an authority, I say it could not have been done.

[1] Professor D. HAYES AGNEW (*The Principles and Practice of Surgery*, Philadelphia, 1878, Vol. I, p. 630) states that "during the War of the Rebellion there were 116 ligations of the common carotid for wounds of the face and the neck, 81 of which died," and gives as his authority the *Surgical History of the War*, Part I. The eminent professor evidently overlooked the fact that the cases given in detail are also included in the tabular statements. On page 423 of the *First Surgical Volume* the number of ligations of the common carotid, as then ascertained, was stated to be 75. On page 456 of the same volume another case was subsequently added, making a total of 76 cases. Since then 6 additional cases have been found, making a total of 82.

[2] GUTHRIE, (G. J.), *Commentaries*, London, 1855, Sixth Edition, p. 253.

In the first place, the jaw was shattered, pieces of which had been removed before he came to this hospital [Tullahoma]. The face and neck were enormously swelled, and a large quantity of flowing pus from a great suppurating surface blinded every view of the parts. Again, when the hæmorrhage came on, it was in such a torrent that there was no time for a nice dissection, such as Guthrie advises in his theoretical operation."

CASE 1105.—Corporal J. Quick, Co. G, 38th New York, aged 21 years, was wounded in the face, at the battle of Fredericksburg, December 13, 1862, a ball passing behind the left condyle of the lower jaw and making its exit on the left side of the nose. The wounded man was admitted to Eckington Hospital, at Washington, five days after receiving his injury, his face being very much swollen on the left side and the left eye being closed but uninjured. The treatment consisted of rest, aperients, low diet, and lead-wash locally. No fever ensued, the swelling abated, and the patient did very well until December 25th, when secondary hæmorrhage occurred at 4 P. M. The blood gushed from his mouth and left nostril, amounting to a quart in a few minutes. Acting Assistant Surgeon H. N. Fisher, assisted by Acting Assistant Surgeon A. Edelin, quickly plugged the nares with bits of muslin strung on threads and thrust into the nostril, which promptly stopped the hæmorrhage. It occurred again, however, and was controlled by thrusting in more of the tampon. The patient slept pretty well all night, being carefully watched and having his head well elevated. At 10 A. M. on December 26th he commenced bleeding again, the blood spouting from the wound at the side of the nose. A compress then applied over the orifice, and snugly bandaged, controlled the hæmorrhage. On the morning of the following day the patient had another free attack of hæmorrhage, but it was promptly checked by increased pressure on the compress, after which, on consultation, it was determined to tie the common carotid artery. Acting Assistant Surgeon Fisher accordingly ligated that vessel just above the omo-hyoid muscle, the patient not being etherized. The plugs were then removed from the nostril and the compress from the face, and no hæmorrhage recurred. The patient was put to bed, and the face and fresh wound were dressed with cold water. With the aid of an anodyne the patient slept well during the following night. The next morning his pulse was 120, a very slight pulsation being detected in the left temporal artery and that side of the head preserving its warmth. He was now also afflicted with diarrhœa, the discharges being thin and light colored. Beef tea and stimulants were ordered. On December 30th the pulse had increased to 150; patient's mind wandering; very restless; diarrhœa still continuing. Opium pills were now prescribed and the stimulants continued. On January 2, 1863, the patient was quite insensible, but gave answers when aroused; diarrhœa still continuing; stools frequent and involuntary; skin cold; pulse 140 and weak; wound looking sunken and glassy. In addition to opiates vegetable astringents were now ordered. Being unable to swallow solids and feeling choked by swallowing liquids, he was ordered oysters, which he ate greedily and swallowed readily. On January 4th the patient was still in a stupor; skin cold; pulse 146; some little redness about wound of face; wound of neck suppurating. In the afternoon a sanious discharge came on from the place of operation, giving reason to fear hæmorrhage from the artery. The oozing from the neck continued, and the patient's condition was about the same on the following day until 2.30 P. M., when the attending surgeon was called in haste and found that the carotid had given way and the blood was gushing per saltum from the wound. Death supervened in a few minutes. At the post-mortem examination the artery was found to have ulcerated through anteriorly where the ligature was applied. No attempt at union of the inner coats of the vessel was discovered, and no fibrinous deposit was found on the cardiac side, it having doubtless been forced out by the hæmorrhage. The distal side was, however, occupied by a plug extending up to the bifurcation of the vessel. The history of the case, together with the injured portion of the ligated artery (*Spec.* 898), represented in the annexed cut (FIG. 421), was contributed to the Museum by the operator.

FIG. 421.—Left common carotid; ulceration of artery without formation of clot. *Spec.* 898.

TABLE CXXVI.

Condensed Summary of Eighty-two Cases of Ligations of the Common Carotid for Shot Injuries.

[Recoveries, 1—19; Deaths, 20—82.]

No.	NAME, AGE, AND MILITARY DESCRIPTION.	DATE OF INJURY.	NATURE OF INJURY.	DATE OF HÆMORRHAGE.	PROBABLE SOURCE OF HÆMORRHAGE.	DATE OF OPERATION.	OPERATION, OPERATOR.	RESULT.
1	Ames, J. F., Pt., G, 91st N. Y., age 24.	Mar. 31, 1865.	Fracture left nasal and superior maxillary bones.	Apr. 5, 1865.	Branch of internal maxillary artery.	Apr. 5, 1865.	Left; in upper 3d, in cont. Surg. T. R. Crosby, U.S.V.	Discharged July 3, 1865.
2	Andrews, W. C., Pt., A, 30th Iowa, age 19.	Dec. 28, 1862.	Shell wound left temporal region.	Jan. 18, 1863.	Middle meningeal artery.	Jan. 18, 1863.	Left; in continuity. Ass't Surg. C. T. Alexander, U. S. A.	Discharged May 28, 1863.
3	Beamenderfer, C. W., Pt., A, 84th Pa., age 20.	May 6, 1864.	Fracture left lower maxilla; excision.	May 12, 1864.	Carotid artery....	May 12, 1864.	Left; in continuity, just above clavicle.	Discharged Nov. 29, 1864.
4	*Beard, J. J.*, Lieut., B, 19th Va. Cav., age 28.	Aug. 13, 1864.	Fracture of inferior maxilla.	Aug. 21, Sept. 4, 1864.	Common carotid...	Sept. 4, 1864.	——; in continuity. Surg. W. S. Love, P. A. C. S.	Recovered.
5	Brooks, J., Pt., I, 57th Pa., age 17.	May 6, 1864.	Fracture left temporal bone.	June —, 1864.	Temporal artery; June 18, lig. temp.	June 20, 1864.	Left; in continuity. Surg. T. R. Crosby, U. S. V. Aug. 15, re-ligation below omo-hyoid.	Discharged June 8, 1865.
6	Cox, D., Pt., F, 15th Indiana, age 25.	Nov. 25, 1863.	Fracture left lower maxilla.	Nov. 25, 1863.	Sublingual artery.	Nov. 29, 1863.	Left; in continuity. Surg. A. McMahon, U. S. V.	December 3, left carotid ligated. Discharg. June 25, 1864.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
7	Fugleson, C., Serg't, E, 4th Ohio, age 35.	May 12, 1864.	Flesh wound of lower jaw.	June 25, 1864.	—— ligation facial artery.	July 1, 1864.	Right; in continuity. Surg. D. W. Bliss, U. S. V.	Discharged October 27, 1864.
8	Hayden, J. S., Pt., D, 2d Iowa.	Feb. 14, 1862.	Fracture temporal bone.	Mar. 8, 1862.	.....	Mar. 22, 1862.	Left; in cont. Surg. J. Moore, U. S. A.	Discharged July 23, 1862.
9	Higgins, P., Pt., K, 56th New York	May 31, 1862.	Fracture lower jaw..	May 31, 1862.	Sublingual artery .	May 31, 1862.	Right; in continuity. Surg. Z. E. Bliss, U. S. V.	Discharged Sept. 21, 1862.
10	Klingenberg, C., Pt., F, 7th New York Artillery.	June 3, 1864.	Fracture lower jaw..	June 9, 1864.	.....	June 9, 1864.	Right; in continuity. Surg. D. P. Smith, U. S. V.	Discharged Feb. 20, 1865.
11	Maley, T. E., Lieut., 5th Cavalry, age 29.	July 28, 1864.	Fract. bones of face .	Aug. 18, 1864.	Internal maxillary artery.	Aug. 24, 1864.	Right; in continuity. Surg. A. B. Mott, U. S. V.	Retired December 15, 1870.
12	Merchant, G. B., Serg't, K, 4th Ohio, age 33.	May 10, 1864.	Fract. inferior maxilla.	May 15, 1864.	Internal maxillary artery.	May 15, 1864.	Right; in continuity. Ass't Surgeon W. Thomson, U. S. A.	Returned to duty June 19, 1864.
13	Murray, J. L., Pt., B, 42d N. Y., age 32.	Oct. 14, 1863.	Fract. inferior maxilla.	Oct. 25, 1863.	.....	Oct. 25, 1863.	Right; in continuity. Surg. E. Bentley, U. S. V.	Discharged Feb. 13, 1864.
14	Plasket, J., Pt., A, 120th New York.	Sept. 9, 1864.	Fracture of bones of face.	Sept. 9, 1864.	.....	Sept. 9, 1864.	Carotid; in continuity. Surg. W. B. Reynolds, 2d U. S. S. S.	Transfer'd to V. R. C. May 4, 1865.
15	Reed, J. K. P., Serg't, D, 13th Mass.	Sept. 17, 1862.	Fracture of bones of face, right side.	.....	.....	Sept. 28, 1862.	In continuity	Discharged Nov. 14, 1862.
16	Salmon, G. E., Pt., I, 207th Pa., age 26.	Apr. 2, 1865.	Fracture right inferior maxilla.	Apr. 10, 1865.	Right common carotid.	Apr. 11, 1865.	Right; in continuity.	Discharged May 18, 1865.
17	Sandy, N. B., Pt., G, 3d W. Va., age 19.	Aug. 30, 1862.	Fracture left inferior maxilla.	Sept. 6, 1862.	Through mouth ..	Sept. 6, 1862.	Right; in continuity. Ass't Surg. P. Adolphus, U. S. A.	Discharged October 10, 1862.
18	Shockey, D., Pt., I, 101st Ind., age 22.	Sept. 19, 1863.	Fracture left lower jaw.	Sept. 25, 1863.	Hæm. recur. Sept. 30, Oct. 6, 9, 10.	Oct. 14, 1863.	Left; in continuity. Confederate surg.	Discharged June 24, 1865.
19	Siggins, T., Lieut., 49th Mass.	May 27, 1863.	Fracture maxillary bones.	May 31, 1863.	.....	June 16, 1863.	Left; in cont. Ass't Surg. F. C. Greene, 30th Mass.	Recovered.
20	*Ashley, J. J.*, citizen, age 63.	Oct. 16, 1864.	Wound of left ear, sloughing.	Oct. 29, 1864.	Temporal artery ..	Oct. 29, 1864.	Left; in cont. A. A. Surg. N. A. Robbins.	Died November 2, 1864.
21	*Bachus, J. W.*, Pt., A, 12th Ga. Batt'y, age 20.	July 9, 1864.	Fracture right inferior maxilla.	July 20, 1864.	Facial artery.....	July 25, 1864.	Right; in cont. Ass't Surg. R. F. Weir, U. S. A. Aneurism; relig. above and below aneurism, Aug. 30.	Died September 1, 1864.
22	Baine, H., Pt., C, 188th Pa., age 19.	June 3, 1864.	Wound left side of face.	June 15, 1864.	Internal maxillary artery.	June 16, 1864.	Left; in continuity. Surg. N. R. Moseley, U. S. V.	Died June 26, 1864; exhaustion.
23	Beare, J., Pt., G, 11th Pa., age 34.	May 10, 1864.	Injury com. carotid artery and external jugular vein.	May 10, 1864.	Common carotid ..	May 15, 1864.	Left; in cont. and ext. jug. vein. Surg. E. Bentley, U. S. V.	Died May 21, 1864; pyæmia.
24	Bowles, G. W., Serg't, I, 42d Pa., age 25.	July 3, 1863.	Fract. inferior maxilla.	July 9, 1863.	External carotid ..	July 10, 1863.	In continuity.....	Died July 13, 1863. *Specs.* 3969, 3902.
25	Boyts, H., Pt., A, 142d Pa., age 18.	Aug. 21, 1864.	Fracture left temporal region.	Aug. 26, 27, 1864.	.....	Aug. 27, 1864.	Left; in continuity..	Died Sept. 2, 1864. *Spec.* 3179.
26	Brown, G, Pt., I, 25th Mass., age 41.	Dec. 14, 1862.	Fract. malar, temp., and max. bones.	Jan. 7, 9, 1863.	External carotid...	Jan. 9, 1863.	Right; in continuity.	Died Jan. 18, 1863; exhaustion.
27	Burns, R., Pt., 10th Massachusetts.	May 31, 1862.	Wound of mouth and neck.	.. ...	.....	June 18, 1862.	In continuity; linguai also tied.	Died June 19, 1862; exhaustion.
28	Clark, J., Pt., H, 57th Pa., age 21.	Sept. 30, 1864.	Fracture right upper jaw.	Oct. 13, 1864.	External carotid...	Oct. 13, 1864.	Right; in continuity. A. A. Surg. J. H. Packard.	Died Oct. 22, 1864, of hæmorrhage.
29	*Copeland, W. R.*, Pt., B, 61st Ala., age 34.	Sept. 19, 1864.	Wound left side of face.	Oct. 7, 1864.	.....	Oct. 7, 1864.	Right; in continuity. Surg. W. S. Love, P. A. C. S.	Hæm. recurred; died Oct. 8, 1864.
30	*Creecy, B.*, Pt., F, 42d Va.	May 3, 1863.	Shot wound of larynx.	May 12, 1863.	.....	May 12, 1863.	Right; in continuity. Surg. R. Murdock, P. A. C. S.	May 15, left; in cont. Died May 20, 1863.
31	Cronin, M., Pt., F, 95th N. Y., age 19.	June 19, 1864.	Wound right side of face.	July 1, 1864.	Internal maxillary artery.	July 4, 1864.	Right; in continuity; religated July 6.	Died July 6, 1864; hæmorrhage.
32	Darnaby, E., Pt., H, 1st Maine Cav., age 19.	Apr. 12, 1865.	Ball entered below ang. jaw; carotid artery wound.	.....	External carotid ..	.....	In continuity. Acting Staff Surgeon N. F. Graham.	Died May 5, 1865, of hæmorrhage.
33	Deibold, C., Lieut., D, 82d Ohio.	May 8, 1862.	Shot wound of neck	May 23, 1862.	External carotid sloughed.	May 24, 1862.	In continuity. Surg. J. Y. Cantwell, 82d Ohio	Died June 19, 1862.
34	Dougherty, J., Sergeant, B, 69th N. Y., age 23.	May 13, 1864.	Fracture right parietal.	May 16, 1864.	Middle meningeal artery.	May 16, 1864.	Right; in continuity. Surg. E. Bentley, U. S. V.	Died May 26, 1864, of exhaustion.
35	Felix. W., Pt., H, 9th W. Va., age 18.	Aug. 25, 1864.	Fracture right lower jaw.	Sept. 3, 1864.	Lingual artery	Sept. 3, 1864.	Left; in continuity. Ass't Surg. R. F. Weir, U. S. A.	Died Sept. 4, 1864, of hæmorrhage.
36	Fisher, W., Lieut., H, 99th Pa.	Oct. 7, 1864.	Facial and carotid arteries severed.	.....	Facial and carotid arteries.	Oct. 9, 1864.	Left; in continuity. Surg. W. B. Reynolds, 2d U. S. S. S.	Died Oct. 10, 1864.
37	Fonderan, A., Serg't, D, 11th Indiana, age 25.	June 24, 1863.	Fracture lower jaw, right side.	July 7, 1863.	.....	July 8, 1863.	Right; in continuity; religated at bifurc. ext. and int. car.; inc. in ligature.	Died July 10, 1863, from exhaustion. *Specs.* 1635, 1636.
38	*Gardner, J. B.*, Pt., F, 5th Louisiana.	Feb. 7, 1865.	Ball entered anterior to left ear.	Feb. 17, 1865.	Recur. 20th, 21st, and 22d.	Feb. 22, 1865.	Left; in continuity. Surg. W. F. Richardson, P. A. C. S.	Died Feb. 22, 1865.
39	*Guthrie, W. T.*, Pt., F, 38th Va., age 30.	May 16, 1864.	Wound of face.....	June 19, 22, 1864.	Superior maxillary	June 23, 1864.	Left; in continuity..	Died June 25, 1864; exhaustion.
40	Harrington, M., Pt., L, 21st N. Y. Cav., age 19.	July 24, 1864.	Wound through neck	Aug. 9, 1864.	.....	Aug. 10, 1864.	Left; in continuity. Surg. J. B. Lewis, U. S. V. Aug. 14, lig. right com. car.	Died Aug. 19, 1864.
41	Heiser, J., Corp'l, I, 53d Pa., age 27.	Aug. 14, 1864.	Shot wound of face..	Aug. 24, 25, 1864.	Inferior maxillary artery.	Aug. 25, 1864.	In cont. Surg. N. R. Moseley, U. S. V.	Died Aug. 30, 1864; exhaustion.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
42	Herman, H., Pt., I, 12th Pa. Res., age 23.	Sept. 17, 1862.	Wound of neck; ball lodged in spinal cord.	Sept. 29, 1862.	Carotid artery; aneurism.	Sept. 30, 1862.	Right; both ends in wound. A. Surg. R. F. Weir, U. S. A.	Died Oct. 1, 1862.
43	*Houston, J. C.*, Pt., D, 2d Ala., age 18.	Apr. 9, 1865.	Fracture right malar bone.	May 6, 7, 1865.	Branches external carotid.	May 7, 1865.	Left; in continuity. Surg. A. McMahon, U. S. V.	Hæm. recurred; died May 26, 1865.
44	*Hughes, D. C.*, Pt., F, 11th Virginia.	May —, 1862.	Wound of neck.....	.....	.....	.....	Left; in cont. May 17, lig. of right com. carotid.	Died May 17, 1862.
45	Hutchins, H., Pt., I, 25th Ohio, age 25.	Dec. 9, 1864.	Fracture inf. maxilla.	Dec. 18, 1864.	Lingual artery	Dec. 18, 1864.	In cont. A. A. Surg. S. Hendrickson.	Died Dec. 27, 1864; hæmorrhage.
46	*Hutts, M.*, Pt., C. S. A., age 35.	.....	Fracture lower jaw ..	June 7, 1863.	.....	June 7, 1863.	Right; in continuity	Died June 8, 1863.
47	Jones, E., Pt., D, 29th Iowa.	July 4, 1863	Fracture left inferior maxilla.	July 18, 1863.	Brach., facial, and lingual arteries.	July 18, 1863.	Left; in continuity ..	Hæm. recurred; died July 26, 1863.
48	*Jones, J. P.*, Pt., E, 21st Miss., age 30.	May 3, 1863.	Fracture left superior maxilla.	June 3, 1863.	Slough. rec. 5, 6, 7.	June 7, 1863.	In continuity	Died June 7, 1863; exhaustion.
49	Jungk, J. G., Serg't, F, 46th N. Y., age 30.	Sept. 30, 1864.	Fracture right upper jaw.	Oct. 7, 1864.	External carotid artery.	Oct. 7, 1864.	Right; in cont. A. A. Surg. G. A. Chesley.	Died Oct. 12, 1864, of hæmorrhage.
50	Keitlin, V. L., Serg't, K, 105th Pa.	July 2, 1863.	Fracture right arch of atlas.	July 12, 1863.	Internal carotid ...	July 13, 1863.	Right, in continuity. Surg. H. Palmer, U. S. V.	Died July 14, 1863.
51	Kenrick, A. F., Pt., A, 16th Ky., age 24.	June 2, 1864.	Wound of face	June 17, 1864.	Recurred 18th and 19th.	June 19, 1864.	Left; in continuity ..	Died June 22, 1864.
52	Kilburn, D. W., Pt., I, 1st Maine, age 22.	May 19, 1864.	Wound of face and neck.	May 29, 1864.	Facial and exterior carotid arteries.	May 29, 1864.	Right; in cont. A. A. Surg. J. C. Nelson.	Died June 2 1864, of asphyxia.
53	Klink, N., Pt., K, 95th Pa., age 26.	May 3, 1863.	Wound right side of face.	May 14, 1863.	.....	May 16, 1863.	Right; in continuity.	Died May 20, 1863.
54	*Lilley, E. F.*, Pt., G, 8th Texas, age 24.	May 9, 1864.	Wound of face.....	May 16, 1864.	.....	May 16, 1864.	Right; in continuity	Died May 16, 1864.
55	*McGuire, J. H.*, Pt., K, 24th Miss.	Sept. 26, 1863.	Fracture left mastoid process.	.....	.....	Oct. 10, 1863.	Left; in continuity..	Died Oct. 24, 1863.
56	McIlroy, J. P., Pt., C, 45th Pa.	June 3, 1864.	Fract. inf. maxilla; int. max. art. inj.	.....	.....	June 18, 1864.	In cont. A. A. Surg. J. H. York.	Died June 19, 1864; hæmorrhage.
57	McInnis, S., Pt., A, 11th Illinois, age 27.	May 22, 1863.	Fracture lower jaw; right side.	May 31, 1863.	External carotid ..	May 31, 1863.	In cont. Surg. E. M. Powers, 7th Mo.	Died June 7, 1863.
58	McIntosh, T., Pt.. A, 40th Ind., age 18.	Nov. 25, 1863.	Fract. frontal bone..	Dec. 16, 17, 1863.	.....	Dec. 16, 1863.	Right; in continuity.	Died Dec. 19, 1863; exhaustion.
59	McKenney, E., Pt., 6th Pa. Cav., age 26.	Jan. 1, 1863.	Wound through left side neck.	Jan. 1, 1863.	Aneurism	Feb. 26, 1863.	Left; in cont. Ass't Surg. R. F. Weir, U. S. A.	Died April 6, 1863.
60	Martin, T. B., Pt., E, 96th Ill.	Sept. 20, 1863.	Fract. orbital plate and nasal bones.	Oct. 8, 1863.	Ophthalmic artery; hæmorrhages Oct. 23 and Nov. 7, 10.	Nov. 11, 1863.	Right; in cont. A. A. Surg. J. H. Coover.	Died Dec. 19, 1863.
61	Messenger, P. B., Sergeant, A, 111th Pa.	Nov. 24, 1863.	Fracture right lower jaw.	Dec. 3, 1863.	Internal carotid...	Dec. 3, 1863.	Right; both ends in wound. Assistant Surgeon H. Pearce, 150th N. Y.	Died Dec. 8, '63. *Spec.* 2018, A. M. M.
62	Moore, J. G., Corp'l. B. 110th Pa., age 20.	Feb. 6, 1865.	Wound left side of head.	Feb. 15, 1865.	Internal carotid...	Feb. 15, 1865.	Left; in continuity. Feb. 21, religated.	Died Feb. 25, 1865.
63	O'Connor, P., Pt., H, 18th Inf.	Sept. 20, 1863.	Fracture left inferior maxilla.	Oct. 2, 1863.	Facial art.; Oct. 4, ligature ext. carotid. Surg. P. H. Cleary, U. S. V.	Oct. 23, 1863.	Right; in continuity. Surg. I. Moses, U. S. V.	Died Oct. 25, 1863, of exhaustion. *Spec.* 2133.
64	Peckham, A. J., Corporal, I, 115th N. Y., age 30.	June 2, 1864.	Fracture cranium ...	.....	.....	June 8, 1864.	Right; in continuity. Surg. E. Bentley, U. S. V.	Died June 13, 1864; exhaustion from continued hæm.
65	Phillips, G., Corp'l, H, 91st Pa., age 28.	Oct. 27, 1864.	Left inferior maxilla.	Nov. 4, 6, 1864.	Lingual	Nov. 6, 1864.	Left; in continuity. Surg. N. R. Moseley, U. S. V.	Died Nov. 18, 1864, of exhaustion. *Spec.* 3409.
66	Pyle, L. A., Serg't, A, 8th N. Y. Art., age 21.	Aug. 25, 1864.	Ball impinged on temporal bone.	Sept. 7, 9, 1864.	Post. auricular artery.	Sept. 9, 1864.	Right; in continuity. A. A. Surgeon W. W. Valk.	Died Sept. 20, 1864; hæmorrhage. *Spec.* 3252.
67	Quick, J., Corp'l, G, 38th N. Y., age 21.	Dec. 13, 1862.	Fracture left lower jaw.	Dec. 25, 1862.	Recurred 26th and 27th.	Dec. 27, 1862.	Left; in cont. A. A. Surg. H. N. Fisher.	Died January 6, 1863. *Spec.* 858, A. M. M.
68	Reeves, W., Pt., C, 76th N. Y., age 22.	May 6, 1864.	Fracture of inferior maxilla.	May 12, 1864.	Lingual and inf. dental arteries.	May 12, 1864.	Left; in cont. A. Surg. G. A. Marsick, U. S. V.	Died May 13, 1864; exhaustion.
69	Ritigan, J., Pt., B, 63d N. Y., age 30.	May 6, 1864.	Fracture of inferior maxilla.	May 14, 1864.	Carotid artery	May 31, 1864.	Right; in continuity. Surg. G. L. Pancoast, U. S. V.	Died June 1, 1864; prostration. *Specs.* 2481, 2482, A. M. M.
70	*Robinson, J. W.*, Captain, C, 27th Georgia, age 21.	June 19, 1864.	Wound left side of neck.	June 19, 1864.	Internal carotid...	June 19, 1864.	Left; in cont. July 3, relig. below omohyoid.	Died July 5, 1864.
71	*Rollin, J. N.*, Pt., I, 1st N. Carolina, age 28.	Oct. 19, 1864.	Ball entered back of neck; fracture vertebra.	Oct. —, 1864.	....	Nov. 9, 1864.	In cont. A. A. Surg. G. G. Brewer.	Died Nov. 9, 1864; exhaustion.
72	Schenck, W., Pt., F, 119th N. York, age 18.	June 15, 1864.	Fracture sup. maxilla.	July 6, 1864.	Superior maxillary artery.	July 10, 1864.	In cont. A. A. Surg. D. J. Griffiths.	Died July 24, 1864; exhaustion.
73	Schlicher, J., Corp'l, C, 20th Mass., age 33.	July 1, 1863.	Fracture left superior maxilla.	July 8, 1863.	Recurred 10th and 16th.	July 16, 1863.	Left; in cont. A. A. Surg. W. W. Keen.	Died Aug. 23, 1863. *Spec.* 4428, A. M. M.
74	Sheppard, P., Pt., K, 42d Indiana, age 34.	Aug. 1, 1864.	Fracture nasal, malar, and inf. maxillary bones.	Aug. 29, 1864.	Internal maxillary artery.	Aug. 30, 1864.	Right; in continuity. Surg. B. B. Breed, U. S. V.	Died Aug. 30, 1864; hæmorrhage.
75	*Smith, W. W.*, C. S. A.	May 5, 1864.	Wound of head and neck.	May 12, 1864.	.....	May 21, 1864.	In continuity	Died May 22, 1864.
76	Spacht, M., Pt., D, 52d Pennsylvania.	May 31, 1862.	Fracture sup. maxilla.	June 13, 14, 1862.	....	June 14, 1862.	Left; in cont. A. A. Surg. D. W. Cheever.	Died June 24, 1862. *Spec.* 508, A. M. M.
77	Stienberger, S., Pt., 1st Cavalry.	May 5. 1862.	Fracture lower jaw and 3d cervical vertebra.	May 13, 1862.	Vertebral artery.	May 16, 1862.	In cont. Surg. R. B. Bontecou, U. S. V.	Died May 23, 1862; hæmorrhage.
78	Theilman, H., Pt., K, 15th New York Artillery. age 37.	June 19, 1864.	Wound left side face; fracture.	.....	.....	July 6, 1864.	Left; in cont. A. A. Surg. O. W. Peck.	Died July 12, 1864; exhaustion.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
79	Thomas, G., Pt., C, 82d Pa., age 22.	May 10, 1864.	Fracture infer'r and superior maxillæ.	June 2, 1864.	Internal maxillary	June 2, 1864.	Left; in cont. A. Surg. W. Thomson, U. S. A. Int. jug. vein also tied.	Died June 3, 1864. *Spec.* 3542, A. M. M.
80	Trabey, H., Pt., I, 5th Pa. Cav., age 26.	May 8, 1864.	Shot-wound of face.	June 26, 1864.	Facial artery.....	June 27, 1864.	In cont. A. Surg. W. Webster, U. S. A.	Died July 5, 1864.
81	Ward, P. H., Pt., B, 24th Wisconsin.	Dec. 30, 1862.	Fracture inf. maxilla.	.....	Inferior maxillary artery.	Jan. —, 1863.	Right; in continuity.	Died Jan. 15, 1863.
82	Winter, F., Pt., A, 3d Illinois Cav., age 24.	Aug. 21, 1864.	Fracture upper and lower jaws.	Sept. 4, 1864.	Internal maxillary artery.	Sept. 6, 1864.	Left; in cont. A. A. Surg. J. Z. Hall.	Died Sept. 7, 1864; exhaustion.

Ligations of the Internal Carotid Artery.—Instances of this operation are rare,[1] and no cases were reported by the medical officers of the Union army.

Ligations of the External Carotid.—Of seven cases, four recovered and three were fatal. The bleedings were from the internal maxillary in two, from the carotid in four instances; in one case the source of the hæmorrhage was not indicated.

Table CXXVII.

Condensed Summary of Seven Cases of Ligations of the External Carotid Artery for Shot Injuries.

[Recoveries, 1—4; Deaths, 5—7.]

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
1	Bryant, W., Pt., B, 17th Indiana.	June 25, 1863.	Fract. left malar and maxillary bones.	July 5, 8, '63.	External carotid ..	July 8, 1863.	One end in wound...	Returned to duty June 11, 1864.
2	Diss, C. A., Pt., D, 30th Ohio.	Sept. 14, 1862.	Fract. superior maxilla.	Sept. 22, 1862.	Internal maxillary and carotid.	Sept. 22, 1862.	In cont. Surg. H. S. Hewit, U. S. V.	Discharged Nov. 24, 1862.
3	Henderson, G., Serg., F, 7th Wisconsin.	Sept. 14, 1862.	Fract. inferior maxilla.	Sept. 15, 1862.	External carotid ..	Sept. 15, 1862.	In continuity.....	Discharged Oct. 25, 1862.
4	*Thompson, L. C.*, Pt., S, 1st Texas, age 26.	Dec. 14, 1864.	Fract. inferior maxilla.	Dec. 14, 1864.	Internal maxillary.	Dec. 14, 1864.	In cont. Surg. J. C. Jones, 4th Texas.	Recovered June 14, 1865.
5	Godfrey, A., Pt., H, 14th N. Y. Art'y, age 16.	June 18, 1864.	Wound of external carotid.	June 27, 1864.	External carotid ..	June 27, 1864.	Both ends in wound. Surgeon G. L. Pancoast, U. S. V.	Died June 30, 1864.
6	*Nelson, G. W.*, Pt., K, 12th Georgia.	June 6, 1864.	Fracture of zygoma.	June 7, 1864.	Internal maxillary.	June 7, 1864.	In continuity	Died June 19, 1864.
7	Whitney, F. L., Pt., D, 36th Massachusetts, age 24.	June 3, 1864.	Fract. right orb. and zygomatic arch.	June 15, 1864.	.....	June 16, 1864.	In continuity. A. A. Surg. W. H. Ensign.	Died June 16, 1864, of exhaustion.

Thirty-five examples of ligations of minor branches of the external carotid were reported. They comprise one ligation of the superior thyroid, one of the lingual, five of the occipital,

[1] On the Confederate side a case is related by Dr. W. H. BRAMLETTE. It will be found on page 194 of the *Medical Record*, New York, 1869–70, Vol. IV: Captain *H*——, 5th Georgia State Reserves, aged 47, was wounded December 10, 1864, by a minié ball, which comminuted the malar bone, and ranging backward, impinged against the base and inner border of the mastoid process, passing out at back of neck. He was sent to a hospital at Macon, where the fractured bone was removed; secondary hæmorrhage occurred on the tenth day from wound of entrance, which was controlled by pressure on common carotid until the arrival of the surgeons. The ordinary incision was made and the internal carotid ligated, as was believed, about three-fourths of an inch above the bifurcation; hæmorrhage from wound ceased; ligature came away on 14th day without hæmorrhage. On the following day an alarming hæmorrhage recurred from a small opening in the line of the incision of the neck; the common carotid was then ligated below the omo-hyoid muscle; hæmorrhage continuing through the reflow of the blood through the external carotid, the latter was ligated, as also the superior thyroid. The ligatures separated and came away without hæmorrhage—that of the common carotid about the 18th day; but a few hours afterwards hæmorrhage recurred while straining at stool. This time the hæmorrhage was arrested by styptics and pressure. No further hæmorrhages occurred. The wounds healed in three weeks, and the patient was furloughed and went home. Since the war a case in which ligatures were placed around the internal as well as the external and common carotid for shot injury is reported by W. U. BYRD (*Ligation of the Common, External, and Internal Carotid Arteries for Gunshot Injury—Death*, in *New York Medical Journal*, 1876, Vol. XXIV, p. 174): A policeman, shot by thieves at Quincy, Illinois, May 29, 1876. Wounds of lip, chin, and fracture of jaw; ball split in three pieces, one of which split the external carotid artery, with the point impinging upon and entering the left internal carotid a half inch above the division of the left common carotid. Profuse hæmorrhage. May 30, 1876, common carotid ligated just below bifurcation, and internal and external carotids just above points of injury; died 20 minutes after operation. The first ligation of the internal carotid seems to have been performed by KEITH, in 1850, who, while removing a foreign body, accidentally cut the internal carotid: KEITH (W.) (*Case of Wound of the Internal Carotid Artery, inflicted while operating from within the Mouth for the removal of a foreign body deep in the Neck—Ligature of the Internal Carotid—Hæmorrhage controlled by a Single Ligature, and Cure*, in *The Monthly Journal of Medical Science*, Edinburgh, 1851, Vol. XII, p. 435). Two operations for punctured wounds, and one after disarticulation of the lower jaw for malignant tumor, have been reported by: LEWIS (M.), *Double Ligation of the Internal Carotid Artery in* 1869, *by* Dr. A. T. LEE, *deceased, formerly of Kingston, Tenn.*, in *Am. Jour. Med. Sci.*, 1879, Vol. LXXVII, p. 142. BRIGGS (W. T.), *Traumatic Aneurism of the Internal Carotid Artery, the result of a Puncture—Ligation of the Internal Carotid at the seat of the Injury*, in *Nashville Journal of Med. and Surgery*, 1874, Vol. XIII, p. 119. SANDS (H. B.), *A Case of Hæmorrhage from the Internal Carotid Artery treated successfully by the Ligature*, in *New York Medical Journal*, 1874, Vol. XIX, p. 34.

one of the auricular, eighteen of the temporal, eight of the facial, and one of the submental arteries. The results are indicated in TABLE CXXV, on page 765.

Ligation of Superior Thyroid.—CASE 1107.—Private G. Atwood, Co. H, 142d New York; shot injury of inferior maxillary region, October 27, 1864. Hæmorrhage occurred from branch of superior thyroid November 7, 1864. Ligation of both ends in wound November 7, 1864. Discharged April 19, 1865.

Ligation of Lingual Artery.—CASE 1108.—Private P. Everson, B, 1st Minnesota; shot through base of tongue; jaw fractured, July 2, 1863. Hæmorrhage from both linguals occurred July 14th; both arteries tied *en masse* in wound on the same day. Discharged June 12, 1864; unable to eat other than liquid food.

Ligations of Occipital Artery.—CASES 1109-1113.—Private *L. C. Adzer*, K, 9th Louisiana, aged 20, wounded at Monocacy Junction July 9, 1864; shot penetration of neck; occipital artery severed; July 19, hæmorrhage, 16 ounces, from occipital; both ends of artery ligated in wound by Surgeon C. H. Todd, C. S. A.; recovery.—Sergeant D. Holliday, B, 26th Pennsylvania; flesh wound of neck, July 2, 1863; hæmorrhage, 32 ounces, occurred July 25; both ends ligated in wound on the same day; hæmorrhage recurred on the 27th, but ceased spontaneously; duty May 3, 1864.—Private R. Norris, C, 1st Cavalry, wound of right side of head and neck, May 8, 1864; May 19, hæmorrhage from occipital; May 25, 1864, ligation by A. A. Surgeon F. G. H. Bradford; discharged July 25, 1864.—Private D. H. Roberts, E, 118th New York; wounded October 17, 1864; fracture of external table of occipital bone; November 7, hæmorrhage from occipital; ligation, both ends in wound, on same day; discharged April 20, 1865.—Private J. Horton, D, 57th Massachusetts; wounded May 18, 1864; ball lodged in first dorsal vertebra; May 31, hæmorrhage from occipital; artery ligated in wound by Surgeon R. B. Bontecou, U. S. V.; hæmorrhage recurred; artery re-ligated June 2; death June 2, 1864.

Ligation of Auricular Artery.—CASE 1114.—Private C. Wagner, L, 1st New York Cavalry, aged 25 years; fracture of temporal bone by pistol ball June 26, 1865; ligation of posterior auricular on the same day by Surgeon D. W. Bliss, U. S. V. Discharged October 12, 1865.

Ligations of the Temporal Artery.—There were eighteen cases of ligations of the temporal artery; fourteen were successful and four were fatal; the hæmorrhages in fifteen instances were from the temporal, and in three from branches of this artery.

TABLE CXXVIII.

Condensed Summary of Eighteen Cases of Ligations of the Temporal Artery for Shot Injuries.

[Recoveries, 1—14; Deaths, 15—18.]

No.	NAME, AGE, AND MILITARY DESCRIPTION.	DATE OF INJURY.	NATURE OF INJURY.	DATE OF HÆMORRHAGE.	PROBABLE SOURCE OF HÆMORRHAGE.	DATE OF OPERATION.	OPERATION, OPERATOR.	RESULT.
1	Faucett, R., Pt., B, 8th Michigan, age 45.	May 6, 1864.	Fract. of right mastoid process.	May 19, 1864.	Small branch of right temporal.	May 19, 1864.	Prox. end in wound. Surg. I. I. Hayes, U. S. V.	Transferred to V. R. C. Jan. 23, 1865.
2	Fobes, J., Pt., L, 1st Vt. Cavalry, age 19.	June 24, 1864.	Scalp wound of forehead.	.....	.....	.....	Right	Retur'd to duty September 29, 1864.
3	Fuller, B., Pt., H, 7th Iowa.	Oct. 3, 1862.	Flesh wound; temporal artery severed.	.....	.....	.....	Right; ligated.....	Discharged January 13, 1863.
4	Gilmore, H., Lieut., A, 17th Vermont, age 32.	May 12, 1864.	Flesh wound of scalp.	May 21, 1864.	Temporal artery ..	May 21, 1864.	In continuity, by A. A. Surgeon F. W. Kelly.	Retur'd to duty September 6, 1864.
5	*Hartly, F. C.*, Pt., G, 49th Virginia.	May 31, 1864.	Wound of scalp....	.....	Branch of temporal.	June 5, 1864.	Ligated	Recovered .....
6	Jones, D., Pt., B, 1st Massachusetts, age 26.	May 6, 1864.	Wound of scalp	May 24, 1864.	Temporal artery ..	May 24, 1864.	Left; in cont., by A. A. Surg. S. D. Marshall.	Recovered .....
7	Kullman, H., Corp'l, I, 37th Wis., age 24.	July 30, 1864.	Wound of scalp and right ear.	Aug. 14, 1864.	Temporal artery ..	Aug. 14, 1864.	In cont., by Surg. R. B. Bontecou, U. S. V.	Mustered out May 30, 1865.
8	Miller, L., Pt., D, 46th New York, age 34.	June 30, 1864.	Fracture of parietal, temp., and frontal.	July 28, 1864.	Temporal	July 28, 1864.	Left; ligated	Discharged July 25, 1865.
9	Mullen, J., Pt., A, 100th Pennsylvania.	Nov. 30, 1863.	Wound of scalp; temporal art'y severed.	Nov. 30, 1863.	Temporal	Nov. 30, 1863.	In cont., by Surg. G. B. Coggswell, 29th Massachusetts.	Returned to duty.
10	Reese, H., Pt., I, 53d Pa., age 18.	July 2, 1863.	Flesh wound of scalp; right.	July 13, 1863.	Temporal	July 13, 1863.	One end in wound...	Retur'd to duty Dec. 7, 1863.
11	Smith, A. H. C., Lt., E, 12th N. H.	June 3, 1864.	Scalp wound; temporal artery severed.	June 3, 1864.	Temporal	June 3, 1864.	Ligated.	Discharged June 21, 1865.
12	Talmadge, A. S., Corp'l, E, 11th New Jersey, age 32.	July 3, 1863.	Flesh wound of left temple.	July 14, 1863.	Temporal	July 14, 1863.	Ligated. Surg. I. I. Hayes, U. S. V.	Retur'd to duty Mar. 24, 1864.
13	Taylor, J. C., Corp'l, D, 5th N. J., age 44.	June 1, 1862.	Shot wound of scalp	June 4, 1862.	Temporal	June 4, 1862.	In continuity.....	Retur'd to duty Aug. 19, 1862.
14	Wheeler, W., Pt., B, 91st N. Y., age 37.	April 1, 1865.	Fracture of temporal bone; right side.	Apr. 22, 1865.	Temporal and posterior auricular.	Apr. 22, 1865.	One end in wound...	Discharged June 29, 1865.
15	Dunbar, R., Serg't, B, 19th Mass.	Oct. 14, 1863.	Fracture of left frontal eminence.	Nov. 6, 1863.	Temporal	Nov. 6, 1863.	In wound	Died November 29, 1863. *Spre.* 1951.
16	Jones, L., Pt., C, 115th N. Y., age 23.	Feb. 20, 1864.	Flesh wound of scalp	Feb. 27, 1864.	Anterior temporal	Feb. 27, 1864.	In wound	Died Oct. 15, 1864.
17	Newcomb, J. S., Pt., E, 50th New York.	Sept. 18, 1861.	Scalp wound; temporal artery torn.	Sept. 18, 1861.	Temporal	Sept. 18, 1861.	In continuity	Died September 21, 1861.
18	Taylor, R. I., Pt., F, 1st Maine H. Art., age 25.	May 19, 1864.	Fracture of left temporal bone.	June 3, 1864.	Temporal	June 3, 1864.	Ligated	Died June 5, 1864.

Ligations of the Facial Artery.—Eight cases were reported; five of the patients recovered and three died—one from hæmorrhage, one from tetanus, and one from the severity of the injuries to the bones of the lower portion of the face.

TABLE CXXIX.

Condensed Summary of Eight Ligations of the Facial Artery for Shot Injuries.

[Recoveries, 1—5; Deaths, 6—8.]

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
1	Bessel, A. J., Serg't 14th Michigan.	July 5, 1864.	Fracture of inferior maxilla.	.....	.....	.....	Facial ligated in continuity.	Discharged January 4, 1865.
2	Corwell, J., Pt., D, 4th Pa. Cavalry.	Oct. 18, 1861.	Fracture of left inferior maxilla.	Oct. 19, 1861.	Facial.....	Oct. 19, 1861.	Ligated	Discharged January 9, 1862.
3	Gaines, W., Pt., C, 5th Colored Troops, age 20.	June 18, 1864.	Fracture of superior and inferior maxilla.	June 25, 1864.	Facial artery.....	June 25, 1864.	In continuity. A. A. Surg. C. C. Ela.	Recovered.
4	McCray, J. A., Pt., 145th Pennsylvania.	May 12, 1864.	Fracture of lower jaw.	June 4, 1864.	Facial artery.....	June 4, 1864.	One end in wound...	Recovered.
5	Woodward, C. L., Pt., I, 2d Vt., age 19.	May 3, 1863.	Fracture of lower maxilla.	.....	.....	.....	Left; ligated in wound.	Returned to duty Feb. 19, 1864.
6	Dutton, A. H., Col. 21st Conn., age 25.	May 29, 1864.	Fracture of lower maxilla.	May 31, 1864.	Facial.....	June 2, 1864.	One end in wound...	Died June 4, 1864; tetanic symptoms.
7	Foot, B., Pt., I, 4th C. Troops, age 22.	June 15, 1864.	Fracture of superior maxilla.	June 15, 22, '64.	Ascending palatine artery.	June 23, 1864.	In continuity. A. A. Surg. C. C. Ela.	Died June 23, 1864, from hæmorrhage.
8	Parks, J. D., Pt., A, 29th Conn., age 30.	Oct. 27, 1864.	Fracture of body of inf. maxilla.	.....	.....	.....	Ligation of facial ...	Died November 6, 1864.

Ligation of Submental Artery.—CASE 1115.—Private J. Ketcham, Co. F, 5th Michigan, received at Gettysburg, July 2, 1863, a shot wound of left cheek, severing the submental artery. The vessel was tied on the field. The patient was returned to duty on December 5, 1863.

Ligations of the Subclavian Artery.—Fifty-one cases of ligations of the subclavian artery for shot injuries were reported, of which ten terminated in recovery. In ten cases the operations were performed for aneurism, either diffused or circumscribed. In seventeen instances amputation had been performed prior to the ligation—in seven cases at the shoulder joint, in ten in the arm. In the remaining twenty-four cases the bleeding was from the brachial in three, the posterior circumflex in one, the axillary in eight, the subscapular in one, and the subclavian in five instances; and in six cases the source of hæmorrhage was not indicated. In the following case, of which the specimen is preserved in the Army Medical Museum, the subclavian was ligated in its third portion after the arm had been amputated in the upper third:

CASE 1116.—Private S. R. Peterson, Co. D, 14th Infantry, aged 27 years, was wounded at Chancellorsville, May 3, 1863, and received into Second Division Hospital, Fifth Army Corps. Assistant Surgeon C. Wagner, U. S. A., noted: "Gunshot wound of arm. Amputation by B. Howard, Assistant Surgeon, U. S. A." From the field hospital the patient was, on June 14th, admitted to Douglas Hospital at Washington, and several days afterwards he was transferred to Satterlee Hospital at Philadelphia. Acting Assistant Surgeon D. Kennidy contributed the specimen (*Cat. Surg. Sect.*, 1866, p. 458, *Spec.* 2607) with the following minutes of the case: "Patient was wounded by a shell in the left arm, rendering amputation near the shoulder necessary. The operation was performed upon the battle-field, about fifteen minutes after he received the wound, without the administration of anæsthetics. At the time he was transferred to this hospital he had erysipelas of left side of thorax and back. He was immediately placed on *tinctura ferri chlor. gtts xx* every three hours, and *unguent. ferri sulph.* used locally. The stump, which suppurated freely, was dressed with a poultice. He began to improve, and by June 30th the erysipelas had disappeared and he was fast gaining strength. July 5th: Had slight diarrhœa; prescribed astringents. July 6th: Not so well; very weak. Ordered beef essence and wine whey. July 8th: Bled about a pint from the stump; ice-water and compress applied. July 9th: Had another hæmorrhage early in the morning; subclavian artery ligated at its third part. Present at the operation: Drs. Hayes, Schell, Baldwin, and Roe. Prescribed brandy, one-half ounce every two hours. July 10th: Feels stronger and pulse good; ordered sulphate of quinine, *grs. ii*, three times a day. He continued to do well until the 16th, when he had a hæmorrhage from the artery where it had been ligated; bled about a pint; digital pressure applied. July 17th: No bleeding. Early in the morning of the 18th he lost some blood while changing the fingers. His pulse had been very weak since the 16th, and he was fast losing strength. About 10 o'clock on the morning of the 18th of July he died." The specimen

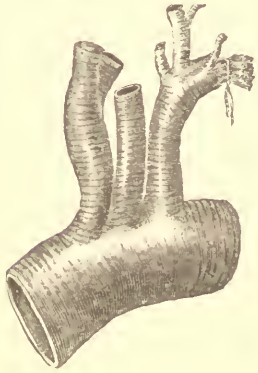


FIG. 422.—Portions of the aorta, innominata, left common carotid, and subclavian arteries. *Spec.* 2607.

consists of a wet preparation of the arch of the aorta, the innominata, left common carotid, and subclavian arteries, terminating at the point of ineffectual ligation of the left subclavian in its third portion, showing the separation of the coats with no formation of clot.

TABLE CXXX.

Condensed Summary of Fifty-one Cases of Ligations of the Subclavian Artery for Shot Injuries.

[Recoveries, 1—10; Deaths, 11—51.]

No.	NAME, AGE, AND MILITARY DESCRIPTION.	DATE OF INJURY.	NATURE OF INJURY.	DATE OF HÆMORRHAGE.	PROBABLE SOURCE OF HÆMORRHAGE.	DATE OF OPERATION.	OPERATION, OPERATOR.	RESULT.
1	*Caughman, G. M.*, K, 13th S. C., age 25.	July 3, 1863.	Shot through chest; subclav'n wounded.	.....	.....	July, 1863.	Ligated in third portion in continuity.	Recovered; arm paralyzed.
2	*Endy, J. T.*, Pt., F, 5th N. C., age 23.	July 2, 1863.	Ball entered below scapula and lodged.	July 16, 17, '63.	.....	July 17, 1863.	In cont. in third portion; lig. subscap.	Furloughed August 31, 1863.
3	Herman, A., Pt., C, 48th N. Y., age 42.	Feb. 20, 1864.	Shot fracture of right humerus; excision.	Sept. 5, 1864.	Posterior circumflex.	Sept. 5, 1864.	In cont. in third portion Surg. A. B. Mott, U. S. V.	Discharged October 4, 1864.
4	Hickey, J., Serg't, M, 1st N. Y. Cav., age 28.	June 5, 1864.	Ball entered below right clavicle.	.....	Axillary aneurism.	Sept. 19, 1864.	Ligated in continuity by Surgeon F. H. Gross, U. S. V.	Discharged May 30, 1865.
5	Hurst, C., Pt., C, 16th Ohio.	Dec. 29, 1862.	Fract. right humerus; amputation.	Jan. 11, 1863.	Brachial on face of stump.	Jan. 11, 1863.	In cont. by Asst. Surg. W. D. Turner, 1st Illinois Art.	Discharged March 7, 1863.
6	Kellogg, E. S., Pt., A, 89th, N. Y., age 21.	June 18, 1864.	Fract. left humerus; amputation arm.	July 25, 1864.	Axillary ligated in stump.	Aug. 8, 1864.	In continuity in third portion by A. A. Surg. R. J. Revis.	Hæm. Aug. 15. Discharged April 6, 1865.
7	Kitrell, J. H., Pt., D, 3d Tennessee.	July 12, 1863.	Fract. right humerus; amp. arm.	July 26, 28, '63.	Hæmorrhage from stump, Aug. 2.	Aug. 2, 1863.	In continuity in third portion.	Furloughed September 3, 1863.
8	Palmer, D. J., Corp'l, C, 8th Iowa, age 20.	Apr. 7, 1862.	Wound of left axillary artery.	April 8, 1862.	Aneurism	Apr. 14, 1862.	In cont. by Surg. T. F. Azpell, U. S. V.	Discharged September 6, 1862.
9	Phelps, J. T., Pt., D, 24th Mass., age 32.	Aug. 16, 1864.	Fract. left shoulder; amputation.	Sept. 26, 1864.	Axillary.....	Sept. 26, 1864.	In cont. by A. A. Surg. J. C. Morton.	Discharged December 13, 1864.
10	Wiggins, C., Pt., G, 9th N. Y. A., age 21.	Mar. 25, 1865.	Ball perforated below right clavicle.	May 7, 1865.	Subclavian.....	May 7, 1865.	Both ends in wound.	Discharged August 3, 1865.
11	Andrews, M., Pt., E, 17th Vt., age 22.	May 12, 1864.	Fract. right humerus; amp. at sh.	July 23, 1864.	Axillary artery	July 27, 1864.	Lig. by A. A. Surg. J. B. Crandall.	Died July 28, 1864.
12	*Averitt, W. S.*, Pt., H, 14th Tennessee.	Aug. 9, 1862.	Fract. left arm; amputation.	.....	Axillary (?)	.....	Ligation of subclavian.	Died January 26, 1863.
13	Brannon, B., Pt., B, 61st N. Y., age 22.	May 8, 1864.	Wound of right shoulder and arm.	May 29, 1864.	Subclavian.....	May 29, 1864.	In cont. by Surg. A. V. Sheldon, U. S. V.	Died June 19, 1864; hæm. rec'd.
14	Broderick, W., Cor'l, C, 199th Pa., age 39.	Apr. 2, 1865.	Left shoulder below clavicle.	Apr. 17, 1865.	Axillary aneurism.	May 30, 1865.	In continuity in outer third.	Died June 11, 1865.
15	Buzzell, H., Serg't, D, 12th N. H., age 21.	June 3, 1864.	Wound right shoulder.	.....	.....	June 17, 1864.	Right; in continuity. Surg. N. R. Moseley, U. S. V.	Died June 29, 1864, of hæm. *Spec.* 2812, A. M. M.
16	*Click, J. B.*, Pt., G, 5th Virginia Cav.	Nov. 8, 1863.	Wound in right axilla; lesion axillary artery.	.....	Large aneurismal tumor.	Dec. 16, 1863.	Right; in continuity. Asst. Surgeon J. C. Baylor, C. S. A.	Died Dec. 17, 1863.
17	Conant, A. E., Pt., K, 8th Maine, age 22.	May 20, 1864.	Fracture head left humerus; amp. at shoulder joint.	May 24, 25, '64.	Axillary	May 26, 1864.	Left; in continuity. A. A. Surgeon T. Liebold.	Died May 29, 1864; exhaustion.
18	Conterman, T. J., Pt., G, 48th N. Y., age 21.	May 9, 1864.	Wound in right axilla.	May 27, 30, '64.	Subscapular artery and axillary vein.	May 31, 1864.	Right; in continuity. A. A. Surgeon G. F. Shrady.	June 2, br. ax. plex. veins lig. Died June 2, 1864. *Spec.* 4331.
19	*Denton, F. M.*, Pt., H, 4th S. C. Cav., age 34.	May 28, 1864.	Flesh wound shoulder and chest.	Aug. 28, 1864.	Axillary aneurism.	Sept. 1, 1864.	Left; in continuity. A. Surg. J. C. McKee, U. S. A.	Amp. at shoulder jt. Died September 2, 1864.
20	Dow, S. E., Color Serg't, 4th N. Y., age 21.	Oct. 27, 1864.	Shot wound of chest.	Nov. 5, 1864.	Subclavian.....	Nov. 5, 1864.	Right; in continuity. Assistant Surgeon H. Allen, U. S. A.	Died November 18, 1864; hæmorrhage.
21	Downing, S., Pt., C, 9th Ill. Cav., age 21.	July 14, 1864.	Fracture right arm; amputation.	Aug. 8, 10, '64.	Brachial	Aug. 10, 1864.	Right; in cont. A. A. Surg. J. N. Sharp.	Died August 30, 1864. *Spec.* 2568.
22	Everly, F. M., Pt., G, 17th Kentucky.	Apr. 7, 1862.	Fract. right humerus; amp. at sh. jt.	Apr. 20, 1862.	Stump	Apr. 20, 1862.	Right; in continuity.	Died April 20, 1862; exhaustion.
23	Gates, E. O., Serg't, M, 4th N. Y. H. A., age 22.	June 4, 1864.	Flesh wound of right arm.	June 25, 1864.	Brachial; axillary ligated.	July 1, 1864.	Right; in continuity. A. A. Surgeon T. G. Morton.	Died July 1, 1864. *Spec.* 2545.
24	Graves, H., Pt., B, 5th Pa. Cav., age 25.	Oct. 7, 1864.	Wound left side of neck.	Dec. 14, 1864.	Subclavian artery.	Dec. 16, 1864.	Left; in continuity. Asst. Surg. W. E. Day, 117th N. Y.	Died December 18, 1864.
25	Grimm, A., Pt., D, 7th Conn., age 21.	June 9, 1864.	Fracture right clavicle.	June 28, 1864.	Aneurism.....	June 30, 1864.	Right; in continuity.	Died July 9, 1864.
26	Grothenn, H., Serg't, K, 5th Cav., age 28.	June 9, 1863.	Right shoulder; axillary artery wound.	Aug. 18, 1863.	Aneurism.....	Aug. 18, 1863.	Right; in cont. Surg. R. H. Coolidge.	Died Aug. 18, 1863. *Spec.* 2609, A. M. M.
27	Henderson, J. H., Pt., F, 57th Pa.	May 31, 1862.	Flesh wound left arm	June 19, 1862.	.....	June 23, 1862.	Left; in continuity..	Died June 27, 1862; pyæmia.
28	Hites, J., Pt., C, 7th Iowa, age 19.	Oct. 3, 1862.	Wound in right axilla	Oct. 22, 1862.	Axillary artery....	Oct. 22, 1862.	R't; in cont. Surg. J. S. Hodgden, U. S. V.	Died Oct. 31, 1862.
29	*Holshowes, W. W.*, Serg't, 3d S. C. Bat.	Nov. 30, 1863.	Wound left lung	Feb. 27, 1864.	Subclavian.....	Feb. 27, 1864.	Left; in cont. Surg. B. B. Breed, U. S. V.	Died March 11, 1865; pyæmia.
30	*Howard, A. C.*, Confederate.	May 31, 1862.	Left shoulder; inj. spine.	.....	.....	June 7, 1862.	Left; in continuity..	Died June 8, 1862.
31	Ingalls, D. W., Pt., B, 6th Conn., age 35	May 20, 1864.	Wound of chest.....	.....	Branches axillary.	June 18, 1864.	Ligation; in continuity.	Died June 24, 1864; pyæmia. *Spec.* 4089.
32	*Jordan, J. F.*, Capt., B, 13th Va Cavalry, age 31.	June 21, 1863.	Left axillary artery divided.	July 12, 1863.	Aneurism.....	July 14, 1863.	Left; in cont. Surg. J. A. Lidell, U. S. V.	Died Aug. 29, 1863. *Spec.* 1684, A. M. M.
33	*Kahea, K. P.*, Pt., B, Jeff. Davis' Legion, age 29.	June 14, 1864.	Through left axilla, sev. axillary artery.	July 10, 1864.	Aneurism.....	July 23, 1864.	Left; in continuity. Surg. W. Seldon, C. S. A.	Died July 31, 1864.
34	*King, J. W.*, Pt., C, 29th N. Carolina.	Sept. 19, 1863.	Fracture head; right humerus.	Oct. 10, 11, '63.	.....	Oct. 11, 1863.	Right; in continuity	Died Oct. 21, 1863.
35	Klechner, G. M., Cor. D, 93d Ill., age 23.	Oct. 5, 1864.	Left arm and chest..	.....	.....	Oct. 13, 1864.	Left; in cont. Surg. J. H. Grove, U. S. V.	Died Oct. 13, 1864.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
36	L'Aimée, A. B., Pt., G, 51st N. Y., age 21.	Mar. 14, 1862.	Fracture right humerus; amp. arm.	Mar. 29, 1862.	Stump	Mar. 29, 1862.	Right; in cont. Surg. G. Derby, 23d Mass.	Died April 5, 1862; pyæmia.
37	McMichael, H., Pt., A, 57th Ind., age 19.	Nov 30, 1864.	Wound chest, inj. axillary artery.	Dec. 11, 1864.	Axillary artery....	Dec. 11, 1864.	Right; in cont. Surg. S. E. Fuller, U. S. V.	Died Dec. 16, 1864.
38	Malott, E., Pt., K, 62d Ohio, age 28.	April 2, 1865.	Fracture right humerus; excision.	April 18, 1865.	Brachial artery....	April 18, 1865.	Right; in continuity.	Died April 20, 1865.
39	Moore, W. R., Pt., E, 57th Mass., age 23.	Oct. 8, 1864.	Fracture right humerus; amputat'n at shoulder joint.	Nov. 21, 1864.	Axillary artery ..	Nov. 21, 1864.	Right; in continuity. Asst. Surg. C. Wagner, U. S. A.	Died November 27, 1864.
40	Mowrey, H. B., Corporal, B, 6th Pa. Res., age 26.	Sept. 17, 1862.	Fracture left humerus.	Sept. 26, 1862.	.....	Sept. 26, 1862.	Left; in continuity. Surg. A. B. Hasson, U. S. A.	Amputat'n at shoulder j't. Died September 27, 1862.
41	Peterson, S. R., Pt., D, 14th Inf.	May 3, 1863.	Left arm shattered; amputation arm.	July 8, '9, '63.	Stump	July 9, 1863.	Left; in continuity. A. A. Surg. D. Kennidy.	Died July 18, 1863. *Spec.* 2607, A. M. M.
42	Pflüger, E., Pt., H, 2d Pa. Art., age 28.	June 27, 1864.	Fracture right scapula.	July 14, 1864.	——; lig. axillary artery.	July 25, 1864.	Right; in continuity.	Died August 10, 1864.
43	Reed, A., Pt., B, 6th Massachusetts.	Jan. 30, 1863.	Fracture right arm; amputat'n at shoulder joint.	Feb. 6, 1863.	Axillary artery ...	Feb. 7, 1863.	Right; in cont. Asst. Surg. O. M. Humphrey, 6th Mass.	Died February 27, 1863.
44	Shasteen, W., Scout	Nov. 15, 1864.	Fracture right clavicle and rib.	.....	.....	Dec. 14, 1864.	Right; in continuity. Asst. Surg. S. C. Ayres, U. S. V.	Died December 14, 1864. *Spec.* 4729, A. M. M.
45	Smith, A. H., Pt., F, 25th Iowa, age 30.	Jan. 11, 1863.	Fracture right elbow joint; amputation arm.	April 4, 6, '63.	Brachial artery....	April 6, 1863.	Right; in continuity. Surg. C. T. Alexander, U. S. A.	Died April 14, 1863.
46	Smith, P., Sergt., E., 84th Pa., age 33.	Sept. 30, 1864.	Flesh wound right arm.	Oct. 12, 1864.	Brachial artery; artery ligated.	Oct. 21, 1864.	Right; in continuity. A. A. Surg. J. C. Morton.	Died November 22, 1864; pyæmia.
47	Staines, S., Pt., C., 53d Pa., age 25.	July 2, 1863.	Flesh wound right arm.	July 23, 1863.	Brach. artery lig.; Aug. 2, amp. arm.	Aug. 23, 1863.	Right; in continuity.	Died September 2, 1863.
48	Stilwell, J., Pt., I, 1st Maryland Cavalry, age 21.	Aug. 16, 1864.	Fracture head; left humerus; Sept. 21, excision.	Sept. 21, 1864.	Axillary artery....	Sept 21, 1864.	Left; in continuity. A. A. Surg. J. C. Morton.	Died September 23, 1864.
49	Ward, T., Corp'l, C, 2d Pa. Res.	June 25, 1862.	Wound in left axilla	Mar. 14, 1863.	Aneurism.....	Mar. 15, 1863.	Left; in continuity. Prof. S. D. Gross.	Died March 17, 1863.
50	Wisser, H. H., Corporal, F, 27th Massachusetts, age 34.	June 15, 1864.	Left arm shattered; amputat'n at shoulder joint.	July 13, 1864.	Stump; axillary ligated.	Aug. 6, 1864.	Left; in continuity..	Died August 17, 1864.
51	Wright, S. A., Capt., F, 55th Illinois.	April 6, 1862.	Fracture left humerus; wound of hip.	May 9, 1862.	Axillary artery....	May 9, 1862.	Left; in continuity..	Died May 12, 1862.

Twelve cases of ligations of branches of the subclavian were reported. Two were ligations of the internal mammary, six of the intercostals, one of the thyroid axis, one of the superficial cervical, and two of the suprascapular arteries. The two operations on the internal mammary and two of the ligations of the intercostal artery were fatal:

Ligations of the Internal Mammary.—Cases 1117-1118.—Private A. Campbell, Co. A, 2d Pennsylvania Heavy Artillery, wounded near Petersburg, June 29, 1864; penetration of chest near second rib; hæmorrhage July 13; ligation of internal mammary by Surgeon O. A. Judson, U. S. V.; death July 19, 1864. (*First Surg. Vol.*, p. 548.)—Private J. Gallin, F, 65th New York, aged 30; wounded at Spottsylvania May 8, 1864; penetration of chest and wound of internal mammary; hæmorrhages; ligation of artery May 19, 1864, by Surgeon R. B. Bontecou, U. S. Vols.; death May 24, from recurring hæmorrhage. (*First Surg. Vol.*, p. 548.)

Ligations of Intercostals.—Cases 1119-1124.—Private R. Morris, K, 142d Pennsylvania, aged 25; shot wound of chest, Fredericksburg, Dec. 12, 1862; hæmorrhage January 20, 1863; ligation of intercostal, one end in wound; discharged from service June 13, 1863. (*First Surg. Vol.*, p. 550.)—Private S. Scofield, D, 6th Connecticut, age 21; shot wound of chest, Drury's Bluff, May 14, 1864; hæmorrhage May 27; ligation of intercostal artery by Asst. Surg. W. H. Gardner, U. S. A.; ligature passed around rib; no recurrence of hæmorrhage; discharged September 3, 1864. (*First Surg. Vol.*, p. 550.)—Private *J. B. Bruce*, C, 31st Alabama, aged 17; shot fracture of ninth rib, at Shiloh, April 6, 1862; April 29, hæmorrhage from intercostal; both ends ligated in wound by Asst. Surg. B. Howard, U. S. A.; ligature included rib; death April 29, from hæmorrhage. (*First Surg. Vol.*, p. 550.)—Private J. H. Butterfield, F, 3d Vermont, wounded in chest, at Lee's Mill's, April 16, 1862; hæmorrhage April 25; ligation of intercostal artery; hæmorrhage recurred April 27; artery religated; death May 4, 1862. (*First Surg. Vol.*, p. 551.)—Private J. Mahew, D, 100th Pennsylvania; shot fracture of rib May 24, 1864; ligation of intercostal; death May 26, 1864. (*First Surg. Vol.*, p. 551).—Private P. F. Wilson, A, 33d Ohio; penetrating wound of chest, Chickamauga, September 20, 1863; hæmorrhage October 4; ligation of intercostal October 5; death October 30, 1863. (*First Surg. Vol.*, p. 551.)

Ligation of Thyroid Axis.—Case 1125.—Private A. P. Dunem, Co. H, 1st New Jersey Cavalry, aged 46; shot wound of right shoulder, ball passing over clavicle, June 3, 1864; June 30th, hæmorrhage of thirty ounces from thyroid axis; artery ligated on the same day, one end in wound; returned to duty December 7, 1864.

Ligation of Superficial Cervical Artery.—Case 1126.—Private J. H. Potter, F, 15th Massachusetts; shot wound of left posterior triangle of neck June 18, 1864; July 13, hæmorrhage from superficial cervical; one end ligated in wound on the same day; transferred to V. R. C. May 16, 1865.

Ligations of Suprascapular Arteries.—Cases 1127-1128.—Corporal T. Barrick, 44th New York, age 25; shot wound of side of neck July 2, 1863; hæmorrhage from suprascapular July 21st; artery ligated on same day by A. A. Surgeon D. Kennidy; discharged March 26, 1864. (*First Surgical Volume*, p. 422.)—Private S. Sickles, H, 14th New Jersey, age 27; shot penetration of chest and fracture of scapula July 9, 1864; hæmorrhage, probably from diffuse aneurism, August 1, 1864; both ends of suprascapular artery ligated; no recurrence; discharged July 6, 1865. (*First Surgical Volume*, p. 549.)

Ligations of the Axillary Artery.—The total number of ligations of the axillary artery reported is forty-nine; of these seven recovered and forty-two proved fatal, a mortality rate of 85.7 per cent. The operation was on the right side in seventeen, on the left in twenty-five instances; in seven the side was not stated. In fifteen instances amputation of the arm had been performed. In four of these fifteen cases re-ligation of the artery was performed on the face of the stump, and in eleven in the continuity. In one instance only was the artery ligated on the field immediately after the injury, for primary bleeding. Of the forty-nine operations, hæmorrhages recurred in twenty-one, only one of which terminated in recovery after amputation of the arm. Four operations were performed for aneurism. The specimen (No. 3630, *Surg. Sect.*) of one of these cases is preserved in the Army Medical Museum and is shown in FIG. 423. It is a wet preparation of the axillary artery, and shows loss of substance by sloughing; slight hæmorrhage occurred on the seventeenth day, which was controlled by pressure; severe hæmorrhage followed on the nineteenth day; an immense aneurism formed, which was opened, and ligatures placed on both sides of the injury; mortification supervened; the arm was amputated at the shoulder, but death ensued several hours after the operation. The case is reported in detail on page 443 of the *Second Surgical Volume* (CASE 1255).

FIG. 423.—Axillary art'ry showing loss of substance from sloughing. *Spec.* 3630.

TABLE CXXXI.

Condensed Summary of Forty-nine cases of Ligation of the Axillery Artery for Shot Injuries.

[Recoveries, 1—7; Deaths, 8—49.]

No.	NAME, AGE, AND MILITARY DESCRIPTION.	DATE OF INJURY.	NATURE OF INJURY.	DATE OF HÆMORRHAGE.	PROBABLE SOURCE OF HÆMORRHAGE.	DATE OF OPERATION.	OPERATION, OPERATOR.	RESULT.
1	Coolream, P., Pt., B, 61st N. Y., age 45.	May 8, 1864.	Fract. head right hum.; excision.	May 24, 1864	.....	May 24, 1864.	Right; in continuity	Discharged October 13, 1865.
2	Cutler, F. R., Pt., K, 72d Pennsylvania.	Sept. 17, 1862.	Fract. right hum.; ampt'n at sh'd'r j't.	Oct. 19, 1862.	Axillary	Oct. 20, 1862.	Right; in cont. Surg. H. S. Hewit, U. S. V.	Disch. Aug. 10, 1864. Died May 11, 1873.
3	Fries, A., Corp'l, E, 100th Ill., age 26.	Sept 19, 1863.	Fract. right hum.; amputation arm.	Nov. 8, 9, 1863.	.....	Nov. 9, 1863.	Right; in cont. Surg. A. McMahon, 64th Ohio.	Discharged April 18, 1864.
4	James, W., —, D, 83d Pa., age 20.	July 2, 1863.	Wound in brachial border axilla.	July 14, 1863.	Brachial	July 14, 1863.	——; in continuity ..	Recovered.
5	Sobbey, W., Pt., G, 51st Pa., age 29.	July 12, 1864.	Flesh wound right arm.	July 23, 24, 1864.	Brachial	July 24, 1864.	Right; in continuity	Recovered.
6	Vancellette, T., Pt., D, 3d Vt., age 21.	Apr. 16, 1862.	Flesh wound left arm.	Apr. 18, 23, 1862.	Brachial	April 23, 1862.	Left; in cont. Surg. R. B. Bontecou, U. S. V.	Apr. 25; ampt'n arm. Disch. Jan. 13, 1863.
7	Williams, A. E., Pt., B, 7th Mich., age 27.	July 2, 1863.	Flesh wound right arm.	Aug. 4, 1863.	.. ..	Aug. 4, 1863.	Right; both ends in wound.	Ret'd to duty April 25, 1864.
8	Aldrich, A., Pt., F, 25th Mass., age 25.	June 3, 1864.	Wound in left axilla	June 15, 1864.	Small artery ligated.	June 17, 1864.	Left; in continuity..	Died June 17, 1864. *Spec.* 2576, A. M. M.
9	*Baggs, W. A.*, Pt., E, 20th Georgia Cav.	.....	Flesh wound right shoulder.	June 23, 24, 1864.	Axillary	June 25, 1864.	Artery ligated	Died June 28, 1864.
10	Corrie, J. S., Serg't, A, 11th Mo., age 25.	May 22, 1863.	Fracture left hum.; ampt'n at sh'd'r j't.	June 6, 7, 1863.	Posterior circumflex.	June 7, 1863.	Left; in continuity; recurred.	June 8, brs. acrom. thor.lig. Died June 9, 1863.
11	*Davis, H. J.*, Pt., G, 5th N. C., age 41.	June 21, 1864.	Fracture left humerus.	June 22, 1864.	Brachial	June 22, 1864.	Left; in continuity; amputation arm.	Hæm. July 3. Died July 6, 1864.
12	Dawson, M. M., Lt. Col., 100th Pennsylvania, age 38.	June 17, 1864.	Flesh wound left shoulder.	June 27, 1864.	Axillary artery ...	June 27, 1864.	Left; both ends in wound.	Hæm recur'd. Died June 30, 1864.
13	Downing, W. E., Pt., I, 16th Pennsylvania Cavalry, age 19.	May 28, 1864.	Wound through left axillary space.	June 12, 1864.	Axillary artery ..	June 15, 1864.	Left; both ends in wound; vein also tied.	Died June 28, 1864.
14	Dunn, N., Pt., H, 38th Wisconsin, age 19.	Apr. 2, 1865.	Fracture left humerus.	.....	Axillary	May 4, 1865.	Left; in cont. Ass't Surg. O. P. Sweet, U. S. V.	Died May 8, 1865; exhaustion.
15	Foley, M., Pt., K, 11th Ill. Cav., age 20.	Mar. 3, 1864.	Wound right arm; cutting axillary.	Mar. 3, 1864.	Axillary	Mar. 5, 1864.	One end in wound. A. A. Surg. W. B. Trull.	Religated. Died March 10, 1864.
16	Friedeboldt, F., Pt., K, 5th Michigan.	May 31, 1862.	Flesh wound arm; injury brachial art.	.....	Brachial	June 10, 1862.	In cont. A. A. Surg. C. C. Page; subscap. artery also tied.	Died July 14, 1862.
17	Gillies, P., Pt., H, 131st N. Y., age 25.	Oct. 19, 1864.	Fracture head left humerus.	Oct. 26, 1864.	Aneurism; amputation sh'd'r j't.	Oct. 31, 1864.	Left; on face stump	Died Nov. 1, 1864, of rec. hæmorrhage.
18	Goodheart, J. F., Pt., F, 88th Pa., age 29.	May 10, 1864.	Fracture left arm; amputation arm.	.....	Stump	June 4, 1864.	Left; in continuity..	Died June 5, 1864.
19	Hall, W., Pt., H, 15th Infantry, age 19.	Jan 11, 1866.	Wound of chest; fractured rib.	Jan. 11, 20, 1866.	Axillary	Jan. 22, 1866.	Right. A. A. Surg. R. W. Coale.	Died Jan'ry 22, 1866. *Spec.* 2674.
20	Hankin, J., Pt., H, 1st Mich. S.S., age 17.	June 17, 1864.	Fract. head of right humerus; excision.	July 23, 1864.	Axillary	July 23, 1864.	Right axillary art'y ligated.	Died July 24, 1864; hæmorrhage.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
21	Herpst, H., Serg't, H, 119th Pa., age 25.	May 5, 1864.	Fract. r't humerus; amputation arm.	June 13, 1864.	Axillary	June 13, 1864.	Right; in cont. A. A. Surg. J. C. Nelson.	Died June 15, 1864. *Spec.* 2463, A. M. M.
22	Hills, J. W., Pt., A, 145th Pa., age 24.	Dec. 13, 1862.	Wound through left axilla.	Dec. 23, 1862.	Subscapular art'y.	Dec. 23, 1862.	Left; in continuity..	Died Dec. 29, 1862.
23	Hoggard, J., Pt., E, 137th Ills., age 20.	Aug. 21, 1864.	Fract. right humerus; amp. sh. joint.	Sept. 9, 1864.	Brachial	Sept. 9, 1864.	Right; in continuity; relig. Sept. 11.	Hæm. Died Sept. 12, 1864.
24	Hollingshead, A., Corp'l, H, 12th Ky.	June 21, 1864.	Wound in upper 3d right arm.	June—, 1864.	Brachial aneurism	June 24, 1864.	Right; both ends in wound. Surg. E. Shippen, U. S. V.	Died June 26, 1864.
25	Hurd, F., Corp'l, F, 8th Maine, age 24.	May 16, 1864.	Flesh wound of left arm.	May 21, 1864.	Brachial; art. tied; hæm. rec. May 25, June 1.	June 1, 1864.	Left; in cont. A. A. Surg. J. H. Jamar.	Died June 1, 1864.
26	Leddic, J., Pt., E, 118th New York.	June 30, 1864.	Flesh wound of left arm.	June 30, 1864.	Brachial	June 30, 1864.	Left; in cont. Surg. T. H. Squire, 89th New York.	Died July 2, 1864.
27	Lightfoot, J., Pt., E, 25th Mass., age 28.	Aug. 10, 1864.	Flesh wound of left shoulder.	Aug. 27, 29, 1864.	Axillary; diffused aneurism.	Sept. 17, 1864.	Left; both ends in wound. A. A. Surg. L. K. Baldwin.	Sept. 19, amp. at sh. j. Died Sept. 19, 1864. *Spec.* 3630.
28	*McTough, J. H.*, Pt., I, 45th Ga., age 23.	May 3, 1863.	Fracture humerus; amp. at sh. joint.	May 27, 1863.	Axillary artery ...	May 27, 1863.	Ligated on face of stump.	Died June 3, 1863.
29	Mackey, J., Serg't, I, 50th Pa., age 23.	May 25, 1864.	Wound left arm, div. axillary artery.	.....	Axillary	June 5, 1864.	Left axillary. A. A. Surg. H. Craft.	Died June 5, 1864.
30	Marquis, W. H., Pt., E, 85th Pa., age 20.	Aug. 27, 1863.	Fracture right arm; amp. at sh. joint.	Sept. 12, 1863.	Brachial	Sept. 12, 1863.	Right; on face of stump.	Died Sept. 12, 1863.
31	Melley, E. C., Pt., K, 2d West Virginia.	Nov. 6, 1863.	Wound of chest	Nov. 18, 1863.	Aneurism	Nov. 19, 1863.	Right axillary tied. Surg. S. N. Sherman.	Died Nov. 19, 1863.
32	Miller, E. D., Pt., F, 90th Pennsylvania.	Aug. 30, 1862.	Flesh wound of arm, inj. brachial art.	Sept. 5, 1862.	Brachial	Sept. 6, 1862.	Axillary tied in continuity.	Died Sept. 12, 1862.
33	*Moore, H. C.*, Pt., A, 26th Georgia.	May 12, 1864.	Flesh wound, left arm.	May 19, 1864.	Axillary	May 19, 1864.	Left axillary tied ...	May 23, amputation at shoulder joint. Died May 23, 1864.
34	Morgan, W., Pt., F, 126th N. Y., age 22.	July 2, 1863.	Fracture humerus; amputation sh. jt.	July 19, 1863.	Axillary	July 19, 1863.	Axillary tied in continuity.	Died July 19, 1863.
35	Morgan, W. B., Pt., F, 17th Connecticut, age 24.	July 3, 1863.	Fracture left arm; amputation arm.	July 20, 1863.	.....	July 20, 1863.	Left; in continuity. Aug. 3, religated.	Died Aug. 16, 1863.
36	Moser, J., Pt., B, 51st Ill., age 18.	Nov. 30, 1864.	Fracture right scapula.	Dec. 12, 1864.	Enlarged vessel, collateral circula.	Dec. 14, 1864.	Right; in continuity	Hæm. rec. Dec. 19. Died Dec. 21, 1864.
37	Oldfield, T., Sergt., D, 10th Michigan, age 33.	July 20, 1864.	Flesh wound left arm	.....	.....	Aug. 10, 1864.	Left; in continuity. A. A. Surg. J. C. Thorpe.	Died Aug. 16, 1864; irritative fever.
38	Ourish, P., Sergeant, E, 32d Massachusetts, age 19.	May 30, 1864.	Fract. left humerus	May 31, 1864.	Axillary	May 31, 1864.	Left; in cont., June 7, relig. A. Surg. G. A. Mursick, U. S. V.	June 8, amputation shoulder jt. Died June 8, 1864.
39	Packard, G. R., Pt., F, 3d Me., age 21.	May 31, 1862.	Fract. left humerus; amputation arm.	July 1, 1862.	....	July 28, 1862.	Left; in cont. A. A. Surg. S. Teal.	Died Aug. 5, 1862; recurrent hæm.
40	*Raper, W.*, Pt., G, 5th N. C.	May 5, 1862.	Flesh wound right arm.	June 13, 1862.	.....	June 13, 1862.	Right; in continuity. Surg. R. B. Bontecou, U. S. V.	Died June 14, 1862.
41	Richards, S., Corp., M, 11th Pa., age 25.	Aug. 25, 1864.	Flesh wound left arm	Sept. 6, 1864.	Brachial	Sept. 6, 1864.	Left; in cont. A. A. Surg. W. P. Moon. Relig. Sept. 11.	Died Sept. 18, 1864.
42	Sawyer, D., Pt., D, 31st Me., age 33.	July 30, 1864.	Fracture head left hum.; amp. sh. jt.	Aug. 8, 9, 1864.	.....	Aug. 8, 9, 1864.	Left; tied 3 times on face of stump.	Died Aug. 9, 1864; asthenia.
43	Sheppard, J. F., Pt., A, 18th Mass., age 25.	July 2, 1863.	Wound through left axillary space.	July 14, 1863.	.....	July 14, 1863.	Left; in continuity; religated July 19, 23.	Died July 24, 1863.
44	Smith, D., Pt., E, 6th Penn. Cavalry, age 29.	June 12, 1864.	Flesh wound left arm		Aneurism; brach.; lig. twice; amp. at shoulder joint.	Aug. 7, 8, 1864.	Left; in cont. Asst. Surg. H. S. Schell, U. S. A. Religated.	Died Aug. 8, 1864.
45	Stetson, S. M., Pt., B, 32d Me., age 19.	May 31, 1864.	Fracture right arm; amputation arm.	June 22, 1864.	.....	June 22, 1864.	Right; in cont. A. A. Surgeon J. F. Thompson.	Died June 22, 1864; exhaustion.
46	Tighe, C., Pt., F, 56th Mass., age 18.	June 16, 1864.	Wound left chest and arm.	July 1, 1864.	Axillary	July 2, 1864.	Axillary tied. Surg. R. B. Bontecou, U. S. V.	Died July 4, 1864; exhaustion.
47	Van Gasback, W. A., Pt., 11th New York Battery, age 23.	June 6, 1864.	Fract. left humerus; amputation at sh. joint.	June 12, 1864.	.....	June 18, 1864.	Left; in continuity; religated June 23.	Died June 23, 1864; exhaustion.
48	Walsh, D., Pt., D, 106th N. Y., age 23.	Oct. 19, 1864.	Wound left shoulder.	Nov. 3, 1864.	Axillary art. and vein.	Nov. 3, 1864.	Left; axillary artery and vein tied. A. A. Surg. E. L. Duer.	Hæm. recurred Nov. 13, 15. Died Nov. 15 1864.
49	Yoho, P., Corpl., F, 116th Ohio, age 37.	Sept. 19, 1864.	Flesh wound left arm	Oct. 4, 1864.	Brachial	Oct. 7, 1864.	Left; in cont. A. A. Surg. W. L. Wells.	Died Oct. 22, 1864; pyæmia. *Spec.* 3679.

Twenty-two ligations of branches of the axillary were reported: one (fatal) of a branch of the acromial thoracic artery; two (one recovery, one fatal) of the subscapular; eighteen (eleven recoveries, seven fatal) of the circumflex; and one (fatal) of the muscular branch.

Ligation of Branch of the Acromial Thoracic Artery.—Case 1129.—Lieutenant A. Stephens, C, 121st Ohio, wounded at Chickamauga September 19, 1863, in right chest; hæmorrhage October 6th; October 10th, ligation of branch of acromial thoracic in wound; hæmorrhage recurred; death October 22, 1863.

Ligations of Subscapular Artery.—Cases 1130–1131.—Private E. Burk, I, 81st Pennsylvania, age 20; fracture of head of left humerus May 12, 1864; May 20, excision; May 23, hæmorrhage from subscapular; ligation in wound on the same day; hæmorrhage recurred May 28; death from pyæmia June 28, 1864.—Private J. Stottlemeyer, C, Cole's Maryland Cavalry; fracture of spine of left scapula June 6, 1864; June 19, 20, hæmorrhages; July 24, ligation of subscapular in continuity; returned to duty December 3, 1864.

Ligations of Circumflex.—Of eighteen cases, eleven recovered and seven were fatal.

TABLE CXXXII.

Condensed Summary of Eighteen Ligations of the Circumflex Artery for Shot Injury.

[Recoveries, 1—11; Deaths, 12—18.]

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
1	Boothman, W., Pt., B, 173d N. Y., age 18.	June 14, 1863.	Fracture right shoulder; excision.	June 25, 1863.	Circumflex artery	June 25, 1863.	Right; both ends in wound.	Discharged Jan. 31, 1864.
2	Detweiler, —, Corp'l, G, 198th Pa., age 18.	Mar. 29, 1865.	Wound right arm ...	Apr. —, 1865.	Posterior circumflex.	Apr. —, 1865.	Posterior circumflex ligated.	Discharged June 10, 1865.
3	Gear, S., Corp'l, H, 49th Ohio, age 18.	Dec. 16, 1864.	Fracture right humerus; excision.	Dec. 26, 1864.	Posterior circumflex.	Dec. 26, 1864.	Right; one end in wound. A. A. Surg. S. M. Blackwood.	Discharged June 29, 1865.
4	Howard, J. R., Pt., B, 7th Iowa.	Nov. 7, 1861.	Fracture humerus; amputation arm.	Nov. 24, 1861.	Anterior circumflex.	Nov. 24, 1861.	Ligated on face of stump.	Discharged June, 1863.
5	[1] Irvine, S., Corp'l, I, 67th Pa., age 23.	Sept. 22, 1864.	Right arm, injured humerus.	Oct. 28, 1864.	Anterior circumflex artery.	Oct. 28, 1864.	Right anterior circ. artery ligated.	Amp. at sh. jt. Dis. Sept. 9, 1865.
6	Sharp, H. J., Serg't, F, 6th N. Y. Cav., age 21.	Aug. 29, 1864.	Flesh wound of left shoulder.	Sept. 8, 1864.	Posterior circumflex artery.	Sept. 8, 1864.	Left; both ends in wound.	Vet. Reserve Corps Feb. 10, 1865.
7	Smith, S., Pt., H, 150th Pa., age 36.	May 10, 1864.	Fracture right humerus; excision.	May 26, 28, 1864.	Posterior circumflex artery.	May 28, 1864.	Right; in wound....	Discharged Jan. 7, 1865.
8	Spray, J. C., Pt., G, 71st Ohio, age 22.	Dec. 16, 1864.	Fracture right humerus; excision.	Jan. 10, 1865.	....	Jan. 10, 1865.	Right; post. circ. Surg. J. H. Grove, U. S. V.	Jan. 22, amputated arm. Discharged May 16, 1865.
9	Wager, S., Pt., B, 1st Art.	June 3, 1864.	Fracture right humerus; amp. sh. jt.	June 10, 1864.	Circumflex	June 10, 1864.	Right; on face of stump.	Disch. Mar. 16, 1865. Died Dec. 31, 1868.
10	Ward, A. D., Corp'l, F, 15th Mass., age 25.	July 2, 1863.	Flesh wound of left shoulder.	July 13, 1863.	Posterior circumflex artery.	July 13, 1863.	Left; one end in wound.	Discharged July 28, 1864.
11	Yarick, R., Pt., G, 1st Mich., age 27.	June 3, 1864.	Flesh wound, left arm	July 14, 1864.	Anterior circumflex artery.	July 14, 1864.	Left; one end in wound.	Vet. Reserve Corps Feb. 10, 1865.
12	Beckwith, R. J., Pt., B, 12th New York Cav., age 28.	Mar. 9, 1865.	Fracture head right humerus; excision.	May 8, 1865.	Posterior circumflex artery.	May 8, 1865.	Right; in continuity	Died May 12, 1865; pyæmia.
13	Lyon, Z. S., Pt., I, 17th Vt., age 20.	Apr. 2, 1865.	Fract. r't scapula; ball lodged in lung.	Apr. 14, 1865.	Brs. circumflex artery.	Apr. 16, 1865.	Several small brs. circumflex ligated.	Died April 21, 1865.
14	Monahan, J., Corp'l, E, 22d Mass., age 38.	May 5, 1864.	Fract. rt. hum.; exc.; amputation arm.	Sept. 19, 1864.	Anterior circumflex.	Sept. 19, 1864.	Right; in continuity	Amp. sh. jt. Died Sept. 26, 1864. *Spec.* 3331, A. M. M.
15	Sanford, J. E., Pt., D, 7th Mass., age 24.	May 6, 1864.	Fracture right humerus; excision.	June 7, 1864.	Circumflex artery.	June 7, 1864.	Right; one end in wound.	Hæm. recur'd. Died June 16, 1864.
16	Stoutenberg, M., Serg't, C, 148th N. Y., age 24.	May 5, 1864.	Fracture left humerus.	June 15, 1864.	Posterior circumflex artery.	June 16, 1864.	Left. Surg. H. Palmer, U. S. V.	Died June 18, 1864.
17	Welch, B. A., Serg't, H, 1st D. C. Cav., age 20.	Aug. 25, 1864.	Fract. left hum.; excision; amputation at shoulder joint.	Sept. 24, 1864.	Stump	Sept. 24, 1864.	Anterior and posterior circumflex on face of stump.	Died Oct. 11, 1864. *Spec.* 3675, A. M. M.
18	Zwick, G. T., Serg't, I, 27th Mich., age 27.	May 12, 1864.	Flesh wd. left shoulder.	July 2, 1864.	Posterior circumflex artery.	July 2, 1864.	Left; in wound	Died July 15, 1864; exhaustion.

Ligation of Muscular Branch of Axillary.—CASE 1132.—Private E. Draper, A, 3d Delaware, aged 23; shot flesh wound of axilla; axillary artery divided March 31, 1865; amputation at shoulder April 9, 1865; hæmorrhage from muscular branch April 16th, ligation on face of stump; no recurrence of hæmorrhage; death from exhaustion April 16, 1865.

Ligations of the Brachial Artery.—One hundred and seventy cases of ligation of the brachial artery were reported; one hundred and nineteen were successful and fifty-one were fatal, a mortality rate of 30.0 per cent.

TABLE CXXXIII.

Summary of One Hundred and Seventy Cases of Ligations of the Brachial Artery.

[Recoveries, 1—119; Deaths, 120—170.]

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
1	Babcock, F., Serg't, M, 6th Ill. Cav.	Feb. 21, 1864.	Flesh; left hand	——— 1864.	Palmar arch	Mar. 14, 1864.	In continuity. A. A. Surg. A. Sterling.	Duty, July 13, 1864.
2	Babcock, O. P., Serg't, H, 207th Pa., age 25.	April 2, 1865.	Fracture left radius, upper third.	Apr. 12, 1865.	Rec. branch radial.	Apr. 12, 1865.	In continuity, lower fourth. A. Surg. H. Allen, U. S. A.	Discharged June 2, 1865.
	Becker, W., Serg't, B, 98th Pennsylvania.	July 2, 1863.	Fracture left wrist ..	July 14, Aug. 30, 31, 1863.	Ulnar radial.....	After Aug. 31, 1863.	In continuity.....	Discharged August 17, 1864.
4	Bergner, F., Pt., B, 121st Pa., age 21.	May 25, 1864	Flesh; left arm, middle.	June 13, 1864.	Brachial	June 11, 13, 1864.	Both ends in wound. A. A. Surg. E. De Witt.	Duty.
5	Berry, P., Corp'l, G, 23d Illinois, age 27.	June 21, 1864.	Fract. left humerus; elbow joint amp.	July 1, 1864.	Stump	July 1, 1864.	On face of stump...	Discharged December 5, 1864.

[1] MOON (W. P.), *Amputation of Right Shoulder Joint*, in *Am. Jour. Med. Sci.*, 1866, Vol. LI, p. 143.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
6	Bettenhauser, C., Pt., I, 61st N. Y., age 22.	July 2, 1863.	Flesh; left arm	Aug. 12, 1863.	Brachial	Aug. 12, 1863.	One end in wound	V. R. C. May 13, 1864.
7	Bird, W. A., Pt., G, 68th Ind., age 32.	Aug. 14, 1864.	Fract. left humerus, lower third.	Sept. 9, 15, 1864.	Humeral	Sept. 9, 1864.	In continuity; hæm. Sept. 15.	Sept. 15, amp.; discharged November 26, 1864.
8	Bowman, G. W., Pt., C, 107th Illinois.	Aug. 6, 1864.	Left elbow, cut brachial artery.	Aug. 6, 1864.	Brachial	Aug. 6, 1864.	Both ends in wound	Discharged April 11, 1865.
9	Boynton, A. J., Pt., H, 13th Wis., age 23.	Nov. 21, 1864.	Fract. left humerus; Nov. 22, amp. arm.	Dec. 4, 7, 1864.	Brachial	Dec. —, 1864.	In continuity	Discharged April 8, 1865.
10	Brannagán, T., Pt., B, 22d Mass., age 19.	June 18, 1864.	Flesh; right arm	July 20, 24, '64.	Brachial	July 24, 1864.	One end in wound. A. A. Surg. H. Sanders.	V. R. C. May 2, 1865.
11	Brooks, J., Pt., E, 22d Mass., age 18.	July 2, 1863.	Fract. left humerus; amp. arm.	July 15, 1863.	Brachial	July 15, 1863.	In continuity	Recovery.
12	[1] *Broom, P.*, Serg't, A, 48th N. C.	Aug. 25, 1864.	Mid. finger left hand		Palmar arch	Aug. 30, 1864.	In continuity. Surg. P. Wright, P. A. C. S.	Recovery.
13	Budd, J., Pt., F, 100th Pa., age 22.	Mar. 25, 1865.	Fract. right humerus, lower third.	Apr. 2, 1865.	Superior profunda	Apr. 3, 1865.	In cont. Surg. N. R. Moseley, U. S. V.	Discharged June 27, 1865.
14	Caden, L., Pt., C, 8th New Jersey, age 19.	June 16, 1864.	Flesh; right arm, middle.	July 2, 1864.	Minor profunda	July 2, 1864.	One end in wound. A. A. Surg. W. Hooper.	Duty January 15, 1865.
15	Callahan, P., 4th N. J. Battery, age 26.	Aug. 16, 1864.	Brachial artery, right arm.		Brachial	Aug. 16, 1864.	In continuity; Sept. 1, 13, religated.	Discharged October 31, 1865.
16	Canning, W. J., Pt., D, 95th Pa., age 24.	Feb. 6, 1865.	Fract. left radius, up. third, wd. radial.		Radial		In continuity, middle third.	Discharged September 9, 1865.
17	Carnaghan, J., Pt., C, 29th Pa., age 21.	July 2, 1863.	Left hand	July 21, 1863.	Superficial palmar arch.	July 21, 1863.	In continuity, middle third.	V. R. C. Feb. 24, 1864.
18	Carr, S. H., Pt., C, 90th Ohio, age 21.	June 20, 1864.	Flesh; left arm, low. third.	July 12, 13, 1864.	Brachial	July 12, 1864.	In cont. A. A. Surg. D. J. Griffith.	July 13, amp.; disch. Sept. 23, 1864.
19	Carroll, J., Pt., E, 39th N. Y., age 28.	May 6, 1864.	Right brachial artery, high up.	May 12, 1864.	Brachial	May 12, 1864.	One end in cont. A. A. Surg. F. G. H. Bradford.	Discharged July 28, 1864.
20	Clark, O. A., Serg't, D, 21st Ohio, age 31.	July 9, 1864.	Flesh; left arm, middle.	July 24, 1864.	Brachial	July 24, 1864.	In cont. A. A. Surg. A. H. Hoy.	Discharged.
21	[2] Cloud, A., Pt., H, 22d Iowa, age 41.	May 22, 1863.	Fract. left humerus, lower third, amp.	Aug. 17, 1863.	Stump	Aug. 17, 1863.	On face of stump	Discharged Sept. 19, 1863.
22	Cole, N., Lieut., 20th Wisconsin.	Dec. 7, 1862.	Brachial artery, left arm.		Brachial	Dec. 16, 1862.	In continuity	Discharged Feb. 27, 1863.
23	Daniels, D., Pt., C, 3d Wis. Cav., age 30.	Oct. 16, 1864.	Flesh; right forearm	Repeated.	Diffused aneurism	Oct. 28, 1864.	In cont., mid. Surg. P. Harvey, U. S. V.	Discharged May 31, 1865.
24	David, W., Pt., D, 107th Illinois.	Aug. 18, 1864.	Brachial artery, bend of left elbow.		Brachial		Both ends in wound	Discharged July 2, 1865.
25	Davis, J. H., Pt., E, 39th C. T., age 21.	July 30, 1864.	Flesh; right hand			July 31, 1864.	In continuity, upper third.	Recovered Jan. 19, 1865.
26	Davis, W., Pt., E, 3d Artillery, age 24.	Feb. 20, 1864.	Flesh; left forearm	Mar. 7, 1864.	Ulnar and interosseous.	Mar. 7, 1864.	In cont., mid. A. A. Surg. J. T. Kennedy.	Duty Apr. 24, 1864.
27	Donnelly, J., Pt., D, 16th Mass., age 41.	May 12, 1864.	Flesh; left arm, upper brachial artery.	May 24, 1864.	Brachial	May 12, '64.	Both ends in wound. A. A. Surgeon E. G. Waters.	Discharged Jan. 10, 1865.
28	Downey, J. N., Pt., 6th Maine Battery, age 21.	June 18, 1864.	Right forearm			July 6, 1864.	In cont. A. A. Surg. G. E. Brickett.	Discharged June 3, 1865.
29	Duffy, H., Lieut., D, 155th N. Y., age 46.	June 3, 1864.	Brachial artery, left arm.		Brachial	July 13, 1864.	Ligation	July 21, amputated; disch. Oct. 11, 1864.
30	Ellis, D., Pt., A, 12th N. H., age 34.	May 3, 1863.	Right elbow; amp. arm.	June 29, 1863.	Brachial	June 29, 1863.	In continuity, high up.	Discharged Aug. 29, 1863.
31	Ells, W., Pt., K, 9th N. Y. Cav., age 20.	Aug. 1, 1863.	Flesh; left arm, lower third.	Aug. 11, 12, '63.	Branch brachial	Aug. 12, 1863.	In cont. A. A. Surg. J. E. Smith.	Duty Oct. 10, 1863.
32	Estes, H., Pt., H, 11th Ky., age 18.	June 9, 1863.	Flesh; right hand	June 13, 1863.	Palmar arch; lig. radial June 13.	June 19, 1863.	In continuity	Discharged Jan. 16, 1864.
33	Fisher, A., Corp'l, G, 36th Mass.	June 22, 1864.	Flesh; right arm	On field		On field	Ligation	Discharged Dec. 23, 1864.
34	Flewellen, A., Pt., I, 29th Ind., age 20.	Apr. 6, 1862.	Flesh; left hand	Apr. 20, 1862.	Palmar arch	Apr. 21, 1862.	In continuity	Discharged July 2, 1862.
35	Ford, I. C., Pt., C, 10th Mich., age 21.	Feb. 25, 1864.	Fracture left carpus	Mar. 25, 1864.	April 20, 21, recurred.	Apr. 21, 1864.	In continuity, lower third. A. A. Surg. D. O. Farrand.	Discharged Dec. 7, 1864.
36	Frank, P., Pt., D, 5th Minnesota, age 27.	Dec. 16, 1864.	Left arm, upper third.			Dec. 23, 1864.	Ligation	Duty Sept. 5, 1865.
37	Fritschey, W., S'gt, M, 12th Pa. Cav., age 24.	Mar. 21, 1865.	Flesh; left arm, middle third.	Apr. 23, 1865.	Brachial	Apr. 23, 1865.	In cont. Surg. J. B. Lewis, U. S. V.	Hæm. rec.; May 14, amputated; disch. June 27, 1865.
38	Gates, R., Pt, I, 4th N. Y., age 19.	Dec. 13, 1862.	Fracture left wrist joint.	Jan. 13, 1863.	Ulnar	Jan. 13, 1863.	In cont. at bend of elbow.	Furloughed.
39	Gilboa, A., Pt., C, 8th Mich. Cav., age 27.	Jan. 29, 1864.	Left elbow joint		Brachial	Feb. 11, 1864.	Both ends in cont. A. A. Surg. H. C. May.	Discharged Nov. 14, 1864.
40	*Giltard, M.*, Pt., K, 16th Miss., age 27.	Aug. 24, 1864.	Flesh; through biceps.		Brachial	Sept. 7, 1864.	Both ends in wound. A. A. Surg. J. Morris.	To prison Feb. 5, 1865.
41	Girrbach, A., Pt., B, 5th Penn. Cav., age 26.	June 25, 1864.	Flesh; right wrist	Sept. 5, 14, '64.	Ulnar ligated Sept. 5.	Sept. 15, 1864.	In continuity, mid. A. Surgeon J. H. Merriam, U. S. V.	Discharged May 16, 1865.
42	Goodwin, A. K., Pt., I, 4th N. H., age 23.	May 16, 1864.	Right arm fractured amp.	June 21, 1864.	Brachial	June 21, 1864.	Both ends in continuity.	Discharged Sept. 23, 1864.
43	Grady, J., Pt., C, 164th N. Y., age 47.	June 16, 1864.	Flesh; right arm	July 2, 4, 1864.	Brachial	July 4, 1864.	Both ends in wound. Assist. Surgeon H. S. Schell, U. S. A.	Discharged Feb. 6, 1865.
44	Graham, R., Pt., B, 81st Penn., age 43.	July 1, 1862.	Radial artery, left forearm, up.	Prim. and recurring.	Radial	July 9, 1862.	In continuity, lower third.	Discharged Dec. 9, 1862.
45	Griggs, E. P., Pt., F, 14th Inf., age 21.	Aug. 30, 1862.	Fractured metacarpal, right hand.	Sept. 26, 1862.		Sept. 26, 1862.	Radial, ulnar, and brachial in cont.	Discharged Nov. 10, 1862.
46	[3] Hamilton, J., Pt., I, 51st Penn., age 22.	Jan. 1, 1862.	Left hand, fract. met. Jan. 1, excision.	Jan. 10, 15, Mar. 1, 1862.	Palmar arch; lig. radial Jan. 10.	Jan. 23, Mar. 1, 1862.	In continuity	Recovered March —. 1862.

[1] Wright (D. F.), *The Effects of the Hunterian Method of Ligation on Inflammation*, in *Confederate States Medical and Surgical Journal*, 1864, Volume I, p. 178.

[2] Lloyd (D. C.), *Report of Five Cases of Hospital Gangrene*, in *Am. Med. Times*, 1863, Vol. VII, p. 267.

[3] Squire (T. H.), *Report of Surgical Cases at Roanoke Island*, in *Boston Med. and Surg. Jour.*, 1862, Vol. LXVI, p. 176.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
47	Hammond, R., Pt., G, 8th Minn.	Dec. 7, 1864.	Brachial art'y, upper third, right arm.	Dec. 7, 1864.	Brachial	Dec. 7, 1864.	Both ends in wound. Surgeon H. B. Johnson, 15th Ohio.	Discharged July 26, 1865.
48	Hardy, M. H., gen'l service.	——— 1862.	Fractured right radius, mid.	.....	.....	.....	Ligation	Discharged Feb. 26, 1863.
49	Hastings, C. S., Pt., E, 2d U. S. S. S., age 21.	May 2, 1863.	Fractured right carp. and met.; excision.	June 29, 1863.	Palmar arch.....	June 29, 1863.	In cont. at elbow. Surg. D. P. Smith, U. S. V.	July 4, amp. arm; discharged Oct. 9, 1863.
50	Hatmaker, J., Capt., B, 51st Ohio.	Nov. 24, 1863.	Right arm	Nov. 24, 1863.	....	Nov. 24, 1863.	.....	Discharged Oct. 4, 1864.
51	Hawkins, A. P., Lt., E, 8th New York Artillery, age 20.	Aug. 25, 1864.	Fractured left hum., elbow; exc., amp.	Sept. 1, 10, '64.	Brachial	Sept. 10, 1864.	In continuity	Discharged Jan. 26, 1865. *Spec.* 2010.
52	Haywood, R. G., Corporal, B, 4th Vt., age 19.	Dec. 13, 1862.	Brachial artery	Dec. 31, 1862.	Brachial	Jan. 1, 1863.	Ligated	Discharged Oct. 30, 1863. Died Aug. 10, 1869.
53	Helcker, R., Pt., G, 65th Ohio, age 25.	Nov. 25, 1863.	Brachial artery, left arm.	.....	Brachial	Dec. 6, 1863.	Both ends in wound.	Discharged Oct. 7, 1864.
54	Henby, J. R., Pt., F, 51st Ind., age 22.	Aug. 14, 1864.	Right humerus, elbow.	Aug. 29, Sept. 3, 1864.	Brachial	Aug. 29, Sept. 3, 1864.	In continuity	Discharged April 25, 1865.
55	*Henderson, D. D.*, Pt., I, 15th Miss., age 21.	Feb. 12, 1865.	Flesh; left brachial artery.	Feb. 24, 1865.	Brachial	Feb. 24, 1865.	Both ends in wound. Surg. B. B. Breed, U. S. V.	Recovered.
56	[1] Henderson, W., Pt., E, 115th Penn., age 37.	July 2, 1863.	Fracture left ulna ...	Aug. 8, 1863.	Ulnar branches....	Aug. 8, 1863.	In continuity. A. A. Surg. J. Ashhurst, jr.	Veteran Res. Corps May 12, 1864.
57	Henninger, J., Pt., H, 67th Ohio, age 18.	May 20, 1864.	Flesh; right arm, lower third.	July 24, 1864.	Brachial	July 24, 1864.	Both ends in wound. Surgeon A. Heger, U. S. A.	Discharged June 28, 1865.
58	Hereford, J., Pt., L, 6th Kansas Cav'ry, age 18.	Oct. 22, 1864.	Right arm, brachial artery.	.....	Aneurism	Nov. 27, 1864.	Both ends in wound. Surg. A. C. Vanduyn, U. S. V.	Discharged June 23, 1865.
59	[2] *Herring, Isaac*, Pt., C, 53d C. S. A.	Nov. 25, 1863.	Flesh; left hand	.....	Palmar arch.....	Nov. 29, 1863.	In continuity	April 24, 1864, hæmorrhage; recovery.
60	Hinckman, W., C'pl, B, 5th N. Y., age 25.	Aug. 19, 1864.	Fractured left ulna, mid.	.....	.....	Sept. 24, 1864.	In continuity. A. A. Surg. A. Ansell.	Sept. 14, '64, amp.; disch. May 11, 1865.
61	Hubn, H., Lieut., K, 44th Ill., age 24.	June 27, 1864.	Flesh; left brachial artery.	June 27, 1864.	Brachial	June 27, 1864.	In continuity	Discharged Dec. 17, 1864.
62	Huntley, W. F., Pt., F, 5th Vt., age 26.	May 5, 1864.	Flesh; right brachial	May 5, 1864.	Brachial	May 5, 1864.	Both ends in wound. Surg. A. N. Dougherty, U. S. V.	Discharged Feb. 22, 1865.
63	Hurley, R., Pt., H, 159th New York.	Sept. 19, 1864.	Right arm, middle...	Sept. 27, 28, 1864.	Brachial	Sept. 28, 1864.	In continuity, upper third.	Oct. 9, amp. forearm. Disch'd Mar. 27, '65.
64	[3] *Kennedy, M. J.*, Pt., H, 6th La., age 24.	Aug. 29, 1862.	Flesh; right arm, middle.	.....	Aneurism	Apr. 7, 1863.	In continuity. Surg. F. Formento, jr.	Recovery.
65	Lastofka, W., Pt., I, 26th Wis., age 19.	May 3, 1863.	Fract. r't humerus; May 15, amp. sh. jt.	June 1, 1863.	Brachial	June 1, 1863.	On face of stump ...	Discharged Aug. 13, 1863.
66	Leichfield, J. N., B, 20th Ind., age 21.	May 12, 1864.	Left forearm, upper.	May 24, 31, June 7, 1864.	Radial	June 7, 1864.	In continuity	Discharged July 9, 1864.
67	Letterman, H., K, 67th Penn., age 36.	June 4, 1864.	Left radius, wrist ...	July 13, 1864.	Radial	July 14, 1864.	In continuity	Discharged Mar. 1, 1865.
68	Little, J. H., Serg't, I, 32d Maine.	June 3, 1864.	Fracture right ulna, lower; excision.	.....	.....	June 14, 1864.	In cont. A. A. Surg. J. A. McArthur.	Duty Jan. 26, 1865.
69	Luse, J. B., Pt., C, 125th Ohio.	July 18, 1864.	Fract. radius; July 23, excision.	Aug. 1, 4, 1864.	Radial; brachial. Aug. 2, amp. arm.	Aug. 4, 1864.	On face of stump....	Discharged Apr. 11, 1865.
70	Maher, T., Pt., E, 55th Mass., age 17.	June 17, 1864.	Left humerus, middle.	July 6, 1864.	Brachial	July 6, 1864.	In cont., upper third. A. A. Surg. H. M. Dean.	Recovered Sept. 24, 1864.
71	Martin, T. A., Pt., G, 91st N. Y., age 22.	Mar. 31, 1865.	Fracture right forearm.	Apr. 16, 1865.	Radial	Apr. 16, 1865.	In cont., lower third	April 18, amputated. Disc'h Aug. 17, 1865.
72	May, A. D., Corp'l, H, 33d Ind., age 22.	May 15, 1864.	Fracture right ulna, middle.	May 24, 26, 27, '64.	Ulnar or interosseous.	May 27, 1864.	In cont., at elbow. A. Surg. H. T. Legler, U. S. V.	Discharged Mar. 6, 1865.
73	McAllister, W., S'gt, F, 96th Pa., age 30.	May 10, 1864.	Flesh; right arm, lower.	May 21, 1864.	Brachial	May 21, 1864.	One end in wound; relig. June 6. Surg. E. Bentley, U. S. V.	Discharged Oct. 13, 1864.
74	*McClinty, G.*, Pt., F, 17th S. C. C., age 17.	Aug. 27, 1864.	Right elbow joint ...	Sept. 20, 1864.	Brachial	Sept. 20, 1864.	Both ends in wound.	Exchanged Oct. 17, 1864.
75	McGraw, E. H., C'pl, A, 9th Me., age 18.	July 21, 1864.	Left arm, fracture; primary amp.	Aug. 30, 1864.	Brachial	Aug. 30, 1864.	In cont., upper third, near stump.	Discharged Sept. 27, 1864.
76	McIntire, A., Pt., M, 2d N. Y. Art., age 22.	June 3, 1864.	Right forearm	.....	.....	June 15, 1864.	In cont. Surg. T. R. Crosby, U. S. V.	Discharged Dec. —, 1864.
77	McMillan, S. L., Pt., C, 40th Ohio, age 21.	Sept. 20, 1863.	Fracture right ulna .	Nov. 5, 1863.	Brachial	Nov. 5, 1863.	.....	Duty May 26, 1864.
78	Moore, A. A., Pt., C, 53d Ind., age 21.	July 21, 1864.	Flesh; left forearm..	.....	.....	Oct. 1, 1864.	In cont. Surg. J. C. Morgan, 29th Mo.	Discharged May 11, 1865.
79	Morris, R., Pt., A, 149th Penn., age 25.	Oct. 27, 1864.	Flesh; right forearm, upper.	Nov. 13, 1864.	Radial.....	Nov. 14, 1864.	In cont. Surg. N. R. Moseley, U. S. V.	Discharged April 26, 1865.
80	Mullen, H., Pt., E, 36th Illinois.	Dec. 31, 1862.	Left arm; March 12, amputation.	Mar. 26, 31, 1863.	.....	Mar. 31, 1863.	In cont.; slight hemorrhage.	Discharged June 27, 1863.
81	Myers, H., Serg't, A, 23d Illinois.	May 3, 1863.	Brachial artery near elbow, left.	May 3, 1863.	.....	May 3, 1863.	Ligation. A. A. Surg. J. Kirker.	Discharged July 24, 1865.
82	Noyes, E., Corp., C, 11th Maine, age 21.	Aug. 16, 1864.	Right arm.....	Sept. 3, 1864.	Brachial	Sept. 3, 1864.	In cont. A. A. Surg. E. B. Woolston.	Amputated Sept. 10; disch. Jan. 27, 1865.
83	O'Coyle, D., Pt., K, 1st Wis. C., age 21.	July 27, 1862.	Interosseous artery, right forearm.	.....	.....	.....	In continuity, near elbow.	Discharged October 25, 1862.
84	Owens, E. G., Pt., H, 13th W. Va., age 19.	Oct. 19, 1864.	Left arm, lower third.	Oct. 27, 1864.	Brachial	Oct. 27, 1864.	Both ends in wound.	Vet. R. C. May 26, 1865.
85	Parrett, W. B., Pt., D, 5th Iowa, age 20.	Sept. 19, 1862.	Left arm	Oct. 3, 1862.	.....	Oct. 3, 1862.	Ligation	Discharged January 7, 1863.

[1] Ashhurst (J.), *Surgical Cases*, in *Am. Jour. Med. Sci.*, 1864, Vol. XLVII, p. 144.

[2] Holloway (J. M.), *Consecutive and Indeterminate Hæmorrhage from Large Arteries after Gunshot Wounds, etc.*, in *Am. Jour. Med. Sci.*, 1865, Vol. L, p. 342.

[3] Formento (F.), *Notes and Observations on Army Surgery*, New Orleans, 1863, p. 56.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
86	[1]Pepper, E., Pt., B, 18th Inf., age 35.	Dec. 31, 1862.	Fracture right ulna, upper third.	Jan. 8, 10, 1863.	.....	Jan. 10, 1863.	In continuity; Feb. 10, hæmor. rec.	Feb. 12, amputated. Dis. April 21, 1863.
87	Perman, M., Pt., F, 2d N. J. C., age 33.	May 2, 1864.	Fract. right radius, middle.	June 21, 1864.	Radial	June 21, 1864.	In cont., mid. third. Ass't Surg. J. C. G. Happersett, U.S.A.	Discharged September 5, 1864.
88	Philbrick, C. W., Pt., F, 3d N. H., age 22.	May 15, 1864.	Fract. left humerus; May 15, amputation.	June 1, 1864.	Brachial	June 1, 1864.	On face of stump	Discharged August 18, 1864.
89	Pierce, G. W., Corp., D, 20th Ind., age 22.	Aug. 29, 1862.	Lacerated wound of left hand.	Sept. 9, 10, 1864.	Palmar arch.....	Sept. 10, 1862.	In continuity	Discharged February 11, 1863.
90	Potter, E., Pt., H, 86th N. Y., age 29.	May 6, 1864.	Flesh; left arm; injured artery.	May 17, 1864.	Brachial	May 17, 1864.	In continuity, mid. Assistant Surg. W. Thomson, U. S. A.	Discharged March 12, 1865.
91	Powers, C. C., Pt., A, 40th Iowa.	June 13, 1865.	Fracture left radius, middle.	.....	.....	June 17, 1865.	In continuity. Ass't Surg. J. C. Miles, U. S. V.	Recovery.
92	Price, E., Corp'l, B, 39th N. Y., age 22.	April 2, 1865.	Elbow; injury to brachial artery.	April 6, 1865.	Ulnar, recurrent .	April 6, 1865.	Ligat'n brachial and ulnar.	Discharged July 27, 1865.
93	Quinn, J., Pt., C, 18th Infantry.	Dec. 31, 1862.	Flesh; middle third arm.	Jan. 10, 22, 1863.	....	Jan. 23, 1863.	Ligation in continuity, upper third.	V. R. C. July 8, 1863.
94	Reede, K., Pt., C, 184th Pennsylvania, age 21.	Aug. 14, 1864.	Left forearm, near elbow.	Sept. 2, 7, 1864.	Ulnar ligated September 2.	Sept. 7, 1864.	Both ends in wound. A. A. Surg. W. H. Ensign.	Discharged Dec. 26, 1864.
95	Reese, C., substitute, age 20.	Oct. 17, 1863.	Fracture left radius and artery.	.....	.....	Oct. 17, 1863.	In continuity. A. A. Surg. A. Hewson.	Jan. 7, 1864, amp. Disc. Nov. 28, 1864.
96	Reese, R., Pt., H, 105th Ohio.	Oct. 8, 1862.	Fracture ulna	Oct. 22, 1862.	.....	Oct. 22, 1862.	In continuity. Surg. W. Varian, U. S. V.; ineffectual.	Hem. cont. by excision. Discharged Jan. 27, 1863.
97	Rice, J. H., Pt., A, 20th Conn., age 22.	Mar. 19, 1865.	Right brachial artery.	Mar. 19, 1865.	Brachial	Mar. 19, 1865.	Ligation	May 7, amp. Disc. Oct. 18, 1865.
98	Root, E. C., Lieut., D, 2d New York Artillery, age 29.	May 19, 1864.	Fracture left forearm, upper third; excision.	June 1, 15, 1864.	Radial and branch profunda.	June 1, 15, 1864.	In cont. 1st Surg. H. W. Ducachet, U. S. V., and 2d A. A. S. J. O. Stanton.	Dismissed Jan. 25, 1865.
99	Schrichfield, J. H., Pt., B, 20th Indiana, age 21.	May 12, 1864.	Left elbow joint.....	May 24, 31, June 7, 1864.	Radial	June 7, 1864.	In continuity, lower third.	Discharged July 29, 1864.
100	Shook, J., Pt., G, 27th Ohio, age 21.	July 4, 1864.	Left forearm, upper third.	.....	Radial	July 18, 1864.	In cont'n'ty. Surg. J. H. Grove, U. S. V.	Discharged May 25, 1865.
101	Sipes, J., Serg't, K, 32d Ohio, age 24.	July 16, 1865.	Right humerus, inv. brachial artery.	.....	Brachial	July 17, 1865.	Ligation. Surg. R. R. Taylor, U. S. V.	Discharged Sept. 27, 1865.
102	Smith, T. J., Pt., E, 6th Iowa, age 22.	April 6, 1862	Fract. right radius	Apr. 24, 1862.	Brachial	Apr. 24, 1862.	Ligation; in continuity.	Discharged Mar. 19, 1863.
103	Smith U. A., Pt., C, 15th Iowa, age 29.	Aug. 14, 1864.	Right arm, upper third brachial art.	.....	Brachial	Aug. 14, 1864.	Ligation in upper third.	Discharged Dec. 6, 1864.
104	Stevenson, T. J., Pt., G, 52d Ohio, age 30.	Dec. 10, 1862.	Fracture left hand ..	Dec. 18, 1862.	.....	Dec. 18, 1862.	In continuity near elbow.	Discharged Jan. 23, 1863.
105	Sweeny, P., Pt., D, 2d New York Heavy Artillery, age 40.	Aug. 14, 1864.	Left arm	Sept. 17, 1864.	Brachial	Sept. 17, 1864.	Ligat'n. Surg. N. R. Moseley, U. S. V.	Hæm. September 29. Discharged Feb. 3, 1865.
106	Thompson, W. M., Serg't, E, 99th Ohio.	Nov. 25, 1863.	Fracture elbow, sev. brachial artery.	.....	Brachial	.....	Ligation	Discharged June 28, 1864.
107	*Tobert, L. C.*, Serg't, C, 2d Alabama, age 18.	April 9, 1865.	Flesh; left arm, elbow.	Apr. 17, 1865.	Brachial	Apr. 17, 1865.	In continuity, lower portion. Surg. A. McMahon, U. S. V.	April 25, 1865, hæm. Recovery.
108	Trask, T., Pt., F, 2d New York M. R., age 16.	June 3, 1864.	Left forearm, radial and ulnar arteries.	June 20, 1864.	Radial	June 20, 1864.	In cont. Surg. N. R. Moseley, U. S. V.	Discharged May 23, 1865.
109	Tuttle, F. M., Pt., B, 44th Ill., age 23.	June 27, 1864.	Flesh; left forearm	July 17, 1864.	Ulnar ligated	July 19, 1864.	In continuity, lower third.	Discharged Feb. 28, 1865.
110	[2] *Ward, C. O.*, Pt, G, 66th North Carolina, age 25.	June 30, 1864.	Fracture left metacarp.	.....	Sloughing.....	July 16, 1864.	In cont. Asst. Surg. O'Leary, C. S. A.	July 26, slight hæm. Recovery.
111	Warren, S., Pt., A, 11th Maine.	May 31, 1862.	Flesh; left arm, near elbow.	.....	Brachial	.....	In continuity	Discharged 1862.
112	Welch, E. F., Pt., 57th New York, age 20.	June 16, 1864.	Left arm; fracture; amputated.	July 6, 1864.	.....	July 6, 1864.	On face of stump. Surg. R. B. Bonteeu, U. S. V.	Discharged September 19, 1864.
113	*Whaley, I.*, Corp., H, 54th Alabama.	July 28, 1864.	Fracture right sh. joint; excision.	Aug. 11, 12, 1864.	Deltoid branch....	Aug. 12, 1864.	In wound	.....
114	White, A. B., Pt., D, 1st D. C. Cavalry, age 22.	June 16, 1864.	Flesh; upper third, right arm.	July 6, 1864.	Brachial	July 6, 1864.	Both ends in wound. A. A. Surg. J. M. McGrath.	Discharged December 29, 1864.
115	White, E. B., Pt., F, 19th Maine, age 21.	Mar. 31, 1865.	Flesh; right arm, inj. brachial artery.	Apr. 12, 1855.	Brachial	Apr. 12, 1865.	In cont., mid. A. A. Surg. W. H. Ensign.	Discharged June 29, 1865.
116	Williams, J., Pt., A, 6th Pennsylvania Cavalry, age 26.	Sept. 20, 1862.	Left arm; div. brachial artery.	Sept. 20, 1862.	Brachial	Sept. 20, 1862.	In wound, both ends. Asst. Surg. J. W. S. Gouley, U. S. A.	Duty October 16, 1862.
117	Wilkinson, E. W., Serg., G, 42d New York.	May 10, 1864.	Fract. ulna; lacera'd brachial artery.	May 10, 1864.	.....	May 10, 1864.	In cont. (ulnar also). Surg. J. M. Burr, 42d New York.	Duty April 26, 1865.
118	Wiltse, M. H., Pt., G, 1st U. S. Signal Service, age 25	May 3, 1863.	Fracture right ulna, upper third; exc.	May 15, 1863.	Post. interosseous.	May 26, 1863.	In continuity, near elbow.	Discharged January 11, 1864.
119	Winnemore, E., Mus., K, 88th Pennsylvania, age 21.	June 26, 1864.	Right forearm, upper third.	Aug. 8, 1864.	Ulnar	Aug. 8, 1864.	In cont, mid. third. A. A. Surg. W. P. Moon.	Discharged January 13, 1865.
120	Barker, J. H., Corp., E, 142d Penn., age 25.	May 12, 1864.	Fract. left humerus; amputated.	June 1, 1864.	Brachial	June 1, 1864.	In continuity	Died June 1, 1864.
121	Beaver, T., Pt., H, 2d Wisconsin, age 30.	Aug. 27, 1862.	Fract. right humerus; excision.	Sept. 1, 1862.	Brachial	Sept. 1, 1862.	In wound	Died September 17, 1862.
122	Beverly, W. J., Pt., C, 17th Maine, age 27.	May 5, 1864.	Flesh, elbow; brach. artery severed.	May 23, 24, 1864.	Brachial	May 24, 1864.	Both ends in wound. Asst. Surg. G. A. Mursick, U. S. V.	Died July 2, 1864, pyæmic pneumonia.

[1] Shrady (J.), *Ligature of Brachial Artery*, in *American Medical Times*, 1863, Vol. VI, p. 173.

[2] Wright (D. F.), *The Effects of the Hunterian Method of Ligation on Inflammation*, in *Confederate States Medical and Surgical Journal*, 1864, Vol. I, p. 177.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
123	Blakeley, A., Pt., I, 3d Michigan Cavalry.	June 16, 1863.	Left arm	July 8, 9, 10, 1863.	Brachial	July 10, 1863.	In cont.; ineffectual. Surg. B. A. Vanderkieft, U. S. V.	Amp. arm, sh. joint; hæm. recur'd, amp. Died July 26, 1863.
124	Bohner, W., Pt., H, 3d Ohio Cav., age 20.	Aug. 19, 1864.	Fract. left humerus, lower third.	Sept. 5, 1864.	Humeral	Sept. 5, 7, 8, 10, 1864.	In cont. A. A. Surg. J. L. Eaton.	Died October 3, 1864.
125	Brickett, E. J., Pt., A, 7th Michigan Cavalry, age 19.	July 2, 1863.	Fract. right arm, upper third; amp.	July 23, 1863.	Brachial	July 23, 1863.	In continuity	Died Aug. 10, 1863; pyæmia.
126	Brint, J., Corp., F, 14th Ohio, age 27.	Aug. 5, 1864.	Right arm, near elbow; gangrene.	Sept. 13, 1864.	Brachial	Sept. 13, 1864.	Both ends in cont.; Sept. 16, relig.	Sept. 23, amp.; died Oct. 12, 1864; py.
127	Brooks, G., Pt., I, 9th W. Virginia, age 20.	Aug. 26, 1864.	Flesh; middle right arm; part. severed brachial artery.	Sept. 5, 1864.	Brachial	Sept. 5, 1864.	Both ends in wound. A. A. Surg. T. J. Dunott.	Died Sept. 16, 1864; gangrene.
128	Burnham, L. M., Corp., D, 132d Pennsylvania, age 22.	Sept. 17, 1862.	Fract. left radius; amp. forearm.	Oct. 30, 1862.	Slough. stump	Nov. 4, 1862.	In continuity	Died Nov. 15, 1862.
129	Cline, C. R., Pt., D, 7th W. Va., age 21.	June 1, 1864.	Flesh; right brach. artery injured.	June 15, 1864.	Brachial	June 15, 1864.	Lig. A. A Surg. H. D. Vosburgh.	June 23, amp.; died June 25, 1864.
130	Core, T., Capt., K, 148th Penn., age 27.	May 6, 1864.	Right elbow fracture; excision.	May 16, 19, 1864.	Radial	May 19, 1864.	In continuity, upper third.	Died May 31, 1864; pyæmia.
131	*Cronan, J.*, —, E, 10th La., age 27.	May 12, 1864.	Fracture right arm; amputation.	June 1, 1864.	Brachial	June 1, 1864.	In continuity	Died June 2, 1864.
132	Donnelly, E., Pt., C, 51st N. Y., age 29.	Sept. 17, 1862.	Flesh; left arm.	Oct. 3, 5, 6, 1862.	.....	Oct. 6, 1862.	Both ends in wound; Oct. 7, amputation.	Died Nov. 7, 1862; pyæmia.
133	Evers, W., —, E, 9th Wisconsin.	.....	Elbow; ulnar artery.	.....	.....	Nov., 1862.	In continuity	Died 24 hours after lig. of aneurism.
134	Fitzgerald, J. P., Pt., G, 52d N. Y., age 37.	May 18, 1864.	Frac. left humerus; amputation.	May 22, 1864.	Brachial	May 22, 1864.	On face of stump. Ass't Surg. G. A. Mursick, U. S. V.	Died June 4, 1864; pyæmia.
135	Great, A., Corp'l, D, 46th N. Y., age 37.	June 18, 1864.	Flesh; upper third right forearm.	July 23, 1864.	Radial	July 23, 1864.	In continuity (after lig. radial).	Died July 25, 1864; exhaustion.
136	Hamlin, F. N., Lt., K, 147th N. Y., age 32.	May 5, 1864.	Fracture left forearm, ulnar artery divided.	June 5, 1864.	Ulnar	June 5, 1864.	In cont'ty; after lig. ulnar. Surg. H. W. Ducachet, U. S. V.	Died June 25, 1864; exhaustion.
137	[1]*Hardy, F. S.*, Pt., B, 30th N. C., age 22.	July 12, 1864.	Fracture left ulna and right radius.	Aug. 13, 1864.	Right brachial	Aug. 13, 1864.	In cont'ty; slough.; hæm. recurred.	Died Aug. 14, 1864; exhaustion.
138	Heatherly, J., Pt., E, 11th W. Va., age 35.	Oct. 28, 1864.	Fracture left forearm, upper third; Oct. 29, excision.	Dec. 10, 16, 19, 1864.	Brachial	Dec. 19, 1864.	In continuity, above bifurcation; hæm. recurred.	Jan. 4, 1865; amputation. Died Jan. 21; pyæmia.
139	Hendrix, A., Pt., C, 140th N. Y.	July 2, 1863.	Fracture right elbow joint.	July 26, Aug. 2, 1863.	.....	Aug. 4, 1863.	In wound; hæmorrhage recurred Aug. 14, 16.	Died Aug. 18, 1863.
140	Howard, G., Pt., H, 8th N. Y. Heavy Artillery, age 20.	June 3, 1864.	Fracture right forearm.	June 29, 1864.	Brachial	June 29, 1864.	Both ends in wound	Died July 1, 1864; exhaustion.
141	Iler, W. S., Bugler, D, 15th Ohio, age 22.	May 27, 1864.	Fracture right arm, elbow; amp.	Sept. 6, 1864.	Brachial	Sept. 6, 1864.	On face of stump ...	Died Sept. 16, 1864.
142	Johnson, O., Pt., C, 33d Iowa.	July 4, 1863.	Flesh; right forearm.	July 30, Aug. 5, 1863.	Radial and ulnar..	Aug. 5, 1863.	In continuity	Died Aug. 13, 1863.
143	Jones, J., Pt., A, 143d Penn., age 28.	July 1, 1863.	Frac. right wrist; amputation.	July 17, 1863.	Brachial	July 17, 1863.	In continuity	Died July 18, 1863.
144	*Kane, J. F.*, Pt., D, 27th Georgia.	June 1, 1864.	Fracture humerus, upper third; amputation.	June 13, 16, 1864.	Brachial	June 15, 16, 1864.	In continuity	Died June 16, 1864.
145	Lake, J. F., Corp'l, A, 14th N. J., age 44.	Nov. 27, 1863.	Fracture left humerus; amp.	Dec. 15, 1863.	Brachial	Dec. 15, 1863.	In continuity; Dec. 24, lig. sup. prof.	Died Dec. 25, 1863.
146	Lamareaux, A., Corporal, E, 14th N. Y., age 20.	April 1, 1865.	Fracture left radial, upper third; radial artery severed.	Apr. 9, 12, 15, 1865.	.....	Apr. 15, 1865.	In continuity	Died April 16, 1865; exhaustion. *Spec.* 4186.
147	Lanoni, C., Pt., I, 9th N. H., age 23.	Sept. 13, 1864.	Right arm.....	Oct. 10, 1864.	Brachial	Oct. 10, 1864.	One end in wound. A. A. Surg. G. Sweet.	Died Nov. 13, 1864; chronic diarrhœa.
148	Marshall, H., Pt., E, 1st Mich. C., age 20.	May 28, 1864.	Flesh; right arm ...	June 19, 1864.	Radial and ulnar..	June 19, 1864.	In continuity; hæmorrhage recurred.	June 24, 1864, amp. Died July 11, 1864; pyæmia.
149	McCriden, B., Pt., D, 63d N. Y., age 30.	June 16, 1864.	Fracture left humerus; 23d, exc. sh. jt.	June 29, 1864.	.....	June 29, 1864.	Ligation	Died July 8, 1864.
150	Morgan, L., Pt., D, 14th Mich. age 22.	Mar. 25, 1865.	Flesh; left arm, middle third.	April 8, 1865.	Brachial	April 8, 1865.	Both ends in wound.	Died April 13, 1865; pyæmia.
151	Mullan, P., disch'd soldier, age 30.	Jan. 29, 1862.	Inj. humerus and thoracic parietes.	Oct. 20, 1862.	Brachial	Oct. 20, 1862.	Ligation	Oct. 21, amputated; died Nov. 5, 1862.
152	Nash, J. E., Pt., B, 9th N. Y. A., age 25.	July 9, 1864.	Left elbow joint; amputation.	Aug. 2, 1864.	Brachial	Aug. 2, 1864.	On face of stump....	Died Aug. 7, 1864; pneumonia.
153	*Nunn, T. P.*, Pt., F, 12th Ga.	.....	Right elbow, cutting brachial.	.....	.....	....	In continuity	Died June 20, 1864.
154	Palmer, U., Pt., B, 4th Art.	July 1, 1863.	Left arm.....	July 12, 16, 1864.	Brachial; July 12, amp. arm.	July 16, 1864.	On face of stump....	Died July 21, 1864.
155	Parmenter, R. B., Pt., A, 21st Mich., age 32.	Dec. 16, 1862.	Left hand	.....	.....	Dec. —, 1862.	In continuity near elbow.	Died Jan. 1, 1863; mortification.
156	Rea, J. H., Pt., H, 102d Penn., age 17.	May 5, 1864.	Left arm, upper third.	.....	Brachial	May —, 1864.	Ligation	May 17, amputated; died Dec. 1, 1864; phth. and diar.
157	Reagles, L., Pt., A, 64th N. Y., age 20.	Oct. 14, 1864.	Arm nearly severed at middle; amputated in upper third	Oct. 18, 1864.	Brachial	Oct. 18, 1864.	In continuity at axilla. A. A. Surg. C. P. Bigelow.	Died Oct. 20, 1864; recur. of hæm.
158	Rees, G. W., Pt., G, 20th Pa. C., age 22.	April 1, 1865.	Fracture left radius, middle third.	Apr. 12, 1865.	Radial	Apr. 12, 1865.	In cont. A. A. Surg. J. Morris.	Died April 26, 1865; pneumonia.
159	Richardson, O. B., Serg't, E, 32d Me., age 21.	June 3, 1864.	Fracture right radius.	July 1, 1864.	.....	July 5, 1864.	Both ends in cont. Surg. E. Russell, Farmington, Me.	July 15, amputated; died Aug. 23, 1864.
160	Roberts, J., Corp'l, H, 24th N. Y. Cav.	June 3, 1864.	Right arm, lower third.	.....	....	June 28, 1864.	Ligated	Died July 8, 1864; pyæmia.
161	Satterfield, E., Pt., F, 12th W. Va.	Apr. 2, 1864.	Left elbow joint; amputation arm.	Aug. 6, 1864.	Brachial	Aug. 6, 1864.	On face of stump....	Died August 7, 1864; pyæmia.

[1] Leavitt (T. L.), *Tenacity of Human Life as seen in Gunshot Injuries*, in *Medical and Surgical Reporter*, Philadelphia, 1865, p. 299.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
162	Slater, J., Corp'l, K, 7th New York Artillery, age 20.	June 16, 1864.	Fracture right radius and ulna, mld.; amputation.	June 30, 1864.	Radial and ulnar	June 30, 1864.	In continuity	Died July 8, 1864. *Spec.* 2700.
163	Tipton, J., Pt., C, 78th Illinois, age 30.	Sept.—, 1862.	Left wrist joint	Oct. 15, 1862.		Oct. 15, 1862.	In continuity; Oct. 17, amputation.	Disch'g'd; died Nov. 30, 1862; lung fever.
164	Urmston, J., Pt., K, 86th Indiana.	Sept. 19, 1863.	Thro' carpus right hand; amputation.			Oct. 20, 1863.	In continuity at lower third.	Died October 21, 1863.
165	Vandersliee, J., Pt., D, 96th Pennsylvania, age 49.	June 3, 1864.	Flesh; arm	June 14, 1864.	Brachial	June 14, 1864.	One end in wound. A. A. Surg. D. Kendy.	Died July 16, 1864; pyæmia.
166	Waite, W., Pt., E, 53d Ohio.	May 31, 1864.	Flesh; right arm, upper third; brachial artery cut.	May 31, 1864.	Brachial	May 31, 1864.	Ligated. Surg. J. N. Barnes, 116th Illinois.	Died May 31, 1864; effect of chlorof'm.
167	Walker, H. H., Pt., A, 27th New York, age 29.	June 27, 1862.	Flesh; middle third arm.	Aug. 3, 1862.		Aug. 3, 1862.	Ligation	Died August 3, 1862.
168	*Walker*, W., Pt., C, 18th Georgia.	1863.	Fracture humerus				Ligation; hæm. rec. December 10.	Died December 11, 1863.
169	Williamson, J., Corporal, F, 111th Illinois, age 26.	Dec. 13, 1864.	Right forearm, injuring ulnar artery.	Dec. 30, 1864.	Ulnar	Jan 2, 1865.	In continuity. A. A. Surg. H. Leaman. Jan. 6, re-ligated.	January 7, amputation. Died February 1, 1865; pyæmia.
170	Wolfe, F., Pt., N, 9th New York Artillery, age 28.	Oct. 19, 1864.	Flesh; injuring brachial artery.	Oct. 29, 1864.	Brachial	Oct. 29, 1864.	Both ends in wound. A. A. Surg. H. L. Snyder.	Died November 14, 1864, of pyæmia.

Of the one hundred and seventy cases amputation of the arm had been performed in twenty-nine, and the subsequent ligations were on the face of the stump in ten and in the continuity in nineteen instances. Hæmorrhages recurred after ligations in thirty-eight instances, causing fatal terminations in sixteen cases.

Ligations of Branches of the Brachial Artery.—These include three cases of ligations of muscular branches (one recovery, two fatal), seven ligations of the profunda (five recoveries, two deaths), and a fatal case of ligation of the anastomotica magna:

Ligations of Muscular Branch of Brachial Artery.—Cases 1133–1135.—Private R. Richards, G, 4th New Hampshire, aged 29; shell wound of right elbow February 21, 1865; amputation of arm on same day; hæmorrhage March 27; muscular branch ligated on face of stump; discharged June 11, 1865.—Private W. Fitzgerald, B, 1st U. S. Sharpshooters, age 19; shot fracture of elbow joint November 7, 1863; excision November 8, 1863; amputation of arm November 12th; hæmorrhage November 24th from muscular branch; ligation on face of stump by Assistant Surgeon W. F. Norris, U. S. A.; death from pyæmia November 29, 1863.—Lieut. D. A. Walbridge, A, 11th Vermont, age 31; shot fracture of right humerus June 4, 1864; amputation of arm on same day; hæmorrhage June 18th; ligation of muscular branch on face of stump; hæmorrhage recurred; artery re-ligated; death June 19, 1864, from exhaustion.

Ligations of Profunda Arteries.—Cases 1136–1142.—Private G. C. Figgens, 8th Illinois, age 25; right shoulder joint April 9, 1865; excision of neck of humerus same day; hæmorrhage from profunda May 9th; ligation in wound May 9th; no recurrence; discharged July 22, 1865.—Private E. Getchell, C, 3d Maine, age 29; shot fracture of left arm May 5, 1864; amputation of arm May 6th; hæmorrhage from profunda May 9th; ligation on face of stump; discharged December 13, 1864.—Private G. Johnson, I, 9th U. S. Colored Troops; shot fracture of right humerus September 29, 1864; hæmorrhages October 16–26; excision of head of humerus and ligation of profunda; discharged December 9, 1865.—Corporal A. C. Vantine, B, 123d Ohio, age 23; shot wound of right elbow September 22, 1864; amputation of arm October 12th; hæmorrhage from profunda October 16th; ligation on face of stump; no recurrence; discharged February 21, 1865.—Private L. G. Williams, H, 84th Illinois, age 30; flesh wound of arm September 19, 1863; hæmorrhage from profunda October 8th; ligation of cardiac end in wound October 8th; no recurrence; discharged February 28, 1865.—Private J. P. Wells, E, 104th New York, age 19; flesh wound of arm July 1, 1863; hæmorrhage from profunda July 7th; ligation July 9th; death July 20, 1863.—Private J. Woods, C, 85th Pennsylvania, age 23; fracture of left humerus September 2, 1863; amputation of arm September 9, 1863; hæmorrhage from profunda September 12th; artery ligated on face of stump; death September 17, 1863, from exhaustion.

Ligation of Anastomotica Magna.—Case 1143.—Corporal J. Foster, K, 38th Illinois; flesh wound of arm September 19, 1863; hæmorrhage from anastomotica magna September 29th; wound enlarged and artery ligated same day; gangrene October 7th; death from exhaustion October 9, 1863.

Ligations of the Radial Artery.—Fifty-nine cases with forty-five recoveries and fourteen deaths were reported, a fatality rate of 23.7 per cent. In four cases, of which one proved successful and three fatal, the ulnar artery was also ligated. The ligation was performed after amputation in the forearm in seven instances; in three cases of recovery on the face of the stump; and in four cases, with two recoveries and two deaths, in the continuity. In four instances primary ligation was performed on the field; all recovered.

TABLE CXXXIV.

Condensed Summary of Fifty-nine Ligations of the Radial Artery for Shot Injury.

[Recoveries, 1—45; Deaths, 46—59.]

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
1	Blackney, J., Pt., G, 63d Penn., age 40.	June 16, 1864.	Fracture right radius.	June 28, 1864.	Radial artery.....	June 28, 1864.	Right; both ends in wound. Act. Asst. Surg. C. Eberhardt.	Discharged July 7, 1865.
2	Brown, D., Pt., I, 7th West Va. Cavalry.	Nov., 1864.	Wound left hand....	.....	.....	Nov., 1864.	Left; radial ligated.	Mustered out Aug., 1865.
3	Clough, A., Pt., C, 31st Maine, age 18.	June 3, 1864.	Fracture right radius.	June 8, 1864.	Radial artery.....	June 8, 1864.	Right; both ends in cont. Act. Asst. Surg. C. Eberhardt.	Veteran Reserve C. Feb. 18, 1865.
4	Cottrell, C. H., Pt., I, 7th N. J., age 18.	May 12, 1864.	Fracture left radius.	.....	.....	.....	Left. A. Surg. H. M. Sprague, U. S. A.	Duty Oct. 17, 1864.
5	Dieffenbach, H., Lt., I, 111th Pa., age 30.	July 20, 1864.	Fracture right radius; excision.	July 20, 1864.	Radial.....	July 20, 1864.	Right. Surg. A. K. Fifield, 29th Ohio.	Discharged Nov. 3, 1864.
6	Engle, G. D., Pt., A, 28th Mich., age 18.	Mar. 10, 1865.	Fracture left radius; excision.	Mar. 18, 1865.	Radial.....	Mar. 18, 1865.	Left; radial ligated..	Discharged July 20, 1865.
7	Fairfield, E. F., Corp'l, D, 74th N. Y.	Aug. 29, 1862.	Fracture left hand; amputation finger.	.....	.....	.....	Rad. and ulnar art. in cont., lower third.	Discharged Oct. 31, 1862.
8	Fisher, R., Pt., K, 121st N. Y., age 18.	May 10, 1864.	Flesh wounds right forearm and arm.	June 7, 1864.	Radial.....	June 7, 1864.	Right; both ends in wound. Act. Asst. Surg. A. A. Smith.	Discharged Dec. 10, 1864.
9	Gaunt, B., Pt., A, 12th N. J., age 26.	June 5, 1864.	Fracture right forearm; amputation.	June 30, 1864.	Radial.....	June 30, 1864.	Right; on face stump.	Discharged Oct. 26, 1864.
10	Gracey, A., Pt., E, 52d Ohio, age 40.	July 1, 1864.	Flesh wound left forearm.	July 20, 1864.	Radial.....	July 20, 1864.	Left; both ends in wound.	July 22, amp. arm. Disch'd May 2, 1865.
11	Greenly, H., Pt., K, 34th New York.	June 30, 1862.	Shell wound right wrist.	July 15, 1862.	.....	July 18, 1862.	Right; in continuity.	Discharged Jan. 10, 1863.
12	Hakes, A., Pt., A, 32d N. Y., age 23.	Sept. 17, 1862.	Fracture right radius.	Oct. 9, 1862.	Radial artery.....	Oct. 9, 1862.	Right; one end in wound.	Duty Feb. 13, 1863.
13	Hall, J. M., Pt., E, 20th Illinois.	April 6, 1862.	Fracture right radius.	.....	.....	....	Right; radial ligated.	Discharged Aug. 28, 1862.
14	Hannaberry, W. A., Pt., A, 26th Penn., age 20.	July 2, 1863.	Fracture left ulna...	July 19, 1863.	Radial artery.....	July 19, 1863.	Left; one end in wound.	Discharged Feb. 9, 1864.
15	Harding, H. S., Capt., A, 122d Ohio, age 42.	June 3, 1864.	Fracture left radius.	June 3, 1864.	Radial artery.....	June 3, 1864.	Left; on field.	Discharged Oct. 27, 1864.
16	Hart B., Pt., D, 28th Mass., age 38.	July 3, 1863.	Fracture bones right hand.	July 4, 1863.	Radial artery.....	July 4, 1863.	Right; in continuity.	Discharged Feb. 28, 1864.
17	Hathaway, L., C'p't, I, 25th Mass., age 25.	June 2, 1864.	Flesh wound left forearm.	June 6, 1864.	.....	June 13, 1864.	Left; in cont. Surg. E. Bentley, U. S. V.	Discharged Oct. 27, 1864.
18	Hayden, J., Corp'l, H, 17th Wis., age 25.	Aug. 22, 1864.	Fracture left hand and wrist.	Sept. 9, 1864.	Radial artery.....	Sept. 9, 1864.	Left; in cont. Surg. J. G. Miller, 11th Iowa.	Discharged May 5, 1865.
19	Hulse, S., Pt., I, 84th Penn., age 27.	May 15, 1864.	Flesh wound, injuring right rad. art.	May 26, 1864.	Radial artery.....	May 26, 1864.	Right; in cont.; both ends. Act. Asst. Surg. J. Evans.	Deserted October 16, 1864.
20	Lamper, C., Pt., F, 82d Penn., age 21.	June 1, 1864.	Fracture left ulna...	July 27, 1864.	Radial artery.....	July 27, 1864.	Left; both ends in wound. Act. Asst. Surg. W. F. Atlee.	Discharged May 17, 1865.
21	Lewis, E. H., Pt., E, 145th Penn., age 18.	Dec 13, 1862.	Frac. left carpus j't; excis.; amp. forearm.	Mar. 7, 1863.	Radial artery.....	Mar. 7, 1863.	Left; in continuity..	Discharged June 13, 1864.
22	McIsaacs, J., Corp'l, G, 5th Mich., age 21.	May 10, 1864.	Flesh wound left forearm.	May 24, 1864.	Radial artery.....	May 24, 1864.	Radial; both ends in wound. Act. Asst. Surg. W. R. Dunton	Duty Aug. 12, 1864.
23	McMullin, S., Serg't, A, 14th Penn. Cavalry, age 43.	Sept. 18, 1864.	Fracture right carp. bones.	Oct. 18, 1864.	Radial artery	Oct. 18, 1864.	Right; both ends in wound. A. A. Surg. J. M. McGrath.	Oct. 21, amputation forearm. Disch'd Aug. 21, 1865.
24	Miller, I., Pt., K, 97th Penn., age 25.	May 20, 1864.	Flesh wound left forearm.	.....	.....	June 12, 1864.	Left; both ends in wound. A. A. Surg. T. Liebold.	Vet. R. Corps April 12, 1865.
25	Nevins, H. M., Serg't E, 25th New York Cavalry, age 23.	July 11, 1864.	Wound right wrist, rad. art. severed.	July 11, 1864.	Radial artery	July 11, 1864.	Right; in continuity. Aug. 1, 2, hæm., palm. arch.	Aug. 2, amputation forearm. Disch'd May 18, 1865.
26	O'Brien, M., Pt., I, 169th N. Y., age 24.	June 30, 1864.	Flesh wound left forearm.	July 14, 1864.	Radial artery	July 15, 1864.	Left; both ends in wound. Asst. Surg. E. Curtis, U. S. A.	Aug. 2, amputation arm. Discharged Feb. 11, 1865.
27	O'Donnell, E., Pt., C, 3d Pa. Art., age 20.	July 3, 1863.	Fracture left ulna...	July 21, 1863.	Radial artery	July 21, 1863.	Left; in continuity..	Discharged May 16, 1864.
28	Perkins, G. W., Pt., G, 8th Mich., age 25.	Aug. 19, 1864.	Fracture left wrist; amp. forearm.	Oct. 9, 1864.	Radial artery	Oct. 9, 1864.	Left; in continuity..	Discharged Jan. 17, 1865.
29	Ray, D., Pt., I, 5th Conn., age 22.	May 25, 1864.	Flesh wound left forearm.	July 22, 1864.	Musc. branch radial artery.	July 22, 1864.	Left; both ends in wound.	Duty Jan. 26, 1865.
30	Reichneider, P., Pt., H, 28th Penn., age 24.	July 20, 1864.	Fracture left wrist joint; amputation; forearm re-amp.	June 16, 1865.	Radial artery	June 16, 1865.	Left; on face of stump	Discharged Sept. 9, 1865.
31	Richards, G. W., Pt., A, Vet. Res. Corps.	Sept. 3, 1864.	Fracture right wrist and hand; amputation forearm.	Sept. 10, 1864.	Radial artery	Sept. 10, 1864.	Right; in wound; one end.	Discharged July 2, 1865.
32	Rose, G. M., Pt., G, 6th Cavalry, age 22.	Mar. 29, 1864.	Fracture ulna, radial artery injured.	Apr. 2, 1864.	Radial artery	Apr. 7, 1864.	One end in wound. A. A. Surg. W. P. Wolhaupter.	Duty July 12, 1864.
33	Smith, J., Pt., K, 119th Pa., age 22.	Nov. 7, 1863.	Fracture right rad. at wrist.	Nov. 20, 1863.	Radial artery	Nov. 20, 1863.	Right; in cont. A. A. Surg. J. Stearns.	Discharged.
34	Smith, S., Pt., H, 71th Ohio, age 36.	Oct. 2, 1863.	Fracture left radius.	Oct. 26, 1863.	Radial artery.	Oct. 26, 1863.	Left. A. A. Surg. J. Grant.	Duty Sept. 7, 1864.
35	Swords, J. W., Serg't, H, 26th Iowa.	Mar. 20, 1865.	Fracture left radius; resection.	.....	.....	Mar. 20, 1865.	Left radial artery lig.	Discharged June 6, 1865.
36	Tate, W. C., Pt., B, 56th Illinois.	Oct. 4, 1862.	Flesh wound right fore'm, rad. art. sev.	Oct. 4, 1862.	Radial artery	Oct. 4, 1862.	Right; in wound....	Duty Nov. 11, 1862.
37	Thomas, J., Pt., G, 75th Illinois, age 22.	Oct. 8, 1862.	Flesh; right forearm.	Oct. 20, 1862.	Radial artery	Oct. 20, 1862.	Right; both ends in wound.	Discharged Dec. 7, 1862.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
38	Thompson, W. M., Pt., E, 1st Maryland, age 24.	June 3, 1864.	Flesh; left forearm, inj. rad. art.	June 11, 1864.	Radial	June 12, 1864.	Left; both ends in wound. Surg. E. Bentley, U. S. V.	Duty Sept. 19, 1864.
39	Van Kirk, P., Pt., A, 26th Penn., age 21.	July 2, 1863.	Fracture left ulna ..	July 22, 1863.	Radial artery	July 22, 1863.	Left; one end in wound.	Duty May 3, 1864.
40	Washington, M., Pt., K, 8th Colored Troops, age 30.	Aug. 16, 1864.	Fracture left wrist..	Sept. 9, 1864.	Radial artery	Sept. 9, 1864.	Rad. tied in wound..	Discharged May 26, 1865.
41	White, P., Pt., B, 22d Mass., age 42.	July 2, 1863.	Flesh wound left hand.	July 10, 1863.	Dorsal artery	July 10, 1863.	Left; in continuity..	Recovered. Killed June 3, 1864.
42	Wiggins, H., Pt., I, 20th Mass., age 31.	Feb. 26, 1863.	Fracture left carpus; excis.	Mar. 9, 1863.	Recurred March 10, 11, 12.	Mar. 12, 1863.	Left; in continuity..	Discharged Dec. 29, 1863.
43	Woodruff, J., Pt., A, 27th Mich., age 33.	June 18, 1864.	Fracture fingers left hand; amputation.	July 3, 1864.	Radial	July 3, 1864.	Left; on face stump	Transferred July 28, 1864.
44	Wright, W. C., Corp'l, F, 107th N. York, age 21.	July 20, 1864.	Flesh wound right forearm, rupturing radial artery.	.....	Radial	Aug. 5, 1864.	Right; in wound. A. A. Surg. S. W. Blackwood.	Duty July 13, 1865.
45	Wrightman, G., Sgt., L, 6th Mich. Cav., age 23.	May 28, 1864.	Flesh wounds left hand and thigh.	June 27, 28, '64.	Radial artery	June 28, 1864.	Left; one end in wound.	Furloughed Aug. 19, 1864.
46	Beach, H. M., Serg't, C, 5th Minn., age 31.	Dec. 16, 1864.	Flesh wound right arm, inj. rad. and uln. arteries.	Jan. 10, 1865.	Radial and ulnar arteries.	Jan. 10, 1865.	Right; rad. and uln. arteries tied, one end in wound. A. A. Surg. J. Sloan.	Died Jan. 27, 1865; jaundice, etc.
47	Daniels, L., Pt., B, 69th N. Y., age 26.	Mar. 25, 1865.	Flesh wound left forearm and chest.	.....	Radial artery.....	.....	Left; both ends in wound.	Died April 12, 1865, of asthma.
48	Frantz, P., Corp'l, H., 148th Penn., age 21.	May 10, 1864.	Fracture left forearm.	.....	Radial artery.....	May 30, 1864.	Left; rad. art. and musc. branch. A. A. Surg. A. A. Smith.	Died Sept. 3, 1864; pharyngitis.
49	Grundy, J. N., Corp., F, 98th N. York, age 21.	Sept. 29, 1864.	Flesh wound left arm.	Oct. 9, 13, '64.	Radial and inter. arteries.	Oct. 16, 1864.	Left; one end in wound.	Died Oct. 26, 1864.
50	Humphrey, J. M., Pt., B, 183d Penn., age 32.	May 18, 1864.	Wound left hand; amp. fingers.	May 23, 1864.	Radial artery.....	May 23, 1864.	Left; in continuity..	Died June 8, 1864.
51	Jackson, T., Pt., B, 95th N. Y., age 19.	Feb. 7, 1865.	Fracture left radius; wounds both hands.	Feb. 21, 1865.	Radial artery.....	Feb. 21, 1865.	Left; in continuity...	Feb. 21, amp. forearm. Died April 8, 1865; pyæmia.
52	Knock, A., Serg't, B, 84th Ill., age 26.	June 27, 1864.	Flesh wound left forearm.	July 22, 1864.	Radial artery.....	July 22, 1864.	Left; one end in wound.	July 24, amp. arm. Died Oct. 11, 1864; diarrhœa.
53	Kuhn, J. G., Pt., G, 75th Pa., age 42.	July 3, 1863.	Fracture left hand; amp. fing.	July 24, 1863.	Radial artery.....	July 24, 1863.	Left; both ends in wound.	July 29, amp. forearm. Died August 19, 1863; pyæmia. *Specs.* 2615, 2616, 2773, A. M. M.
54	McCready, J. S., Captain, H, 126th Ohio, age 35.	May 10, 1864.	Fracture left ulna; exc. ulna May 20.	May 19, 1864.	Radial artery.....	May 20, 1864.	Left; both ends in wound. Surg. N. R. Moseley, U. S. V.	July 6, amp. forearm. Died Sept. 7, 1864; pyæmia. *Spec.* 2810, A. M. M.
55	Merrick, T., Serg't, F, 102d Ill., age 35.	Oct. 20, 1864.	Fracture left radius; wound left hip.	Nov. 6, 1864.	Radial artery	Nov. 6, 1864.	Left; in continuity..	Nov. 6, amp. arm. Died Nov. 15, 1864; exhaustion.
56	Palmer, A., Pt., K, 73d Ohio, age 40.	July 3, 1863.	Flesh wound forearm	July 29, 1863.	Radial	July 29, 1863.	One end tied in wound.	July 29, amp. forearm. Died July 31, 1863.
57	Pohlman, W. H., Adjutant, 59th N. Y.	July 3, 1863.	Wounds r't forearm and left shoulder.	.....	.....	July —, 1863.	Right; radial ligated	Died July 21, 1863.
58	*Strickland, M. P.*, —, G, 50th Ga., age 22.	Sept 14, 1862.	Fracture left radius; amp. forearm.	Oct. 20 1862.	Radial and ulnar arteries.	Oct. 20, 1862.	Left; radial and ulnar arteries in continuity.	Died Dec. 3, 1862; pyæmia. *Spec.* 217, A. M. M.
59	Washburn, J., Pt., H, 38th Ind.	Sept 19, 1863.	Fracture met. bone right thumb; amp.	Oct. 3, 1863.	.....	Oct. 3, 1863.	Right; radial and ulnar arteries ligated.	Oct. 26, amp. forearm. Died Oct. 29, 1863; pyæmia.

Ligations of the Ulnar Artery.—There were twenty-two cases of ligation of this artery with two deaths, the fatal issue being ascribed to hæmorrhage in one instance and to exhaustion following hæmorrhage in the other. In a case of aneurism of the ulnar artery both ends of the vessel were ligated in the wound; the bleeding did not recur, and the patient recovered without further untoward accident.

Table CXXXV.

Condensed Summary of Twenty-two Ligations of the Ulnar Artery for Shot Injuries.

[Recoveries, 1—20: Deaths, 21—22.]

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
1	Black, J. A., Capt., B, 56th Pa., age 36.	May 23, 1864.	Fracture left ulna; excision.	May —, 1864.	.....	May 28, 1864.	Left; in wound ...	Discharged July 1, 1865.
2	Booth, G. W., Pt., F, 1st Mich., age 26.	Aug. 21, 1864.	Flesh wound; left forearm.	Sept. 6, 7, '64.	Aneurism of ulnar artery.	Sept. 7, 1864.	Left; both ends in wound. A. Surg. H. Allen, U. S. A.	Discharged Feb. 25, 1865.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
3	Bruso, T., Pt., A, 121st N. Y., age 21.	Apr. 6, 1865.	Fracture left radius.	May 14, 1865.	Ulnar artery	May 14, 1865.	Left; both ends in wound.	Discharged Aug. 1, 1865.
4	Carter, J., Pt., D, 11th Conn., age 22.	May 16, 1864.	Flesh wound right forearm.	June 2, 1864.	Ulnar artery	June 2, 1864.	Right; in wound. A. A. Surg. O. W. Peck.	Discharged Dec. 21, 1864.
5	Copley, J. G., Capt., E, 86th N. Y.	May 6, 1864.	Fract. left forearm; excision.	May 22, 1864.	Ulnar artery	May 22, 1864.	Left; in wound	May 23, amp. arm. Disch. Sept. 19, 1864.
6	Cranshaw, S., Pt., B, 70th N. Y., age 45	May 31, 1864.	Fracture left radius and ulna; excision.	.....	.....	June 18, 1864.	Left; amp. forearm same day.	Discharged Sept. 13, 1864.
7	Eiger, J. H., Pt., F, 28th Mass., age 20.	May 6, 1864.	Fracture left hand.	May 21, 1864.	.....	May 21, 1864.	Left; ulnar tied; excision.	May 28, amp. forea'm. Disch. Apr. 16, 1865. *Spec.* 2477, A. M. M.
8	Fallon, P., Pt., I, 146th N. Y., age 22.	Dec. 13, 1862.	Wound of wrist joint.	Dec. 24, 1862.	Ulnar artery	Dec 24, 1862.	Left; in continuity..	Discharged Apr. 23, 1863
9	Ford, M., Pt., G, 51st N. Y., age 28.	Sept. 17, 1862.	Fracture of ulna	Oct. 2, 1862.	Ulnar artery	Oct. 3, 1862.	Left; both ends in wound.	Discharged Feb. 2, 1863.
10	Fox, W. H., Pt., F, 16th Wis., age 18.	Aug. 20, 1864.	Fracture of left ulna.	.....	.....	.....	Ligation of ulnar....	Discharged Mar. 22, 1865.
11	*Freeman, J. N.*, Capt., H, 58th Va., age 36.	Sept. 19, 1864.	Flesh w'd right forearm, ulnar severed.	Sept. 19, 1864.	Ulnar	Sept. 19, 1864.	Lig. in wound. Surg. C. W. Todd, 13th Va.	Exchanged Oct. 25, 1864.
12	Harbison, G., Pt., L, 2d Pa. H. A., age 32.	Sept. 29, 1864.	Wound of right forearm.	Nov. 1, 1864.	Ulnar artery	Nov. 1, 3, '64.	Liga. both ends in cont. A. Surg. W. S. G. Elliott, U. S. V.	Duty Dec. 22, 1864.
13	Harrison, W. H., Pt., M, 1st U. S. Art., age 22.	Feb. 20, 1864.	Fracture of left ulna	Mar. 1, 1864.	Distal end of ulnar.	Mar. 1, 1864.	Both ends in wound. Surg. C. L. Allen, U. S. A.	Duty July 12, 1864.
14	*Howell, S. W.*, Pt., E, 6th N. C., age 20.	July 3, 1863.	Fracture of ulna ...	July 13, 1863.	.....	July 13, 1863.	Left; ulnar ligated..	Recovery.
15	Kripps, J. B., Pt., E, 2d Pa. Art., age 40.	Sept. 29, 1864.	Fracture of ulna ...	Oct. 8, 1864.	Ulnar artery	Oct. 8, 1864.	Left; both ends in wound.	Returned to duty Mar. 31, 1865.
16	McColliff, J., Pt., B, 2d Ill. Cav., age 28.	Aug. 11, 1864.	Fracture of radius...	Aug. 24, 1864.	Ulnar artery; 40 oz	Aug. 24, 1864.	One end in w'd. Surg. D. C. Jones, 2d Ill. C.	Returned to duty Nov. 25, 1864.
17	Price, L. H., Pt., G, 86th N. Y.	Aug. 30, 1862.	Fracture of ulna	Sept. 15, 1862.	Ulnar artery; 18 oz.	Sept. 15, 1862.	In continuity	Discharged Dec. 29, 1862.
18	Shaw, G. W., Pt., H, 85th Pa., age 42.	May 20, 1864.	Wound of left arm; gangrene.	June 12, 1864.	.....	June 12, 1864.	Ligation. Act. Asst. Surg. W. C. Pryer.	Discharged Nov. 12, 1864.
19	Wartenbee, W. D., Pt., 100th O., age 23.	Feb. 20, 1865.	Flesh wound right forearm.	Mar. 26, 1865.	Ulnar artery; 20 oz.	Mar. 26, 1865.	Both ends in wound. A. A. Surg. G. Byers.	Discharged July 5, 1865.
20	Wood, D. E., Pt., K, 64th N. Y., age 33.	July 3, 1863.	Fract. of right ulna..	July 24, 1863.	Ulnar artery; 8 oz.	July 24, 1863.	Both ends in wound.	July 29, exc. Disch. Dec. 31, 1863.
21	Bell, G. L., Serg't, E, 10th Conn., age 34.	Dec. 15, 1862.	Flesh wound right forearm.	Dec. 27, 1862.	16 oz	Dec. 27, 1862.	In continuity; also amp. arm.	Died March 11, 1863.
22	Clapper, J. D., Pt., G, 43d N. Y., age 22.	July 12, 1864.	Left forearm	Aug. 8, 1864.	Ulnar artery; 6 oz. A. A. Surg. W. F. Atlee.	Aug. 8, 1864.	Both ends in wound.	Died Sept. 14, 1864.

Of the branches of the ulnar artery the interosseous was ligated in nine instances, of which three, or 33.3 per cent., proved fatal:

Ligations of the Interosseous Artery of Forearm.—Cases 1144-1152.—Private J. J. Boden, B, 45th Pennsylvania; shot fracture of lower extremity of radius September 14, 1862; October 17th, excision of pieces of radius; hæmorrhage; ligation of anterior interosseous in wound by Assistant Surgeon E. W. Brennermann, U. S. A.; discharged, April 18, 1863.—Private I. B. Flint, K, 1st Massachusetts Artillery, age 21; shot fracture right radius May 18, 1864; removal of ball and section of radius on May 28; hæmorrhages May 28, 30, June 1st; ligation of interosseous, June 1, in the wound; no recurrence; duty February 16, 1865.—Private T. Hart, C, 145th Pennsylvania, age 25; shot wound of third finger of left hand June, 1864; amputation of finger; gangrene; interosseous tied to prevent hæmorrhage; duty March 14, 1865.—Private *S. W. Howell*, E, 6th North Carolina, age 20; minié ball entered posterior part of left forearm two and a half inches from wrist joint, fractured the ulna and passed through, July 2, 1863; hæmorrhage July 13, 1863; ligation by A. A. Surgeon J. H. Bartholf; no recurrence of hæmorrhage; transferred August 10, 1863.—Private D. McKennelly, G, 10th Kentucky; shot fracture metacarpal bones of right hand September 19, 1863; September 28th, amputation, three fingers; October 29th, amputation forearm; November 4th, hæmorrhage from interosseous; ligated on face of stump; transferred to V. R. Corps August 20, 1864.—Corporal I. Martz, B, 184th Pennsylvania, age 39; shot fracture of middle finger of right hand June 3, 1864; amputation of finger June 3; gangrene; flap amputation of forearm at lower third; whole stump became diseased June 30, 1864; hæmorrhage from interosseous in July; ligation of artery on face of stump; circular amputation of arm at lower third April 9, 1865; discharged July 26, 1865.—Private J. Archibald, 33d New York, age 50; comminuted fracture of lower extremity of left radius and carpal bones December 13, 1862; amputation of forearm at upper third January 8, 1863; hæmorrhage from interosseous January 10th; artery ligated on face of stump same day; hæmorrhage recurred January 13, artery re-ligated; death from pyæmia January 29, 1863.—Private J. Bowman, K, 20th Indiana, age 25; shot fracture of forearm; hæmorrhages July 16th, August 4th; ligation; September 5th, amputation of arm; death of diphtheria and gangrene September 6, 1863.—Private J. A. Forsyth, G, 9th Maine, age 21; flesh wound of left wrist June 30, 1864; July 19th, hæmorrhage from branch of interosseous; July 20th, ligation of both ends in wound by Assistant Surgeon E. Curtis, U. S. A.; August 13th, hæmorrhage recurred; death ensued on August 13, 1864, from secondary hæmorrhage.

Ligations of Arteries of the Hand.—Of twelve cases, four were ligations of the palmar arch, two of the *dorsalis* and *radialis indicis*, one of the *dorsalis carpi*, one of the *arcus volaris profundi*, and four of the digital arteries. One only terminated in death, from pyæmic irritation of the system.

TABLE CXXXVI.

Condensed Summary of Twelve Cases of Ligations of Arteries of the Hand.

[Recoveries, 1—11; Death, 12.]

No.	NAME. AGE, AND MILITARY DESCRIPTION.	DATE OF INJURY.	NATURE OF INJURY.	DATE OF HÆMORRHAGE.	PROBABLE SOURCE OF HÆMORRHAGE.	DATE OF OPERATION.	OPERATION, OPERATOR.	RESULT.
1	Achuff, H. N., Pt., K, 27th Pa., age 20	May 3, 1863.	Fracture 3d finger right hand.	June 4, 1863.	Deep palmar arch.	June 4, 1863.	Branch deep palmar arch ligated.	Recovered.
2	*Gantt, Z.*, Pt., G, 27th S. C., age 36.	June 15, 1864.	Wound right hand..	July 20, 1864.	Digital artery.....	July 20, 1864.	One end 3d digital in wound. A. Surg. E. Curtis, U. S. A.	Recovered.
3	Gripping, I. G., Pt., Oneida N. Y. Cav., age 45.	July 3, 1863.	Fracture 2d met. bone right hand.	July 30, 1863.	Superficial palmar arch.	July 30, 1863.	Branch superfi. palmar arch in wound.	Discharged January 4, 1864.
4	Holdridge, H., Pt., A, 6th O. Cav., age 28.	May 12, 1864.	Wound both hands; fracture fingers.	May 21, 1864.	.....	May 21, 1864.	Both ends arch vol. prof. tied in wd. A. A. Surg. T. Liebold.	Discharged September 9, 1864.
5	Loland, J., Pt., 4th N. Y. Art., age 17.	June 16, 1864.	Fracture right metacarpus.	July 17, 1864.	Dorsalis indicis artery ligated.	July 19, 1864.	Dorsalis carpi, both ends in wound.	Discharged June 16, 1865.
6	McNamara, P., Pt., A, 2d N. Y. Art., age 36.	June 16, 1864.	Fracture metacarpus bone left little finger; amputation.	July 1, 1864.	Digital artery.....	July 1, 1864.	One end dig. art. tied in wound. Hæm. rec. July 6, 8, Aug. 5.	Aug. 11, amp. forearm. Disch. Mar. 27, 1865. *Spec.* 2450, A. M. M.
7	Mullin, D., Pt., K, 16th Mass., age 24.	May 8, 1864.	Fract. 1st 3 met. bones right hand; amp.	May 29, 1864.	.....	May 29, 1864.	Right dorsal indices on face stump.	Duty September 3, 1864.
8	Roberts, R. D., Pt., F, 72d Ill., age 49.	Mar. 9, 1864.	Flesh wound right forearm and hand.	Mar. 22, 1864.	Superficial palmar arch.	Mar. 27, 1864.	Right; superfi. palmar arch tied.	Discharged January 26, 1865.
9	Sylvester, H., Pt., G, 91st N. Y., age 23.	May 4, 1863.	Fract. 2d phal. right ind. finger; amp.	May 17, 1863.	.....	May 18, 1863.	Right radialis indicis on face stump.	Trans. Provo Marshal May 27, 1863.
10	Tucker, N. J., Pt., E, 17th Ky., age 23.	Sept. 2, 1864.	Fracture fingers left hand; amputation.	Sept. 25, 1864.	Superficial palmar arch.	Sept. 25, 1864.	Left; superfi. palmar arch, both ends in wound.	Duty December 7, 1864.
11	Turner, J. W., Pt., A, 126th Ohio, age 24.	May 12, 1864.	Flesh wound right hand.	May 21, 1864.	Digital artery.....	May 22, 1864.	Both ends dig. art. t'd in wound. Surg. N. R. Moseley, U. S. V.	Veteran Reserve Corps January 17, 1865.
12	Moynehan, W., Pt., F, 122d Ohio, age 40.	July 9, 1864.	Fracture bone left hand.	July 18, 1864.	Digital artery.....	July 18, 1864.	Digital artery tied in wound.	Amp. fing. Au. 1 hæ. Died Aug. 15, 1864.

Ligations of the Common Iliac Artery.—Four cases of ligations of the common iliac artery following shot injuries, and one following a bayonet stab, were reported during the war.[1]

TABLE CXXXVII.

Summary of Five unsuccessful Cases of Ligation of the Common Iliac Artery.

No.	NAME, AGE, AND MILITARY DESCRIPTION.	DATE OF INJURY.	NATURE OF INJURY.	DATE OF HÆMORRHAGE.	PROBABLE SOURCE OF HÆMORRHAGE.	DATE OF OPERATION.	OPERATION, OPERATOR.	RESULT.
1	Boner, J., Pt., I, 48th Pennsylvania, age 19.	May 31, 1864.	Flesh wound of both thighs.	June 10, 15, 1864.	From small vessels; ligation of femoral June 15; hæmorrhage Jun. 22.	June 22, 1864.	Ligation of common iliac.	Death June 22, 1864. See p. 39, *ante*, CASE 82.
2	Hardy, John, Pt., H, 95th N. Y., age 25.	Aug. 20, 1864.	Shot wound of left gluteal region; ball lodged against right wall of pelvis.	Sept. 5, 1864.	Gluteal artery; hæmorrhages recurred Sept. 6, 8, 11; Sept. 12, ligation of internal iliac.	Sept. 12, 1864.	Ligation of common iliac by Asst. Surg. J. Cooper McKee, U. S. A.	Death Sept. 14, 1864. See *Sec. Surg. Vol.*, p. 334, CASE 976.
3	Preston, J. E., Corporal, G, 119th Penn.	May 4, 1864.	Shot injury of ant. sup. spin. process of left ilium.	May 5, 1864.	.....	May 14, 1864.	Dr. F. H. Hamilton.	Death M'y 14, '64. See p. 39, *ante*, NOTE 1.
4	Scott, J. R., Col., 19th Illinois.	Dec. 31, 1862.	Shot wound of groin, ball grazing inside of femur.	Apr. 9, 10, 1863.	Arrested by compress over femoral; hæmorrhage recurred; ligation of external iliac April 10; bleeding continued.	Apr. 10, 1863.	Ligation of common iliac by Dr. Brainard.	Death July 8, 1863. See CASE 975, *Sec. Surg. Vol.*, p. 333.
5	Tapka, A., Pt., H, 35th Wisconsin, age 25.	Mar. 18, 1864.	Bayonet stab in gluteal region.	Oct. 2, 1864.	Diffuse aneurism..	Oct. 7, 1864.	Ligation of common iliac by A. A. Surg. R. N. Isham.	Death Oct. 11, 1864. See CASE 977, p. 335 of the *Sec. Surg. Vol.*

In one of the five cases the external and in another the internal iliac artery had been ligated without arresting the bleeding.

Ligations of the Internal Iliac Artery.—Three cases were reported; all terminated fatally, from recurring hæmorrhage.

[1] A sixth case of ligation of the common iliac (case of Private G. W. Clark, I, 4th New Jersey) for aneurismal varix has been referred to in the preceding chapter, in the foot-note on page 681, and has been detailed on page 336 of the *Second Surgical Volume.*

TABLE CXXXVIII.

Condensed Summary of Three Ligations of the Internal Iliac Artery.

No.	NAME, AGE, AND MILITARY DESCRIPTION.	DATE OF INJURY.	NATURE OF INJURY.	DATE OF HÆMORRHAGE.	PROBABLE SOURCE OF HÆMORRHAGE.	DATE OF OPERATION.	OPERATION, OPERATOR.	RESULT.
1	Fonda, E. R., Serg't-Major, 115th N. Y., age 28.	May 7, 1864.	Shot through right gluteal region.	June 12, 15, 17, 1864.	Sciatic artery	June 17, 1864.	Int. iliac above Poupart's lig't. Surg. A. B. Mott, U. S. V.	Died July 22, 1864. *Sec. Surg. Vol.*, p. 332, CASE 973.
2	Hardy, John, Pt., H, 95th N. Y., age 25.	Aug. 20, 1864.	Shot wound of left gluteal region; ball lodged against right wall of pelvis.	Sept. 5, 6, 8, 11, 12, 1864.	Gluteal artery ...	Sept. 12, 1864.	Lig. of internal iliac. Surg. J. Cooper McKee, U. S. A.	Sept. 12, ligation of com'n iliac. Death Sept. 14, 1864. *Sec. Surg. Vol.*, p. 334, CASE 976.
3	*P——, Thomas*, Pt., 16th Tenn. Cav.	July 10, 1864.	Shot penetration of left buttock.	July 26, 1864.	Gluteal artery	July 26, 1864.	Ligation of internal iliac. Dr. S. N. Denham.	Aug. 1, sudden hæmorrhage follow'd by death in a few minutes. *Sec. Surg. Vol.*, p. 332, CASE 972.

Eight cases of ligations of branches of the internal iliac comprised six ligations of the gluteal and two of the sciatic arteries; four of the former and one of the latter were fatal.

Ligations of the Gluteal Artery.—In four of the six cases the bleeding was the result of the shot injuries. In two instances the gluteal was accidently cut—in one while searching for the missile, in another while excising the head of the femur.

TABLE CXXXIX.

Summary of Six Ligations of the Gluteal Artery.

[Recoveries, 1—2; Deaths, 3—6.]

No.	NAME, AGE, AND MILITARY DESCRIPTION.	DATE OF INJURY.	NATURE OF INJURY.	DATE OF HÆMORRHAGE.	PROBABLE SOURCE OF HÆMORRHAGE.	DATE OF OPERATION.	OPERATION, OPERATOR.	RESULT.
1	Warner, A. J., Col., 10th Penn. Res.	Sept. 17, 1862.	Shot perforation of right ilium.	Feb 6, 1863.	Gluteal cut while searching for ball.	Feb. 6, 1863.	Lig. cardiac end in wound. Surg. J. H. Brinton, U. S. V.	Discharged and pensioned. *Sec. Surg. Vol.*, pp. 232, 329, CASE 678.
2	West, R., Pt., B, 104th Ill., age 31.	Aug. 7, 1864.	Flesh wound of right buttock.	Sept. 19, 1864.	Gluteal artery.....	Sept. 19, 1864.	Cardiac end ligated in wound.	Discharged Feb. 7, 1865. *Sec. Surg. Vol.*, p. 329, CASE 961.
3	Davidson, R. C., Pt., K, 6th Md., age 16.	April 2, 1865.	Shot wound of right hip, fract. of ilium.	Apr. 13, 15, 16, 1865.	Gluteal artery	Apr. 16, 1865.	In continuity. Surg. E. Bentley, U. S. Vols.	Death April 19, 1865. *Sec. Surg. Vol.*, p. 330, CASE 964.
4	*Johnson, G. M. W.*, Pt., I, 32d Tenn., age 20.	Feb. 15, 1862.	Shot wound of left hip.	Mar. 12, 1862.	Gluteal artery; 25 ounces.	Mar. 12, 1862.	Ligated	Death March 24, 1862. *Sec. Surg. Vol.*, p. 329. CASE 962.
5	Melcar, I., Pt., 8th Michigan, age 18.	Nov. 16, 1863.	Shot fracture of head and neck of femur.	Nov. 16, 1863.	Gluteal cut while excising head of femur	Nov. 16, 1863.	Cardiac end ligated. Surg. J. S. D. Cullen, P. A. C. S.	Died Dec. 2, 1863. *See* CASE 232, p. 97, *ante*.
6	Morrison, J., Serg't, A, 102d Ill., age 27.	May 15, 1864.	Shot wound of both buttocks.	June 17, 1864.	Gluteal artery; left.	June 17, 1864.	Ligation of gluteal. Ass't Surgeon B. E. Fryer, U. S. A.	Death from pyæmia July 3, '64. *Sec. Surg. Vol.* p. 329, CASE 963.

Ligations of Sciatic Artery.—The two cases of ligations of the sciatic artery proved fatal, one on the first the other on the third day after the operation.

CASES 1153–1154.—*W. R. Carrington*, H, 2d South Carolina, wounded at Cedar Creek October 19, 1864; comminution of transverse portion of sacrum; admitted on the next day into Prisoner's Hospital at Winchester; hæmorrhage from sciatic artery occurred on November 3d; artery ligated and missile extracted by Dr. Duval (Confederate); death November 4, 1864. — Private H. C. Leslie, M, 7th New York Artillery, aged 18 years, received a shot wound of nates, injuring the sciatic artery, by a minié ball, at Cold Harbor, June 3, 1864. The patient was removed to a field hospital of the Second Corps, and on June 8th was sent to Washington and admitted into Columbia Hospital; hæmorrhage to the extent of twenty-five ounces from the sciatic artery occurred on June 16th; ligation of the artery on the same day; death from gangrene June 19, 1864.

Ligations of the External Iliac Artery.—Of twenty-six cases of ligation of the external iliac artery twenty-three had fatal terminations, a mortality rate of 88.4 per cent. Six were ligations after amputations—one on the face of the stump, five in the continuity (four after amputations in the thigh and two after amputations at the hip); hæmorrhage recurred in six cases, and in one instance the common iliac was afterwards ligated.

TABLE CXL.

Summary of Twenty-six Ligations of the External Iliac Artery.

[Recoveries, 1—3; Deaths, 4—26.]

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
1	Locke, H., Pt., H, 6th Vermont, age 23.	May 5, 1864.	Flesh wound right thigh.	May 12, 1864.	Femoral art. ligated; hæm. rec.	May 16, 1864.	Right; in continuity.	V. R. C. December 3, 1864.
2	Smith, E. E., Pt., A, 11th Maine, age 19.	Aug. 16, 1864.	Fract. head rt. tib.; amp. thigh.	Oct. 17, 1864.	Femoral lig. Jan. 19, 1865; amp. at hip joint; hæm.	Jan. 27, 1865.	Ext. iliac tied. A. A. Surg. J. C. Morton.	Discharged May 27, 1865. *Spec.* 3709, A. M. M.
3	Zeiders, J. K., Serg't, I, 53d Penn., age 19.	July 3, 1863.	Flesh wd. rt. thigh; Aug. 4, fem. art. lig.; Aug. 11, religated.	Oct. 8, 1863.	.....	Oct. 8, 1863.	Right; in continuity.	Discharged May 14, 1864.
4	[1]*Brown, B. B.*, Pt., C, 9th Va. Cav., age 24.	June 24, 1864.	Fract. ramus pubis..	July 14, 1864.	Femoral aneurism	July 18, 1864.	Left; in cont. Ass't Surg. J. C. Baylor, C. S. A.	Died Aug. 22, 1864; exhaustion.
5	[2]Cornwell, R. B., Pt., 25th Ohio, age 23.	Sept. 14, 1862.	Wound right thigh, inj. femoral art.	Sept. 21, 1862.	Aneurism; femoral artery ligated.	Oct. 30, 1862.	Right; in continuity.	Died Nov. 3, 1862.
6	Degolia, J. S., Pt., A, 76th Penn., age 32.	May 16, 1864.	Flesh wounds right hip and left thigh	May 24, 1864.	Femoral artery tied.	May 29, 1864.	Left; in cont. Surg. J. H. Thompson, U. S. V.	Died June 1, 1864; gangrene.
7	Dougherty, M., Pt., E, 49th Pa., age 35.	Sept. 19, 1864.	Fracture left knee; amputation thigh.	Nov. 4, 1864.	Femoral artery ligated 3 times.	Mar. 26, 1865.	Left; in continuity; hæm. recurred.	Died April 8, 1865.
8	[3]*Gatewood, J. H.*, Pt., F, 21st Ga., age 32.	Aug. 28, 1862.	Flesh wounds left hip and right thigh.	.....	Femoral aneurism.	Jan. 31, 1864.	Right; in continuity. Surg. J. Chambliss, P. A. C. S.	Died Feb. 17, 1864.
9	Gentle, G. W., Pt., E, 5th Ohio.	Sept. 17, 1862.	Fracture right femur.	Oct 2, 3, 1862.	.....	Oct. 27, 1862.	Right ext. iliac tied..	Died Oct. 28, '62. *Sp's* 758, 894, A. M. M.
10	Hambrecht, C., Pt., E, 4th New Jersey.	Sept. 14, 1862.	Fract. os pubis and neck femur.	Oct. 18, 1862.	.....	Oct. 18, 1862.	Ext. iliac and fem. arts. tied.	Died Oct. 18, 1862.
11	Heary, P., Pt., E, 73d Ohio, age 25.	Mar. 11, 1862.	Wound in iliac region.	Mar. 27, 1862.	.....	Mar. 27, 1862.	Ext. iliac tied in continuity.	Died April 26, 1862; pyæmia.
12	Husk, G. W., Pt., F, 1st Maryland Cavalry, age 49.	Aug. 16, 1864.	Flesh wound right thigh.	Nov. 10, 1864.	Femoral artery....	Nov. 10, 1864.	Right; in cont. A. A. Surg. J. C. Morton.	Died Nov. 17, 1864; hæmorrhage.
13	[4]*Langford, J. R.*, Pt., F, 10th Ga., age 19.	Sept. 17, 1862.	Wound in rt. groin, injuring fem. art.	Nov. 6, 1862.	Femoral aneurism.	Nov. 6, 1862.	Right; in continuity.	Died Mar. 15, 1863. *Spec.* 3986.
14	McQuillan, J. A., Lt., I, 38th Ohio, age 25.	Aug. 17, 1864.	Flesh wound right thigh.	Sept. 20, 1864.	Femoral art. tied September 20.	Sept. 26, 1864.	Right; in continuity.	Died Oct. 2, 1864.
15	Marshall, W. L., Pt., E, 11th Pa., age 26.	June 27, 1862	Flesh, right thigh, inj. fem. art.	Aug. 23, 1862.	False aneurism; femoral tied.	Sept. 5, 1862.	Right; in continuity.	Died Sept. 16, 1862.
16	O'Neil, M., Pt., E, 58th Mass., age 19.	June 3, 1864.	Fract. right femur; amp. at hip joint.	Aug. 20, 1864.	Femoral artery....	Aug. 20, 1864.	Right; in continuity.	Died Sept. 2, 1864. *Spec.* 3098.
17	Ridge, J., Lieut., B, 13th Iowa.	July 21, 1864.	Wound in left iliac region.	Aug. 26, 29, '64.	Epigastric artery..	Aug. 30, 1864.	Left; in continuity..	Died Oct. 4, 1864; pyæmia.
18	[5]Scott, J. R., Col., 19th Illinois.	Dec. 31, 1862.	Wound in thigh, inj. fem. artery.	April 5, 9, 1863.	Profunda artery...	April 10, 1863.	Ext. iliac tied. Dr. D. Brainard.	Common iliac tied. Died July 8, 1863; diarrhœa.
19	Seaburn, A., Pt., G, 97th Pennsylvania.	July 30, 1864.	Fract. left femur; amp. thigh.	Sept. 22, 1864.	Aneurism.....	Sept. 25, 1864.	Left; in cont. Surg. E. Bentley, U. S. V.	Died Oct. 9, 1864. *Spec.* 3282.
20	Sears, L. C., Sergt. maj., 5th N. H., age 22.	Dec. 13, 1862.	Flesh wound right thigh; profunda inj.	Dec. 22, 1862.	— femoral artery tied.	Jan. 8, 1863.	Right; in cont. Surg. T. Antisell, U. S. V.	Died Jan 11, 1863.
21	Shields, P. J., Pt., D, 6th Wis., age 20.	Apr. 29, 1863.	Fract. left knee jt.; amp. thigh.	June 1, 1863.	Stump; fem. art. tied and relig.	June 9, 1864.	Left; in continuity..	Died June 19, 1864. *Spec.* 1143.
22	Smith, H. F., Corp., 1st Wis., age 25.	Mar. 24, 1862.	Fracture left femur..	Mar. 30, 1862.	Femoral artery....	Mar. 30, 1862.	Left; in cont. Surg. A. H. Thurston, U. S. V.	Died Mar. 30, 1862.
23	[6]Spaulding, J. R., Pt., F, 112th New York, age 23.	Jan. 15, 1865.	Flesh wound left thigh.	Mar. 23, 31, 1865.	.....	April 2, 1865.	Left; in cont. Ass't Surg. S. H. Orton, U. S. A.	Died June 15, 1865.
24	Teel, M., Pt., C, 73d Indiana.	Dec. 31, 1862.	Fract. right thigh...	.....	.....	Jan —, 1863.	Right; in continuity.	Died Jan. 19, 1863.
25	Vogel, F., Pt., G, 74th Penn., age 28.	July 3, 1863.	Fract. rt. fib.; hæm.; amp. leg.	Sept. 8, 1863.	Stump; fem. art. tied Sept. 8.	Sept. 19, 1863.	Right; in cont. A. A. Surg. A. Hewson.	Died Oct. 4, 1863; hæmorrhage.
26	Yockey, P., Pt., D, 29th Ohio, age 29.	July 22, 1864.	Fract. right femur; amp. thigh; reamp.	.....	.....	.....	Right; in cont.; fem. art. prev. tied.	Died April 23, 1865; diarrhœa.

Ligation of the Spermatic Artery.—The only instance of ligation of this artery has been detailed on page 337 of the *Second Surgical Volume:*

CASE 1155.—Color-Sergeant E. W. Crippen, C, 27th Illinois, aged 29, was wounded at Missionary Ridge November 25, 1863; the left testicle was shot away, leaving a ragged wound of the scrotum, also wound of ankle. On November 28 the spermatic artery was ligated and the debris of the testicle removed. Hæmorrhage, which ceased spontaneously, occurred on December 14; on December 19 hæmorrhage from wound of ankle, arrested by persulphate of iron; death on the same day.

Ligations of the Femoral Artery.—Three hundred and seventy-four cases, including ninety-three recoveries and two hundred and eighty-one deaths, are comprised in this group, giving a mortality rate of 75.1 per cent. In one hundred and seventy-nine cases amputation

[1] BROWNE (P. F.), *Ligation of the External Iliac for Traumatic Aneurism of the Femoral Artery*, in *Confed. States Med. and Surg. Jour.*, 1864, Vol. I, p. 163. [2] HEARD (L.), *Wound of the Femoral Artery*, in *Am. Med. Times*, 1862, Vol. V, p. 337.

[3] CHAMBLISS (J.), *Case of Traumatic Femoral Aneurism, etc.*, in *Confederate States Med. and Surg. Jour.*, 1864, Vol. I, p. 97.

[4] NORTH (A.), *Report of Sixty Cases of Hospital Gangrene*, in *American Medical Times*, 1863, Vol. VI, p. 256.

[5] BRAINARD (D.), *Ligature of the Common Iliac Artery*, in *Chicago Medical Journal*, 1864, Vol. XXI, p. 97.

[6] LIDELL (J. A.), *Gunshot wound of thigh; Secondary Hæmorrhage; Ligation of External Iliac Artery*, in *United States Sanitary Commission Memoirs*, Surgical Vol. I, p. 231.

in the thigh had been performed prior to the ligation; in eighty-two of these cases the vessel was ligated on the face, and in ninety-seven in the continuity of the stump. In nineteen cases, with five recoveries and fourteen deaths, the ligations were followed by amputation.

TABLE CXLI.

Summary of Three hundred and Seventy-four Ligations of the Femoral Artery.

[Recoveries, 1—93; Deaths, 94—374.]

No.	NAME, AGE, AND MILITARY DESCRIPTION.	DATE OF INJURY.	NATURE OF INJURY.	DATE OF HÆMORRHAGE.	PROBABLE SOURCE OF HÆMORRHAGE.	DATE OF OPERATION.	OPERATION, OPERATOR.	RESULT.
1	Askey, J., Pt., F, 200th Penn., age 18.	Mar 25, 1865.	Fract. r't knee joint; March 28, amputation thigh.	Apr. 11, 1865.	Femoral artery....	Apr. 11, 1865.	Right; in continuity. Act. Assist. Surg. J. Tyson.	Disch'd July 28, 1865. *Specimen* 3997, A. M. M.
2	Atchison, J. N., Pt., F, 2d N. J., age. 28.	Aug. 27, 1862.	Fract. left femur; primary amputation thigh.	Sept. 3, 1862.	Femoral artery....	.....	Right; in continuity. Surg. E. Bentley, U. S. V.	Discharged June 3, 1863.
3	Austin, A. H., Pt., B, 106th N. Y.	Apr. 20, 1863.	Fract. left leg; amp. thigh May 22.	June 7, 1863.	Femoral artery ...	June 7, 1863.	Left; in continuity; hæm. rec. June 11.	Discharged August 23, 1863.
4	Barkaloo, J. T., Pt., M, 2d Ohio Cav., age 28.	July 19, 1863.	Flesh wound right thigh.	July 19, 1863.	Popliteal artery ..	July 19. 1863.	Right; in continuity.	Amp. thigh. Disch'd March 17, 1865.
5	Blake, G., Pt., I, 3d W. Va. Mtd. Inf.	Aug. 27, 1863.	Flesh wound left thigh, severing popliteal artery.	Sept. 9, 1863.	....	Sept. 9, 1863.	Left; in continuity. Surg. W. D. Stewart, U. S. V.	Discharged November 12, 1863.
6	Brannan, J., Pt., C, 44th N. Y., age 26.	July 2, 1863.	Fracture right leg; prim. amp. leg.	July 12, 1863.	Post. tib. art.; art. tied.	July 15, 1863.	Right; in continuity; in Scarpa's space.	Recovered.
7	Brown, J., Pt., D, 120th Ohio.	May 28, 1863.	Flesh, left leg	June 9, 10, '63.	.....	June 10, 1863.	Left; in cont. Sur. J. D. Brumley, U. S. V.	Furloughed July 31, 1863.
8	*Brown*, W., Serg't, 1st Md. Art.	Dec. 10, 1863.	Flesh wound left thigh.	.....	....	.....	Femoral artery tied.	Detailed Mar. 16, 1864.
9	Bugbee, S., Corp., E, 14th Conn., age 24.	Oct. 27, 1864.	Wound right knee joint; prim. amp. thigh, lower third.	Nov. 8, 1864.	Stump	Nov. 12, 1864.	Right; on face stump. Surg. W. L. Baylor, C. S. A.	Discharged August 23, 1865.
10	*Cheany*, W. W., Lt., B, 30th Ark.	July 4, 1863.	Wound right knee; prim. amp. thigh.	Aug. 17, 1863.	Femoral artery....	Aug. 17, 1863.	Right; in continuity.	Transferred to prison April 21, 1864.
11	[1]*Cheek*, *M.*, Pt., I, 61st N. C.	July 30, 1864.	Flesh wound thigh.	Aug. 3, 1864.	Femoral artery....	Aug. 3, 1864.	Femoral tied, in continuity. Sur. D. F. Wright, P. A. C. S.	Furloughed August —, 1864.
12	Cleggett, T., Pt., D, 76th Colored troops, age 45	Apr. ?, 1865.	Fracture right knee joint; amp. thigh, lower 3d, April 24.	May 2, 1865.	Femoral artery....	May 2, 1865.	Ligation in continuity, in upper third.	Discharged July 22, 1865.
13	Clover, B., civilian, age 16.	Aug.—, 1864.	Flesh wound thigh, femoral injured.	Sept. 1, 1864.	Aneurism of femoral.	Sept. 1, 1864.	Ligation in cont. just above profunda.	Recovered.
14	*Coble*, *J. A.*, Pt., F, 45th N. C., age 20.	Nov. 27, 1863.	Flesh wound of left thigh, lesion of femoral.	Jan. 23, 1864.	Aneurism of femoral.	Jan. 23, 1864.	Both ends in wound. Surg. J. G. Dudley, C. S. A.	Recovery.
15	Cockburn, W., Serg't, H, 2d New Jersey Cav., age 38.	Dec. 28, 1864.	Shot fracture left knee joint; amp. Dec. 29.	Jan. 7, 1865.	Femoral artery....	Jan. 7, 18, 23, 1865.	Three consecutive ligations in continuity.	Mustered out May 11, 1865.
16	Collins, M., Pt., K, 13th Kansas, age 27.	Dec. 7, 1862.	Left knee joint; amp. thigh Dec. 10	Dec 25, 1862.	Femoral artery....	Dec. 25, 1862.	In cont., in middle..	Discharged May 13, 1864.
17	Cuthbert, T., Serg't, G, 8th New York H. Art, age 44.	Oct. 27, 1864.	Left knee joint; prim. amp. thigh; gangrene.	Nov. 21, 1864.	Femoral artery...	Nov. 21, 1864.	In continuity, just above profunda. Surg. Gibbs, C.S.A.	Discharged July 18, 1865.
18	Danforth, H. J., Corp'l, A, 8th New York H. Art.	May 18, 1864.	Right knee joint; prim. amputation thigh, lower third.	May 26, 1864.	Femoral artery,...	May 26, 1864.	On face of stump...	Discharged Aug. 11, 1865.
19	Darling, R. A., Pt., H, 67th New York.	May 31, 1862.	Fracture right thigh; amp. low. 3d June 3.	June 14, 1862.	Femoral	June 14, 1862.	Femoral ligated	Discharged Aug. 9, 1862.
20	Dassel, T., Pt., G, 60th Indiana, age 25.	Jan. 11, 1863.	Right leg; tibia and arteries injured.	Feb. 20, 1863.	Anterior tibial artery.	Feb. 20, 1863.	Femoral, in cont.; in Scarpa's triangle.	Discharged Dec., 1863.
21	Davis, A. A., Pt., K, 6th Wis., age 32.	Mar. 31, 1865	Right knee joint; prim. amp thigh.	Apr. 4, 1865.	Profunda femoris .	Apr. 4, 1865.	In cont. Surg. N. R. Moseley, U. S. V.	Discharged Sept. 14, 1865.
22	Dow, G. E., Pt., G, 12th N. H., age 22.	June 3, 1864.	Left leg amputated at knee joint June 3.	June 23, 1864.	Popliteal artery...	June 24, 1864.	Femoral artery. A. A. Surg. W. H. Ensign.	Discharged Nov. 18, 1864.
23	Downs, T., Pt., F, 88th N. Y., age 38.	Sept. 17, 1862.	Fracture knee joint; amputation thigh.	Sept. 29, 1862.	Femoral artery....	Sept. 29, 1862.	Femoral, in continuity. Surg. H. S. Hewit, U. S. V.	Discharged Mar. 13, 1863.
24	*Dunn*, *G. R.*, Serg't, E, 25th S. C., age 20.	May 16, 1864.	Upper third of right thigh.	May 29, 1864.	Femoral artery....	May 29, 1864.	Femoral above origin of profunda; in cont.	Furloughed July 23, 1864.
25	Ellis, H. H., Corp'l, I, 16th N. Y., age 23.	May 3, 1863.	Left knee joint; amp. thigh.	May 20, 1863.	Profunda	May 21, 1863.	Femoral, in continuity; hæm. recurred.	Discharged Oct. 26, 1863.
26	Ferguson, D., Lieut., A, 113th Ill, age 27.	Jan. 11, 1863	Left knee joint; amp. thigh.	Feb. 20, 1863.	Femoral artery...	Feb. 20, 1863.	Femoral, in continuity; hæm. recurred.	Discharged Sept. 13, 1863.
27	Gardner, H., Capt., I, 100th Ill., age 23.	Nov. 24, 1863.	Right knee joint; amp. thigh, middle third.	.....	....	.....	Ligation in cont.; in Scarpa's triangle.	Discharged Aug. 18, 1864.
28	*Gardner*, *R. F.*, Pt., A, 1st Maryland Battery, age 19.	July 2, 1863.	Through both thighs; gangrene.	July 23 1863.	Femoral	July 23, 1863.	In continuity.....	Exchanged Oct. 28, 1863.
29	*Goodman*, W., Pt., Clark's N. C. Art.	May 5, 1864.	Left thigh and leg...	June 5, 1864.	....	June 5, 1864.	In cont.; below Poupart's ligament.	Recovered.
30	Graham, R. P., Pt., H, 7th Ill., age 23.	Oct. 5, 1864.	Right knee joint; amp. thigh Nov. 9.	Nov. 17, 1864.	Femoral; 16 ounces	Nov. 17, 1864.	Femoral, on face of stump, lower 3d.	Discharged May 22, 1865.
31	Harbaugh, H., Serg't, K, 7th Wis., age 22.	July 2, 1863.	Left thigh; sloughing.	Sept. 12, 1863.	Profunda	Sept. 13, 1863.	Femoral; gangrene..	Discharged July 21, 1864.
32	Hartman, J., Pt., A, 37th Wis., age 16.	June 19, 1864.	Upper third tibia; prim. amp. thigh.	June 26, 27, 1864.	Femoral	June 27, 1864.	In cont., in upper third. Surg. N. R. Moseley, U. S. V.	Discharged Aug. 14, 1865.
33	Harvey, R., Pt, E, 31st Penn., age 20.	July 1, 1862.	Fract. of left femur; Aug. 1, amputation.	Aug. 12, 1862.	Femoral	Aug. 12, 1862.	Femoral, in continuity.	Discharged Oct. 6, 1863.
34	Houser, P., Serg't, H, 76th Penn., age 27.	Aug. 16, 1864.	Flesh wound of left thigh.	Sept. 10, 1864.	Femoral	Sept. 10 1864.	In continuity. A. A. Surg. J. H. Packard.	Discharged May 20, 1865.

[1] WRIGHT (D. F.), *The Effects of the Hunterian Method of Ligation on Inflammation*, in *Confed. States Med. and Surg. Jour.*, Vol. I, p. 177.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
35	Hubner, J., Pt., K, 5th Mich., age 29.	May 31, 1862.	Flesh wd. of thigh..	June 27, 1862.	Copious hæmorrhage.	June 27, 1862.	In continuity. Surg. T. M. Markoe.	Discharged Oct. 1, 1862.
36	Hunt, J. L., Pt., G, 57th N. Y., age 41.	May 5, 1864.	Flesh wound of left thigh.	July 9, 1864.	Femoral	July 9, 1864.	Femoral; dry gangrene of toes; amp. toes.	Discharged June 6, 1865.
37	*Hutchinson, R. B.*, Pt., D, 7th S. C.	Sept. 17, 1862.	Right knee joint; prim. amp. thigh.	Nov. 24, 1862.	.....	Nov. 24, 1862.	Femoral, on face of stump.	To Prov. Marshal April 27, 1863.
38	Jordan, W. H., Capt., 9th Infantry.	June 7, 1862.	Right knee joint	June 28, 1862.	.....	June 28, 1862.	In cont.; in Scarpa's triangle.	Returned to duty.
39	Karlmyer, F., Pt., K, 48th N. Y., age 37.	June 1, 1864.	Flesh wd. of thigh ..	June 9, 1864.	.....	June 9, 1864.	In cont. Surg. E. Bentley, U. S. V.	Discharged May 20, 1865.
40	*Kelly, F.*, Pt., C, 10th Louisiana.	.....	Phalanx of left foot..	.....	.....	.....	Femoral.	Recovery.
41	Klein, D., Pt., C, 64th Illinois, age 26.	July 22, 1864.	Fract. of left femur; prim. amputation.	Aug. 3, 1864.	Femoral	Aug. 3, 1864.	On face of stump. Surg. W. C. Jacobs, 81st Ohio.	Discharged Feb. 16, 1866.
42	Lahany, P., Corp'l, G, 5th Vermont, age 21.	April 2, 1865.	Fract. of left fibula .	April 9, 1865.	.....	April 9, 1865.	In Scarpa's triangle. Surg. D. P. Smith, U. S. Vols.	Discharged Aug. 14, 1865.
43	*Lee, J. A.*, Pt., I, 17th Miss., age 25.	July 2, 1863.	Upper third of left leg.	July 18, 20, 1863.	Posterior tibial artery.	July 21, 1863.	Femoral, at upper third.	Recovery.
44	Leuneghan, P., S'g't, B, 88th New York, age 30.	April 6, 1865.	Flesh wound right thigh.	Apr. 20, 1865.	Femoral	Apr. 20, 1865.	In continuity. Acting Staff Surg. J. Aiken.	Discharged July 26, 1865.
45	Lesler, J., Pt., H, 148th N.Y., age 48.	June 3, 1864.	Flesh wound of left thigh.	July 24, 1864.	Femoral	July 24, 1864.	In continuity. A. A. Surg. W. P. Moon.	Hæm. rec.; religated. Disch. Jan. 11, 1865.
46	Linehan, T., Pt, D, 37th N. Y., age 19.	May 31, 1862.	Fracture of right femur: June 27, amp. thigh.	June 27, 1862.	Femoral	June 27, 1862.	On face of stump. Surg. R. Bartholow, U. S. A.	Discharged Sept. 26, 1862.
47	Lyon, A. E., Pt., E, 37th Iowa, age 23.	Aug. 8, 1864.	Fracture of right os calcis; amp. thigh.	Aug. 17, 1864.	Femoral	Aug. 17, 1864.	In continuity	Discharged Aug. 13, 1865.
48	McGonagle, C., C'p'l, C, 36th Ohio, age 24.	Oct. 19, 1864.	Fract. condyle right femur; prim. amp.	Oct. 23, 1864.	Femoral	Oct. 23, 1864.	On face of stump	Discharged Mar. 31, 1865.
49	McLin, V., Pt., H, 7th Wis., age 24.	July 1, 1863.	Fracture right knee joint; Aug. 3, amp. thigh.	Aug. 16, 20, '63.	Femoral	Aug. 20, 1863.	On face of stump. Asst. Surg. J. D. Johnson, U. S. V.	Discharged Sept. 6, 1864.
50	*McMullen, R. T.*, Pt., I, 4th Ga., age 20.	May 3, 1863.	Fract. of leg; May 5, amp. at knee; 27th, re-amp. in thigh.	June 5, 1863.	Femoral	June 7, 1863.	Femoral, in cont.; in Scarpa's triangle.	Furloughed Aug. 4, 1863.
51	McNally, J., Pt., G, 69th N. Y., age 24	June 16, 1864.	Middle third, right thigh.	July 4, 1864.	Femoral	July 4, 1864.	In continuity. A. A. Surg. O. P. Sweet.	Furloughed Nov. 1, 1864.
52	Malloy, M., Pt., H, 69th New York.	Sept. 17, 1862.	Fract. of r't femur; Sept. 27, amp. thigh.	Oct. 4, 1862.	Femoral	Oct. 4, 1862.	In continuity. A. A. Surg. A. H. Smith.	Discharged Mar. 4, 1863.
53	Meikle, D., Pt., B, 11th Massachusetts.	Aug. 30, 1862.	Left knee joint; amp. at knee Sept. 28.	Oct. 4, 1862.	Popliteal ligated; recurred Oct. 7.	Oct. 7, 1862.	In continuity	Discharged Dec. 16, 1862.
54	Miller, C., Pt., G, 9th Penn., age 19.	June 30, 1862.	Fracture of left leg; Sept. 30, amp. leg.	Aug. 14, 1862.	.....	Aug. 14, 1862.	Femoral, in continuity.	Discharged June 29, 1863.
55	Minehan, A., Corp'l, F, 27th Mich., age 31.	Aug. 21, 1864.	Fract. right knee j't; prim. amp. thigh.	Sept. 25, 1864.	Femoral.....	Sept. 25, 1864.	In continuity; thigh re-amp. Oct. 19, 1864.	Discharged May 10, 1865.
56	Monroe, H., Pt., I, 20th Maine, age 25.	June 22, 1864.	Right leg; amp. leg, upper third.	July 10, 1864.	From stump	July 10, 1864.	In cont.; July 17, in Scarpa's triangle.	Discharged January 13, 1865. Died 1870.
57	*Moor, W.*, Pt., G, 5th N. C., age 27.	Oct. 19, 1864.	Wound of femoral artery.	Oct. 20, 1864.	Femoral	Oct. 20, 1864.	In wound. Surg. Pearson, 5th N. C.	Exchanged Feb. 10, 1865.
58	*Moore, J. W.*, Pt., I, 13th Miss., age 23.	July 3, 1863.	Middle third, right leg.	July 13, 17, ——.	Ant. tibial artery..	July 17, 1863.	Femoral, in continuity.	Transferred for exchange Oct. 5, '63.
59	Moore, L. J., Lieut., 10th Penn. Res., age 26.	June 27, 1862.	Fract. of left femur; July 24, amp. lower third.	July 31, 1862.	Branch of femoral; recurred Aug. 2.	Aug. 2, 1862.	In Scarpa's triangle. Surg. R. B. Bontecou, U. S. V.	Resigned January 21, 1863.
60	Morris, J., Pt., H, 14th U. S. Inf.	Aug. 30, 1862.	Left femoral injured .	Aug. 30, 1862.	.....	Aug. 30, 1862.	Ligated on field	Discharged November 7, 1862.
61	Moss, B. F., B, 101st Illinois, age 43.	July 20, 1864.	Flesh wound of left leg; gang.; amp. leg; amp. thigh.	Dec. 15, 1864.	Femoral	Dec. 15, 1864.	Left; in continuity, high up.	Discharged June 26, 1865.
62	Palmer, J. C., Pt., G, 10th Conn., age 18.	April 2, 1865.	Flesh wound of right thigh.	Apr. 10, 1865.	Femoral	Apr. 10, 1865.	Both ends in wound .	Mustered out July 5, 1865.
63	*Paschal, J.*, Pt., I, 2d N. C. Cav.	Aug. 16, 1864.	Flesh wound of right thigh; gangrene.	Aug. 27, 1864.	.....	Aug. 27, 1864.	In Scarpa's triangle. Surg. D. F. Wright, C. S. A.	Retired February 22, 1865.
64	*Perkins, L. A.*, Corp'l, D, 50th Va., age 19.	Sept. 19, 1864.	Fract. right femur; prim. amp. thigh.	.....	Secondary hæmor. from sloug. stu'p.	.....	Femoral ligated	Recovery, April 1, 1865.
65	Pickett, J., Pt., F, 8th Illinois Cav., age 21.	June 20, 1863.	Femoral art. severed	June 20, 1863.	.....	June 20, 1863.	Femoral ligated	Discharged June 9, 1864.
66	Robertson, T. W., Lt., 7th N. Y., age 26.	June 16, 1862.	Left knee joint.....	July 8, 1862.	Anterior tibial	July 8, 1862.	Femoral, in continuity.	Resigned March 6, 1863.
67	*Ross, A. G.*, Corp'l. I, 13th Miss., age 21.	Oct. 19, 1864.	Right femoral artery wounded.	.....	.....	.....	Fem. ligated; amp. right leg Nov. 8.	Retired March 14, 1865.
68	Rowe, J. B., Pt., G, 12th N. H., age 22.	May 14, 1864.	Middle third right thigh.	June 12, 1864.	Femoral	June 12, 1864.	Both ends in wound. Surg. A. Heger, U. S. A.	Discharged June 5, 1865.
69	Sassaman, L. H., Pt., E, 12th Penn. Res., age 24.	May 8, 1864.	Upper third of leg; injury of ant. tibial.	June 2, 1864.	Anterior tibial	June 4, 1864.	Femoral, in Scarpa's triangle. A. A. Surg. J. S. Cohen.	Mustered out June 28, 1865.
70	Scott. A. J., Pt., A, 9th Maine, age 24.	Aug. 16, 1864.	Head of right tibia..	Dec. 17, 1864.	Anterior tibial	Dec. 17, 1864.	Femoral, in continuity. A. A. Surg. J. C. Morton.	Discharged June 6, 1865.
71	Sharren, J., Pt., E, 170th N. Y., age 46.	May 24, 1864.	Right femur, middle; Oct. 1, amp. thigh	Oct. 8, 1864.	Femoral	Oct. 13, 1864.	In cont., in Scarpa's triangle.	Discharged August 15, 1865.
72	Sheffer, G. W., Pt., C, 5th U. S. Art.	May 24, 1864.	Flesh wound of left thigh.	May 24, 1864.	.....	May 24, 1864.	Femoral ligated	Discharged January 30, 1865.
73	Short, S. A., Serg't, A, 73d Ill., age 26.	July 20, 1864.	Fract. knee j't; amp. thigh; sloughing.	Aug. 14, 1864.	Femoral	Aug. 14, 1864.	Right femoral ligated in continuity.	Discharged January 18, 1865.
74	*Simmons, H. H.*, Capt., F, 21st Miss., age 24.	July 2, 1863.	Fracture right leg; prim. amp. leg, up. third.	July 28, 1863.	From stump	July 30, 1863.	Femoral, in continuity.	Sent to Provost Marshal March 17, 1864.
75	*Smith, F. A.*, Pt., G, 4th Ala., age 24.	July 2, 1863.	Fracture lower third of femur.	July 2, 1863.	.....	July 2, 1863.	Femoral ligated on field.	Transferred for exchange Apr. 27, '64.

No.	Name. Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
76	Smith, E. E., Pt., A, 11th Maine, age 19.	Aug. 16, 1864.	Fracture right tibia; Sept. 12, amp. thigh.	Oct. 17, 1864.	Femoral.....	Oct. 17, 1864.	Femoral lig.; amp. hip joint Jan. 19; lig. of ext. iliac Jan. 27, 1865.	Discharged May 27, 1865. *Spec.* 3709, A. M. M.
77	*Smith, H.*, Pt., F, 21st Va., age 41.	Oct. 19, 1864.	Both thighs; right femoral severed.	.....	.....	.....	Femoral ligated	Returned March 14, 1865.
78	Sockwell, C. L., Pt., K, 12th N. J., age 22.	May 6, 1864.	Wound of right thigh	May 6, 1864.	.....	May 6, 1864	Femoral, on field; hæm. rec'd May 31.	Discharged June 30, 1865.
79	*Spivey, D.*, Pt., 5th N. C., age 46.	May,—, 1863.	Left thigh, femoral wounded.	June 11, 1863.	Aneurism from femoral.	July 8, 1863.	In Scarpa's triangle. Surg. E. B. Haywood, C. S. A.	Recovered.
80	Surface, W. J., Pt., F, 7th Indiana.	Aug. 9, 1862.	Left kneejoint; Aug. 15, amp. at thigh.	Nov. 19, 1862.	Femoral	Nov. 19, 1862.	In continuity.....	Discharged October 27, 1862.
81	Sweeney, J. D., Serg't, D, 12th Mass.	May 5, 1864.	Right thigh; femoral artery injured.	May 19, 1864.	Femoral.....	May 19, 1864.	In continuity.....	Discharged July 8, 1864.
82	Union Lieutenant...	July 14, 1864.	Fracture of upper third of femur.	.....	Femoral.....	.....	Femoral ligated	Recovery.
83	*Van Lear, A. G. L.*, Pt., K, 5th Virginia.	May 3, 1863.	Right knee; prim. amp. at thigh.	May 15, 1863.	Femoral	May 15, 1863.	In continuity.....	Removed.
84	Vearing, W., Pt., G, 12th Mo., age 30.	May 22, 1863.	Wound of right thigh.	June 22, 1863.	Femoral	June 22, 1863.	Femoral ligated	July 1, venous hæm. Duty Dec. 16, 1863.
85	Vickery, R. S., Ass't Surg., 2d Michigan.	July 30, 1864.	Flesh wound left thigh, upper third.	July 30, 1864.	Femoral	July 30, 1864.	Both ends in wound. Surg. W. B. Fox, 8th Mich.	Discharged March 11, 1865.
86	Wilder, E., Corp'l, A, 100th N. Y., age 19.	Aug. 16, 1864.	Left leg; sloughing .	Sept. 21, 1864.	Posterior tibial artery.	Sept. 21, 1864.	Fem., in continuity. A. A. Surg. J. C. Morton.	Recovered.
87	Williams, B. F., Serg't, K, 40th Ohio, age 23.	June 20, 1864.	Fracture left thigh; prim. amputation.	July 4, 1864.	.....	July 4, 1864.	Femoral, in continuity.	Discharged May 29, 1865.
88	Wilson, J., Pt., 27th N. Y. Batt., age 26.	May 26, 1863.	Left thigh, middle third.	July 16, 1863.	Aneurism	July 16, 1863.	Both ends in wound. A. A. Surg. G. B. Hammond.	Returned to duty.
89	Winchell, C. D., Pt., K, 38th Wis., age 19.	Apr. 2, 1865.	Upper third of left thigh.	Apr. 11, 1865.	Branch of femoral.	Apr. 12, 1865.	Femoral, 1½ inches below Poupart's lig.	Discharged July 3, 1865.
90	Winchester, D. W., Pt., I, 1st Mc. Artillery, age 21.	May 19, 1864.	Middle third of left thigh.	May 28, 1864.	Femoral.....	May 28, 1864.	In Scarpa's triangle. Surg. T. R. Crosby, U. S. V.	Discharged June 6, 1865.
91	Winston, D. S., Pt., F, 117th N. Y., age 23.	Sept. 29, 1864.	Right knee joint; prim. amp. at thigh.	Sept. 26, 1865.	From stump	Sept. 26, 1865.	On face of stump. Ass't Surg. J. H. Armsby, U. S. V.	Discharged.
92	Wood, W., Corp'l, H, 81st Indiana.	Dec. 31, 1862.	Right thigh.....	1863.	.....	....	Femoral, in continuity.	Returned to duty June 22, 1863.
93	Wright, M., Pt., F, 25th Ind., age 18.	Dec. 11, 1864.	Fracture lower third femur.	Jan. 2, 1865.	.....	Jan. 2, 1865.	In Scarpa's triangle. A. A. Surg. E. L. Mola.	Discharged July 8, 1865.
94	Ackland, G., Corp'l, H, 21st Mo., age 25.	April 4, 1865.	Fracture left ankle joint; Apr. 24, amp. leg.	April 27, 1865.	Posterior tibial ..	April 27, 1865.	In cont., Scarpa's sp. A. Surg. E. McClintock, U. S. V.	Died May 1, 1865.
95	Allen, E. S., Serg't, D, 3d Me., age 36.	July 2, 1863.	Fracture left leg; prim. amp. thigh.	July 21, 1863.	Femoral	July 21, 1863.	Ligation	Died August 7, 1863; hæm.
96	Ambrose, J. G., Chap. 12th N. H., age 35.	July 25, 1864.	Upper part rt. thigh, inj. femoral, &c.	Aug. 15, 1864.	Femoral	Aug. 15, 1864.	In cont., one end; Aug. 20, lig. of prof.	Died August 20, 1864.
97	*Anderson, J.*, C, 16th Georgia.	Sept. 14, 1862.	Lower third of thigh.	....	.....	Sept. 29, 1862.	In wound	Died Sept. 30, 1862.
98	Archibald, T., Pt., G, 24th Mass., age 18.	April 2, 1865.	Flesh, right thigh, injured femoral	April 12, 1865.	Femoral	April 12, 1865.	In wound, one end...	Died April 26, 1865.
99	Armstrong, F., S'g't, A, 58th Massachusetts, age 30.	June 3, 1864.	Fract. left knee j't; prim. amp. thigh.	June 26, 1864.	.....	June 26, 1864.	In continuity, upper third.	July 17, hæm. profunda. Died July 18, 1864.
100	Atkins, W. H., Pt., I, 10th Mass., age 20.	July 1, 1862.	Fract. lower third right femur; amp.	Aug. 10, 1862.	Femoral	Aug. 11, 1862.	In continuity, near femoral ring.	Died Aug. 12, 1862; exhaustion.
101	Atkinson, J. M., Pt., A, 3d Indiana Cavalry, age 23.	May 12, 1864.	Fracture femur, right.	.....	.....	May 25, 1864.	In continuity. A. A. Surg. T. Liebold.	June 2, amp. Died June 7, 1864; pyæmia.
102	Atwood, L. D., Pt., B, 32d Mass.	Sept. 30, 1864.	Flesh, middle, left thigh.	Oct. 31, 1864.	Femoral	Oct. 31, 1864.	Both ends in wound.	Died Nov. 9, 1864; artery had sloughed.
103	Ayres, B., Pt., A, 5th Iowa, age 40.	May 19, 1863.	Flesh, left thigh, femoral vein inj'd.	May 31, June 1, 1863.	.....	June 1, 1863.	In continuity.	Died June 1, 1863. *Spec.* 2085.
104	Bailey, J., Pt., I, 55th Pa., age 26.	June 18, 1864.	Flesh, left thigh...	July 9, 1864.	Femoral	July 9, 1864.	In continuity below profunda.	Died July 10, 1864.
105	Ball, C. E., Pt., F, 53d Mass., age 20.	June 14, 1863.	Fract. right fem.; lower third amp.	June 23, 1863.	Femoral	June 23, 1863.	On face of stump.	Died June 29, 1863.
106	Banfill, T., Serg't, C, 19th Ind., age 20.	May 12, 1864.	Flesh, lower third, left thigh.	.....	....	June 12, 1864.	In cont., in Scarpa's triangle. Surg. T. R. Crosby, U. S. V.	Died June 12, 1864; pyæmia.
107	Barnes, C., Pt., D, 40th N. Y., age 21.	May 5, 1864.	Fract. right knee; prim. amputation.	June 16, 17, '64.	.....	June 17, 1864.	On face of stump.	Hæmor. rec. Died June 19, 1864.
108	Bauer, P., Pt., B, 9th Illinois.	Feb. 14, 1862.	Fracture right patella; Mar. 15, amp.	Mar 23, 1862.	Femoral	Mar. 23, 1862.	On face of stump.	Died May 5, 1862; exhaustion.
109	Baxter, S., Serg't, C, 68th C. T., age 39.	April 1, 1865.	Fract. tibia, inv. knee jt.; Apr. 12, am.	April 22, 1865.	Femoral	April 22, 1865.	In continuity, upper third.	Died June 2, 1865; exhaustion.
110	Bearly, J. H., Serg't, I, 101st Ohio.	Sept. 1, 1864.	Fracture right femur; Sept. 8, amp.	Sept. 17, 1864.	Femoral	Sept. 17, 1864.	On face of stump.	Died Oct. 31, 1864.
111	*Bedingfield, J. F.*, Capt., G, 60th Ga., age 25.	Mar. 25, 1865.	Both thighs, upper third.	April —, 1865.	.....	April 15, 1865.	In cont., Scarpa's sp. A. A. Surg. N. A. Robbins.	22d, hæm. Died Apr. 25, 1865.
112	Bell, T. C., Pt., E, 34th Iowa, age 23.	April 6, 1865.	Left post. tibial artery.	April 15, 1865.	Left post. tibial...	April 17, 1865.	In cont., Scarpa's. Surg. A. McMahon, U. S. V.	Hæm.; amp. Died April 23, 1865; exhaustion.
113	Bell, R. H., Capt., F, 7th N. Y. H. A., age 37.	May 7, 1864.	Left knee j't; prim. amputation thigh.	June 10, 1864.	Femoral.....	June 10, 1864.	On face of stump.	Died June 20, 1864; exhaustion.
114	Benn, J. H., Pt., E, 45th Pa.	May 6, 1864.	Flesh, both thighs...	May 28, 1864.	Profunda.....	May 28, 1864.	One end in wound ..	June 14, hæm. Died June 14, 1864.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
115	Berkey, C., Pt., A, 10th Pa. Res., age 24.	Aug. 30, 1862.	Dividing of left popliteal.	Sept. 11, 13, 14, 1862.	.....	Sept. 14, 1862.	In continuity, Scarpa's space.	September 15, hæm.; 18, amp. Died September 18, 1862.
116	*Bibb, W. J.*, Pt., G, 32d Tennessee.	May 15, 1864.	Right knee j't fract.; prim. amputation.	.....	.....	Aug. 14, 1864.	On face of stump....	Died September 23, 1864.
117	Bickley, H., Pt., E, 10th N. J., age 21.	May 14, 1864.	Flesh, mid., left leg; Aug. 3, ampt'n leg.	Aug. 23, 1864.	Femoral.....	Aug. 23, 1864.	On face of stump ...	Died August 23, 1864; exhaustion.
118	Bills, C., Pt., K, 17th N. Y.	Aug. 30, 1862.	Right thigh, inv. profunda artery.	Sept. 13, 15, 22, 1862.	....	Sept. 26, 1862.	In cont.; Oc. 3, hæm.; unsuccessful att'pt to relig.	Died October 4, 1862.
119	Bloomer, J., Pt., K, 170th N. Y., age 41.	Aug. 25, 1864.	Fracture upper 3d of right leg.	Sept. 17, 1864.	Post. tibial	Sept. 17, 1864	In cont., in Scarpa's triangle.	September 18, amp. Died Sept. 21, 1864.
120	*Boozer, P. S.*, Pt., K, 5th S. C., age 37	May 28, 1864.	Flesh, near groin....	.....	....	July 3, 1864.	In cont. A. Surg. J. C. McKee, U. S. A.	Died July 20, 1864.
121	*Boston, S. S.*, Pt., K, 50th Va.	.....	Groin and testicles..	.....	....	June 19, 1864.	Ligation	Died June 19, 1864; exhaustion.
122	Bowser, J. F., Pt., B, 11th Pa., age 18.	Mar. 30, 1865.	Right tibia, head; Apr. 11, amp. thigh.	Apr. 17, 28, 1865.	Femoral	Apr. 28, 1865.	On face of stump. A. Surg. W. F. Norris, U. S. A.	Died May 21, 1865; pyæmia.
123	*Brandon, E. E.*, Pt., K, 14th Va., age 23.	May 10, 1864.	Frac. up. 3d right tib. May 19, amp. thigh.	May 25, 1864.	Femoral	May 25, 1864.	On face of stump ...	Died June 24, 1864; exhaustion.
124	Brassington, J., Pt., H, 96th Pa., age 32.	May 13, 1864.	Right tibia, knee j't; May 30, amp.	June 5, 1864.	....	June 5, 1864.	On face of stump. A. Surg. W. F. Norris, U. S. A.	Died June 7, 1864; exhaustion.
125	Briscoe, M., Pt., G, 155th N. Y., age 42.	June 3, 1864.	Left knee joint; June 28, amputation.	June 15, 16, 1864.	Femoral	June 16, 1864.	In cont. Surg. N. R. Moseley, U. S. V.	Hæm. recur. Died June 17, 1864.
126	Britton, M., Corp'l, F, 7th Pa. Res., age 21.	Dec. 13, 1862.	Bones, r't foot; Dec. 26, amp. knee j't.	Jan. 7, 1863.	Stump	Jan. 7, 1863.	In continuity. Surg. E. Bentley, U. S. V.	Died Jan. 12, 1863.
127	*Brooks, A. M.*, Lieut, A, 26th Va.	Apr. 6, 1865.	Fract. right femur, inj. pop. artery.	.....	Popliteal.....	Apr. 17, 1865.	In continuity, below profunda.	Died April 20, 1865.
128	Brooks, J. H., Pt., E, 1st Md. Cav., age 37.	Aug. 16, 1864.	Fracture left fibula..	Sept. 11, 1864.	Femoral.....	Sept. 11, 1864.	In cont. A. A. Surg. E. B. Woolston.	Sept. 28, amp. Died Oct. 17, 1864; exh'n.
129	Brown, S., Pt., G, 134th N. Y., age 16.	Aug. 30, 1862.	Post. tibial artery...	Nov. 14, 28, 1862.	Post. tibial	Nov. 28, 1862.	In cont., low. 3d. A. Surg. W. A. Conover, U. S. V.	Died Dec. 7, 1862; pyæmia. *Spec.* 1024, A. M. M.
130	Brown, W. C., Serg't, G, 51st N. Y., age 21.	May 11, 1864.	Fract. r't thigh, low. 3d; primary amp.	May 21, 1864.	Femoral.....	May 21, 1864.	On face of stump ...	Died July 11, 1864.
131	Burke, P., Pt., G, 10th Infantry.	Aug. 30, 1862.	Right knee j't; Sept. 11, amp. thigh.	Sept. 13, 1862.	.....	Sept. 13, 1862.	In continuity.....	Died Sept. 14, 1862; exhaustion.
132	Cain, W. H., Serg't, I, 115th N. Y., age 23.	Aug. 16, 1864.	Injuring right tibia; Sept. 17, amp. leg.	Sept. 25, 1864.	Femoral..... ..	Sept. 25, 1864.	In continuity.....	Died September 26, 1864.
133	[1]Cameron, D. H., Pt., C, 4th R. I., age 24.	Mar. 14, 1862.	Condyles r't femur; prim. amputation.	Apr. 5, 1862.	Femoral.....	Apr. 5, 1862.	In continuity.....	Died April 6, 1862.
134	*Campbell, J. W.*, Sgt., A, 17th Va., age 23.	Aug. 4, 1864.	Fracture femur	Aug. 13, 1864.	.....	Aug. 13, 1864.	In continuity, Scarpa's space.	Died August 13, 1864; exhaustion.
135	Campbell, S., Pt., H, 140th Pa., age 30.	May 29, 1864.	Fract. middle third right femur.	June 10, 13, '64.	Profunda ligated..	June 13, 1864.	In continuity. Asst. Surg. W. Thomson, U. S. A.	Died June 13, 1864; exhaustion. *Spec.* 3557, A. M. M.
136	*Campbell, S. G.*, Pt., F, 58th Va., age 31.	May 31, 1864.	Left knee joint; primary amputation thigh.	June 20, 1864.	Femoral.....	June 21, 1864.	On face of stump....	Died June 23, 1864; pyæmia.
137	*Carroll, R. A.*, Pt., F, 3d Ala., age 19.	July 2, 1863.	Flesh, right leg; secondary amputation thigh.	Dec. 9, 23, '63.	Stump	Dec. 23, 1863.	In continuity	Died February 17, 1864; pyæmia.
138	Carter, C. S., Pt., D, 50th Pa., age 22.	May 12, 1864.	Right leg; amputation thigh.	May 28, 1864.	.....	May 28, 1864.	On face of stump ...	Died June 2, 1864.
139	Chase, J. B., Pt., K, 24th N. Y. Cavalry, age 49.	June 16, 1864.	Fracture left tibia and fib.; prim. amp. knee joint.	July 6, 1864.	.....	July 7, 1864.	In continuity, Scarpa's. A. A. Surg. W. H. Ensign.	Died July 9, 1864.
140	*Clark, W. L.*, Pt., K, 25th N. C., age 20.	April 1, 1865.	Flesh, right thigh, femoral artery.	April 10, 1865.	Femo'l and branch profunda.	April 10, 1865.	In continuity, above profunda. A. A. Surg. J. Morris.	Gangrene. Died Apr. 19, 1865.
141	Claypole, S., Pt., D, 62d Pa., age 27.	May 30, 1864.	Flesh, right leg	June 8, 1864.	Anterior tibial ..	June 8, 1864.	In continuity, Scarpa's. A. Surg. W. P. Norris, U. S. A.	Hæm. recur'd. Died August 4, 1864; asthenia.
142	Clelland, W., Pt., H, 8th N. Y., age 18.	June 1, 1864.	Flesh, left thigh, middle.	July 24, 1864.	Femoral	July 24, 1864.	One end in wound, mid.	Died July 24, 1864.
143	Cleveland, J. L., Pt., G, 16th Me., age 25.	Dec. 13, 1862.	Primary amp. thigh, lower third.	Dec. 30, 1862.	Femoral.....	Dec. 30, 1862.	On face of stump ...	Died December 31, 1862; exhaustion.
144	Clymer, J., Pt., B, 104th Pa.	May 31, 1862.	Popliteal space.....	June 15, 16, '62.	Popliteal.....	June 16, 1862.	In continuity, Scarpa's. A. A. Surg. W. K. Cleveland.	Died June 16, 1862.
145	Coder, D., Corp'l, F, 16th Pa. Cavalry, age 23.	May 28, 1864.	Trochanter minor, right thigh.	June 8, 9, '64.	Femoral	June 9, 1864.	In continuity. Asst. Surg. W. Thomson, U. S. A.	Died June 10, 1864; asthenia.
146	Coleman, G., Pt., F, 91th N. Y., age 19.	Aug. 29, 1862.	Upper third femur ..	Dec. 3, 1862.	Profunda	Dec. 3, 1862.	In continuity	Died December 3, 1862; pyæmia.
147	Colgan, W., Pt., C, 2d Mass. Cavalry, age 21.	Sept. 14, 1864.	Flesh, left thigh.....	.....	....	Sept. 27, 1864.	In continuity, four inches below profunda.	Hæmor. recurred. Died September 28, 1864.
148	Conlin, J. S., Pt., I, 5th Michigan.	May 31, 1862.	Right femoral artery, middle.	June 10, 1862.	Femoral	June 10, 1862.	In cont.; also lig. profunda. Surg. R. B. Bontecou, U. S. V.	Relig. profunda. Died June 17, 1862.
149	Connell, M., Pt., K, 2d N. Y. H. A., age 34.	April 7, 1865.	Flesh, middle, right thigh.	.....	Femoral sloughed	June 15, 1865.	In continuity, one end. A. A. Surg. O. P. Sweet.	Died June 16, 1865; exhaustion.
150	Coultes, W. H., L't, C, 61st N. Y.	June 1, 1862.	Middle of thigh, injury femoral artery.	June 18, 1862.	Femoral.....	June 18, 1862.	Both ends in wound. A. Asst. Surg. W. Hunt.	Died June 23, 1862.
151	*Councell, E. C.*, Col., 16th Miss., age 32.	Aug. 21, 1864.	Fracture right leg near knee; Aug. 21, amp. knee joint.	Sept. 2, 1864.	Femoral.....	Sept. 3, 1864.	On face of stump....	September 10, hæm. Died Sept. 10, 1864.

[1] Thompson (J. H.), *Report of the wounded at the battle of New-Berne*, in *American Medical Times*, Vol. 5, p. 6.

No.	Name. Age. and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
152	Cox, T. C., Pt., G, 88th New York.	Dec. 13, 1862.	Fr. left fem., up. th'd, femoral injured.	Jan. 9, 10, '63.	Femoral.....	Jan. 10, 1863.	In continuity	Died Janua'y 10, 1863.
153	Coy, J., Serg't, K, 6th Maine, age 28.	Nov. 7, 1863.	Left thigh, middle...	Nov. 24, 1863.	Femoral.....	Nov. 24, 1863.	In continuity; religated Dec. 1 and 13.	Died Dec. 23, 1863; recurring hæm's.
154	*Crews, M. A.*, Pt., F, 2d S. C., age 36.	June 1, 1864.	Fracture right leg; primary amputation thigh.	June 19, 1864.	....	June 19, 1864.	On face of stump....	Died October 25, 1864; tuberculosis.
155	*Crowder, D. J.*, Pt., Stannard's Batt'ry, age 23.	Dec. 16, 1864.	Flesh, lower third thigh.	.....	Popliteal..... ...	Jan. 9, 1865.	In continuity, middle. A. A. Surg. D. D. Talbot.	Died Feb. 3, 1865.
156	Cummings, H., A, 7th W. Va., age 21.	May 8, 1864.	Right thigh	May 25, 1864.	Femoral	May 25, 1864.	In continuity, above profunda.	Died May 29, 1864.
157	Cummings, J. M., Pt., D, 49th Ind.	Dec. 28, 1862.	Right thigh, cutting femoral artery.	... .	Femoral	.....	In cont., in Scarpa's space.	Jan. 12, gangrene. Died Jan. 29, 1863.
158	Cummins, A. H., Pt., K, 34th New York, age 25.	Dec. 13, 1862.	Left tibia, up. third; Dec. 26, amp. thigh.	Jan. 3, 1863.	Femoral	Jan. 3, 1863.	In continuity, high up.	Died Jan. 25, 1863; exhaustion.
159	Cunningham, S., Pt., D, 13th Ind. Cavalry, age 29.	Dec. 4, 1864.	Right knee joint; primary amputat'n thigh.	Dec. 9, 1864.	Femoral	Dec. 9, 13, 20, 1864.	On face of stump, in continuity.	Dec. 22, hæm. Died Jan. 26, 1865.
160	Curtis, J. J., Serg't, A, 13th New Hampshire, age 20.	June 15, 1864.	Pelvis, left side	.....	....	July 31, 1864.	Both ends in wound; also int. cir. A. Surg. E. Curtis, U. S. A.	Died July 31, 1864.
161	Daly, J., Serg't, K, 82d N. Y., age 27.	May 6, 1864,	Fracture left fibula..	May 20, 1864.	Post. tibial	May 20, 1864.	In cont., Scarpa's. A. Surg. W. F. Norris, U. S. V.	Recurring hæmorrhages. Died June 3, 1864; exhaust'n.
162	Darling, S. G., Pt., D, 32d Me., age 19.	May 5, 1864.	Severing femoral, rt. thigh, lower third.	May, 1864.	.....	May, 1864.	In co tinuity, below profunda.	Amputation thigh. Died May 26, 1864.
163	*Day, H.*, Corp'l, A, 6th Alabama.	May 3, 1863.	Right leg, fracture fibula.	May 26, 28, '63.	Post. tibial.....	May 28, 1863.	In continuity	Gang'ne. Died June 5, 1863.
164	Delamater, M., Corporal, G, 7th Mich. Cav., age 20.	May 28, 1864.	Right thigh, lower third.	.....	.....	July 10, 1864.	In cont.; July 12, hæm. popliteal.	Amputation thigh. Died Aug. 7, 1864; pyæmia.
165	Delaney, J., Pt., G, 67th New York, age 20.	May 6, 1864.	Fracture head left tibia; May 27, amp. thigh.	July 3, 1864.	Femoral	July 4, 1864.	On face of stump. Surg. R. B. Bontecou, U. S. V.	Died July 10, 1864; exhaust'n, pyæmia.
166	Deming, J. C., Corp'l, A, 111th New York, age 20.	Oct. 12, 1863.	Left pelvic bone, femoral artery.	Oct. 21, 1863.	Femoral	Oct. 21, 1863.	Ligation	Died Oct. 21, 1863.
167	Detweiler, C., Pt., C, 47th Pa., age 24.	Oct. 19, 1864.	Fracture left femur, middle third.	Mar. 5, 9, '65.	Ext. circumflex; lig. profunda.	Mar. 10, 1865.	Both ends in wound, Scarpa's triangle.	Died March 10, 1865; exhaustion.
168	Dier, W., Corp'l, A, 129th Pa., age 23.	Dec. 13, 1862.	Left popliteal space.	Feb. 22, 1863.	.....	Feb. 22, 1863.	Ligation	Died March 4, 1863; pyæmia.
169	Dougherty, J. H., Pt., G, 66th New York, age 35	June 3, 1864.	Fracture left knee joint; June 9, amp. thigh.	June 20, 21, '64.	.....	June 21, 1864.	On face of stump...	Died June 29, 1864; pyæmia.
170	Dougherty, M., Pt., E, 49th Pa., age 35.	Sept. 19, 1864.	Fracture left knee; amputation thigh.	Nov. 4, 1864.	Femoral	Nov. 4, 1864.	Femoral; March 26, 1865, external iliac ligated.	Died April 8, 1865.
171	Doyle, L., Pt., K, 8th Maine, age 34.	May 20, 1864.	Flesh, middle, right thigh.	....	.....	June 1, 1864.	Both ends in wound. Surg. A. Heger, U. S. A.	Amputation thigh. Died June 6, 1864; exhaustion.
172	Dunn, B. M., Pt., D, 1st Louisiana.	July 2, 1863.	Fract. right femur, severing femoral.	July 2, 1863.	Femoral	July 2, 1863.	In cont., in Scarpa's space.	Sept. 8, hæm. Died April 13, 1864.
173	Eddy, G., Pt., E, 7th Wisconsin, age 24.	Aug. 30, 1862.	Fracture right leg; prim. amp. thigh.	Sept. 10, 13, '62.	Femoral	Sept. 13, 1862.	In continuity.... ..	Died Sept. 13, 1862.
174	*Edson, W.*, Pt., I, 5th N. C., age 22.	May 12, 1864.	Fract. low. third left femur; amp. thigh.	May 24, 1864.	Profunda	May 24, 1864.	In continuity	Died May 26, 1864.
175	Edwards, R., Pt., G, 98th Illinois.	June 25, 1863.	Flesh, both thighs.	July 6, 8, 1863.	Femoral	July 8, 1863.	In continuity, one end.	Died July 11, 1863.
176	Edwards, J. W., Pt., B, 28th Ill., age 18.	Mar. 26, 1865.	Right leg, upper fm., third.	Apr. 15, 20, '65.	Posterior tibial artery.	Apr. 20, 1865.	Lower portion Scarpa's space. A. A. Surg. H. B. Cole.	Died April 28, 1865.
177	Elliot, E., Pt., H, 118th Pa., age 21.	June 3, 1864.	Flesh wound middle third right th.	June 13, 1864.	.....	June 13, 1864	Femoral, one end in wound. A. Surg. A. Allen, U. S. A.	Died June 21, 1864.
178	Faust, P. L., Pt., A, 79th Pa., age 26.	Aug. 10, 1864.	Fracture left knee; prim. amp. thigh.	Sept. 15, 1864.	Femoral	Sept. 15, 1864.	On face of stump	Died Oct. 2, 1864.
179	Ferguson, J., Pt., G, 142d Pennsylvania.	Dec. 13, 1862.	Upper third right leg.	Jan. 23, 24, 25, '63	Popliteal	Jan. 25, 1863.	Femoral, in Scarpa's triangle.	Died Jan. 29, 1863. *Spec.* 1140, A. M. M.
180	Firth, R. E., Pt., A, 157th N. Y., age 23.	Dec. 6, 1864.	Left knee joint; Dec. 10, amp thigh.	Dec. 17, 19, '64.	Branch of femoral.	Dec. 19, 1864.	Femoral, in continuity.	Died Dec. 29, 1864; pyæmia.
181	Fliege, H., Corp'l., F, 7th Michigan.	Sept. 17, 1862.	Right knee joint; Oct. 9, amp. thigh.	Oct. 11, 1-62.	Femoral	Oct. 11, 1862.	Femoral ligated .	Died Oct. 18, 1862.
182	Flowers, M., Pt., H, 101st N. Y., age 26.	Aug. 30, 1862.	Wound of thigh; Aug. 30, amputated.	Sept. 20, 1862.	From stump	Sept. 20, 1862.	Femoral ligated, in cont.	Died Sept. 24, 1862.
183	Floyd, J., Sergeant, 13th Pa. Cavalry.	May 28, 1864.	Fracture of left femur	June 19, 1864.	Profunda	June 19, 1864.	Fem. above origin of profunda. A. A. Surg. J. Newcombe.	Hæm. rec. Died June 25, 1864.
184	Freeman, A., Pt., H, 61st New York.	Sept. 17, 1862.	Fracture of left femur	Nov. 3, 1862.	Femoral	Nov. 3, 1862.	Femoral ligated .	Died Nov. 24, 1862.
185	Freeman, C. A., Sergeant, B, 37th Mass., age 22.	Apr. 6, 1865.	Flesh wound of left thigh.	Apr. 15, 1865.	Femoral	Apr. 15, 1865.	In Scarpa's triangle. Surg. B. A. Vanderkieft, U. S. V.	Hæmor. recurred. Died April 18, 1865.
186	Geitz, H., Pt., C, 15th N. Y., age 26.	May 18, 1864.	Fracture of right femur.	May 29, 30, '64.	Profunda	May 30, 1864.	In continuity. Surg. D. W. Bliss, U. S. V.	Died June 8, 1864.
187	Gilley, M., Pt., G, 9th N. Y. Vols., age 27.	May 5, 1864.	Wound of thigh...	May —, 1864.	Femoral	May —, 1864.	Femoral ligated . .	Died May 27, 1864; pyæmia.
188	Goodman, E., Pt., D. 27th Pa., age 17.	May 2, 1863.	Shot wound; amputated thigh.	June 18, 1863.	....	June 18, 1863.	Femoral ligated	Died Aug. 9, 1863.
189	Goodwin, A. B., 2d New Hampshire.	July 2, 1863.	Left thigh.....	July 20. 1863.	Femoral	July 20, 1863.	Both ends in wound	Died Aug. 8, 1863.
190	Graham, J. A., Sergeant, H, 116th Pa.	June 1, 1864.	Right thigh.....	June 8, 1864.	Profunda; profunda ligated.	June 8, 1864.	Femoral, two inches above the profunda.	Died June 15, 1864.
191	Gray, J., Pt., D, 2d Pa. H. Art., age 17.	June 17, 1864.	Upper third of left thigh.	June 30, 1864.	.....	June 30, 1864.	In cont. Surg. N. R. Moseley, U. S. V.	Died July 12, 1864.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
192	Griffiths, H., Pt., E, 8th N. Y. Cav.	Sept. 17, 1862.	Left femur, knee; Nov. —, amp. thigh.	Nov. 19, 1862.	Branch of femoral.	Nov. 19, 1862.	In Scarpa's triangle. Surg. H. S. Hewit, U. S. V.	Died Nov. 19, 1862.
193	Gross, C., Pt., 6th Penn. Cavalry.	May 30, 1864.	Left thigh, femoral divided.	May 31, 1864.	Femoral	May 31, 1864.	Both ends in wound; hæm. recurred.	Died June 8, 1864.
194	Hagan, J., Pt., G, 76th Pa.	July 17, 1864.	Right thigh, femoral divided.	July 23, 1864.	Femoral.....	July 23, 1864.	One end in wound ..	Died of gangr. July 27, 1864.
195	Ham, J. C., Serg't, B, 87th Pa.	Oct. 19. 1864.	Left knee joint; Oct. 29, amp. thigh.	Oct. 28, 1864.	Femoral, 32 oz.....	Oct. 28, 1864.	On face of stump	Died Oct. 28, 1864.
196	Hamilton, E., Capt., G, 15th N. J., age 19.	May 6, 1864.	Right thigh, femoral divided.	May 15, 1864.	Br'ch of profunda	May 15, 1864.	In Scarpa's triangle. Surg. H. W. Ducachet, U. S. V.	Died May 16, 1864.
197	Harper, J., Pt., B, 16th Inf.	Dec. 31, 1862.	Fracture of thigh....	.....	.....	.....	Femoral ligated.....	Died Feb. 14, 1863.
198	Harriman, R. C., Pt., F, 11th Me., age 39.	Aug. 16, 1864.	Head of left tibia; Sept. 16, amp. thigh.	Sept. 23, 1864.	Femoral.....	Sept. 23, 1864.	In continuity. A. A. Surg. J. C. Morton.	Died Sept. 26, 1864.
199	Harrington, W. J., Pt., C, 16th Wis.	July 5, 1864.	Flesh wound of left thigh.	July 16, 1864.	Femoral.....	July 16, 1864.	In continuity. Surg. G. F. French, U. S. V.	Died July 21, 1864; gangrene.
200	Harris, J. M., Corp'l, C, 14th Iowa, age 20.	July 15, 1864.	Lower third right thigh.	July 27, 1864.	Traumatic aneurism.	July 27, 1864.	Both ends in wound. Surg. J. G Keenon, U. S. V.	July 27, amp. Died August 3, 1864; pyæmia.
201	Harrison, E., Color-Serg't, B, 10th N. Y.	May 10, 1864.	Right thigh, femoral artery severed.	May 10, 1864.	Femoral.....	May 10, 1864.	Femoral ligated on field.	Died May 22, 1864.
202	Haskell, A. M., Corp'l, K, 12th Me., age 23.	Oct. 19, 1864.	Right knee; Nov. 15, amp. thigh.	Nov. 21, 1864.	From stump.	Nov. 21, 1864.	Femoral, on face of stump.	Hæm. Nov. 27, 28, 30. Died Dec. 1, 1864.
203	Haskins, W. H., Pt., K, 39th Massachusetts, age 23.	May 10, 1864.	Left ankle joint; May 18, amp. thigh.	May 24, 31, '64.	Femoral; lig. musc. branch May 24.	May 31, 1864.	Femoral, on face of stump.	Died May 31, 1864.
204	Hayden, G., Pt., B, 1st Maryland Bat., age 22.	July 3, 1863.	Left knee joint; July 8, amp. thigh.	July 13, 1863.	.....	July 13, 1863.	Femoral ligated in continuity.	Died Sept. 23, 1863.
205	Heath, L., Serg't, D, 2d Mich., age 22.	June 18, 1864.	Right tibia; July 7, amp. thigh.	July 12, 1864.	.....	July 12, 1864.	In Scarpa's triangle.	Died July 28, 1864; pyæmia.
206	Hershay, C., Serg't, F, 25th Iowa, age 21.	Mar. 19, 1865.	Right femur; Mar. 20, amp. thigh.	April 14, 1865.	Femoral artery....	April 14, 1865.	Femoral, on face of stump.	Died April 15, 1865.
207	Hickey, T. G., 72d Pa., age 53.	Aug. 30, 1862.	Middle third of right thigh.	Sept. 27, 1862.	Femoral artery ..	Sept. 27, 1862.	Femoral, in continuity.	Died Sept. 27, 1862.
208	*Horn, S.*, Pt., H, 53d North Carolina.	Mar. 25, 1865.	Flesh wound of left thigh.	July 6, 9, 1865.	Femoral artery ...	July 9, 1865.	In cont. A. A. Surg. J. Morris.	Died July 14, 1865; hæmorrhage.
209	Horton, A., Pt., I, 48th N. Y., age 19.	June 3, 1864.	Right knee j't; prim. amp. thigh.	June 12, 1864.	From stump.....	June 12, 1864.	Femoral, on face of stump.	Hæm. rec. June 16. Died June 23, 1864
210	Hubbs, J. B., Pt., B, 142d Pa., age 20.	Dec. 13, 1862.	Fracture right leg; Dec. 26, amp. thigh.	Dec. 29, 1862.	Femoral; hæm. recurred.	Jan. 9, 1863.	In Scarpa's triangle	Died Jan. 12, 1863. *Spec.* 652.
211	Huggins, W., Serg't, G, 60th Illinois.	Mar. 16, 1865.	Right thigh	April 3, 1865.	Prof'da; prof. ligated.	April 5, 1865.	Femoral, just below Poupart's ligament.	Died April 8, 1865.
212	Hulbert, G. D., Pt., G, 109th N. Y., age 37.	May 17, 1864.	Flesh w'ds of both thighs.	June 8, 1864.	Profunda.....	June 8, 1864.	Femoral, in continuity.	Died June 8, 1864.
213	Hyatt, J., Pt., E, 2d Ohio, age 30.	May 15, 1864.	R't thigh; ball lodg'd in pelvic cavity.	May 28, 1864.	Profunda	May 28, 1864.	Femoral, in Scarpa's triangle. A. A. Surg. H. C. May.	Died June 2, 1864.
214	*Johns, J. M.*, Pt., G, 5th Florida.	Sept. 17, 1862.	Left knee; prim. amp. thigh.	Oct. 3, 1862.	From stump.....	Oct. 3, 1862.	Femoral, in Scarpa's triangle.	Died Oct. 5, 1862.
215	Johnson, F. B., Pt., E, 16th Maine.	Dec. 13, 1862.	Right knee; prim. amp. thigh	Dec. 25, 1862.	From stump.....	Dec. 25, 1862.	On face of stump ..	Died Dec. 25, 1862.
216	*Johnson, P. L.*, Pt., D, 25th Va., age 22.	May 3, 1863.	Right leg; May. 23, amp. thigh.	May 26, 1863.	From stump.....	May 26, 1863.	On face of stump ..	Died June 2, 1863.
217	Johnson, V., Pt., I, 13th Ind., age 22.	May 10, 1864.	Wounds of both thighs, frac. of left.	May 19, 1864.	Profunda; prof. lig'd in continuity.	May 22, 1864.	Femoral above profunda, in cont.	Died May 26, 1864.
218	Johnston, J., Pt., B, 27th Connecticut.	Dec. 13, 1862.	Right tib. and fib.; Dec. 23, amp. thigh.	Dec. 31, 1862.	From stump.....	Dec. 31, 1862.	Femoral, in Scarpa's triangle.	Died Jan. 5, 1863. *Spec.* 982, A. M. M.
219	Jones, W. H., Pt., C, 14th N. Y. A., age 24.	June 9, 1864.	Flesh wound of right thigh.	July 5, 1864.	Femoral artery....	July 5, 1864.	Femoral, above profunda, in wound.	Died Sept. 25, 1864.
220	*Jones, W. W.*, Ensign, Thomas's Legion, age 25.	Sept. 19, 1864.	Flesh wound of thigh, femoral injured.	.....	.....	Oct. 2, 1864.	Femoral ligated ...	Died Oct. 6, 1864.
221	Judd, J. E, Lieut., K, 49th Mass., age 25.	May 27, 1864.	Injury to coats of femoral artery.	June 12, 1864.	Femoral	June 12, 1864.	Both ends in wound. Medical Inspector P. Pinco, U. S. A.	Died June 13, 1864. (Vein also tied.)
222	Kane, W. H., Serg't, I, 115th New York, age 23.	Aug. 16, 1864.	Left tibia; Sept. 17, amp. at knee joint.	Sept. 25, 1864.	From stump.....	Sept. 25, 1864.	Femoral, in continuity. A. A. Surg. J. C. Morton.	Died Sept. 26, 1864.
223	Keaton, J. M., Pt., D, 19th Ind., age 19.	May 12, 1864.	Left knee j'nt; prim. amp. thigh.	May 25, 1864.	Femoral artery ..	June 2, 1864.	On face of stump; relig. in Scarpa's triangle. Surg. T. R. Crosby, U. S. V.	Died June 12, 1864; pyæmia.
224	Keeler, J., Pt., D, 5th Ohio Cavalry.	Apr. —, 1862.	Wound of left thigh.	May 1, 1862.	.....	May 1, 1862.	Femoral, in continuity.	Died May 4, 1862.
225	Keese, W., Corp'l, G, 74th N. Y., age 31.	July 23, 1863.	Left knee j'nt; prim. amp. thigh.	Aug. 14, 25, 1863.	Femoral	Aug. 25, 1863.	Femoral, in continuity; reamp.	Died May 8, 1864.
226	Keller, H. H., Pt., B, 7th Michigan Cav.	May 6, 1864.	Right femur; prim. amp. thigh.	May 20, 1864.	From stump; recurred May 28.	May 28, 1864.	Femoral, in continuity.	Died June 25, 1864; pyæmia.
227	*Kelley, J. A.*, Lieut, C, 9th Missouri.	July 4, 1863.	Fracture of left femur.	July 12, 13, '63.	Profunda.....	July 13, 1863.	Femoral, in continuity.	Died July 13, 1863.
228	Kennedy, J. J., Sergeant, G, 155th N. Y., age 29.	Aug. 14, 1864.	Right thigh and left groin.	Aug. 22, 1864.	Femoral artery....	Aug. 22, 1864.	Femoral, below Poupart's lig. A. Surg. A. Delany, U. S. V.	Died Aug. 22, 1864.
229	Kimler, W. O., Pt., D, 36th Ill., age 33.	Nov. 29, 1864.	Flesh wound of right thigh; gangrene.	Jan. 20, 1865.	Femoral	Jan. 20, 1865.	Both ends in continuity.	Died June 26, 1865.
230	Kinsey, R. C., Pt., K, 104th Pa.	June 1, 1862.	Right leg; June 8, amp. leg.	June 14, 1862.	.....	June 14, 1862.	Femoral, in continuity.	Died June 14, 1862.
231	Kitzing, A., Pt., H, 57th N. Y., age 40.	Dec. 13, 1862.	Through popliteal space, arteries wounded.	Dec. 20, 1862.	....	Dec. 20, 1862.	Femoral, in continuity. Surg. J. P. Prince, 36th Mass.	Amp. thigh Dec. 23. Died Jan. 12, 1863.
232	Knapp, C. A., Pt., B, 6th Vt., age 20.	May 10, 1864.	Left knee joint; May 29, amp. thigh.	May 31, 1864.	Femoral	May 31, 1864.	In continuity; successive ligations.	Died June 4, 1864.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
233	Knecht, M., Pt., K, 4th Ohio Cavalry.	July 10, 1863.	Fract. of left femur, popliteal artery wounded.	July 28, 1863.	Popliteal; hæm. Aug. 3, popliteal lig.; rec. 5, 9, 10.	Aug. 10, 1863.	Femoral above anastomotica magna.	Died Aug. 12, 1863.
234	Koch, J. R., Serg't, F, 69th Pa., age 22.	June 16, 1864.	Left knee; amputation at knee joint.	July 3, 4, '64.	Femoral	July 4, 1864.	On face of stump. Surg. R. B. Bontecou, U. S. V.	Died July 12, 1864.
235	Krowlow, H., Pt., A, 66th N. Y., age 18	Mar. 31, 1865.	Right leg; amputation at knee joint.	June 18, 1865.	Femoral	June 18, 1865.	On face of stump; relig. June 23.	Died June 24, 1865; gangrene.
236	Lackey, M., Pt., K, 6th Vermont.	July 10, 1863.	Right thigh; prim. amputation.	July 21, 1863.		July 21. 1863.	On face of stump	Hæm. rec. Died Oct. 22, 1863.
237	Landon, L., Lieut., H, 6th Col. Troops, age 20.	Sept. 29, 1864.	Left thigh, middle third.	Oct. 9, 1864.	Aneurismal tumor.	Oct. 9, 1864.	Both ends in wound.	Died Oct. 28, 1864; pyæmia.
238	Lane, W., Pt., I, 1st East Tenn., age 20.	Dec. 31, 1862.	Head of tibia; Mar. 2, 1863, amp. thigh.	Mar. 4, 1863.	Femoral	Mar. 4, 1863.	On face of stump	Died March 6, 1863.
239	Lanfair, S. P., Pt., A, 37th Mass., age 40.	May 5, 1864.	Right thigh; amputation.	May 25, 1864.	From stump	May 26, 1864.	Ligation femoral	Died May 26, 1864.
240	Lang, W. M., Pt., C, 40th N. Y., age 34.	April 2, 1865.	Right leg, inner side	April 12, 13, '65.	Posterior tibial artery.	April 13, 1865.	Femoral, in Scarpa's triangle.	Died April 15, 1865.
241	Lapp, C., Pt., I, 22d Wisconsin, age 21.	July 20, 1864.	Left thigh, femoral artery cut.	Aug. 11, 1864.	Femoral	Aug. 11, 1864.	Femoral. A. A. Surg. J. M. Browne.	Died August 11, 1864.
242	Larabee, J., Pt., E, 75th Ohio, age 19.	July 1, 1863.	Left leg; amputation of leg.	July 18, 20, '63.	Posterior tibial artery.	July 21, 1863.	Femoral, in continuity.	Died August 20, 1863.
243	Lawson, L. B., Pt., F, 128th New York.	Sept. 19, 1864.	Left knee j'nt; Sept. 26, amp. thigh.	Oct. 1, 1864.	From stump	Oct. 1, 1864.	On face of stump	Died October 4, 1864.
244	*Layne, J. H.*, Pt., B, 19th Virginia, age 18.	April 6, 1865.	Flesh, lower third right thigh.		Femoral vein	April 25, 1865.	Artery and vein. A. A. Surg. J. Morris.	May 6, lig. above profun. Died May 7, 1865; exhaustion.
245	Lazier, W., Pt., M, 5th Cav., age 25.	Aug. 1, 1863.	Fracture right ankle	Aug. 17, 18, '63.	Tibial	Aug. 18, 1863.	In cont. A. Surg. W Thomson, U. S. A.	Died Aug. 19, 1863; pyæmia.
246	Leake, W. G., Pt., K. 6th New Jersey.	May 5, 1862.	Leg and thigh				In continuity	Died May 20, 1862.
247	Leline, G., Serg't, C, 8th Mich., age 27.	Nov. 30, 1864.	Flesh, right thigh, femoral artery.			Dec. 5, 1864.	In cont. A. A. Surg. S. T. Williams.	Died Dec. 5, 1864; hæmorrhage.
248	Linn, H., Pt., A, 6th Pennsylvania Reserves, age 25.	Sept. 17, 1862.	Left fibula; Dec. 3, exc.; 4th, amp.; Jan. 15, amp. thigh.			Feb. 4, 1863.	Ligation	Died March 31, 1863. *Specs.* 748, 3818, 3983.
249	Loetsch, H., Pt., G, 9th N. J., age 56.	Dec. 14, 1862.	Fracture right knee; 14th, amp. thigh.	Jan. 14, 17, '63.		Jan. 17, 1863.	In cont. Surg. C. A. Cowgill, U. S. V.	Died Jan. 31, 1863; rec. hæmorrhage.
250	Loutz, J., Pt., D, 94th New York, age 17.	April 2, 1865.	Fracture lower third left femur; amp.			May 19, 1865.	On stump; May 25, relig. in cont. A. A. Surg. H. M. Bellows.	Died May 26, 1865.
251	Lund, E. F., Pt., C, 4th New Hampshire, age 20.	July 30, 1864.	Flesh, left thigh, right knee joint.	Aug. 12, 1864.		Aug. 12, 1864.	Both ends in wound. A. Surg. W. Thomson, U. S. A.	Died Aug. 23, 1864; pyæmia. *Spec.* 3592, A. M. M.
252	Lutz, J., Pt., B, 1st Pa. R., age 17.	Dec. 13, 1862.	Fracture left femur; 20th, amp. thigh.	Dec. 22, 1862.	Femoral	Dec. 22, 1862.	On face of stump	Died December 22, 1862.
253	Lynn, J. B., 83d Ohio, age 19.	April 9, 1865.	Fracture right tibia, knee; May 30, amp.	June 5, 1865.	Femoral	June 5, 1865.	In continuity	Died June 7, 1865; exhaustion.
254	McCarthy, J., Corp'l, E, 76th N. Y., age 31.	Oct. 1, 1864.	Neck of right femur	Nov. 5, 1864.	Profunda	Nov. 5, 1864.	In continuity, below Poupart's lig.	Hæm. recurred. Died Nov. 13, 1864.
255	*McDaniel M.*, Pt., K, 48th Virginia.	May 23, 1863.	Fractured leg; June 9, amputation leg.			June 27, 1863.	In continuity	Died July 8, 1863.
256	McGuire, T., Pt., D, 53d Penn, age 19.	Dec. 13, 1862.	Fractured left leg, upper third.	Dec. 31, 1862.	Post. tibial	Dec. 31, 1862.	In continuity; two ligatures; excision.	Died Jan 3, '63; gangrene.
257	McMahon, J., Pt, A, 61st New York.	Sept. 17, 1862.	Fractured left knee joint; Sept., amputation thigh.			Oct. 3, 1862.	Ligation	Died Oct. 16, 1862.
258	McReynolds, J., Corporal, 9th Co., 60th Ohio, age 20.	Aug. 19, 1864.	Both thighs			Sept. 5, 1864.	In continuity. A. A. Surg. H. B. Mabon; Sept. 11, relig.	Hæm. recurred. Died Sept. 17, 1864; hæm.
259	*Madden, C. B.*, Pt., 3d S. C. Bat., age 17.	Sept. 14, 1862.	Fract'd right knee; Oct. 2, amputation.	Oct. 15, 1862.	Femoral	Oct. 15, 1862.	In continuity	Died Oct. 28, 1862; exhaustion.
260	*Martin*, ——, C, 16th Ga.	Sept. 14, 1862.	Upper part of thigh.			Sept. 28, 1862.	In wound, both ends	Died Sept. 28, 1862.
261	*Mask, M.*, Pt., A, 23d N. C., age 24.	Sept. 14, 1862.	Right thigh; Sept. 20, amputation.	Oct. 6, 1862.		Oct. 6, 1862.	On face of stump	Hæm recur'd. Died Oct. 9, '62; exha'st'n.
262	Mason, J. W., Pt., I, 12th N. Y., age 21.	Aug. 30, 1862.	Shot wound				Ligation of femoral	Died Sept. 28, 1862.
263	Maxfield, D., Pt., E, 97th N. Y., age 20.	Sept. 17, 1864.	Head left tibia; Oct. 22, amputat'n thigh.	Oct. 25, 1864.	Femoral	Oct. 25, 1864.	In continuity	Died Oct. 27, 1864.
264	Mellott, F. L., Pt., K, 12th Penn.	Sept. 14, 1862.	Fractured left knee joint.			Sept. 16, 1862.	In continuity, to prevent inflammation.	Died Oct. 28, 1862.
265	Meranville, R. E., Corporal, F, 2d N. Y. C.	Aug. 29, 1862.	Thigh; primary amputation.	Sept. 5, 6, 1862.		Sept. 7, 1862.	In continuity, above profunda.	Hæm. recurred. Died Sept. 12, 1862.
266	Merriott, E., Pt., D, 6th Mo C. S. M., age 23.	May 3, 1865.	Left knee joint; 4th, amputation.	May 4, 1865.	Femoral	May 4, 1865.	On face stump; two muscular branches also tied.	Died May 29, '65; exhaustion.
267	Metzer, W., Serg't, E, 1st La., age 26.	Apr. 23, 1864.	Left thigh; Apr. 29, amputation.		Femoral	May 15, 1864.	In continuity, Scarpa's space.	Died May 15, 1864; exhaustion.
268	Miller, A., Pt., E, 95th Penn., age 18.	May 3, 1863.	Fract'd cond. right femur; 14th, amputation.	May 25, 1863.		May 28, 1863.	In continuity	Died June 6, 1863; pyæmia.
269	Miller, G. H., Pt., F, 3d Iowa, age 23.	May 18, 1863.	Right thigh, profunda artery.	June 3, 1863.	Profunda	June 3, 1863.	In continuity, above profunda.	Hæm. recurred. Died June 10, 1863.
270	Mills, J., Pt., D, 4th Missouri Cav.	Jan. 16, 1864.	Left femoral artery.	Feb. 7, 1864.			Ligation	Died Feb. 17, 1864.
271	Moan, F. H., Corp'l, F, 6th Me., age 22.	May 3, 1863.	Right knee joint; 14, amputation thigh.	May 16, 18, 1863.	Stump	May 18, 1863.	In continuity	Died May 23, 1863.
272	Mohre, A., Pt., K, 104th Penn.	June 1, 1862.	Fract'd left femur; June 9, amp. thigh.	June 15, 1862.		June 15, 1862.	Ligation	Died June 19, 1862.
273	Monaghan, M., Pt., C, 2d Mich., age 43.	June 17, 1864.	Fractured left leg; 17, amputation leg.	July 20, 1864.	Tibial	July 20, 1864.	In continuity. A. A. Surg. W. H. Ensign.	Died July 25, 1864; gangrene.
274	*Morris, W. C.*, Pt., E, 4th Alabama, age 24.	May 19, 1864.	Fracture right leg; primary amputation thigh.	June 12, 1864.	Femoral	June 29, 1864.	On face of stump	Died July 2, 1864.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
275	Moscrip, W. S., Serg't, 19th Wisconsin, age 33.	Aug. 22, 1864.	Flesh, middle third left thigh.	Aug. 27, 1864.	Femoral	Aug. 27, 1864.	In continuity, Scarpa's triangle.	Sept. 8, hæm. Died Sept. 14, 1864; exhaustion.
276	Mullin, F. H., Pt., F, 3d Penn., age 17.	Nov 14, 1863.	Muscles of r't thigh, severing femoral.			Nov. 14, 1863.	Ligation	Died Nov. 14, 1863; nervous depression.
277	Murphy, D., Pt., F, 62d Penn., age 18.	Dec. 13, 1862.	Right knee-joint; int. amp. thigh.	Jan. 4, 1863.	Femoral	Jan. 4, 1863.	On face of stump	Died January 4, 1863; exhaustion.
278	*Myers, G. R.*, Pt., E, 6th Va. Cavalry.	1864.	Left knee joint; amp. thigh.		Femoral	Oct. 8, 1864.	Ligation	Oct. 9, hæm. Died October 10, 1864.
279	O'Keefe, J., Maj., 2d N. Y. C., age 24.	Apr. 1, 1865.	Flesh, right popliteal space.	Apr. 1, 1865.	Femoral	Apr. 1, 1865.	Within adductor mag.; relig. in cont.	Died May 31, 1865.
280	Osgood, T. J., Pt., A, 39th Ill., age 20.	Aug. 16, 1864.	Fracture head right tibia; Sept. 15, amputation thigh.	Sept. 23, 1864.	Femoral	Sept. 23, 1864.	Ligated by A. A. Surg. J. C. Morton.	Died September 28, 1864; exhaustion.
281	*Pack, J. R.*, Pt., D, 39th N. C., age 17.	Apr. 8, 1865.	Flesh, right thigh, lower third, injuring artery.	Apr. 20, 27, 1865.		Apr. 27, 1865.	In cont., in Scarpa's space. A. A. Surg. H. B. Cole.	Died April 27, 1865; congestive chill.
282	Paddock, D. G., Pt., G, 83d Penn., age 23.	May 8, 1864.	Fracture right knee j't; 16th, amp.; lig. muscular branches.	May 23, 1864.	Femoral	May 24, 1864.	In continuity, below Poupart's ligament.	Died May 24, 1864; exhaustion.
283	Paden, W., Corp'l, G, 10th Penn. Reserves, age 22.	May 23, 1864.	Popliteal space, right thigh.	May 29, 31, 1864.	Popliteal	May 31, 1864.	In continuity. Surg. G. L. Pancoast, U. S. V.	Gangrene; amputation leg. Died June 26, 1864.
284	Parker, J., Corp'l, H, 58th Mass., age 38.	June 3, 1864.	Fracture middle third left femur.	June—, 1864.		June 27, 1864.	Ligation	Died July 12, 1864.
285	[1] *Parker, N.*, Corp'l, B, 51st (?)	May 16, 1864.	Fracture left tibia; May 29, lig. post. tibial.	June 1, 1864.	Sloughing	June 1, 1864.	In continuity where it passes under sartorious.	Hæm.; amputation. Died June 2, 1864.
286	Parks, J., Pt., E, 91st Penn., age 38.	June 18, 1864.	Fracture, and amp. up. third left leg.	June 30, 1864.	Stump	June 30, 1864.	In continuity; religated July 6.	Died July 12, 1864.
287	Parry, T., Serg't, D, 16th Mich., age 30.	Sept. 30, 1864.	Flesh, right thigh	Nov. 19, 1864.	Femoral	Nov. 19, 1864.	Both ends in wound. A. A. Surg. G. R. B. Robinson.	Died November 21, 1864; exhaustion.
288	Payne, D., Pt., H, 2d Conn. H. A., age 25.	Oct. 19, 1864.	Left knee jt.; Nov. 2, amputation thigh.	Nov. 13, 1864.	Femoral	Nov. 13, 1864.	On face of stump	Died Nov. 17, 1864.
289	Payne, G. H., Pt., K, 64th New York, age 18.	Oct. 12, 1864.	Fracture left fibula; 21st, lig. popliteal.	Oct. 28, 1864.	Femoral	Oct. 29, 1864.	In continuity, low down.	October 29, amputation. Died Dec. 4, 1864; exhaustion.
290	Pencil, E., Pt., H, 93d Pennsylvania.	May 31, 1862.	Femoral artery			June 16, 1862.	In continuity, four inches below Poupart's ligament.	Died July 5, 1862; pyæmia.
291	Peters, W. C., Pt., C, 68th Penn.	July 2, 1863.	Flesh, left thigh, lower third.	July 15, 1863.	Femoral	July 15, 1863.	Ligation	Died July 15, 1863.
292	Pope, P. P., Pt., M, 67th Ohio, age 22.	May 9, 1864.	Flesh, right thigh	May 21, 1864.	Femoral	May 21, 1864.	In continuity	Died May 22, 1864; exhaustion.
293	Pope, W., Pt., I, 2d N. Y. A., age 19.	June 3, 1864.	Flesh, lower third left thigh.	June 20, 1864.	Femoral	June 20, 1864.	One end in wound	Died June 24, 1864.
294	Pulhemus, J., Pt., E, 1st Mich., age 20.	Dec. 13, 1862.	Fract. tib. ant. tibial artery; 26th, hæm.; amp. thigh.	Dec. 30, 1862.		Dec. 30, 1862.	On face of stump	Died Jan. 15, 1863; nervous prostration.
295	Rairdon, W., Pt., I, 40th Ind., age 35.	June 27, 1864.	Fracture right foot; July 9, amp. thigh.	July 23, 1864.		July 23, 1864.	In continuity	Died July 23, 1864; exhaustion.
296	Rapp, D., Pt., K, 7th Indiana, age 20.	Nov. 30, 1863.	Flesh, left thigh, fem. art. and vein.	Dec. 9, 1863.	Femoral	Dec. 9, 1863.	Both ends in wound. A. Surg. W. Thomson, U. S. A.	Femoral vein also ligated. Died Dec. 13, 1863; gangrene.
297	*Rayner, G. W.*, Pt., G, 12th Alabama.	Apr. 6, 1865.	Fracture left femur; April 17th, amp.	Apr. 27, 1865.	Femoral	Apr. 27, 1865.	On face of stump	Died May 6, 1865; exhaustion.
298	Reed, J., Pt., C, 15th W. Va., age 26.	June 18, 1864.	Left knee j'nt; 20th, amp. thigh.	Nov. 1, 1864.	Femoral	Nov. 1, 1864.	On face of stump; Nov. 8, hæm.; amp.	Died Nov. 14, 1864; exhaustion.
299	*Reed, J. P.*, Pt., B, 19th Ala., age 20.	Apr. 6, 1862.	Right thigh	May 29, 1862.		May 29, 1862.	Ligation	Died June 30, 1862.
300	Reed, W. H., Pt., H, 10th Vt., age 31.	Oct. 19, 1864.	Right knee j'nt; 21st, amp. thigh.	Oct. 24, 1864.		Oct. 24, 1864.	Ligation; hæm. recur. Oct. 29.	Died Nov. 21, 1864; pyæmia.
301	Reigle, J., Pt., A, 88th Penn., age 23.	May 8, 1864.	Right knee; 28th, amp. thigh.	June 8, 12, 1864.		June 12, 1864.	In cont.; hæm. June 16, 24.	24th, religated. Died June 24, 1864.
302	Riley, E., Pt., G, 98th Illinois.	June 25, 1863.	Flesh, both thighs.	July 6, 8, 1863.		July 8, 1863.	In continuity, one end.	Died July 11, 1864.
303	Ringer, O., Pt., C, 60th Ohio, age 21.	July 6, 1864.	Right thigh; flesh.	Aug. 22, 1864.		Aug. 22, 1864.	In cont., one end. A. A. Surg. J. F. Holt.	23d, hæm. Died Aug. 25, 1864.
304	Roberts, J., Serg't, 9th W. Va., age 31.	July 20, 1864.	Upper third femur	July 29, 1864.	Femoral	July 29, 1864.	Ligation. Surg. J. B. Lewis, U. S. V.	Aug. 4, hæm. Died August 24, 1864.
305	Roberts, A., Pt., I, 127th Ill., age 20.	May 19, 1863.	Flesh, left popliteal space.	June 3, 1863.	Popliteal	June 5, 1863.	In continuity, upper third.	Died June 7, 1863.
306	Robinson, J., Pt., D, 12th Conn., age 34.	Oct. 19, 1864.	Right knee joint; Nov. 4, amp.	Nov. 11, 1864.	Femoral	Nov. 11, 1864.	On face of stump	Died Nov. 23, 1864.
307	Robinson, S., Serg't, 3d N. H., age 23.	May 12, 1864.	Left hip and root of penis.	May 28, 29, 1864.	Profunda, or pudic	May 29, 1864.	In cont. ¾ inch below Poupart's lig.	June 1, hæm. Died June 2, 1864; hæm.
308	Rodgers, S. J., Pt., A, 2d Mich., age 21.	June 17, 1864.	Mid. right thigh		Aneurism	July 26, 1864.	In cont., both ends. A. A. Surg. O. W. Peck.	Died July 30, 1864; hæm.
309	Roe, J., Pt., B, 42d New York.	Sept. 17, 1862.	Fract. low. left fem.; October 27, amp.	Oct. 29, 30, 1862.	Femoral	Oct. 30, 1862.	Ligation	Died Oct. 30, 1862; exhaustion.
310	Root, J. L., Pt., H, 77th New York.	Oct. 19, 1864.	Fracture left femur			Oct. 19, 1864.	Ligation	Died Nov. 1, 1864.
311	Rope, S., Pt., A, 140th Penn., age 43.	June 16, 1864.	Frac. left leg; 17th, amp. thigh.	July 26, 1864.		July 26, 1864.	In cont., in Scarpa's space. Surg. R. B. Bontecou, U. S. V.	Died Aug. 10, 1864; exhaustion.
312	Rosenfelt, N., Serg't, D, 26th Pa., age 22.	July 2, 1863.	Head of fibula; 19th, amp.	Aug. 13, 14, 1863.	Femoral	Aug. 14, 1863.	On face of stump	Died Oct. 2, 1863.
313	Ruhling, F. J., S'g't, E, 112th New York, age 29.	June 1, 1864.	Left tibia knee joint; 11th, amp. thigh.	June 11, 14, 1864.	Mus. branch and femoral.	June 14, 1864.	On face of stump; June 17, religation in continuity.	Died July 8, 1864; gangrene.
314	Sager, W., Serg't, E., 188th N. Y., age 19.	Apr. 1, 1865.	Flesh, middle, right thigh.	Apr. 15, 20, 21, 22, 1865.	Femoral	Apr. 22, 1865.	Both ends, in cont. A. Surg. W. F. Norris, U. S. A.	Died April 29, 1865; pyæmia.

[1] Holloway (J. M.), *Consecutive and Indeterminate Hæmorrhage from Large Arteries, etc.*, in *American Jour. Med. Sci.*, 1865, Vol. L. p. 344. See also *U. S. Sanitary Commission Memoirs*, Surg. Vol. I, p. 188.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
315	Salzman, C., Pt., K, 2d Inf., age 31.	Dec. 27, 1865.	Fract. left leg; Jan. 3, 1866, amp. thigh.	Jan. 10, 12, 1866.	Femoral branch ...	Jan. 12, 1866.	In continuity	Died Jan. 13, 1866.
316	Scanlan, P., Pt., G, 63d N. Y., age 34.	Dec. 14, 1862.	Lodged in r't knee joint; 26th, amp. th.	Jan. 1, 6, 1863.	.....	Jan. 6, 1863.	In cont., in Scarpa's triangle.	Hæm. rec'd. Died Jan. 14, 1863.
317	Scott, J., Pt., F, 1st N. Y. Drag., age 33.	May 31, 1864.	Fract. left leg; June 1, amp. knee joint.	June 16, 1864.	....	June 16, 1864.	In cont. Surg. N. R. Moseley, U. S. V.	Died June 16, 1864; collapse.
318	Scott, J., Pt., F, 69th N. Y., age 30.	July 24, 1864.	Injury lower third left thigh.	Aug. 6, 1864.	Femoral.....	Aug. 6, 1864.	In cont. A. A. Surg. H. M. Dean.	Died Aug. 21, 1864; pyæmia.
319	[1]Seever, A., Serg't, C, 16th Illinois.	Sept. 1, 1864.	Grazing middle left femur.	Sept. 11, 14, 1864.	.....	Sept. 14, 1864.	Lig. in mid. third. Surg. E. Batwell, 14th Michigan.	Died September 18, 1864.
320	*Self, I.*, Pt., H, 11th Alabama.	——— 1862.	Upper third thigh.	July 9, 11, 1862.	.....	July 11, 1862.	Ligation	Died July 11, 1862; exhaustion.
321	*Sexton, J.*, Pt., A, 4th Va. Cav., age 22.	July 9, 1864.	Fracture right fem., middle third.	Aug. 5, 1864.	Femoral.....	Aug. 5, 1864.	In cont.; Aug. 6, relig. profunda. A. A. Surg. J. H. Coover.	Died August 6, 1864; exhaustion.
322	Shaffer, T. W., Pt., F, 22d Mich.	Sept. 2, 1863.	Frac. left, flesh right thigh.	.....	.....	.....	Ligation right femoral.	Died Oct. 20, 1863.
323	Sharpe, A., Pt., D, 11th Pa.	June 21, 1864.	Flesh, thigh.....	.....	.....	June 21, 1864.	Both ends in wound..	Died June 26, 1864.
324	[2]Shaw, M., Pt., I, 17th N. Y.	Sept. 1, 1864.	Flesh, right thigh ..	.....	.....	Sept. 12. 1864.	One end in wound. Surg. E. Batwell, 14th Michigan.	Died November 16, 1864.
325	Shay, M., Pt., B, 61st N. Y., age 20.	Sept. 17, 1862.	Low. third r't fem.; Nov. 15, amp.	.....	Stump	Nov. 20, 1862.	On face of stump ...	Died November 24, 1864. *Sp's* 1096, 853.
326	Sheaffer, C., Pt., D, 1st N. Y. Cavalry.	June 5, 1864.	Right thigh, inv. femoral artery.	.....	Aneurism.....	July 8, 1864.	In continuity, Scarpa's. Surg. Baldwin, C. S. A.	Died July 21, 1864.
327	Shields, P. J., Pt., D, 6th Wis., age 20.	Apr. 29, 1863.	Left knee jt.; amp. thigh April 29.	June 1, 1863.	From stump.....	June 1, 1863.	Femoral, on face of stump; June 9, lig. of ext. iliac.	Died June 19, 1863.
328	Shock, W., Corp'l, K, 46th Pa.	Aug. 9, 1864.	Head left tib.; 16th, amp. thigh.	Aug. 29, 1864.	.....	Aug. 29, 1864.	In cont., in Scarpa's. A. Surg. J. B. Brinton, U. S. A.	Died Sept. 2, 1864. *Spec.* 50, A. M. M.
329	Shugert, J. L., Corp'l, B, 49th Pa., age 20.	Apr. 1, 1865.	Flesh, right knee; May 20, amp.	May 24, 1865.	Femoral	May 24, 1865.	On face of stump....	Died May 25, 1865; exhaustion.
330	Simmons, T., Pt., F, 97th N. Y., age 20.	June 18, 1864.	Flesh, upper third left thigh.	July 27, 1864.	.....	July 27, 1864.	In wound	Died August 3, 1864; gangrene.
331	Singer, L., Pt., F, 174th N. Y.	July 11, 1863.	Fracture left femur; 13th, amp.	July 17, 1863.	Femoral	July 17, 1863.	In continuity.....	Died July 17, 1863.
332	Six, I., Pt., K, 14th W. Va., age 16.	July 20, 1864.	Fract. l't knee joint; July 26, amp. thigh.	Aug. 3, 1864.	Femoral.	Aug. 3, 1864.	On face of stump ..	Died August 14, 1864; hæmorrhage.
333	Smith, D. R., Pt., I, 93d Illinois.	Nov. 25, 1863.	Fract. right femur ..	.....	.....	On field.	Ligated. Surg. J. L. Prout, 26th Illinois.	Died Dec. 5, 1863.
334	Smith, J. ——, D, 97th Pa., age 22.	May 18, 1864.	Flesh, right thigh, upper third.	May 30, 1864.	Circumflex.....	June 2, 1864.	In cont. ¾ inch below Poupart's lig.	Hæm. recur'd. Died June 5, 1864.
335	Smith, R. W., Lt.. F, 5th Pa. Res., age 24.	Aug. 30, 1862.	Flesh, thigh, femoral artery.	Sept. 7, 1862.	Femoral; aneurism.	Sept. 7, 1862.	In continuity; unsuccessfully.	Died Sept. 7, 1862. *Spec.* 509, A. M. M.
336	Smith, W. F., Maj., 1st Delaware.	Oct. 27, 1864.	Sev. femoral artery, middle.	Oct. 27, 1864.	Femoral	Oct. 27, 1864.	Both ends in wound; vein also tied.	Hæm.; amp. Died Nov. 6, 1864.
337	Stark, O. H., Serg't, H, 13th N. H., age 36.	Sept. 29, 1864.	Right leg; Dec. 25, amp. leg; Jan. 3, 1865, amp. knee.	Jan. 3, 1865.	Femoral	Jan. 3, 1865.	On face of stump....	Died Jan. 13, 1865; pyæmia.
338	Steele, G. S., Pt., D, 126th N. Y., age 23.	June 22, 1864.	Fracture left knee j't; 23d, amp. thigh.	July 23, 1864.	Femoral.....	July 23, 1864.	On face of stump...	Hæm. recur'd. Died July 29, 1864; exh'n.
329	Story, F., Pt., E, 38th Ohio, age 22.	July 23, 1864.	Flesh, in Scarpa's space, right.	Sep. 8, 9, 1864.	Femoral.....	Sept. 9, 1864.	Both ends in wound.	Died Sept. 10, 1864.
340	Stowell, F. M., Pt., D, 70th N. Y., age 28.	July 2, 1863.	Fracture left tib. and fib.; 31, amp. thigh.	Aug. 1, 1863.	Muscu. branch of femoral.	Aug. 1, 1863.	On face of stump....	Died Aug. 3, 1863.
341	[3]S——, A., Pt., 37th N. C., age 33.	May 3, 1863.	Lac. femoral artery, middle third.	May 10, 1863.	Femoral.....	May 10, 1863.	Lig. in middle third..	Died June 5, 1863.
342	Taft, G. R., Capt., A, 53d Mass.	June 14, 1863.	Right leg; June 14, amp. leg.	June 21, 1863.	.....	June 21, 1863.	.....	Died July 2, 1863; pyæmia.
343	Thorn, H. C., Pt., I, 14th W. Va., age 19.	July 20, 1864.	Flesh wound right thigh.	Aug. 7, 1864.	Femoral.....	Aug. 7, 1864.	Lig.; hæm. recurred; amp. thigh.	Died Aug. 12, 1864.
344	Thorp, E., Pt., G, 1st Penn. Art., age 20	Aug. 4, 1864.	Left knee j't; Aug. 5th, amputated.	Aug. 9, 1864.	....	Aug. 9, 1864.	In cont. below prof. J. H. Coover, A. A. S.	Died Aug. 12, '64. *Sp.* 3929, 3960, A. M. M.
345	Tompkins, G., Pt., K, 1st New York Art., age 40.	July 3, 1863.	Tib. and fib.; July 4, amp. leg; 17th, amp. thigh, upper third.	July 21, 1863.	Femoral	July 21, 1863.	On face of stump ...	Died July 26, 1863; pyæmia.
346	Tompkins, J., substitute, age 21.	July 28, 1863.	Right leg	.....	.....	July 29, 1863.	Ligation	Died Aug. 4, 1863; tetanus.
347	Tracy, A. L., Pt., K, 141st Penn., age 35.	July 2, 1863.	Right knee; July 5, amp. thigh.	July 12, 1863.	Femoral	July 12, 1863.	On face of stump ...	Died July 22, 1863; exhaustion.
348	Truex, J. B., Corp., F, 14th N. J., age 22.	May 31. 1864.	Fracture right knee joint; June 14, amp.	June 19, 1864.	Femoral.....	June 19, 1864.	On face of stump ..	Died June 20, 1864; pyæmia.
349	*Unknown*	Sept. 17, 1862.	Femoral artery	Sept. 22, 1862.	Femoral	Sept. 22, 1862.	One end in wound...	Died Sept. 22, 1862.
350	Van Wie, S., Serg., B, 62d Ohio, age 25.	Aug. 16, 1864.	Frac. left femur ...	Sept. 28, 1864.	Femoral	Sept. 28, 1864.	In cont. A. A. Surg. J. C. Morton.	Died Sept. 29, 1864; exhaustion.
351	Vermillye, J. C., Pt., K, 124th New York, age 24.	May 12, 1864.	Left leg; May 20, amp. thigh.	May 25, 1864.	.....	May 25, 1864.	On face of stump ...	Died May 28, 1864; exhaustion.
352	*Wakeham, J. E.*, Corp., E, 19th Virginia, age 27.	Mar. 31, 1865.	Flesh, inj. femoral artery.	Apr. 15, 21, 25, 1865.	Femoral	Apr. 10, 25, 1865.	Scarpa's space, in cont. A. A. Surg. J. Morris. Relig.	Hæm. recur'd. Died Apr. 28, 1865.
353	Walter, V., Pt, E, 8th Ohio, age 24.	May 10, 1864.	Fract. upper third femur.	June 7, 1864.	Femoral	June 9, 1864.	In cont. above profunda.	Died June 17, 1864.
354	Wells, L. D., Pt., D., 74th Ind., age 22.	Sept. 20, 1863.	Right knee	.....	.....	Nov. 17, 1863.	In cont., Scarpa's. Surg. W. C. Otterson, U. S. V.	Died Dec. 1, 1863; remittent hæm. ant. tibial.
355	Wendt, C., Pt., E, 153d New York.	Oct. 19, 1864.	Shattering right knee; 20th, amp.	Oct. 27, 1864.	....	Oct. 27, 1864.	Ligation	Died Nov. 5, 1864; exhaustion.

[1] Batwell (E.), *Secondary Hæmorrhage following Gunshot Wound of Thigh*, in *U. S. San. Com. Mem's*, Surg. Vol. I, p. 186.

[2] Batwell (E.), *Cases from the Note Book of an Army Surgeon*, in *Med. and Surg. Rep.*, 1865, Vol. 13, p. 50.

[3] *New Orleans Medical and Surgical Journal*, Vol. 9, p. 71.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
356	Wesley, D. T., Corp., K, 128th New York.	Oct. 19, 1864.	Right knee joint; 20th, amp. lo. third.	Oct. 28, 1864.	.....	Oct. 28, 1864.	On face of stump....	Died Nov. 1, 1864; exhaustion.
357	Wetherall, J. H., Capt., C, 10th Mass.. age 39.	May 5, 1864.	Right knee; 19th, amp. thigh.	May 24, 1864.	Femoral	May 24, 1864.	In continuity, Scarpa's triangle.	Died June 20, 1864; pyæmia.
358	Whallon, W. M., Pt., C, 129th Pa, age 21.	Dec. 13, 1862.	Left knee joint; 18th, amp. lower third.	Dec. 24, 1862.	Femoral	Dec. 24, 1862.	In continuity, Scarpa's space.	Died Jan. 4, 1863; pyæmia.
359	Whitaker, D., Serg't, A, 88th Pa., age 20.	Apr. 1, 1865.	Right knee joint; prim. amp.	.....	Femoral	.....	In continuity	Died Apr. 20, 1865; pyæmia.
360	Wilbur, J. F., Corp., I, 29th Ohio, age 24.	May 3, 1863.	Fracture left knee joint; 8th, amp. th.	May 15, 1863.	Femoral	May 15, 1863.	On stump; May 17, lig. profunda.	Died May 17, 1863.
361	Williams, C., Pt., F, 5th C. T., age 23.	Sept. 29, 1864.	Flesh, left thigh, upper third.	Oct. 15, 1864.	.....	Oct. 15, 1864.	Both ends in wound. A. A. Surg. O. Warner.	Hæm. recur'd. Died Oct. 21, 1864; phlebitis.
362	Williams, G., Corp., E, 9th N. Y. H. A., age 30.	July 9, 1864.	Left thigh, upper third, flesh.	Aug. 3, 1864.	Femoral	Aug. 3, 1864.	In cont. below prof. A. A. Surgeon J. C. Shimer.	Died Aug. 4, 1864; exhaustion.
363	Williams, L., Pt., C, 26th Mich., age 23.	May 12, 1864.	Left knee; June 13, amp. thigh, middle.	July 18, 1864.	Femoral; recurred	July 19, 1864.	On face of stump....	Died July 19, 1864.
364	Willis, A., Pt., I, 7th R. I., age 25.	Dec. 13, 1862.	Femoral artery.....	Dec. 22, 25, 1862.	Femoral.....	Dec. 25, 1862.	Ligation	Died Dec. 28, 1862.
365	Wilson, C. M., Pt., F, 4th N. Y., age 35.	May 5, 1864.	Lower 3d left femur; June 2, amputation.	June 5, 1864.	.....	June 5, 1864.	In continuity above profunda.	Died June 5, 1864; exhaustion.
366	Wilson, G. S., Adj. 17th N. Y., age 24.	Dec. 13, 1862.	Right knee joint; Jan. 3, amputation.	Jan. 12, 1863.	Femoral	Jan. 12, 17, 1863.	On face of stump....	Died Feb. 17, 1863; pyæmia.
367	*Wilson, J*, Pt., B, 5th Texas, age 32.	July 2, 1863.	Fracture right fem.; July 4, amp. thigh.	July 15, 1863.	Femoral.....	July 15, 1863.	In continuity, Scarpa's space.	Hæm. recur'd. Died July 23, 1863.
368	Wipfelder, F., Pt., C, 52d N. Y.	June 1, 1862.	Fracture right fem.; 2d, amp. middle.	June 9, 1862.	From stump	June 9, 1862.	Ligation	Died June 17, 1862.
369	Witham, A., Pt., A, 1st Maine Heavy Artillery, age 20.	May 19, 1864.	Flesh, left thigh, upper third.	June 29, 1864.	Profunda	June 29, 1864.	In cont. just below Poupart's lig. A. A. Surg. J. Newcombe.	Died July 2, 1864.
370	Woolsey, A., Pt., H, 20th N. Y. S. M.	Aug. 30, 1862.	Left knee; Oct. 1, amputation thigh.	Oct. 2, 1862.	Profunda.....	Oct. 2, 1862.	In continuity, Scarpa's triangle.	Died Oct. 5, 1862; exhaustion.
371	Worley, S., Pt., A, 139th Penn., age 20.	May 5, 1864.	Right thigh	.....	.....	May 20, 1864.	Ligation	Died June 2, 1864.
372	Wynne, W. G., Pt., F, 66th New York.	Sept. 17, 1862.	Fracture left knee; Oct. 16, amp. thigh.	.....	From stump	Oct. 25, 1862.	In continuity, Scarpa's triangle.	Died Nov. 3, 1862. *Spec.* 746, A. M. M.
373	Yockey, P., Pt., D, 29th Ohio, age 29.	July 22, 1864.	Fract. right femur; prim. amp. thigh; reamp. middle.	... .	From stump	.....	Ligation of femoral; subsequent lig. of external iliac.	Died April 23, 1865.
374	Young, A., Pt., F, 1st Missouri Cavalry.	Apr. 26, 1863.	Lower 3d, left thigh, flesh.	May 11, 1863.	.....	May 17, 1863.	Both ends in wound.	Died May 20, 1863.

Of the branches of the femoral artery the external pudic was ligated in one, the profunda in twenty-two, and the perforating artery in six instances.

Ligation of the External Pudic Artery.—Case 1156.—Sergeant J. H. Warford, A, 124th New York, age 23, was wounded at Sailor's Creek, Virginia, April 6, 1865, in the right thigh about two inches below Poupart's ligament; June 12th, hæmorrhage from external pudic artery; ligation of artery in wound; no recurrence of hæmorrhage. Patient was discharged August 26, 1865. (*Second Surg. Vol.*, page 326, Case 940.)

Ligation of the Profunda Femoris.—Twenty-two cases, with five recoveries and seventeen deaths were reported. Fourteen were ligations, after amputations, on the face of the stump.

Table CXLII.

Summary of Twenty-two Cases of Ligations of the Profunda Femoris.

[Recoveries, 1—5; Deaths, 6—22.]

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
1	*Bedingfield, R. W.*, Serg't, I, 60th Ga., age 18.	July 9, 1864.	Flesh wounds of both thighs.	Aug. 16, 1864.	False aneurism r't thigh.	Aug. 16, 1864.	Profunda, both ends in wound. A. A. Surg. J. H. Barthelf.	Exchanged October 25, 1864.
2	Casey, P., Pt., H, 1st Col. Troops.	July 10, 1863.	Fracture of right femur; prim. amp.	July 16, 21, 25, 26, 1863.	From stump.	July 26, 1863.	On face of stump. A. A. Surgeon J. C. Shimer.	Discharged December 10, 1863.
3	Crawford, E., Pt., F, 105th Ohio, age 20.	Sept. 19, 1863.	Right ankle jt.; Oct., amp. leg; Aug. 5, 1864, amp. thigh.	Aug. 14, 15. 1864.	From stump	Aug. 15, 1864.	Profunda on face of stump.	Discharged Mar. 18, 1865.
4	Michaelis, T., Corp'l, B, 140th New York, age 27.	May 8, 1864.	Right thigh, upper third.	July 4, 1864.	Profunda	July 4, 1864.	Profunda, proximal end in wound.	Discharged May 31, 1865.
5	Shawgo, G., Pt., A. 121st Penn., age 21.	Apr. 1, 1865.	Right femur; prim. amp. thigh.	Apr. 7, 1865.	Profunda.....	Apr. 7, 1865.	On face of stump ..	Discharged June 15, 1865.
6	Bodley, E., Pt., 39th Indiana, age 28.	Sept. 19, 1863.	Left leg; amputation thigh September 21.	Sept. 28, 1863.	Profunda....	Sept. 28, 1863.	Profunda on face of stump.	Died September 28, 1863.
7	Carlton, C. C., Pt., B, 1st Massachusetts Artillery, age 35.	May 19, 1864.	Left knee joint; amputation thigh May 22.	May 26, 1864.	Anastomotic	May 27, 1864.	Profunda on face of stump.	Died May 30, 1864.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
8	Clark, J., Pt., H, 7th N. Y. Heavy Artillery, age 24.	June 16, 1864.	Right knee joint; primary amp. thigh.	June 27, 1864.	Profunda	June 27, 1864.	Profunda on face of stump.	Died October 9, 1864.
9	Dawson, F., Bugler, I, 1st Cavalry, age 24.	Oct. 19, 1864.	Fracture left knee joint; Oct. 22, amp. thigh.	Oct. 26, 1864.	Profunda..... ..	Oct. 26, 1864.	Profunda on face of stump.	Died November 9, 1864.
10	Doty, N., Pt., E, 102d Penn., age 33.	Sept. 19, 1864.	Condyle of left fem.; Sept. 28, amp. thigh.	Sept. 30, 1864.	Branch of profunda	Sept. 30, 1864.	Ligated on face of stump.	Died November 7, 1864.
11	Folensbee, C. M., Pt., B, 157th New York, age 16.	Dec. 6, 1864.	Right knee joint; Dec. 9, amp. thigh.	Dec. 19, 1864.	Branch of profunda	Dec. 19, 1864.	Artery tied on face of stump.	Died December 26, 1864.
12	Galiger, M., Serg't, G, 73d N. Y., age 22.	July 2, 1863.	Fracture left femur; July 5, amp. thigh.	July 6, 1863.	Profunda.....	July 6, 1863.	Profunda on face of stump.	Died July 8, 1863.
13	Gibson, E. H., Pt., A, 14th New Jersey, age 15.	July 8, 1864.	Fracture of right femur, upper third.	July 19, 1864.	Circumflex	July 19, 1864.	Circumflex branch of prof., both ends in wound. A. A. Surg. T. J. Dunott.	Died July 20, 1864.
14	Gilkey, E., Pt., C, 17th Maine, age 27.	June 19, 1864.	Right thigh, upper third.	July 5, 1864.	.....	July 5, 1864.	Profunda in wound. Ass't Surg. A. Delany, U. S. V.	Vein also lig. Died July 7, 1864; recurrence of hæm.
15	Jenkins, J. H., Serg't, B, 89th Ohio, age 24.	Feb. 25, 1864.	Left knee j't; amp. thigh February 29.	Mar. 12, 1864.	Profunda.....	Mar. 12, 1864.	Profunda on face of stump.	Died March 16, 1864; pyæmia.
16	Labrie, O., Pt., H, 126th Ohio, age 23.	July 9, 1864.	Left thigh; amputation July 12.	July 15, 1864.	Branch of profunda	July 15, 1864.	On face of stump ..	Died July 22, 1864.
17	Lowe, J. T., Lieut, D, 12th N. Jersey.	Oct. 14, 1863.	Wound of left thigh	.....	.....	.....	Profunda, both ends in wound.	Died October 30, 1863.
18	Murphy, M., Pt., G, 5th Kentucky.	Nov. 25, 1863.	Left thigh, flesh, gangrene.	Jan. 26, 1864.	Profunda.....	Jan. 26, 1864.	Profunda. Surgeon A. H. Stephens, 6th Ohio.	Died Jan. 27, 1864.
19	Pattison, T., Corp'l, D, 5th Mich., age 32.	May 5, 1864.	Flesh wound of left thigh.	July 13, 1864.	Branch of profunda	July 13, 1864.	One end in wound; hæm. recurred.	Died July 20, 1864.
20	Sturgis, J., Corp'l, G, 85th Pennsylvania.	Aug. 16, 1864.	Both thighs, right femur injured.	Nov. 1, 1864.	Profunda.....	Nov. 1, 1864.	Profunda, in continuity. A. A. Surg. J. C. Morton.	Died November 6, 1864.
21	Weiler, J., Corp'l, K, 40th N. Y., age 20.	May 24, 1864.	Fracture right thigh; prim. amputation.	May 31, 1864.	Branch of profunda	May 31, 1864.	On face of stump....	Died May 31, 1864.
22	Wells, E., Pt., I, 12th Iowa.	Dec. 16, 1864.	Right knee; amp. thigh Dec. 16.	Dec. 21, 1864.	Profunda.....	Dec. 21, 1864.	On face of stump....	Died December 21, 1864.

Of the branches of the profunda the perforating arteries were ligated in six instances; all the cases terminated in death:

Cases 1157-1162.—Private T. B. Benedict, D, 7th Connecticut, age 32; received a shot flesh wound of right thigh May 10, 1864; hæmorrhage occurred from one of the posterior perforating arteries on June 9th, which was ligated; no recurrence of hæmorrhage; death May 3, 1865, of pneumonia.—Lieutenant *J. Coote*, F, 10th Alabama; wounded May 5, 1862, through left knee joint; May 20th, amputation of thigh; May 23d, hæmorrhage from branch of inferior perforating artery; vessel ligated; death May 25, 1862.—Private T. Hagleman, D, 41st Ohio, age 49; wound of right thigh December 16, 1864; hæmorrhage from superior perforating artery December 29, 1864; vessel ligated at proximal end by A. A. Surg. S. W. Blackwood; died January 15, 1865.—Private J. J. Smith, F, 11th Virginia; fracture of left femur October 19, 1864; amputation of thigh October 20th; November 1st, secondary hæmorrhage; perforating artery ligated on face of the stump on the same day; death November 9, 1864.—Surg. H. S. Wheeler, B, 2d Connecticut H. Artillery, age 29; fracture of condyle of femur October 19, 1864; amputation October 26th; hæmorrhage November 1st from perforating artery, which was ligated on face of the stump; death November 11, 1864.—Private W. F. Young, A, 114th New York, age 26; wound of left knee October 19, 1864; amputation on same day; October 30th, hæmorrhage from inferior perforating artery; October 31st, ligated on face of stump; died November 27, 1864.

Twenty-four cases of ligations of muscular and other minor branches of the femoral artery were reported; twenty-two were ligations on the face of the stump.

Table CXLIII.

Summary of Twenty-four Ligations of Muscular and other small Branches of the Femoral Artery.

[Recoveries, 1—6; Deaths, 7—24.]

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
1	Atkins, C. S., Serg't, D, 6th Kansas, age 22.	July 27, 1864.	Right knee j't; prim. amputation thigh.	Aug. 2, 1864.	Muscular branch ..	Aug. 2, 1864.	Muscular branch tied on face of stump.	Discharged in 1865.
2	Cole, E., Pt., F, 120th New York, age 24	July 2, 1863.	Right leg; prim. amputation leg.	July 11, 1863.	Muscular branch ..	July 11, 1863.	Muscular branch on face of stump.	Discharged April 20, 1864.
3	Dunlap, W., Pt., I, 9th N. H., age 24.	July 30, 1864.	Right thigh; prim. amputation.	Nov. 22, 1864.	Branch of femoral..	Nov. 22, 1864.	Branch of femoral on face of stump.	Discharged May 15, 1865.
4	James, J., Pt., I, 2d Iowa, age 20.	Nov. 19, 1864.	Through left knee; Nov. 28, amp. thigh.	Dec. 3, 1864.	.....	Dec. 3, 1864.	Branch of femoral ..	Discharged April 20, 1865.
5	Schrabaskie, M., Pt., B, 183d Pennsylvania, age 46.	Apr. 1, 1865.	Through right patella; April 8, amputation thigh.	June 7, 1866.	.....	June 7, 1866.	Muscular artery tied.	Recovered.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
6	Swayne, W., Colonel, 43d Ohio, age 30.	Feb. 2, 1865.	Right knee; prim. amputation thigh.	Feb. 13, 1865.	Branch of femoral	Feb. 13, 1865.	On face of stump....	Recovered.
7	Anderson, W. G., Pt., G, 114th Pennsylvania, age 16.	Dec. 13, 1862.	Right knee j't; January 11, amp. thigh.	Jan. 13, 15, 17, 1863.	From stump	Jan. 17, 1863.	Muscular branch on face of stump.	Died Jan. 17, 1863.
8	Carroll, L., Serg't. H, 1st Delaware, age 33.	Oct. 27, 1864.	Fracture femur, upper third.	.....	....	.....	Branches of femoral; hæmorrhage.	November 11, amp at hip. Died Nov. 19, 1864.
9	Davis, H. C., Pt., I, 46th Indiana.	May 1, 1863.	Fract. of femur, profunda injured; amp.	May 17, 1863.	From stump	May 17, 1863.	Small branch on face of stump.	Died May 18, 1863.
10	Fisher, G. A., Pt., A, 8th New York Artillery, age 19.	June 2, 1864.	Right knee j't; June 15, amputa'n thigh.	June 22, 1864.	Muscular branch..	June 22, 1864.	On face of stump. A. A. Surg. D. L. Haight.	Died June 23, 1864; pyæmia.
11	Foster, R., Capt., K, 1st New Jersey, age 39.	May 10, 1864.	Left knee joint; May 27, amputa'n thigh.	June 4, 1864.	Muscular branch..	June 4, 1864.	On face of stump. A. A. Surg. F. H. Colton.	Died June 14, 1864.
12	*Foust, J.*, Pt., N. C. Artillery, age 37.	Mar. 27, 1865.	Left knee; June 17, amputation thigh.	June 17, 1865.	From stump	June 17, 1865.	Small branch on face of stump.	Died July 25, 1865.
13	Geller, M., Pt., D, 48th N. Y., age 37.	June 30, 1864.	Left knee j't; July 4, amputation thigh.	Aug. 5, 1864.	Muscular branch..	Aug. 5, 1864.	Muscular branch on face of stump.	Died August 29, 1864.
14	Hammond, A., Pt., H, 111th New York, age 47.	Apr. 2, 1865.	Left knee joint; Apr. 6, amputat'n thigh.	Apr. 11, 1865.	Muscular branch..	Apr. 11, 1865.	Muscular branch on face of stump.	Died April 16, 1865; pyæmia.
15	Hayer, G., Pt., K, 6th New York Heavy Artillery, age 27.	May 19, 1864.	Left knee j't; June 16, amputa'n thigh.	June 28, 1864.	Muscular branch..	June 28, 1864.	Muscular branch on face of stump.	Died June 29, 1864; pyæmia.
16	Hays, A. H., Pt., B, 142d Penn., age 23.	Dec. 13, 1862.	Fracture left tibia; Dec. 25, amp. thigh.	Jan. 7, 1863.	Branch of femoral.	Jan. 7, 1863.	Small branch on face of stump.	Died January 10, 1863.
17	Knowlton, A. W., Pt., F, 93d N. Y., age 22.	May 5, 1864.	Left knee joint; May 14, amputa'n thigh.	June 1, 1864.	Muscular branch..	June 1, 1864.	On face of stump. Ass't Surg. W. F. Norris, U. S. A.	Died June 4, 1864; pyæmia.
18	Mars, H., Pt., G, 5th New York, age 24.	Mar. 31, 1865.	Right knee joint; Apr. 9, amp. thigh.	Apr. 10, 1865.	Muscular branch..	Apr. 10, 1865.	Muscular branch on face of stump.	Died April 22, 1865; pyæmia.
19	Michaelis, S., Pt., E, 9th Maine, age 21.	June 25, 1864.	Flesh wound of both thighs.	July 30, 1864.	Branch of femoral.	July 30, 1864.	Both ends in wound. Ass't Surg. E. Curtis, U. S. A.	Died August 4, 1864.
20	Spencer, J., Pt., G, 48th Penn., age 19.	May 9, 1864.	Right knee j't; May 16, amputa'n thigh.	May 24, 1864.	From stump	May 24, 1864.	Branches ligated on face of stump.	Died May 31, 1864.
21	Sterling, E. E., Corp'l, E, 143d Pennsylvania, age 32.	May 9, 1864.	Right leg; May 10, amputation thigh.	May 22, 1864.	Branch of femoral.	May 22, 1864.	Small branch on face of stump.	Died Aug. 12, 1864; pyæmia.
22	Townsend, E., Pt., F, 5th N. H., age 35.	June 2, 1864.	Left knee j't; June 21, amputa'n thigh.	June 4, 1864.	Small branch of femoral.	June 4, 1864.	On face of stump ...	Died July 1, 1864.
23	Weismiller, C., Pt., B, 12th Penn. Res., age 22.	Dec. 13, 1862.	Head of left tibia; Dec. 25, amp. thigh.	Dec. 26, 1862.	Branches of femoral.	Dec. 26, 1862.	Branches ligated on face of stump.	Died December 27, 1862.
24	Yeagher, F., Corp'l, C, 26th Mich., age 44.	June 17, 1864.	Right knee joint; prim. amp. thigh.	July 2, 1864.	Muscular branch..	July 3, 1864.	On face of stump....	Died July 5, 1864.

Ligations of the Popliteal Artery.—Thirty-six cases, with eight recoveries and twenty-eight deaths, a mortality rate of 77.7 per cent., were reported. Six of the operations were performed, after amputations, on the face of the stump.

Table CXLIV.

Summary of Thirty-six Ligations of the Popliteal Artery.

[Recoveries, 1—8; Deaths, 9—36.]

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
1	Ditters, W., Pt., H, 42d Illinois, age 27.	May 14, 1864.	Right popliteal space	June 6, 1864.	Popliteal	June 6, 1864.	Both ends in wound. Asst. Surg. B. E. Fryer, U. S. A.	Discharged August 16, 1865.
2	*Fields, B.*, Pt., C, 27th N. C., age 21.	Sept. 17, 1862.	Fracture right leg; Nov. 28, amp. leg.	Dec. 1, 1862.	Popliteal....	Dec. 1, 1862.	On stump. Surg. H. S. Hewit, U. S. V.	Hæm. recur'd. Exch. February 28, 1863.
3	Kansche, G. D., 20th New York, age 35.	Sept. 17, 1862.	Shot laceration of popliteal space.	Sept. 17, 1862.	Popliteal.....	Sept. 17, 1862.	Card. end in wound; hæms. rec'd.	Discharged August 13, 1863.
4	Kracher, J. P., Pt., D, 6th N. Y. H. Art., age 35.	June 1, 1864.	Grapeshot, left thigh, near knee.	July 24, 1864.	Popliteal	July 24, 1864.	One end ligated in wound; no recurrence.	Discharged March 15, 1865.
5	Lo[illegible]z, J., Pt., I, 105th Pa., age 26.	Mar 25, 1865.	Fracture of left fibula.	Apr. 7, 10, 11, 12, 1865.	Posterior tibial and peroneal.	Apr, 12, 1865.	Pop. above its bifurcation. Surg. B. B Wilson, U. S. V.	Discharged August 4, 1865.
6	Maher, C., Pt., A, 64th N. Y., age 20.	Mar. 25, 1865.	Upper third of tibia, post. tibial injured.	Apr. 5, 1865.	Posterior tibial ..	Apr. 5, 1865.	Popliteal, in cont. Surg. T. R. Crosby, U. S. V.	Discharged October 4, 1865.
7	Smith, P. D., Pt., C, 8th Iowa.	Mar. 19, 1864.	Right ankle; gangrene in wound.	May 6, 1864.	Posterior tibial....	May 6, 1864.	In lower portion popliteal, in cont. A. A. Surg. D. McLean.	Discharged March 21, 1865.
8	Taft, E. P., Lt. Col., 9th N. Y. H. Art., age 32.	July 9, 1864.	Tibia and fibula, middle third; July 22, amputation leg.	July 24, 1864.	Popliteal	July 24, 1864.	Popliteal, on face of stump.	Mustered out November 28, 1864.
9	Bartholomew, J. C., Lieut., K, 20th Ind., age 30.	May 16, 1864.	Fracture of left leg	May 16, 1864.	Popliteal.....	May 16, 1864.	Popliteal.....	Died May 29, 1864; tetanus.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
10	Bernhard, A., Pt., K, 4th Ohio Cav., age 35.	Feb. 25, 1864.	Fracture right leg; prim amp. leg.	Mar. 5, 1864.	Anterior tibial	Mar. 5, 1864.	Popliteal, in middle. A. Surg. J. G. Buchanan, 125th Ohio.	Died March 22, 1864; pyæmia.
11	*Brennan, J.*, Capt., A, 16th Va., age 29.	Oct. 27, 1864.	Cond. of femur and right pop. artery.	Nov. 10, 1864.	Popliteal.....	Nov. 14, 1864.	In w'nd, pop. space. A. A. Surg. C. Eberhardt.	Died Nov. 25, 1864, during amp. thigh.
12	*Burnham, W., G*, 8th Louisiana, age 35.	Oct. 19, 1864.	Right tibia	Oct. 19, 1864.	Popliteal.....	Oct. 19, 1864.	In wound; Nov. 5, amp. thigh.	Died November 21, 1864.
13	Corrigan, H. McQ., Major, 9th N. Y. Cav., age 27.	May 12, 1864.	Right tibia, anterior tibial injured; amp. at knee, prim.	May 18, 1864.	Popliteal.....	May 18, 1864.	On face stump. Surg. A. Heger, U. S. A.	Died May 28, 1864.
14	Elliott, J. E., Corp'l, E, Pa. Cav., age 24.	Apr. 2, 1863.	Through left leg ...	Apr. 19, 1863.	Recurred 5 times.	Apr. 29, 1863.	Popliteal; hæm. recurred; amp. thigh.	Died May 5, 1863.
15	Fletcher, J. M., C'p'l, C, 39th Mass., age 28.	June 18, 1864.	Flesh wound of right knee.	Aug. 14, 1864.	Popliteal	Aug. 14, 1864.	Both ends in wound. A. A. Surg. J. M. McGrath.	Died Aug. 14, 1864; typhoid fever.
16	Gray, W., E, 18th Infantry, age 26.	Dec. 30, 1862.	Popliteal region....	Jan. 12, 1863.	Popliteal artery ..	Jan. 12, 1863.	Both ends in wound	Died January 22, 1863.
17	Gwinn, E., Pt., B, 138th Pa., age 21.	July 9, 1864.	Left knee joint; July 12, amputation.	July 22, 1864.	Popliteal.....	July 22, 1864.	Popliteal, on face of stump.	Died July 22, 1864; pyæmia.
18	Knight, A., Pt., L, 2d Ill. Cav., age 24.	May 4, 1862.	Left femur, popliteal wounded.	Sept. 6, 1862.	.....	Sept. 10, 1862.	Popliteal, both ends in wound.	Died September 29, 1862.
19	Lee, A. F., Corp'l, A, 24th Ohio, age 22.	Feb. 25, 1864.	Upper third right tibula.	Mar. 1, 2, 1864.	Peroneal artery ...	Mar. 2, 1864.	Pop. ligated. A. S'rg. T. A. McGraw.	Relig. Mar. 5. Died Mar. 8, 1864; gang.
20	Leonard, J., Pt., L, 7th N. Y. H. Art., age 21.	May 30, 1864.	Flesh wound upper portion of left leg.	July 3, 1864.	Posterior tibial ..	July 3, 1864.	Popliteal; hæmorrhage recurred.	Amputation thigh. Died July 23, 1864.
21	Lynch, J., Corp'l, K, 146th N. Y., age 34.	May 10, 1864.	Flesh w'd popliteal region left leg.	May 17, 1864.	.....	May 17, 1864.	Poplit'l lig'd. Ass't Surg. C. A. McCall, U. S. A.	Died May 23, 1864; pyæmia.
22	McNulty, J., Pt., E, 22d Michigan.	Sept. 20, 1863.	Both knee joints	.....	.....	October, 1863.	Poplit'l and branch, with popliteal vein.	Died October 15, 1863.
23	Mathews, S., Pt., A, 93d Pa., age 28.	May 15, 1864.	Left leg; prim. amp. at knee joint.	May 30, 1864.	Repeated hæm. to June 12.	June 12, 1864.	Popliteal ligated on base of stump.	Died June 17, 1864; pyæmia.
24	Powers, T., Pt., G, 140th New York.	May, 1864.	Right leg and left foot.	May, 1864.	.....	May, 1864.	Popliteal ligated, in cont.	Died May 14, 1864.
25	Reynolds, H. H., Pt., F, 1st Mich. Cav., age 25.	Sept. 4, 1864.	Left knee j'nt; Sept. 18, amp. thigh.	Sept. 19, 1864.	Popliteal	Sept. 19, 1864.	Popliteal on face of stump.	Died September 30, 1864; pyæmia.
26	*Seldon, B.*, Pt., H, 9th Virg. Cav., age 23.	July 8, 1863.	Popliteal space, popliteal artery divided; left.	July 17, 27, 1863.	Popliteal artery...	July 27, 1863.	Proximal end in w'd. A. A. Surg. W. S. Adams.	Died August 2, 1863; pyæmia.
27	Sharon, P., Pt., I, 153d New York.	Sept. 19, 1864.	Fracture of head of tibia.	Oct. 1, 5, 12, '64.	Anterior tibial	Oct. 12, 1864.	Popliteal; hæm. recurred.	Oct. 18, amp. thigh. Died Oct. 18, 1864.
28	Smith, A. M., Serg't, F, 20th Maine.	May, 1864.	Poplitealart'y w'ded	May, 1864.	Popliteal.....	May, 1864.	Popliteal ligated on field.	Died May 22, 1864.
29	Smith, F., Pt., B, 1st Mass. Art., age 28.	May 23, 1864.	Right leg and left thigh.	June 17, 1864.	Post. tib.; art'y ligated; hæm. recurred.	June 29, 1864.	Poplit'l. A. A. Surg. H. M. Dean.	Died June 29, 1864.
30	Taber, J. A., Pt., E, 5th Mich., age 23.	Mar. 31, 1865.	Right leg in middle third.	Apr. 10, 1865.	Post. tib. or interosseous.	Apr. 12, 1865.	Poplit'l lig'd; hæm. recur'd. Surg. J. C. McKee, U. S. A.	Died April 18, 1865.
31	Thompson, J. A., Corp'l, K, 10th Indiana, age 27.	Aug. 3, 1864.	Left leg; Sept. 3, amp. upper third.	Oct. 4, 1864.	Popliteal.....	Oct. 4, 1864.	Popliteal, in continuity.	Died Oct. 4, 1864.
32	Vann, D., Pt., B, 8th N. Y. H. Art., age 18.	June 3, 1864.	Left knee, popliteal artery injured.	.....	.....	June 16, 1864.	Popliteal. Surg. R. B. Bontecou, U. S. V.	June 20, amp. thigh. Died June 22, 1864.
33	Walker, M. K., colored servant, 58th Pa., age 13.	June 3, 1864.	Popliteal space, popliteal art. wounded.	June 25, 26, '64.	Popliteal.....	June 26, 1864.	Popliteal, one end in wound. Surg. R. B. Bontecou, U. S. V.	Died July 3, 1864.
34	Wick, J. C., Pt., C, 155th Penn., age 22.	Mar. 25, 1865.	Flesh wounds of both thighs.	May 23, 1865.	Popliteal.....	May 23, 1865.	Both ends in wound. Ass't Surg. A. Delany, U. S. V.	June 14, amp. thigh. Died June 20, 1865.
35	Wild, C. B., Corp'l, E, 114th New York.	Sept. 19, 1864.	Right pop. space	Oct. 1, 1864.	Popliteal.....	Oct. 1, 1864.	Popliteal; hæm. rec. Oct. 12.	Oct. 12, amp. thigh. Died Oct. 13, 1864.
36	*Wilkins, T. E.*, Corp'l, A, 49th Virginia.	Oct. 19, 1864.	Fracture of fibula, tibial arteries inj'd.	.....	Ant. tibial; tibial ligated.	... .	Popliteal lig.; amp. thigh Oct. 23.	Died Nov. 12, 1864.

Of the branches of the popliteal the articular artery was ligated in three instances; two of the cases terminated in death:

Ligations of the Articular Branch.—Cases 1163–1165.—Private A. Shaw, I, 16th Massachusetts, aged 19, wounded May 3, 1863; ball entered external condyle of right femur and was cut out at a point three inches above; hæmorrhage; June 11, ligation of articular branch; admitted into Armory Square Hospital, Washington; discharged December 14, 1863.—Sergeant J. W. Long, I, 8th Kansas, aged 23; shot fracture right leg, December 16, 1864; Dec. 17, amputation at knee joint; Dec. 18, hæmorrhage from internal articular artery; ligation on face of stump on same day; Dec. 25, hæmorrhage external articular; death Dec. 26, 1864.—Private S. Lyon, C, 84th Indiana, age 23; shot fracture of right tibia, Chickamauga, September 19, 1863; hæmorrhages October 2d, 3d, probably from popliteal artery; ligation of articular branch October 3; great prostration from extensive loss of blood; gangrene; October 6, amputation of thigh at junction of middle and lower thirds; death October 8, 1863.

Ligations of the Anterior Tibial Artery.—Forty-seven cases come under this group; twenty-six patients survived the operation, twenty-one perished, a mortality rate of 44.6 per cent. In seven cases with four recoveries and three deaths the posterior tibial artery was likewise tied. Fifteen were operations on the face of the stump after amputation in the leg.

TABLE CXLV.

Summary of Forty-seven Ligations of the Anterior Tibial Artery.

[Recoveries, 1—26; Deaths, 27—47.]

No.	NAME, AGE, AND MILITARY DESCRIPTION.	DATE OF INJURY.	NATURE OF INJURY.	DATE OF HÆMORRHAGE.	PROBABLE SOURCE OF HÆMORRHAGE.	DATE OF OPERATION.	OPERATION, OPERATOR.	RESULT.
1	Bartley, J. P., Pt., B, 38th Ind., age 20.	Mar. 3, 1864.	Fracture bones left foot.	.....	....	Mar. 9, 1864.	Ant. and post. tibial. A. A. Surg. J. Grant.	Discharged Apr. 11, 1865.
2	Boebme, C., Pt., E, 52d N. Y., age 33.	Apr. 2, 1865.	Fracture left ankle; 4th, amp. leg.	Apr. 10, 11, 1865.	Anterior tibial	Apr. 11, 1865.	Both tibials, on face of stump.	Discharged Nov. 14, 1865.
3	Brewster, C. C., Capt., D. 10th Conn., age 45.	May 16, 1864.	Flesh, left leg	May 21, 1864.	Anterior tibial ...	May 21, 1864.	Anterior tibial, one end in wound.	Discharged Sept. 19, 1864.
4	[1] *Bullet, R. W.*, Pt., H, 22d N. C.	May 23, 1864.	Fracture right foot; gangrene.	June—, ——.	.....	June 3, 1864.	Ant. tibial in wound. A. Surg. R. O'Leary, P. A. C. S.	Recovered July 23, 1864.
5	Condon, T., Corp'l, C, 2d New York Artillery, age 21.	Aug. 16, 1864.	Flesh, right leg, middle third.	.....	.....	Aug. 26, 1864.	Anterior tibial, both ends in wound. A. A. Surg. W. F. Atlee.	Discharged July 26, 1865.
6	Elmer, A., Pt., I, 69th Pa., age 21.	June 18, 1862.	Fract. tibia, ant. tibial artery divided.	... .	.....	.....	Anterior tibial	Discharged Jan. 7, 1865.
7	Furrow, G., K, 10th Mass., age 20.	May 5, 1864.	Fracture right tibia, middle third.	June 8, 9, 1864.	Anterior tibial	June 9, 1864.	Anterior tibial, both ends in wound.	Discharged Dec. 6, 1864.
8	Galliger, M., Pt., L, 1st W. Va. Cav., age 31.	Apr. 6, 1865.	Right ankle	.....	.....	Apr. 20, 1865.	Ant. tib., one end in wound. A. A. Surg. J. Sweet.	Discharged Aug. 25, 1865.
9	Goodrich, L. H., Pt., B, 6th Vt., age 30.	May 4, 1863.	Fract. left leg, middle; 7th, amp.	May 10, 1863.	.....	May 10, 1863.	Ant. tibial, on face of stump.	Discharged Mar. 19, 1864.
10	Gould, J., Pt., C, 105th Pa.	July 30, 1864.	Fracture left foot ...	.....	.....	On field.	Anterior tibial	Discharged Mar. 18, 1865.
11	Hoar, J., Pt., G, 144th N. Y., age 17.	July 24, 1863.	Fracture right foot..	July 31, 1863.	Metatarsal	July 31, 1863.	Both tibials. Ass't Surg. W. Thomson, U. S. A.	Duty Apr. 11, 1864.
12	Johnson, W. H., Capt., F, 144th New York, age 27.	Feb. 10, 1865.	Left external malleolus.	Feb. 17, 1865.	Anterior tibial	Feb. 17, 1865.	Ant. tib., in continuity. Asst. Surg. J. G. Murphy, U. S. V.	Hæmorrhages recurred; Feb. 23, amp. Disch. May 15, 1865.
13	McCracken, R. W., Serg't, C, 170th New York, age 32.	June 17, 1864.	Right fibula, laceration anterior tibial artery; excision.	.. ..	.....	June 22, 1864.	Anterior tibial ligated; July 25, slight hæmorrhage.	Discharged Jan. 20, 1865.
14	Mangan, J., Pt., F, 61st Ohio, age 28.	July 20, 1864.	Flesh, left leg; 22d, amputation.	.....	.....	Aug. 15, 1864.	Ant. tibial, on face of stump.	Discharged 1865; re-amputation 1866.
15	Matters, B., Pt., A, 108th N. Y., age 18.	July 3, 1863.	Fracture right ankle joint; 4th, amp.	July 8, 1863.	.....	July 10, 1863.	Ant. tibial, on face of stump.	Discharged Nov. 3, 1864.
16	Palmer, A., Pt., G, 3d Mich., age 34.	July 3, 1863.	Fracture left ankle; Aug. 15, amp.	Sept. 2, 1863.	.....	Sept. 2, 1863.	Ant. tibial, on face of stump.	Discharged May 31, 1864.
17	Renshaw, J. L., Pt., H, 2d Pa. R., age 28.	June 24, 1864.	Flesh, left leg.....	Aug. 2, 1864.	Anterior tibial	Aug. 2, 1864.	Both ends in wound.	Discharged May 18, 1865.
18	Riley, S., H, 92d Pa., age 19.	June 1, 1864.	Left leg, upper third.	July 8, 1864.	Anterior tibial	July 8, 1864.	Ant. tibial, in wound.	Discharged Feb. 9, 1865.
19	Sampson, I., Corp'l, F, 1st Mass. Cav., age 35.	May 11, 1864.	Right leg; gangrene.	June 28, 1864.	Anterior tibial	June 28, 1864.	Both ends in wound. A. A. Surg. T. Liebold.	Discharged Oct. 16, 1864.
20	Sargent, C., Pt., B, 4th Vt., age 24.	Dec. 13, 1862.	Fracture middle third tibia; Dec. 14, amp.	Feb. 7, 1863.	Both tibials	Feb. 7, 1863.	On face of stump ...	Discharged Aug. 25, 1863.
21	Saulsbury, W., Pt., K, 39th C. T., age 36.	July 30, 1864.	Flesh, lower third right leg.	Sept. 10, 1864.	Anterior tibial	.....	One end in wound; religation.	Hæm.; Jan. 9, 1865, amputation. Disch'ged May 26, 1865.
22	Schmidt, C., Corp'l, K, 39th N. Y., age 36.	May 5, 1864.	Right tibia, middle third.	.....	.....	May 23, 1864.	Anterior tibial. Surg. E. Bentley, U. S. V.	1865, amputation leg. Disch. July 14, 1865.
23	Smith, H., Pt., E, 11th Vt., age 19.	Sept. 13, 1864.	Left leg; prim. amp.	Sept. 26, 1864.	Stump	Sept. 26, 1864.	Anterior tibial, on face of stump.	Gangrene. Disch'ed Sept. 14, 1865.
24	Stabenfe'd, J., Pt., A, 3d Wis., age 30.	Sept. 17, 1862.	Fracture right foot; Oct. 3, amp. leg.	Oct. 8, 1862.	Anterior tibial	Oct. 8, 1862.	On face of stump ...	Discharged March 6, 1863.
25	Summers, P., Pt., A, 2d Vermont, age 29.	May 5, 1864.	Fracture tibia, right.	June 26, 1864.	Anterior tibial ..	June 26, 1864.	One end in wound. A. A. Surg. J. F. Strawbridge.	Discharged May 13, 1865.
26	*Weaver, L.*, Pt., G, 4th Virginia, age 23.	July 2, 1863.	Both legs (also face).	July 14, 1863.	Anterior tibial	July 14, 1863.	Both ends in wound.	Paroled Nov. 12, 1863.
27	Babcock, E., Pt., K, 1st Mich. C., age 39.	July 3, 1863.	Fract. fibula, left; excision; gangrene.	Oct. 19, 1863.	Anterior tibial; sloughed.	Oct. 19, 1863.	Both ends in wound. A. A. Surg. J. H. Jamar.	Died Oct. 19, 1863. *Spec.* 2611, A. M. M.
28	Boobar, J., Pt., K, 8th Maine, age 49.	May 20, 1864.	Middle third, left fibula.	July 10, 1864.	Anterior tibial	July 10, 1864.	Both ends in w'd. A. A. Surg. T. Liebold.	Died Aug. 28, 1864.
29	Brommel, W., E, 15th N. Y. Art., age 30.	Mar. 31, 1865.	Left leg, flesh, lower third.	.....	Anterior tibial ...	.....	Anterior tibial. A. A. Surg. S. W. Briggs.	Died May 2, 1865; hæmorrhage.
30	Bumpus, M., Pt., A, 5th Maine, age 29.	May 10, 1864.	Right ankle joint....	May 19, 1864.	Branch tibial.....	May 19, 1864.	One end in wound ...	May 24, amputation. Died May 29, 1864; toxæmia.
31	Clark, E. J., Pt., I, 8th Mich., age 36.	May 10, 1864.	Fracture left foot; June 4, amp. leg.	June 6, 1864.	Anterior tibial	June 16, 1864.	On face of stump ...	Hæm. Died June 16, 1864; hæm.; gang.
32	Clark, J. W., Serg't, I, 129th Ind., age 37.	July 19, 1864.	Fracture left leg; prim. amp. upper third.	July 19, 1864.	.....	July 19, 1864.	Anterior tibial, on face of stump. Surg. A. M. Wilder, U. S. V.	Gangrene. Died Sept. 19, 1864.
33	Deuer, C., Pr., B. 6th Connecticut, age 32.	June 3, 1864.	Fracture right leg...	June 12, 1864.	Anterior tibial	June 12, 1864.	One end in wound. A. A. Surg. S. Coloosdian.	Hæm.; amp. of thigh. Died June 18, 1864; exhaustion.
34	Glass, M. C., Serg't, F, 16th Mich., age 24.	Feb. 17, 1865.	Right anterior tibial artery.	Feb. 20, 1865.	Ulceration anterior tibial.	Feb. 20, 1865.	In continuity	Died Feb. 28, 1865; hæmorrhage.
35	Hardfelter, G., Pt., D, 104th Pa.	Sept. 27, 1863.	Foot; prim.; Syme's amputation.	Oct. 3, 1863.	Anterior tibial	Oct. 3, 1863.	In continuity, two inches above stump.	Died Oct. 12, 1863.
36	Jones J., Pt., I, 27th Ind.	Aug. 9, 1862.	Fracture left leg; Aug. 15, amp.	Aug. 18, 1862.	Anterior tibial; interosseous.	Aug. 18, 1862.	Anterior tib., and interosseous, on face of stump.	Died Aug. 20, 1862.
37	Kane, J. A., Corp'l, C, 6th C. T., age 33.	Sept 29, 1864.	Lower third, right fibula.	Oct. 8–12, 1864.	Anterior and posterior tibials.	Oct. 12, 1864.	Both tibials, both ends in wound. A. A. Surg. O. Warner.	Died Oct. 13, 1864.

[1] *Confederate States Medical and Surgical Journal*, Volume I, p. 177.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
38	Kercher, J., D, 7th Mich. Cav.	July 2, 1863.	Right leg, wound of both tibial arteries.	.....	.....	July 29, 1863.	Both tibial arteries ligated.	Hæmorrhage recurred. Died Aug 10, 1863.
39	McCauley, S. E., Pt., H, 28th Iowa, age 19.	Oct. 19, 1864.	Fracture right tarsus; Nov. 7, amp. leg.	Nov. 11, 1864.	Anterior tibial artery.	Nov. 11, 1864.	On face of stump....	Died Nov. 19, 1864; hæmorrhage.
40	Partridge, G. V., Saddler, B, 4th Massachusetts Cav., age 21.	April 2, 1864.	Fracture left tibia, and injury ant. tibial artery.	April 9, 1864.	Anterior tibial	April 9, 1864.	In wound, one end; April 27, hæmorrhage recurred.	Died May 2, 1864; hæmorrhage; pyæmia.
41	*Poiten, W. F.*, Pt., C, 9th Miss., age 24.	Nov. 30, 1864.	Right tibia, middle third; Mar. 19, '65, amputation.	Mar. 23, 1865.	Anterior tibial	Mar. 23, 1865.	On face of stump....	March 24, 1865, amp. thigh. Died April 20, 1865.
42	Robbins, E. H., Corporal, F, 15th Massachusetts, age 29.	May 6, 1864.	Fracture fibula, inj. ant. tibial artery.	May 31, 1864.	Anterior tibial	May 31, 1864.	In continuity. A. A. Surg. J. Ransom.	June 2, amputated thigh. Died July 15, 1864.
43	Schreiber, A., Pt., A, 50th Penn., age 17.	May 10, 1864.	Fracture right tibia.	May 19, 1864.	.....	May 19, 1864.	Tibial, in wound....	May 19, amp. knee jt. Died June 9, 1864; pyæmia.
44	Skiffington, J., Pt., I, 2d New York H. A., age 28.	June 16, 1864.	Flesh, right leg.....	July 28, 1864.	Anterior tibial ...	July 28, 1864.	Both ends in wound. A. A. Surg. W. F. Atlee.	Died Aug. 29, 1864; pyæmia.
45	*Wilkins, T. E.*, Corp'l, A, 49th Virginia.	Oct. 19, 1864.	Fract. fib., sev. ant. and post. tib. arts.	.....	.....	.....	Both tibials; Oct 31, amputated thigh.	Died Nov. 12, 1864; hæmorrhage.
46	Williams, E., Pt., F, 136th Penn., age 45.	Dec. 13, 1862.	Ant. tibial art.; Dec. 28, hæm.; amp.	Jan. 1, 1863.	Anterior tibial	Jan. 1, 1863.	On face of stump....	Died Jan. 1, 1863; pyæmia.
47	Williams, H. M., Pt., D, 19th Maine.	July 2, 1863.	Fracture tibia and fib., lower third.	July 12, 1863.	Anterior tibial	July 12, 1863.	In continuity. A. A. Surg. F. T. Maury.	Died July 18, 1863.

Ligations of the branches of the anterior tibial artery were reported—one of the *dorsalis pedis* and two of the interosseous; one of the latter was fatal:

Cases 1166–1168.—Private J. Johnson, D, 4th U. S. Artillery, age 36; fracture of metatarsal bone of great toe May 14, 1864; gangrene; July 20th, ligation of dorsalis pedis, both ends being tied in wound by Surgeon A. Hegner, U. S. A.—Sergeant H. S. Foster, E, 104th New York, age 22; fracture of left os calcis July 1, 1863; amputation of leg July 8th; hæmorrhage from interosseous July 10th; interosseous ligated on face of stump; discharged March 22, 1864.—Captain J. Brown, H, 92d Ohio; shot wound of right foot September 19, 1863; amputation of leg September 27th; hæmorrhage from interosseous September 29th; artery ligated on face of stump on the same day; died October 5, 1863, from effects of hæmorrhage.

Ligations of the Posterior Tibial Artery.—Forty-eight cases were reported in which the posterior tibial artery alone was ligated; twenty-nine ended in recovery, nineteen in death, a fatality rate of 39.5 per cent. Ten were operations on the face of the stump after amputation of the leg.

Table CXLVI.

Summary of Forty-eight Ligations of the Posterior Tibial Artery.

[Recoveries, 1—29; Deaths, 30—48.]

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
1	Ball, J. D., Corp'l, A, 125th N. Y., age 24.	May 18, 1864.	Flesh, right leg, dividing post. tibial.	May 28, 1864.	Post. tibial.....	May 28, 1864.	Both ends in wound. Asst. Surg. A. Ingram, U. S. A.	Discharged Dec. 29, 1864.
2	Bowers, G., Pt., B, 77th N. Y., age 31.	Sept. 19, 1864.	Fract. right fibula; excision.	Nov. 13, 1864.	Post. tibial.....	.....	Ligation by Asst. Surg. R. F. Wier, U. S. A.	Discharged June 5, 1865.
3	Brazzle, J., Pt., G, 23d Mo., age 18.	Sept. 1, 1864.	Fractured left fibula.	Jan. 1, 3, 9, 1865.	Post. tibial.....	Jan. 9, 1865.	One end in wound. A. A. Surg. A. A. Greene.	Discharged July 26, 1865.
4	*Buckner, J. F.*, 1st C. S. A., age 21.	Apr. 6, 1862.	Right leg	Apr. 16, 1862.	.....	Apr. 16, 1862.	Ligation	Recovery.
5	Cashdollar, L. W., Pt., C, 128th N. Y., age 21.	Sept. 19, 1864.	Fract'd right tibia; 20th, amputated.	Oct. 27, 1864.	.....	Oct. 27, 1864.	On face of stump....	Discharged May 30, 1865.
6	Clark, P., Pt., D, 140th N. Y., age 28.	July 2, 1863.	Right ankle; 3d, amputated.	July 10, 1863.	Post. tibial.....	July 10, 1863.	On face of stump....	Recovery.
7	Collins, O., Pt., D, 151st N. Y., age 32.	Nov. 27, 1863.	Fractur'd left fibula; excision.	Dec. 9, 1863.	Post. tibial.....	Dec. 9, 1863.	In wound, both ends. Surg. E. Bentley, U. S. V.	Discharged Feb. 25, 1865.
8	Copas, W. A., Serg., B, 36th Ohio, age 28.	Sept. 19, 1864.	Fract. middle, right leg; Oct. 26, amp.	Oct. 27, 1864.	Post. tibial.....	Oct. 27, 1864.	On face of stump ...	Discharged June 5, 1865.
9	Dorr, J. A., Pt., E, 136th N. Y., age 20.	May 20, 1864.	Right ankle, severing post. tibial art.	.....	Post. tibial.....	May 20, 1864.	Below int. mallolus. Surg. I. N. Himes, 73d Ohio.	Discharged June 13, 1865.
10	Du Bois, L. A., Lt., I, 120th N. Y., age 24.	Sept. 20, 1864.	Right foot, lacerating post. tibial.	.....	Post. tibial.....	Sept. 20, 1864.	Ligation. Surg. H. F. Lyster, 5th Mich.	Discharged Jan. 10, 1865.
11	Emory, R., Pt., D, 5th Vt., age 33.	May 5, 1864.	Left leg; gangrene..	Aug. 4, 1864.	Post. tibial..... ..	Aug. 4, 1864.	Both ends in wound. A. A. Surg. J. B. Randall.	Discharged Dec. 16, 1864; Aug., 1865, amp.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Hæmorrhage.	Probable Source of Hæmorrhage.	Date of Operation.	Operation, Operator.	Result.
12	Gilmore, M., Pt., B, 96th Ill., age 22.	Aug. 3, 1864.	Flesh, left leg, inv. post. tibial.	Aug. 3, 1864.	.....	Aug. 3, 1864.	Ligation. Surg. S. H. Kersey, 36th Ind.	Discharged Jan. 10, 1865.
13	Hagey, J. D., Pt., I, 138th Pa., age 24.	Apr. 2, 1865.	Flesh, left leg, artery opened.	Apr. 21–28, 1865.	Post. tibial.....	May 8, 1865.	One end in wound. A. A. Surg. H. M. Bellows.	May 9, 1865, amp. leg. Discharg'd July 26, 1865.
14	Ingalls, H. B., L, 1st Me. Cav., age 25.	Mar. 31, 1865.	Middle, right leg, flesh.	Apr. 7, 9, 1865.	Branch post. tibial	Apr. 9, 1865.	Ligation. Surg. E. Griswold, U. S. V.	Discharged Aug. 12, 1865.
15	Johnson, A. J., Corp., A, 19th Ind., age 25.	July 1, 1863.	Fr. left fibula, mid.; gangrene.	Nov. 23, 1863.	Post. tibial.....	Nov. 23, 1863.	One end in wound. A. A. Surg. J. H. Jamar.	Discharged Mar. 30, 1864.
16	Johnson, H. C., Sgt., C, 28th Ky., age 25.	Feb. 4, 1864.	Left ankle; Feb. 25, amp. leg, lower 3d.	Feb. 25, 1864.	Post. tibial.....	Feb. 25, 1864.	On face, in stump ...	Discharged Dec. 16, 1864.
17	Jones, S. W., Corp., A, 4th Del., age 29.	Oct. 8, 1864.	Fract. left fibula	.....	.....	In field.	Post. tibial and peroneal. Surg. A. A. White, 8th Md.	Discharged June 22, 1865.
18	Leichty, J., Pt., F, 8th Pa. C., age 21.	May 11, 1864.	Fract. left fibula; excision.	.....	Post. tibial.....	.....	In wound	Discharged Jan. 11, 1865.
19	Lowth, J., Sgt., M, 4th Wis. C., age 26.	Aug. 24, 1864.	Fr. up. third right fibula; May 27, '65, excis.	May 27, 1865.	Post. tibial.....	May 27, 1865.	In continuity, upper third.	Gang.; amp. thigh. Discharg'd July 17, 1865.
20	McCarty, J., Pt., F, 48th N. Y., age 38.	Mar. 2, 1864.	Fr. foot, dorsal pedis and int. plant. arteries.	Mar. 2, 1864.	.....	Mar. 2, 1864.	In cont. behind int. malleolus.	Amp. foot; amp. leg. Discharg'd June 10, 1865. Died in 1874.
21	Moran, M., Pt., A, 2d N. J. C., age 20.	Feb. 11, 1864.	Right leg, middle, flesh; gangrene.	Feb. 27, 1864.	Post. tibial.....	Feb. 27, 1864.	In wound. A. A. Surg. S. S. Jessop.	Discharged Oct. 21, 1865.
22	*Poole, R. E.*, Pt., E, 17th Ala., age 18.	Nov. 30, 1864.	Frac. middle, right femur.	Mar. 1, 1865.	Post. tibial.....	Mar. 1, 1865.	In wound, both ends. Surg. B. B. Breed, U. S. V.	To Provost Marshal.
23	Rigsby, T., Pt., C, 9th N. H., age 23.	June 20, 1864.	Flesh, left leg	July 3, 1864.	Post. tibial.....	July 3, 1864.	Ligation	Furloughed Aug. 11, 1864.
24	[1]Ritter, D. T., Corp'l, F, 208th Pa., age 19.	Mar. 25, 1865.	Flesh, left leg, upper third.	April 6, 1865.	Post. tibial	April 7, 1865.	Ligated by Surg. G. L. Pancoast, U. S. V.	Discharged July 27, 1865.
25	Sheridan, J., D, 68th Pa., age 31.	July 3, 1863.	Flesh, right leg	July 25, 1863.	Post. tibial.....	July 25, 1863.	Both ends in wound.	Discharged Feb. 6, 1865.
26	Thompson, S., Pt., E, 4th N. J., age 23.	Sept. 22, 1864.	Right leg, middle....	Oct. 14, 17, 19, '64.	Post. tibial.....	Oct. 19, 1864.	Both ends in wound. A. A. Surg. J. W. Kerr.	Duty March 30, 1865.
27	Trask, H. V., Pt., G, 120th N. Y., age 27.	Mar. 25, 1865.	Severing post. tibial artery, right leg.	.....	.....	On field.	Ligation	Discharged Aug. 4, 1865.
28	Trowbridge, D. A., L, 5th Ill. Cav.	July 8, 1863.	Flesh, right leg	Sept. 23, 1863.	Post. tibial.....	Sept. 23, 1863.	In wound	Discharged Nov. 17, 1863.
29	Valentine, L. W., Pt., K, 6th Maine.	May 3, 1863.	Left leg, fract. lower third; 5th, amp.	May 12, 1863.	Post. tibial.....	May 12, 1863.	On face of stump....	Discharged Oct. 27, 1863.
30	Adams, M. J., Pt., D, 20th Indiana.	June 25, 1862.	Fract. left fibula	July 10, 1862.	.....	July 10, 1862.	Ligation	Died July 28, 1862.
31	Brown, W. H., 5th N. J. Battery, age 25.	May 24, 1864.	Flesh, right leg	June 10, 1864.	Post. tibial	June 10, 1864.	Ligation	Died July 7, 1864; pyæmia.
32	Cramp, T., Pt., G, 5th Minn., age 33.	Dec. 16, 1864.	Fract. right tib., lac. post. tib. artery.	Dec. 27, 1864.	Post. tibial.....	Dec. 27, 1864.	Both ends in wound. A. A. Surg. S. W. Blackwood.	Died Feb. 14, 1865.
33	Flaunigan, H. A., Serg't, H, 16th Pa. Cav., age 25.	April 7, 1865.	Left leg, lower third, inj. post. tib. artery.	May 14, 1865.	Post. tibial.....	.....	In cont., mid. third ..	Died June 15, 1865; erysipelas.
34	Fogle, M. P., Corp'l, A, 133d N. Y., age 31.	June 14, 1863.	Fr. tib. and fibula; prim. amp. right leg.	June 23, 1863.	Post. tibial.....	June 23, 1863.	On face of stump....	Disch. Aug. 31. Died Nov. 17, 1863.
35	Freeman, G. B., Pt., F, 58th Mass., age 32.	June 3, 1864.	Fr. low. third rt. fib.; June 9, exc.	June 9, 1864.	Post. tibial.....	.....	Ligated	Died June 17, 1864; exhaustion.
36	Fuller, C. E., Pt., D, 36th Wisconsin.	June 3, 1864.	Fract. tibia.....	.....	.....	On field.	.....	Died June 13, 1864.
37	Gaffney, M., Pt., A, 14th N. Y., age 27.	Oct. 19, 1864.	Bones left foot	Oct. 31, 1864.	Post. tibial.....	Oct. 31, 1864.	In cont., low. third. A. A. Surg. E. L. Duer.	Died Nov. 9, 1864.
38	Hoasch, G., Pt., E, 110th Ohio, age 45.	July 9, 1864.	Both bones left leg; 11th, amp. leg.	Aug. 4, 5, 1864.	Post. tibial.....	Aug. 5, 1864.	On face of stump....	Died Aug. 8, 1864.
39	Hodgkins, F., G, 1st Mass. C., age 29.	Oct. 1, 1864.	Right os calcis	Oct. 29, 1864.	Post. tibial.....	Oct. 29, 1864.	One end in wound ...	Died Nov. 23, 1864.
40	[2]Jones, W. H., Pt., E, 65th N. Y., age 26.	Mar. 25, 1865.	Left fibula, post. tibial artery cut.	Apr. 3, 1865.	Post. tibial.....	Apr. 5, 1865.	Both ends in wound.	Died April 19, 1865.
41	McCluskey, P., Sgt., F, 26th N. Y., age 27.	Dec. 13, 1862.	Fract. left leg; prim. amp. upper third.	Jan. 2, 1863.	Post. tibial.....	Jan. 2, 1863.	On face of stump....	Died Jan. 11, 1863.
42	[3]Matherson, R., Col., 32d New York.	Sept. 14, 1862.	Fr. right fibula and inj. post. tibial.	Sept. 20, Oct. 1, 1862.	Post. tibial.....	Oct. 2, 1862.	Both ends in wound. Surg. G. Burr, U. S. V.	Died October 1, 1862; exhaustion.
43	Miller, H. L., Pt., B, 93d Ohio, age 27.	May 27, 1864.	Fract. middle third right fibula.	.....	.....	June 22, 1864.	Ligation	Died June 30, 1864.
44	Moore, C., Serg't, D, 42d N. Y., age 40.	July 2, 1863.	Fracture left ankle..	July 19, 24, '63.	Post. tibial.....	July 24, 1863.	Ligat'n. Aug. 1, '63, amp. leg.	Hæm'ge; gangrene. Died Sept. 25, 1863.
45	Oakley, C. N., Pt., A, 85th N. Y., age 32.	Mar. 8, 1865.	Lac. flesh left leg ...	.....	.....	Mar. 8, 1865.	Lig. post. tibial and peroneal arteries.	Died March 23, 1865; exhaustion.
46	Tyler, C., Lieut., D, 129th Indiana.	Aug. 3. 1864.	Os calcis and post. tib. artery.	.....	Post. tibial.....	On field.	Both ends in wound	Died Nov. 22, 1864.
47	*Vaughn, N.*, Pt., H, 1st Va., age 30.	Apr. 1, 1865.	Fr. left ankle joint. April 20, amp. leg.	Apr. 26, 1865.	Post. tibial.....	Apr. 26, 1865.	On face of stump...	Died Aug. 30, 1865; exhaustion.
48	Wright, E., Pt., F, 119th Pa., age 18.	May 5, 1864.	Post. tibial artery of right leg.	May 22, 23, '64.	Post. tibial.....	May 23, 1864.	In wound; May 25, hæm. rec'd.	Amp. leg. Died May 28, '64; ex'n and py.

The plantar branch of the posterior tibial was ligated, in three cases, on the face of the stump after partial amputations of the foot; one case resulted in death:

[1] Lidell (J. A.), *On the Wounds of Blood-vessels, etc.*, in *U. S. Sanitary Commission Memoirs*, Surgical Volume I, p. 262.

[2] Lidell (J. A.), *On the Wounds of Blood-vessels, etc.*, in *U. S. Sanitary Commission Memoirs*, Surgical Volume I, p. 223

[3] *American Medical Times*, Vol. VI, p. 101. *U. S. Sanitary Commission Memoirs*, Surgical Volume I, p. 46.

Ligations of Plantar Arteries.—CASES 1169–1171.—Private D. Bailey, G, 3d Iowa Cavalry, age 26; shell wound of right foot June 10, 1864; June 14th, removal of metatarsal bones; external plantar ligated by A. A. Surgeon J. N. Sharp; February, 1865, amputation of leg at lower third; discharged September 11, 1865.—Private J. Betts, K, 2d New Hampshire, age 25; wound of toes of left foot May 27, 1864; May 28, amputation of three toes; June 9, hæmorrhage from plantar; vessel ligated on face of stump; returned to duty July 4, 1864.—Private W. Mockler, G, 81st Pennsylvania, age 47; shot fractune of right foot December 13, 1862; December 26, Chopart's amputation; December 31, hæmorrhage from external and internal planter arteries; ligation on face of stump on the same day; death January 10, 1863.

Of four ligations of the peroneal artery three had fatal terminations; the operation was on the face of the stump after amputation in the leg in one case.

Ligations of the Peroneal Artery.—CASES 1172–1175.—Private O. F. Nash, K, 12th Wisconsin, age 21; shot wound of leg August 23, 1864; August 27, resection of four inches of middle third of left fibula; artery ligated by Surgeon A. J. Miller, 13th Iowa; discharged June 30, 1865.—Private J. E. DeWitt, A, 9th New York Cavalry, age 23; shot fracture of fibula June 21, 1864; bleedings from peroneal June 24, 25; June 25, fractured portion of fibula excised and peroneal artery ligated by A. A. Surgeon O. P. Sweet; death June 25, 1864.—Private C. E. Eastman, F, 9th Maine; shot fracture of left leg July 18th; amputation of leg July 23d; sloughing; hæmorrhage from peroneal; artery ligated on face of stump by Surgeon D. Merritt, 55th Pennsylvania.—Private S. Mitchell, D, 188th Penn., age 23; shot fracture of left fibula June 3, 1864; hæmorrhage from peroneal June 27th; ligation of peroneal and removal of two inches of fibula by A. A. Surgeon A. W. Merrill; death August 17, 1864.

General Remarks on Hæmorrhages and Ligations.—It has been found most convenient in dealing with the cases of hæmorrhage to classify them simply as primary and secondary. While undoubtedly some of these bleedings occurred a short time after the injury and before the period of suppuration had commenced, it was found impossible, from the nature of the records, to eliminate these cases with certainty and accuracy; and inasmuch as such hæmorrhages partook more or less of a primary or secondary character they have been assigned to one or the other of these groups. In the following table are indicated the days on which hæmorrhage first occurred:

TABLE CXLVII.

Table indicating the days on which the first hæmorrhage occurred.

Day after injury on which the hæmorrhage occurred.	Cases.	Head, chest, and upper extremities.	Abdomen, pelvis, and lower extremities.	Day after injury on which the hæmorrhage occurred.	Cases.	Head, chest, and upper extremities.	Abdomen, pelvis, and lower extremities.	Day after injury on which the hæmorrhage occurred.	Cases.	Head, chest, and upper extremities.	Abdomen, pelvis, and lower extremities.
1st day	153	68	85	Forward	788	425	363	Forward	1,166	644	522
2d day	17	5	12	15th day	51	36	15	27th day	13	8	5
3d day	17	6	11	16th day	40	21	19	28th day	17	12	5
4th day	26	17	9	17th day	41	20	21	29th day	13	8	5
5th day	24	15	9	18th day	39	24	15	30th day	5	3	2
6th day	37	22	15	19th day	33	19	14	31 to 40 days	102	51	51
7th day	62	36	26	20th day	20	9	11	41 to 50 days	57	25	32
8th day	58	34	24	21st day	35	23	12	51 to 60 days	40	15	25
9th day	68	35	33	22d day	34	16	18	61 to 70 days	21	6	15
10th day	71	37	34	23d day	28	17	11	71 to 80 days	10	1	9
11th day	71	44	27	24th day	23	15	8	81 to 90 days	8	3	5
12th day	68	43	25	25th day	14	6	8	91 to 100 days	6	.....	6
13th day	64	33	31	26th day	20	13	7	Above 100 days	22	4	18
14th day	52	30	22		1,166	644	522		1,480	780	700

The number of bleedings on the first day was one hundred and fifty-three (153), of which one hundred and ten (110) were hæmorrhages immediately following the injury (strictly primary, see TABLE CXXIV, p. 763), while forty-three (43) occurred at some period within the first twenty-four hours succeeding the injury. Should it be deemed desirable to make a group of intermediary cases, these forty-three cases with those occurring on the second and third days should probably be so classified. Those of the first day undoubtedly

partook of the character of primary hæmorrhage and were results of reaction; as to those of the second and third days the data are insufficient to determine their proper classification. By the fourth day sufficient time had elapsed to allow such changes as result from inflammatory action and which are recognized as productive of secondary hæmorrhage, and it will be noticed that from this day the bleedings perceptibly increase and steadily maintain an upward tendency until the tenth and eleventh days, when the greatest number of hæmorrhages occurred. From this point their frequency gradually and somewhat regularly diminishes until the thirtieth day; after this time they lose their regularity and occur at various intervals, subject to infectious diseases or other peculiar conditions attending each case. Examples of long-deferred hæmorrhages were not rare. In the case of Mullan, cited in TABLE XLIX, on page 650 of the *Second Surgical Volume*, hæmorrhage did not occur until the 264th day, and in the following case the first bleeding took place on the 122d day:

CASE 1176.—J. Brazzle, Co. G, 23d Missouri, aged 18 years, was wounded in both legs, at the battle of Jonesboro', September 1, 1864. He passed through several hospitals, lastly entering No. 8, at New Albany, on December 2d. Assistant Surgeon S. M. Horton, U. S. A., in charge of the latter, reported: "The wound was caused by a minié ball, which entered the left leg at the inner edge of the gastrocnemius muscle, three inches below the knee joint, and passed out at the opposite side of the leg, splintering the fibula in its course. No hæmorrhage took place at the time the wound was received, but three attacks occurred in this hospital, the first on January 1st, the second on January 3d, and the third six days later. The entire loss of blood amounted to about a quart, and its source was the posterior tibial artery, the cardiac extremity of which was ligated at the bottom of the wound, on January 9th, by Acting Assistant Surgeon A. S. Greene. Chloroform constituted the anæsthetic. At the time of the operation the wound was in a healthy condition and the patient was in good health, but looked exsanguineous from the repeated losses of blood. No recurrence of hæmorrhage followed after the operation. Erysipelas, in a mild degree, subsequently attacked the leg, leaving it œdematous. By March 31st the wound had not yet healed, but was discharging unhealthy pus, giving evidence of caries of fibula at the site of the wound." The patient was subsequently transferred as a convalescent to Joe Holt Hospital, and on July 26, 1865, he was discharged from service and pensioned. Examiner G. W Newman, of Bethany, Mo., May 8, 1867, certified to the injury, and added: "From appearance there is yet some detached pieces of the fibula in the wound. The wound is running, the leg is considerably enlarged, and the gastrocnemius muscle contracted so that he cannot bend the foot forward, and walks with difficulty." Two years later the same examiner stated: "The wound has not discharged for ten or twelve months. I think the leg will gradually improve," &c. Examining Surgeon J. Walker, at subsequent dates, reported the wound of the right leg, made by the missile passing through the calf of that limb before entering the left leg, produced no disability, but that the left leg is wasted and its motion much impaired, flexure being confined to a right angle, and the limb requiring to be bandaged to prevent swelling. In May, 1877, the exit wound was reported to be suppurating occasionally. The pensioner was paid September 4, 1880.

In another instance—a case of fracture of the humerus—hæmorrhage from sloughing did not occur until the one hundred and twenty-ninth day, necessitating, at that late period, amputation of the arm:

CASE 1177.—Sergeant M. Bumgardner, Co. B, 9th Iowa, was wounded in the right arm during the assault on Vicksburg, May 22, 1863. He was treated at a field hospital for some weeks, and subsequently at Jefferson Barracks. Surgeon J. F. Randolph, U. S. A., in charge of the latter hospital, made the following report: "The injury consisted of a fracture of the humerus, lower third, and was caused by a round ball. The wound became gangrenous and sloughing, causing hæmorrhage from the brachial artery to the amount of three pints on September 28th. The bleeding was checked, but recurred on October 2d, when circular amputation of the arm was performed at the upper third by Assistant Surgeon H. R. Tilton, U. S. A. Equal parts of ether and chloroform were used as an anæsthetic, from which the patient reacted tardily. At the conclusion of the operation but little hope was entertained of his recovery, and for several days afterwards he continued very weak. Under a treatment, however, of tonics and stimulants, and cold water applications to the stump, the patient subsequently rapidly improved." On December 3, 1863, he was discharged from service and pensioned, and subsequently he was supplied with an artificial arm of the "Lincoln" pattern. In his application for commutation the pensioner described the stump as being in a sound condition. The pensioner was paid June 4, 1881.

Not unfrequently the hæmorrhage following immediately upon the injury ceased spontaneously only to return at a later period, generally in the evening or during the night, at times when the reactionary process, or the wound fever, were most pronounced:

CASE 1178.—Sergeant Christian Geisel, Co. H, 6th Pennsylvania Cavalry, aged 25 years, was wounded at Spottsylvania, May 12, 1864. On May 16th he was admitted into Hammond General Hospital, Point Lookout, Maryland, whence Surgeon A. Heger, U. S. A., reported: "Gunshot wound right side of chest; ball entered in front near the armpit, fracturing the right shoulder blade at the middle; the missile was cut out on May 16th. Secondary hæmorrhage occurred on May 27th, to the extent of eight ounces, from the axillary artery. The fractured lower angle of the shoulder blade was removed. The hæmorrhage did not come from the subscapular artery; the operation to ligate the axillary artery was therefore commenced May 27th, but he

died before it was finished. His comrade said that hæmorrhage to the amount of a gallon occurred immediately after being wounded, but that it ceased spontaneously; the pulse was very low before the operation was commenced; he lost no blood during the operation. Though he was very carefully and slightly put under the influence of chloroform, the same may have hastened his end. No *post-mortem* examination was made; the body was given to his father."

In several instances one or more slight bleedings—"warning bleeding"—preceded the actual hæmorrhage, as in the case of J. Lightfoot, 25th Massachusetts, detailed on page 443 of the *Second Surgical Volume*, and in the example here adduced:

CASE 1179.—Private *A. M. Buzhardt*, Co. K, 14th South Carolina, aged 23 years, received a shot fracture of the upper third of the right femur at the battle of Malvern Hill, July 28, 1864. He was captured and conveyed to hospital at City Point, whence he was transferred to hospital at Alexandria on August 10th. Surgeon E. Bentley, U. S. V., recorded the following result of the injury: "The fracture was very high up and the femur was much shattered. The limb was placed upon a double-inclined plane and the fragments were placed in apposition as nearly as possible. The patient was worn out with exposure and anxiety and had some diarrhœa. Slight hæmorrhages occurred on September 4th and 7th, which readily yielded to pressure. On September 8th a severe hæmorrhage took place, exhausting in amount, from which the patient sank rapidly, and died the same day. The *post-mortem* examination showed the heart to be exsanguineous and without clot; pus in body of the sternum; lungs sound; liver pale and anæmic; other organs sound. Evidences of hæmorrhage from branches of the profunda artery were found."

Instances of hæmorrhage from the distal ends of arteries after ligations of the cardiac end are reported and will be referred to hereafter; but there were also a few instances in which the bleeding occurred from the farther extremity of the wounded blood-vessel, either as primary or secondary hæmorrhage, before operative interference. In the case of Harrison (*Second Surgical Volume*, p. 926, CASE 1869), hæmorrhage from the distal end of the ulnar artery was noted on the tenth day after the injury. In the following case bleeding from the distal end of the anterior tibial artery occurred on the seventh day after the injury:

CASE 1180.—Saddler G. V. Partridge, Co. B, 4th Massachusetts Cavalry, aged 21 years, was wounded in the left leg during a skirmish near Jacksonville, April 2, 1864. The missile, a ball, passed directly through from back to front, fracturing the tibia, comminuting a portion of the internal surface of the bone, and cutting the anterior tibial artery at the middle of the limb. Five days after being wounded the man was admitted to hospital No. 3, at Beaufort, where hæmorrhage occurred to the amount of four ounces from the distal end of the injured vessel on April 9th, on which day the fractured bone was excised and the artery was ligated. The operation was performed by Acting Assistant Surgeon W. A. Greenleaf, who made an incision five inches in length along the line of the internal surface of the tibia and removed eleven pieces of bone, cutting off the points with the chain-saw. At the time of the operation the edges of the wound looked dry and red, and the parts were swollen, very painful, and discharging some. The patient was in good spirits and had a good appetite, but was exhausted from previous loss of blood; pulse 65. Only the lower extremity of the anterior tibial artery was ligated, the vessel having been so extensively destroyed that it was impossible to reach the upper end. Chloroform was used during the operation, from which the patient reacted well. He did well for three days, when chills came on and the wound sloughed. On December 17th sloughing ceased, healthy granulations appeared, and pus discharged freely. Stimulants were duly administered. On April 20th chills were more frequent and at times severe. Decided symptoms of pyæmia developed on April 27th, when a slight hæmorrhage also recurred from the superficial arteries, which was easily controlled by pressure and the application of persulphate of iron. Death resulted from pyæmia May 2, 1864. The history of the case was reported by Assistant Surgeon J. F. Huber, U. S. V.

In the case of Calef, 2d New Hampshire (see CASE 1101, page 756, *ante*), in which a round ball had occluded the proximal end of the divided carotid artery, a false aneurism formed at the distal extremity.

The form of hæmorrhage known as capillary or parenchymatous was occasionally seen, and was marked by a steady leakage of blood from the capillary vessels, often great in amount and frequently resulting in syncope or exhaustion. The discharge had neither the bright scarlet of arterial nor the darker hue of venous blood; it flowed without jets and was often difficult to arrest. When observed as a primary condition, or after a primary operation, it was generally the result of what is known as hæmorrhagic diathesis. In other cases it was due to paralysis of the capillary vessels from inflammatory action. It was most frequently noticed as an accompaniment of pyæmia and osteomyelitis, and was caused by interrupted venous circulation, assisted by the leucothycemic condition of the blood in such cases.

Fifteen cases of this form of hæmorrhage were reported. In the cases of recovery

the bleeding was comparatively slight, and easily controlled by cold, compression, or styptics. Of the nine fatal cases death occurred either as a direct result of the hæmorrhage or from the complications which probably gave rise to the bleeding, as pyæmia, gangrene, erysipelas, and diarrhœa. Of the fifteen cases, capillary hæmorrhage followed amputation in seven instances—with three recoveries and four deaths; and excision in six cases—with one recovery and five deaths.

Four cases of medullary hæmorrhage were noted. Two, occurring from medullary arteries of stumps in pyæmic cases, resulted in death. One appears to have been a case of recurring hæmorrhage from medullary artery of tibia of a patient much debilitated—who finally recovered. The fourth was a case of osteomyelitis of tibia and fibula further complicated by diarrhœa; it ultimately terminated in recovery.

Traumatic Aneurism.—In seventy-four cases the injuries were followed by traumatic aneurism. Twenty-three cases terminated in recovery and fifty-one in death, a mortality rate of 68.9 per cent. Thirty-four, or nearly one-half of all the cases, were aneurisms of the femoral or axillary arteries—twenty of the former and fourteen of the latter.

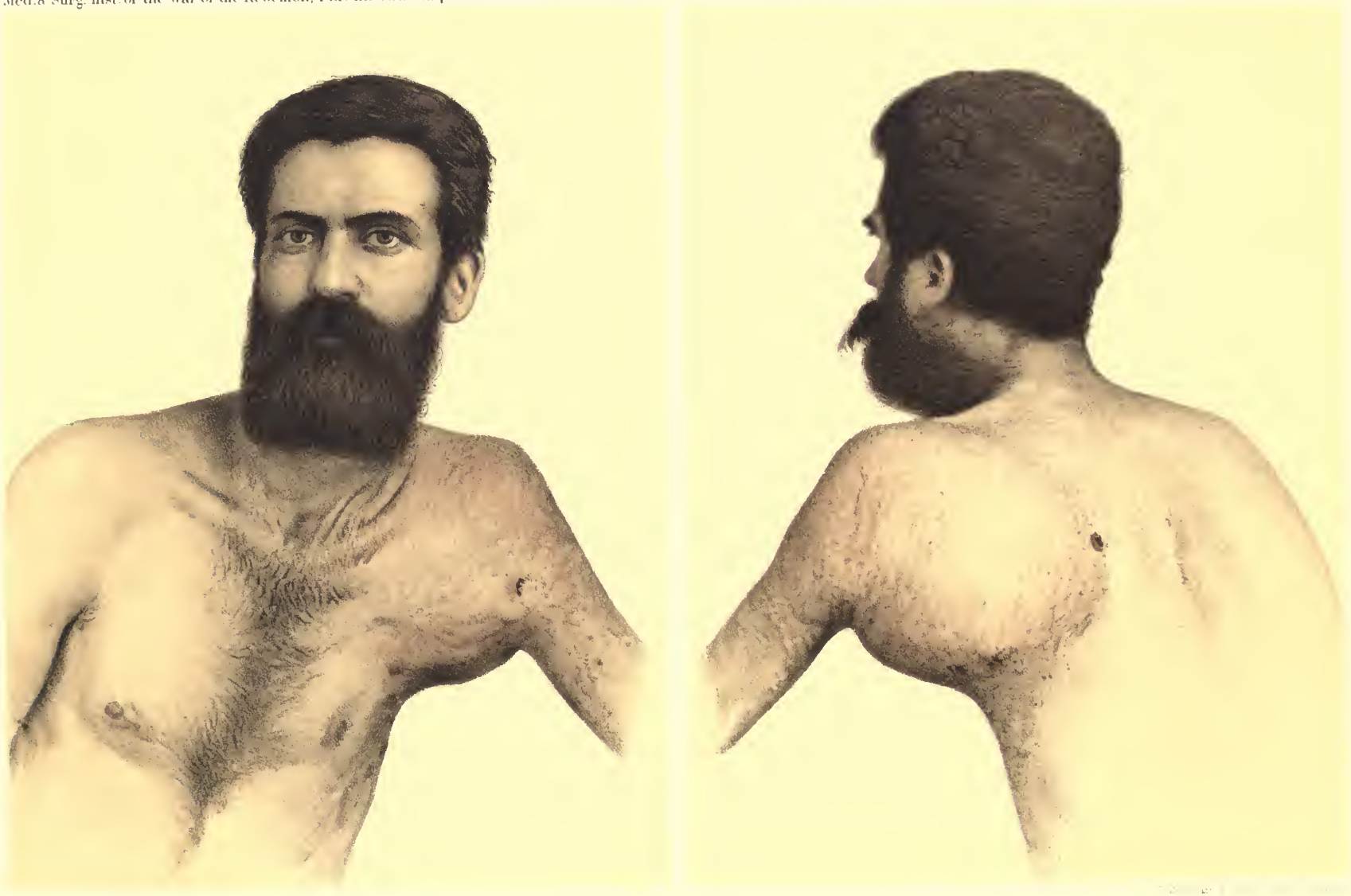
TABLE CXLVIII.

Summary of Seventy-four Cases of Traumatic Aneurism.

ARTERIES.	Cases.	Recoveries.	Deaths.	TREATMENT.			
				Ligation.		No ligation.	
				Recoveries.	Deaths.	Recoveries.	Deaths.
Common Carotid	5	1	4	.....	3	1	1
External Carotid	1	.....	1	.....	.....	.....	1
Subclavian	3	.....	3	.....	.....	.....	3
Suprascapular	2	1	1	1	1	.....	.....
Axillary	14	3	11	2	10	1	1
Acromial Thoracic	1	.....	1	.....	.....	.....	1
Circumflex	1	1	.....	.....	.....	1	.....
Brachial	7	2	5	2	3	.....	2
Profunda	1	.....	1	.....	.....	.....	1
Radial and Ulnar	3	2	1	1	.....	1	1
Forward	38	10	28	6	17	4	11
Carried forward	38	10	28	6	17	4	11
Interosseous	1	1	....	....	.....	1	..
Internal Iliac	1	.....	1	.....	1	.....	.....
Sciatic	1	.....	1	.....	.....	.....	1
Femoral	20	5	15	5	11	.....	4
Pudic	1	1	.....	....	.....	1	.....
Profunda	2	2	.....	2	.....	.....	.....
Popliteal	1	.....	1	.....	.....	.....	1
Tibials	7	2	5	.....	.....	2	5
Peroneal	2	2	.....	.....	.....	2	.....
Aggregates	74	23	51	13	29	10	22

The aneurisms were either diffuse or circumscribed, and in one instance, the case of Click, detailed on page 541 of the *First Surgical Volume*, time had been given for anastomotic communication. In the case of Hickey (*First Surgical Volume*, page 539), in which ligation of the subclavian was performed for aneurism of the axillary, an aneurism again developed after his discharge from the service; the man is a pensioner and was living in April, 1882; the last report of the pension examiners, in September, 1877, states that he has now "aneurism involving the innominate artery; the thrill is very distinct; radial pulse cannot be felt; he suffers from pain in the chest and can do no labor."

Forty-two of the seventy-four cases were treated by ligation, of which thirteen recovered and twenty-nine died. In the following interesting case of shot wound in the axillary region unattended by fracture, an aneurism appeared three months after the injury, which increased very rapidly. The subclavian was ligated, but on opening the sac the tissues were found infiltrated with blood and disorganized, and the arm was amputated at the



Ed. Stauch, pinxt

PLATE LXXVII. TRAUMATIC ANEURISM.

Case of Private Francis M. Denton, H, 4th South Carolina Cavalry.

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shoulder joint. In PLATE LXXVII, opposite page 808, the anterior as well as the posterior appearance of the tumor is illustrated after a photograph contributed by the operator, Assistant Surgeon J. C. McKee, U. S. A.

CASE 1181.—Private *F. M. Denton*, Co. H, 4th South Carolina Cavalry, aged 34 years, was wounded at Hanovertown, May 28, 1864. Surgeon L. W. Read, U. S. V., reported the patient's admission into the field hospital of the 3d division, Fifth Corps, with "gunshot wounds of abdomen and arm; sent to general hospital." On June 5th he was admitted into Lincoln Hospital, Washington. Assistant Surgeon J. C. McKee, U. S. A., reported: "Minié ball entered three inches below left shoulder joint anteriorly, passed through the axilla under the scapula, and emerged one inch to the right of the vertebral margin. July 1st, suffers much pain in the hand and region of the wound. July 4th, arm easy; hand very painful. The daily use of hypodermic injections of morphia, etc., relieved the pain a little. August 28th, swelling in region of wound, extending over pectoral and axillary regions, to vertebral border of scapula, left side, continuing to increase from day to day. Upon consultation it was determined to be an aneurismal tumor, and pressure by spiral bandage advised, which was continued until September 1st, when the tumor increased very rapidly. The patient was quite irritable and weak. Chloroform was administered and ligation of the subclavian artery was performed. On opening the sac the tissues were found so diffused with blood and disorganized that amputation at the shoulder joint was advised and performed. Two ligatures were placed on the external jugular vein and three at the shoulder. About eighty ounces of blood, mostly coagulated, were removed from the aneurism. After the operation the patient rallied considerably. He died September 2, 1864, at 10 o'clock A. M., from exhaustion." The operator, Dr. McKee, contributed to the Army Medical Museum photographs of the anterior and posterior appearances of the aneurismal swelling, which have been accurately copied in PLATE LXXVII.

Causes of Hæmorrhage.—The earlier cases of hæmorrhage were due to the force of the blood current in the returning circulation during reaction; to commencing inflammatory action in which the swelling had been sufficient to force out the protective coagulum; to weakened arterial walls, and to a depraved condition of the blood in persons suffering from exhausting or depressing diseases. Not unfrequently the hæmorrhage of the earlier days had its source in the injury of some vessel of considerable size unnoticed in the primary examination of the wound. Cases have been cited in which no excessive hæmorrhage was noticed until attempts were made to effect the removal of a lodged missile or foreign body which had prevented bleeding by acting as a plug or tampon.

Regarding secondary hæmorrhage in its usual acceptation, as embracing all cases of bleeding from wounded vessels occurring after the establishment of suppuration, including cases of rupture of the sacs of traumatic aneurisms, we find that by far the greater number are due to the separation of a slough, the result of a contusion of the walls of the vessel and the inflammatory action consequent upon it. The time required for this process varies within very wide limits, as shown in TABLE CXLVII, p. 805, and appears to be dependent upon the size of the artery, the extent of the contusion, and somewhat upon its proximity to the heart. Ulcerative action extending from neighboring parts may attack a vessel with similar results.

Scorbutic diathesis, fevers, gangrene, pyæmia, osteomyelitis, and all conditions which lower the vital forces or alter the elements of the blood as well as the general condition of the patient and his physical health largely influence this complication. Hygienic surroundings must also be taken into consideration as playing an important part in the maintenance of a good physical status and enabling the wounded man to successfully resist the insidious attacks of disease.

Thrombosis of veins will cause great pressure on the arteries of wounded parts and re-open vessels temporarily closed:

CASE 1182.—Private J. A. Campbell, Co. H, 81st Illinois, was wounded during the Vicksburg campaign, May 22, 1863, receiving a gunshot wound of the left hand. He was admitted into Church Hospital, Memphis, whence Acting Assistant Surgeon C. H. Cleaveland reported: "Patient of a nervous, bilious temperament; had gangrene of left hand and arm. He was very deaf, and no particulars could be obtained from him except that his hand was 'bruised by a cannon shot.' An ulcer had formed at the wrist just above the annular ligament; another in the palm of the hand, commencing one inch below the wrist, laying open almost the entire palmar surface of the hand and fingers; the first and second fingers hung only by shreds from their articular surfaces, the whole surface being covered with fœtid sloughs, which were removed as effectually as possible and

bromine applied at once. A subcutaneous cavity was also found extending from the wound to near the elbow; the integument was divided upon a director and bromine freely applied. August 10th, wound cleaning rapidly at both extremities; patient troubled with anorexia and diarrhœa. At two A. M., August 14th, hæmorrhage to the extent of thirty ounces occurred from the radial artery while the patient was asleep, and soon resulted fatally. The autopsy revealed thrombi of various sizes in the circulating vessels leading both to and from the heart."

Diseases of the coats of the arteries, as atheroma, etc., will hasten hæmorrhage, and in such cases the conditions will render operative interference doubtful or uncertain.

Transportation of the wounded during the process of suppuration has been mentioned as a not infrequent cause of hæmorrhage by surgical writers, and cases recorded in the late war justify its enumeration as an exciting cause:

CASE 1183.—Private W. F. Lepper, Co. H, 148th Pennsylvania, was wounded at the Wilderness, May 6, 1864, receiving a gunshot compound fracture of the right knee joint. Surgeon J. H. Brinton, U. S. V., referring to this case,[1] remarks: "I amputated at the knee joint, at a hospital in Fredericksburg. This man did well for three days. At the expiration of this time orders were received to remove all patients from the temporary hospitals and to vacate Fredericksburg. I was subsequently informed that as this soldier was being lifted into the ambulance for transportation to the boat a sudden and uncontrollable hæmorrhage occurred, which proved almost immediately fatal. Owing to the pressing exigencies of the occasion, opportunity was not afforded for an examination of the stump after death."

Accidental causes will be found to be not uncommon, as falling out of bed, the pulling off of ligatures during delirium, falling upon stumps, and spasmodic twitchings of muscles:

CASE 1184.—Sergeant Foster Hudson, Co. B, 132d New York, aged 24 years, was wounded near Kinston, North Carolina, March 7, 1865. Surgeon C. A. Cowgill, U. S. V., reported from Foster Hospital, New Berne: "Admitted March 8, 1865, with a gunshot wound, shattering the tibia of the left leg and opening the knee joint. On March 9th Assistant Surgeon E. F. Hendricks, 15th Connecticut, amputated the thigh at the lower third. There was extensive shattering of the head of the tibia, and the soft parts were much infiltrated with blood and serum. The pulse was weak at the time of the operation. Simple dressings were applied to the wound and stimulants administered. The posterior flap sloughed away on the eighth day, but the interior was healthy and covered the stump. On the tenth day the ligature came away, but the stump looked well. Pulse weak, appetite poor. Twelfth day, severe chill, followed by delirium, drowsiness, and spasmodic twitching of muscles. On March 21st, hæmorrhage, amounting to one quart, occurred from the femoral artery. He died March 23, 1865, from secondary hæmorrhage, probably induced by convulsive movements of patient and stump."

The records of the war show a large number of hæmorrhages subsequent to excisions, probably due to the engorged condition of the vessels in the neighborhood of the injury which were cut or injured during such operation.

Treatment.—Of the two thousand two hundred and thirty-five cases of hæmorrhage, two hundred and ninety-four were followed by amputation; seven hundred and eighty-six were treated by compression, styptics, etc., or ceased spontaneously; and in one thousand one hundred and fifty-five cases the bleeding vessels were ligated.

TABLE CXLIX.

Summary of Two Thousand Two Hundred and Thirty-five Cases of Hæmorrhage, indicating Mode of Treatment.

TREATMENT.	CASES.	RECOVERY.	FATAL.	PERCENTAGE OF FATALITY.
Hæmorrhage followed by Amputation	294	122	172	58.5
Hæmorrhage ceased spontaneously or was arrested by Compression and Styptics	786	262	524	66.6
Hæmorrhage followed by Ligations	720	328	392	54.4
Hæmorrhage followed by Ligations and subsequent Amputation	87	34	53	60.9
Hæmorrhage from Stump after Amputation (ligated)	348	109	239	68.6
Aggregates	2,235	855	1,380	61.7

Amputation was resorted to for the purpose of saving life in cases of uncontrollable hæmorrhage, both primary and secondary: In primary bleeding, where the original injury

[1] BRINTON (J. H.), *On Amputation at the Knee Joint and at the Knee*, in *Am. Jour. Med. Sci.*, 1868, Vol. LV, p. 316.

was so far destructive to the parts as to render ligation unavailing; in secondary bleeding, in cases of traumatic aneurism, with great infiltration of tissue; in gangrene following division or ligation of the principal artery; and in cases where ligation had failed to arrest bleeding, and where more radical measures were demanded to prevent a further loss of blood. Of two hundred and ninety-four cases thus treated by amputation, one hundred and twenty-two recovered and one hundred and seventy-two died, a fatality of 58.5 per cent.

Of the remaining one thousand nine hundred and forty-one cases of hæmorrhage, seven hundred and eighty-six were treated by compression, styptics, etc. The fatality of these cases, as indicated in TABLE CXLIX, on the preceding page, was large, exceeding that of ligations 12.2 and that of ligations and subsequent amputations 5.7 per cent. In a number of cases digital compression was employed as a temporary measure, and in a few instances steadily continued compression appears to have been rewarded with favorable results. Generally the tourniquet was carefully and judiciously used, although, in a few instances, a resort to operative procedure would have been much better for the patient:

CASE 1185.—Sergeant T. A. Polleys, Co. H, 6th Wisconsin, aged 25 years, was wounded before Petersburg, June 18, 1864, by a musket ball, which fractured the right thigh. He was admitted to the field hospital of the 4th division, Fifth Corps, where amputation at the lower third of the femur was performed by Surgeon J. H. Beach, 24th Michigan, on the following day. Acting Assistant Surgeon H. E. McCartin reported the following result of the case: "The patient entered Baptist Church Hospital, at Alexandria, on June 28th. The amputation had been performed by the posterior flap method. When received into hospital the stump was found strangulated by a tourniquet placed around it to compress the femoral, and the flap was gangrenous and sloughing extensively; patient's condition very low. Tonics, stimulants, and nutritious diet failed to produce any improvement. Hæmorrhage to the amount of thirty-two ounces from the femoral artery occurred on June 28th; the patient died on June 29, 1864."

Cases of troublesome bleeding from the posterior auricular, occipital, or temporal arteries, or their branches, are reported where the hæmorrhage was controlled by compression by a clamp tourniquet, or by bandage and compress, or by a compress consisting of a metallic disk. In one such instance transverse division of the wounded artery was sufficient to secure complete retraction of the coats.

No cases of acupressure, after the method of Sir James Y. Simpson, appear on the records, though it would seem probable that many wounds must have presented themselves where this measure would have been found convenient, speedy, and effectual.

Torsion was employed to secure arteries, a few cases of this procedure being reported; and Surgeon H. S. Hewit, U. S. V., mentions a case where the actual cautery was resorted to for the arrest of troublesome bleeding.

Two cases of transfusion of blood are found on the records; one, a successful operation, was performed by Surgeon E. Bentley, U. S. V.; the other, a fatal case, by Assistant Surgeon B. E. Fryer, U. S. A. Both are here detailed:

CASE 1186.—Private G. P. Cross, Co. F, 1st Massachusetts Heavy Artillery, aged 19 years, was wounded in the right leg, before Petersburg, June 16, 1864, and entered the Grosvenor Branch Hospital, Alexandria, two weeks afterwards. Surgeon E. Bentley, U. S. V., who operated in the case, made the following report: "The injury consisted of a flesh wound on the posterior aspect of the leg. At the date of the patient's admission he was exsanguineous from previous loss of blood. Owing to his condition no operative measures were adopted, but his languishing vital powers were sustained by stimulating treatment combined with highly nutritious diet. Under this method he slightly improved in strength, but the circulating fluid was so impoverished in quality and reduced in quantity that the face of the wound looked pale and bad, and ultimately, on August 12th, it assumed a gangrenous aspect. Local applications, such as creasote, charcoal poultices, nitric acid, etc., were applied to combat this condition. These means failed to arrest its onward progress, the leg presenting in a short space of time a mass of gangrenous sloughs, horribly fetid. Hæmorrhage from the posterior tibial artery again commenced on the afternoon of August 15th, when it was deemed advisable to amputate to prevent further loss of blood. The operation was accordingly performed just at the tubercle of the tibia, the condition of the parts not allowing a flap to be made below that point. Not more than two tablespoonsful of blood was lost; but the patient not seeming to rally, it was determined to test the method of transfusion of blood as recommended by Brown-Séquard. Blood having been obtained from the temporal artery of a strong healthy German, an attempt was made to penetrate the internal saphenous vein, but was unsuccessful on account of its small size; after which an

opening was made into the median basilic, and about two ounces were transfused by means of a Tiemann's syringe. Immediately after the injection a marked difference was noticed in the patient's pulse, which became stronger and firmer. He was then removed to his bed and generous diet was administered, together with stimulants and tonics, under which treatment he gradually improved, his appetite became better, his strength increased, and the stump assumed a healthy aspect. On October 20th the stump had healed and the patient had so far improved as to be able to be furloughed. At its expiration he returned, and, finally, he was transferred to Webster Hospital, Manchester, January 13, 1865, cured." The patient was ultimately discharged from Central Park Hospital at New York City, June 9, 1865, and pensioned, and afterwards he was supplied with a "Hudson" artificial limb. This pensioner died August 24, 1867.

CASE 1187.—Private J. Mott, Co. E, 105th Illinois, aged 37 years, received a flesh wound in the upper third of the left leg, at Kenesaw Mountain, June 26, 1864, by a musket ball, which lodged between the tibia and fibula. He entered Brown Hospital, at Louisville, nine days after receiving the injury, the missile having been extracted and the wound looking unhealthy and sloughing. During the night of July 24th the patient had a copious hæmorrhage from what was supposed to be the anterior tibial artery, which was arrested. On July 26th bleeding again commenced, the blood welling up from between the bones and from the tissues posterior to them. It was then deemed necessary, in order to save life, to amputate, which was done through the upper third of the leg by the circular method, by Assistant Surgeon B. E. Fryer, U. S. A. Ether was used as an anæsthetic, and three ligatures were applied, the patient reacting very slowly. On the following day it was determined to transfuse some blood into the patient, for which purpose, in the absence of any other suitable apparatus, an ordinary gutta-percha syringe was used, the nozzle of which was filed to fit a small tube having a stop-cock through its centre. The right cephalic vein having been selected, an opening was made carefully into it, and the syringe having been warmed and filled with blood from a healthy man, a little of which was allowed to flow from the syringe before forcing its nozzle tightly into the tube in order that any air might be driven out, the tube was introduced and the stream of blood was slowly and carefully forced in. About sixteen ounces were thus transfused. The first effect upon the patient was to increase respiration from about fifteen to twenty-eight per minute, though it soon returned to its normal number of about sixteen. The pulse ran up from one hundred to one hundred and thirty, which, however, also soon returned to what it had been. The man's general condition was greatly improved. His pulse became fuller and slower; he slept well; his stomach retained food, and altogether the prognosis became more favorable. On August 4th hæmorrhage commenced from the face of the stump, the whole surface of which appeared to be involved. From the effects of this, and from chronic dysentery, the patient died on the following day, August 5, 1864; although his condition, from the effects of chronic dysentery and of the hæmorrhage at the time of the transfusion, was such as hardly to expect his recovery, the improvement was such as to show that the operation was not only justifiable, but that it was to all intents a success. The history of the case was reported by the operator.

Styptics were very commonly used. The persulphate of iron in powder or in solution was placed in every knapsack and pannier, and was found at every hospital. In addition to these we find mention of the nitrate of silver, gallic and tannic acids, alum, and turpentine as having been employed. While it is possible that in many cases the use of styptics may have been ill-advised, and while it may be admitted that in the hands of the timid or ignorant surgeon they may furnish an excuse for procrastination or for deferring operations imperatively demanded, still the evidence as to their usefulness during the late war is not altogether unfavorable, and should lead to some modification of the views previously expressed in this history. The experience of surgeons in the Confederate Army was much to the same point, and Dr. Chisolm observes that "iron styptics will control the most annoying hæmorrhage." Instances in which this class of hæmostatics was successfully used, even in bleeding from larger vessels, are not wanting:

CASE 1188.—Captain E. H. Davis, Inspector General, aged 32 years, was wounded at Fort Steadman, March 25, 1865, by shrapnel, which fractured and comminuted the bones of the right arm and forearm. Surgeon J. M. Holloway states[1] that amputation of the arm was done on the morning of the 26th, supposed to be at the anatomical neck. Repair of the wound was very rapid and unaccompanied by unpleasant symtoms other than occasional nervous twitching in stump. On April 19th he took a long walk; at that time the wound was nearly closed externally. On April 20th he experienced a tingling sensation in the arm, which was immediately followed by a gush of blood. Medical aid was speedily obtained, the dressings removed; a small clot near the lower edge of the incision was removed, and, after exposing the parts for a short time to the air, a compress was secured in the axilla by means of a roller. The patient informed me subsequently that for three days before the hæmorrhage the discharge, which before that had almost entirely ceased, increased in quantity and was darker, and accompanied by a constant aching pain in stump. From this it was concluded that ulcerative destruction of the tissues was going on, which in the end invaded the artery. Hæmorrhage recurred at 3 and again at 6 o'clock of April 21st. Upon removing the dressings, extensive extravasation of blood was discovered in the axilla and anterior thoracic region. *Diagnosis:* Indeterminate hæmorrhage from an aperture in the axillary artery, occasioned by ulcerative destruction of the coats of the artery and the newly formed tissues surrounding. April 21st, 10 A. M., pulse frequent and feeble; cheeks blanched from loss of blood; mind clear and calm; fully aware of the danger of his condition. He was placed upon the operating table, a full stimulant was given, compression with the finger and key was made in the subclavian triangle, and the careful administration of chloroform was commenced. Before

[1] HOLLOWAY (J. M.). *Consecutive and Indeterminate Hæmorrhage from Large Arteries after Gunshot Wounds, etc.*, in *American Journal Medical Sciences*, 1865, Vol. L, p. 348.

he became fully anæsthetized the dressings were removed and the cicatrix laid freely open. The opening was then enlarged by an incision at right angles to this, extending obliquely downward and inward through the skin and great pectoral muscle. A number of large clots were turned out, and, the cavity being empty, pressure upon the subclavian was removed to secure a jet of blood to guide to the bleeding point; the jet was easily obtained, and the blood welled up from the bottom of the cavity, which extended high up under the clavicle. Such was the disorganized condition of the surrounding tissues that no artery could be seen, and it was decided, without delay, that the search should not be prolonged, and that the best chance for the patient would be to plug the cavity with successive layers of lint saturated with a strong solution of persulphate of iron, well packed in, and secured by a figure-of-eight bandage. This was done. Prescribed two grains of opium and ten grains of quinine to be taken at once. April 22d: Has reacted fully; shows loss of blood; slight increase of heat in stump; slept well all yesterday and at night under the influence of the opium and quinine. April 24th, attacked with colic last evening, which was soon relieved by a large enema; annoyed also by uneasiness in the stump. Disorganized blood still exuding. On April 26th the sponge that was placed over the plugs was removed by saturating it with water, after which slight capillary oozing occurred. On April 27th he was seized with a slight rigor, followed by fever, which broke up in a short time, leaving him with a moist skin. On April 29th the largest and most superficial plug came away without force, in the evening; another at 12 P. M. The patient gradually and steadily improved until the morning of May 5th, when he was seized with severe lancinating pain in the right side, which persisted, with distressing nervous symptoms, throughout the day. Physical exploration of the chest could detect no lesion of the lung; strong suspicion of pyæmia was entertained; had suffered with severe pain in the muscles of the jaw during mastication for several days. The patient subsequently suffered from colliquative sweats; the pain and stiffness of the muscles of the jaw increased and interfered with his relish for food. On May 15th the last wad was removed, and the channel soon after closed.

The use of ice and cold was very general and was very favorably regarded. Internal hæmastatics were used to some extent, but little can be said decisively in their favor from the records of cases in which they were used. Of those most frequently used may be mentioned tannic and gallic acids and ergot, generally in the form of the fluid extract. These remedies were especially employed in cases where the vital powers were much depressed and where the coagulative elements of the blood were deficient.

Ligations.—In one thousand one hundred and fifty-five cases of hæmorrhage recourse was had to ligations, embracing nearly all the principal arterial trunks and their branches. Of these, four hundred and seventy-one recovered and six hundred and eighty-four died. The fatality in these cases, as well as in the cases of hæmorrhage followed by amputation, was principally due to exhaustion following excessive loss of blood previous to the operations, to recurring hæmorrhages after operations, or to complications, such as gangrene, erysipelas, and especially pyæmia, as indicated in TABLE CXXIV, pp. 763, 764.

Five hundred and forty-one of these operations, with two hundred and ninety-two recoveries and two hundred and forty-nine deaths, a mortality of 46.0 per cent., were performed in the upper circulatory system, and six hundred and fourteen, with four hundred and thirty-five deaths, a fatality of 70.8 per cent., in the lower circulation, thus confirming the general opinion that proximity to centre of circulation favorably influences the final issue.

Three hundred and forty-eight were ligations after amputations; of these, one hundred and fifty-seven, with fifty-two recoveries and one hundred and five deaths, were ligations in the continuity of the stump, and one hundred and ninety-one, with one hundred and thirty-four deaths, ligations on the face of the stump. It is probable that the ligation in continuity was frequently the only alternative, and perhaps a greater saving of life would have resulted had the operation been more generally performed in the continuity, as bleedings from the stump were generally found in patients of low vitality and where but little was to be expected from any operation in the immediate proximity to diseased tissue. Of the remaining eight hundred and seven cases, two hundred and thirty-six were ligations in the wound, five ligations above and below the wound, and four hundred and thirteen ligations in the continuity; in one hundred and fifty-three instances the mode of ligation was not indicated. It is probable that the large majority of ligations of the last group were operations in the continuity. The various modes of ligations with their respective mortalities are indicated in the following table:

TABLE CL.

Table indicating the various Modes of Ligations and their Fatality.

ARTERIES.	TOTAL CASES.	LIGATIONS IN CONTINUITY.		LIG. BELOW AND ABOVE WOUND.		LIGATIONS IN WOUND.						MODE OF LIG. NOT INDICATED.		AFTER AMPUT'N.			
						ONE END.		BOTH ENDS		NOT INDICATED.				IN CONTINUITY.		ON FACE OF STUMP.	
		Recovery.	Fatal.	Recovery.	Fatal.	Recovery.	Fatal.	Recovery.	Fatal.	Recovery.	Fatal.	Recovery.	Fatal.	Recovery.	Fatal.	Recovery.	Fatal.
Carotids and Branches	124	29	66	....	....	5	1	5	3	3	3	8	1	....	....	....	....
Subclavian and Branches	63	5	29	....	....	4	4	2	1	....	....	1	1	4	12	....	....
Axillary and Branches	71	5	17	....	....	3	2	3	4	2	3	3	9	2	10	1	7
Brachial and Branches	181	66	17	1	1	5	2	17	6	3	3	15	10	9	10	9	7
Radial and Ulnar and Branches	102	11	2	3	....	9	4	22	5	12	1	14	4	4	3	7	1
Iliac and Branches	43	2	24	....	....	2	1	....	....	....	....	....	8	....	5	1	....
Femoral and Branches	427	28	91	....	....	1	10	6	23	2	5	14	28	33	64	21	101
Popliteal and Branches	39	3	10	....	....	2	2	1	4	....	2	1	7	....	....	2	5
Tibials and Branches	101	3	5	....	....	7	4	11	8	6	2	16	10	....	1	16	12
Peroneal	4	....	....	....	....	....	....	....	....	....	....	1	2	....	....	....	1
Aggregates	1,155	152	261	4	1	38	30	67	54	28	19	73	80	52	105	57	134
		63.1%		20.0%		44.1%		44.6%		40.4%		52.2%		66.8%		70.1%	

The fatality after ligations in the continuity was 63.1 per cent., after ligations in the wound 43.6 per cent. The necessity of ligating both ends has been shown in numerous instances in the preceding volumes. In the case of Lieutenant Colonel M. M. Dawson, 100th Pennsylvania Volunteers (CASE 1251, page 442, *Second Surgical Volume*), the cardiac end only of the axillary was tied for hæmorrhage occurring on the tenth day after the injury; the hæmorrhage continued, and the distal end was secured by tying the brachial. In Private G. Harbison's case (*Second Surgical Volume*, page 451) a ligature was placed on the proximal end of the ulnar artery; but hæmorrhage recurring on the next day, the distal end was ligated, and no further bleeding occurred. In the following instances of ligation of the femoral artery hæmorrhages from the distal ends occurred on the second, fourth, and sixth days after the ligation:

CASE 1189.—Private J. Sesler, Co. H, 148th New York, aged 28 years, was wounded in the left thigh, at Cold Harbor, June 3, 1864. From the field he passed to Mount Pleasant Hospital, at Washington, and thence, on June 15th, to Mower, Philadelphia. Surgeon J. Hopkinson, U. S. V., in charge of the latter, made the following report: "The injury was caused by a musket ball passing through the inner aspect of the lower third of the limb. There was profuse discharge and extensive sloughing, extending down to and ulcerating through the femoral artery, and causing hæmorrhage to the amount of from four to six ounces on July 24th, when the vessel was ligated in its continuity, at the middle third of the thigh, one inch above the wound. Bleeding recurred to the extent of from six to eight ounces from the lower end of the artery on July 28th, when the distal end of the vessel was ligated in the wound. The operations were performed by Acting Assistant Surgeon W. P. Moon, chloroform being used in the first and ether in the last, and both being followed by prompt reaction. The patient did well afterwards. The subsequent treatment consisted of simple dressings, tonics, and stimulants." The patient was discharged from service on January 11, 1865, and pensioned. Examiner R. C. Dunham, of Seneca Falls, New York, certified, August 7, 1877, to the injury, and added that the muscular structures and integuments on the inner side of the limb have sloughed out, and that the remaining structures have healed to the bone; also that "the leg is swelled below the knee and is sore and tender to the touch; knee partially anchylosed. Some important nerves must have been wounded and are healed in the structure with the cicatrix, as the leg below the wound is very numb and weak. He cannot walk but a very little distance at a time," etc. The pensioner was paid March 4, 1882.

CASE 1190.—Private C. Berkey, Co. A, 10th Pennsylvania Reserves, aged 24 years, was wounded at the battle of Manassas, August 30, 1862, and entered Filbert Street Hospital, Philadelphia, four days afterwards. Acting Assistant Surgeon A. D. Hall reported the injury as a "wound of the popliteal artery," and described the case as follows: "A round ball passed through the lower third of the left thigh, entering on the inner side one inch or so above the condyles, and making its exit at the opposite side in the direct course of the popliteal artery. The case was treated by simple dressings until the occurrence of arterial hæmorrhage on September 11th from both wounds, which amounted to about sixteen ounces, and was checked by compression with tourniquets until September 13th, when it recurred twice to the extent of eight ounces. Compression by means of Petit's tourniquet over the

femoral, Skey's below the wound, and graduated compresses over the course of the vessel proving unsuccessful, and several attacks of hæmorrhage, though small in amount, occurring on the next day, the femoral artery was ligated at 10 P. M., at the middle third of the thigh, after the method of Hunter. The ligature controlling the bleeding, all compresses were removed after the operation. On September 15th there was slight oozing of bloody serum from the old wounds, and at 11 P. M. another hæmorrhage occurred from the inner wound to the amount of three ounces, which ceased after the application of the tourniquet to the femoral where it crosses the brim of the pelvis. There was no return of hæmorrhage until the morning of September 17th, when it recurred to the amount of six ounces. The question of ligating the popliteal was now discussed, and after consultation it was decided to cut down upon the artery, upon doing which the whole popliteal space beneath the external muscles was found to be in a sloughing state and filled with broken down masses of clot and grumous matter. A cavity was formed by the sloughing tissue that dissected up the muscles of the thigh and laid bare the lower part of the femur. The bullet appeared to have grooved the under surface of the femur in its passage, producing some comminution and opening the cancellated structure of the bone. Under these circumstances it was considered that amputation, although almost certainly fatal, would afford the only chance for the patient. Ether was accordingly given, and the operation was performed by the circular method at the upper part of the middle third of the thigh. There was no reaction, the patient continuing to sink, and dying at 1 A. M. on September 18, 1862. At the *post-mortem* examination the popliteal artery was found to be opened for about one-sixth of an inch at the middle of the popliteal space, in a direction parallel to the axis of the artery. The popliteal vein was filled to distension by a firm clot. The track of the wound was found to have entered through the external hamstring tendon, channelling the under surface of the femur and emerging through the inner hamstring tendon. The popliteal artery was not obliterated, and the hæmorrhage must have occurred, after the ligation, from the lower end of the vessel through the recurrent circulation. The femoral artery was found to be ligated about four inches below the origin of the profunda, a clot extending from the point of the ligature about one-fourth of an inch up to the first small artery above."

CASE 1191.—Private M. Knecht, Co. K, 4th Ohio Cavalry, was wounded in the left thigh, July 1, 1863, by a musket ball, which entered at the lower and external side above the condyle of the femur, and made its exit at the inner condyle near the attachment of the hamstring muscle. He was admitted to hospital at Murfreesboro' nine days after the injury, where Assistant Surgeon W. P. McCullough, 78th Pennsylvania, recorded the following treatment: "The limb was bandaged from foot to hip and ice was applied to the knee. Hæmorrhage occurred on July 28th and 31st to the amount of about twenty ounces, and was controlled by compression. On August 3d there was another hæmorrhage, amounting to twelve ounces, and ligation of the popliteal artery was performed by enlarging the opening of exit. Two days later hæmorrhage again occurred from the wound, and a large anastomotic branch was tied. No further attack followed until August 9th, when profuse bleeding set in from the lower end of the wounded artery, and the femoral was ligated in the middle third. Stimulants were given freely and artificial heat was applied to the foot and leg. The patient died of exhaustion August 14, 1863." The lower third of the shaft of the femur of the injured thigh, showing the outer and posterior border of the bone to be perforated above the condyle by the missile, the seat of injury being carious, was contributed to the Museum by Surgeon I. Moses, U. S. V., and constitutes specimen 1757 of the *Surgical Section*.

Two hundred and sixty-one of four hundred and thirteen ligations in the continuity had fatal terminations, a mortality rate of 63.1 per cent., exceeding the fatality of ligations in the wound nearly 20 per cent.; but it will be observed that, with the exception of the femoral, the large vessels, as the carotid, subclavian, axillary, iliac, and popliteal arteries were, as a rule, tied in the continuity. It is to be regretted that ligations of both ends in the wound were not more generally practiced.

Lidell records,[1] as his personal observation after several severe battles, that he had not met "with a single case of primary hæmorrhage which required a surgical operation, such as the application of a ligature for its suppression." Neudörfer and Richter,[2] experienced European military surgeons, have never been called upon to control primary hæmorrhage after injuries of blood-vessels by ligature on the battle-field or the first place of dressing. But a number of such operations were performed during the war of the rebellion, and the results of these operations seem to have been quite successful. Thus, for instance, of thirteen ligations of the femoral performed on the battle-field, seven proved successful; of ten ligations of the tibial arteries, seven terminated in recovery; and of fourteen ligations of the brachial only one had a fatal termination, although several of these cases were complicated by fractures. In the case of A. Elmer, 69th Pennsylvania (CASE 679, page 435, *ante*), the tibia was fractured and the anterior tibial artery divided; the latter was secured by a ligature on the field; the patient recovered. A case of shot fracture of the lower third

[1] LIDELL (J. A.). *On the Wounds of Blood-vessels, Traumatic Hæmorrhage, Traumatic Aneurism, and Traumatic Gangrene, etc.*, in *United States Sanitary Commission Memoirs*, Surgical Vol. I, New York, 1870, p. 12.

[2] RICHTER (E.), *Chirurgie der Schussverletzungen im Kriege mit besonderer Berücksichtigung Kriegschirurgischer Statistik*, Breslau, 1877, p. 346.

of the left femur, in which the femoral artery was severed and successfully ligated on the field, is cited in TABLE XLIX, on page 353, *ante*, CASE 2.

VEINS.—Hæmorrhage from wounded veins is generally regarded as of less practical importance than that from wounded arteries. It is stated in a previous portion of the history that "no cases have been reported in which the bleeding could not be controlled by pressure." An examination of the cases in the following table shows that in five instances at least ligation of veins was resorted to:

TABLE CLI.

Summary of One Hundred and Six Cases of Hæmmorrhage from Veins.

VEINS.	CASES.	RESULTS.		CAUSES OF DEATH.					LIGATION.		REMARKS.
		Recovery.	Death.	Pyæmia.	Gangrene.	Erysipelas.	Hæmorrhage.	Not stated.	Recovery.	Fatal.	
Parietal	1	1									
Temporal	1	1									
Longitudinal Sinus	2	1	1	1							
Internal Jugular	15	1	14				8	5			1 typhoid pneumonia.
External Jugular	6	3	3	1			2				
Subclavian	3	1	2				2				
Brachial	2	0	2				2				
Median Cephalic	2	1	1			1			1		
Intercostal	1	1									
Vena Cava	7		7				5				{ 1 peritonitis. 1 perf. liver and asc. vena cava.
Mesenteric	1		1				1				
Gluteal	2	1	1				1				
Hæmorrhoidal	1		1	1							
Internal Iliac	2		2				2				
Femoral	15	2	13	3	4		5		1		1 osteomyelitis.
Saphenous	6	1	5	1	1		1	1		1	1 typhoid fever
Profunda	2		2				2				
Popliteal	1	1							1		Subsequent amputation.
Upper extremities, vessel not named	7	3	4	1			3				
Trunk, vessel not named	5	1	4	1			3				
Lower extremities, vessel not named	17	1	16	8			6	1			1 dysentery.
From Stump	7		7				4	2		1	1 diarrhœa.
Totals	106	20	86	17	5	1	47	9	3	2	

Among the instances of wounds of the arteries considered in the preceding pages were quite a number in which the veins were likewise injured. These cases have not been included in this statement of one hundred and six (106) venous hæmorrhages, of which eighty-six (86), or 81.1 per cent., proved fatal.

From the number of venous vessels, and from the fact that they are less liable to evade a projectile in its course than the arteries, it would seem that injuries and hæmorrhages of the veins should have been more frequently noted. Statistics on the relative frequency of injuries of the arteries and veins are nowhere found in military surgery. Richter[1] suspects that many soldiers perish on the battle-field from injuries of these vessels. It remains a fact, however, that hæmorrhages from veins come far more rarely under the observation of the surgeon than those of arteries; but that their fatality is equally as great, if not greater, than that of arteries, is clearly proven in the above tabular statement.

Wounds of large veins lying in cavities and beyond the reach of ligation seem to be as

[1] RICHTER (E.), *Chir. der Schussverletzungen im Kriege mit besonderer Berücksichtigung Kriegschir. Statistik*, Breslau, 1877, 1 Theil, p. 357.

fatal as those of arteries. The femoral and jugular veins would appear to be less amenable to treatment than others which yield to pressure or cease spontaneously. In forty-seven (54.6 per cent.) of the eighty-six fatal cases, death was ascribed to secondary hæmorrhage occurring at various dates; next in order we find pyæmia and gangrene as causes of death, especially in wounds of the lower extremities.

Among the one hundred and six cases of hæmorrhage from veins were twenty cases of primary injury. Of these fifteen, or 75 per cent., were followed by primary bleeding, while in the arteries only one hundred and ten of four hundred and eighty-five, or 22.7 per cent., were succeeded by immediate hæmorrhage. Secondary hæmorrhage from veins occurred at irregular intervals from one to seventy days; in one instance the bleeding did not take place until the one hundred and thirty-seventh day; and in another, a case of shot wound of the buttock, uncontrollable venous hæmorrhage occurred from a persistent fistula three years after the injury:

CASE 1192.—Private W. H. Marsh, Co. K, 13th Illinois, aged 23 years, was wounded at Chickasaw Bayou, December 29, 1862, by two musket balls, one entering the upper part of the left thigh and the other passing into the hip. He was taken prisoner and remained for a time in the hands of the enemy. In May, following, he was conveyed to Memphis, where he entered Overton Hospital, and remained for four weeks, after which he was transferred to Lawson Hospital, at St. Louis. Surgeon C. T. Alexander, U. S. A., in charge of the latter, reported that "the wound of the thigh, which is now quite healed, was treated by a Confederate physician as a fracture of the femur, which does not seem to have existed. The patient avers that the other ball, which entered the gluteal region close to the tuberosity of the ischium, is still there, though it cannot be felt by the probe. There is a sinus, however, extending six inches into the muscles of the buttock, and from the nature of the discharge it is probable that there is a foreign body of some kind in the wound." Acting Assistant Surgeon F. K. Bailey reported the subsequent history of the case, as follows: "The patient was admitted to hospital at Quincy on July 17th, being very feeble and pale and appearing to have lost a great deal of blood. He could not stand on his left lower extremity, and pus was still escaping from the orifice, which was near the coccyx. Good nourishment and laxatives, when necessary, were given, with morphia *pro re nata*. Solution of morphia was also used in poultices and dressing. Two months after his admission he complained of pain in the hypogastric when passing urine, in connection with which he stated that while he was at Vicksburg it was necessary to use the catheter. In October he had neuralgic pains in the left side of the pelvis and in the thigh, and there were indications of miasmatic chills; wound still discharging freely. Quinine was then prescribed, and subsequently small doses of strychnine were added. On October 27th a probe was passed into the opening at the ischiatic region to the depth of three inches toward a point one inch above the crest of the ilium. There was still free discharge of pus, but the patient felt much better than he did a month previously. On October 29th tincture of iodine was injected into the wound, subsequent to which he complained of severe pain along the track of the fistulous opening, accompanied by spasmodic jerking of the wounded extremity. On November 1st a small piece of woollen cloth came out of the opening, which was followed by another, one and one-half inches square, the next day. By November 15th the wound had nearly healed, very little pus was escaping, and the patient was improving in strength but could not yet step upon the injured limb. On November 24th he had some fever, with dysuria, when sweet spirits of nitre was ordered in addition to the quinine. About December 1st the patient was able to step a little and was improving finely. During the next month no change occurred in the condition of the patient, who still complained of pain in the affected side from the orifice through to the crest of the ilium, and also in the inguinal region; pus still escaping, and occasionally a shred of clothing. By March 18, 1864, a probe could still be passed in the direction of the crest of the ilium. On June 6, 1864, the patient was discharged from service for disability, being barely able to walk with the aid of a cane, and his wound not having healed." The ultimate result of the case was communicated by Dr. Bailey several years later: "In November, 1865, I returned to my former home in Joliet, Illinois, where I was called upon to examine the patient, who had returned there after receiving his discharge. The fistulous opening of his wound, which for a long time had been an exit for pus, had become gangrenous during the previous month, and about November 10th inflammation began to extend to the peritoneum, involving the bladder and causing characteristic symptoms of peritoneal inflammation through the lower part of the abdomen. Extensive venous hæmorrhage occurred about twenty-four hours before death. There was no *post-mortem* examination held." The records of the Pension Office show that death took place on November 20, 1865.

In the next two cases death was ascribed to the sudden entrance of air into the veins:

CASE 1193.—Corporal A. M. Delano, Co. E, 1st Maine Heavy Artillery, aged 21 years, was wounded at Spottsylvania, May 12, 1864, by a minié ball, which entered just back of the left ear, fracturing the mastoid process of the left temporal bone, passed downward and forward and lodged just anterior to the artery at the angle of the lower jaw. On May 22d he was admitted into Emory Hospital, Washington, where, on the same day, the missile and a fragment of the cranium were removed. On May 25th hæmorrhage to the extent of twenty ounces occurred from the internal jugular vein. He died suddenly on May 25, 1864. Air was supposed to have passed into the vein. The autopsy revealed the jugular vein to be in process of ulceration two inches of its length, with its tissues severed from before backward, except a few fibres on its posterior surface. Surgeon N. R. Moseley, U. S. V., reports the case.

CASE 1194.—Private B. F. Brown, Co. C, 22d Massachusetts, aged 23 years, was admitted into Emory Hospital, Washington, May 13, 1864, with gunshot wounds of the thigh, leg, and neck, received at the battle of the Wilderness, May 7,

1864. The thigh had been amputated on the field on May 7th, in the lower third, by lateral flaps. A ball had entered the neck below the angle of the jaw, passed through the larynx, and lodged near where the carotid crosses the omo-hyoid muscles. On May 16th the ball was extracted from its position against the carotid by an incision one and a half inches long, one inch below the mastoid process of the temporal bone, by Acting Assistant Surgeon W. H. Ensign, U. S. A. At this date the thigh was healing kindly by first intention. The wound of the neck had an extraordinary appearance. The patient's constitution was slender but not much impaired. Some trouble in swallowing and breathing; cheerful, sleeps well, shows little signs of distress; pulse 90, bowels regular. No medicine given; but good liquid diet with local water dressings. Food has to be administered with a stomach pump. On May 17th hæmorrhage to the amount of one quart occurred from the internal jugular vein. Air was supposed to have passed through the vein into the heart. A *post-mortem* examination showed the cause of hæmorrhage to be ulceration of the anterior surface of the internal jugular vein. The case is reported by Surgeon N. R. Moseley, U. S. V.

In a third instance (Case of E. C. Melley, page 555, *First Surgical Volume*) the subclavian vein was accidentally cut while searching for the axillary artery. The entrance of air caused syncope, and death ensued in less than ten minutes.

In the accompanying chromo-lithograph (PLATE LXXIX, FIG. I) the appearance of the femoral vein removed from a stump twelve hours after death from pyæmia (Case of Sailor, No. 469, page 289, *ante*) is faithfully represented. The end of the vein, well sealed up in the stump, was empty, and collapsed from the end up to the valve of the first anastomosing branch, a distance of about six inches. The vein in this situation was about as large as the artery, the walls being much thickened and about the thickness of those of the artery; the lining membrane looked velvety, wrinkled, and dirty-gray in color; there was no pus in the vein. From the valve above mentioned up to the mouth of the vena profunda, a distance of about two and a half inches, the femoral vein was filled to distension with fetid broken-down liquefied blood, its lining membrane dirty-gray colored in this situation, and its walls somewhat thicker than natural; no pus was found in this locality by the microscope. At the mouth of the vena profunda the femoral vein was plugged up with yellowish-white fibrine; the vena profunda and many of its branches were filled and knotted with recent coagulum; the femoral vein was also filled with recent coagulum above the mouth of the profunda to a distance of about two and a half inches; the lining membrane of the profunda and of the part of the femoral vein last mentioned were stained dark red, and the walls of the vessels somewhat thickened in the same locality. A thin dark colored recent coagulum, not filling the calibre, extended the whole length of the external iliac vein.

TETANUS.

Considering the number of injuries, the proportion of cases of tetanus is not large; of the two hundred and forty-six thousand seven hundred and twelve (246,712) injuries by weapons of war, five hundred and five (0.20 per cent., or a little over two in a thousand) were followed by tetanus. In the cases in which this complication was observed the seat of the injury was: in the head, face, and neck in twenty-one instances, in the trunk in fifty-five, in the upper extremities in one hundred and thirty-seven, in the lower extremities in two hundred and ninety-two instances. The preponderating frequency of tetanus in the lower extremities, observed by Beck[1] and others, was very marked, over one-half of all the cases having occurred after injuries in this portion of the human structure, due undoubtedly to the massive layers of muscles and soft tissue, which prevent the surgeon frequently from clearing the track of the wound of foreign bodies and other obnoxious influences. Of the two hundred and ninety-two cases of tetanus in the lower extremities, the injuries were in the hip in two instances, in the thigh in ninety-nine, in the knee in seventeen, in the leg in ninety-five, in the ankle in twenty-two, and in the foot in fifty-seven instances; of the one hundred and thirty-seven instances in the upper extremities the injuries were in the hand

[1] BECK (B.). *Chirurgie der Schussverletzungen*, Freiburg, i. Br., 1872, p. 331.

Fig. 1

Fig. 2

Ed Stauch pinxt

Sinclair & Son Chromo-lith

PLATE LXXIX

FIG 1 THE LEFT FEMORAL VEIN AFTER DEATH FROM PYAEMIA

Case of Pt Wm Sailor, 119 Penna (Case 469 p 289)

FIG 2 GANGRENE OF FOOT AFTER SHOT WOUND OF LEG, UPPER THIRD

Case of Pt Wm Steel, 70 New York

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in thirty-seven, in the arm in thirty-four, in the shoulder in thirty-one, in the forearm in twenty-four, in the elbow in seven, and in the wrist in four instances. The belief that shot wounds of the foot and hand are particularly apt to cause tetanus is not confirmed by the cases recorded during the war. In the lower extremity, especially, this complication is found most frequently in injuries of the thigh and the leg. In one hundred and thirty-one instances tetanus followed closely upon operations in the extremities, viz, in one hundred and sixteen cases after amputations and in fifteen cases after excisions. The rarity of tetanus as a complication of chest wounds has been noted on page 635 of the *First Surgical Volume*, and it may here be added that in all but one of the seventeen cases there referred to the complication was due to simultaneous injuries of the scapula, shoulder joint, or arm.

Of the five hundred and five cases, four hundred and fifty-one, or 89.3 per cent., ended in death, as follows:

TABLE CLII.

Summary of Five Hundred and Five Cases of Tetanus, indicating Seat of Injury and Result.

SEAT OF INJURY.	TOTAL CASES.	RECOVERIES.	DEATHS.	RATIO OF MORTALITY.
Head, Face, Neck	21	1	20	95.2
Trunk	55	5	50	90.9
Upper Extremity	137	18	119	86.8
Lower Extremity	292	30	262	89.7
Aggregates	505	54	451	89.3

The recoveries after tetanus appear to have chiefly occurred in the cases of slighter or tetanoid forms, or in those in which the disease took a chronic course, and it is possible that the early application of powerful narcotics interrupted the progress of the malady in a few cases of acute form. From an examination of these cases it may be concluded that the later the occurrence of the disease after an injury, the better was the chance of recovery; and also, that the longer the duration of the affection after its inception, the greater was the chance of life. (See TABLE CLIV, on page 820.)

In the following table are indicated the days after the injury or after amputation on which tetanus made its first appearance:

TABLE CLIII.

Statement indicating the day after Injury or Amputation on which Tetanus appeared.

	Days after the Injury or Amputation on which Tetanus appeared.																									
Cases.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26 to 30	Above 30
367	27	8	9	9	19	30	23	37	24	27	25	20	17	12	6	7	11	5	4	4	3	1	3	3	3	7	23

In twenty-seven cases tetanus appeared on the first day; but twenty-one of these were cases of tetanus following amputations, so that in reality it only appeared in six cases within the first twenty-four hours after the original injury, and it may here be stated that, with the exception of a small number of cases, tetanus in cases of amputations invariably followed within a few days after the operation. Few cases occurred on the second, third, and fourth days after the injury; but from the fifth day, when sufficient time had elapsed for inflammatory action to establish itself, the number of cases rapidly increases until the

eighth, when it gradually diminishes again until the fourteenth, after which period tetanus appear irregularly, in one instance the malady not making its appearance until seven months after the injury.

As the causes of this fatal malady are cited: excessive heat, exposure to cold and damp air, draughts, neglect of thorough and early cleaning of the wound channel, pressure of missiles and bone splinters and of bandages on nerves, injuries to nerves while searching for foreign bodies or while performing ligations and excisions.

The duration of the disease is indicated in three hundred and fifty-eight cases, of which twenty-one ended in recovery and three hundred and thirty-seven in death, as follows:

TABLE CLIV.

Numerical Statement of Results of Three Hundred and Fifty-eight Cases of Tetanus in which the duration of the disease was reported.

RESULT.	Totals.	Days of Duration of Tetanus.																												
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	19	20	21	23	24	26	27	29	33	37	39	48	49
Recoveries	21	1	1	...	...	...	...	...	...	1	1	1	...	...	2	..	1	...	..	1	3	2	1	..	..	1	1	1	1	1	1
Deaths	337	69	83	49	31	22	19	14	7	5	6	8	3	2	3	4	..	4	1	3	1	...	...	1	2	..	..	...	...	...	...
	358	70	84	49	31	22	19	14	7	6	7	9	3	2	5	4	1	4	1	4	4	2	1	1	2	1	1	1	1	1	1

In two hundred and three, or more than one-half of the cases in which this point was ascertained, the duration of the malady did not exceed three days, and of these only two recovered; in the remaining nineteen cases of recovery the disease lasted from nine to forty-nine days, while the longest duration in the fatal cases was only twenty-seven days.

In several cases the removal of the missile or of foreign bodies, as pieces of bone, seem to have quieted the threatening symptoms; in one instance they were relieved by the loosening of a bandage pressing on the brachial plexus, and in another by the removal of a neuroma:

CASE 1195.—Private Oscar C. Romaine, Co. I, 145th New York, aged 20 years, was wounded in the right index finger October 25, 1862. The finger was amputated near the base of the first phalanx on October 30th. The part healed readily, but was very tender and often painful. In this condition he was admitted into Lincoln Hospital, Washington, January 18, 1863. Acting Assistant Surgeon B. P. Brown reported: "Nothing special transpired until March 20th, when, on attempting to swallow, he was seized with pain and stiffness in the neck and was unable to speak. Soon there was a heaving up of the chest and the head was rapidly thrown from side to side; the jaws closed, the angles of the mouth were drawn back, the eyebrows knit, and the countenance of a ghastly appearance. For a moment there would be partial remission, when the patient would complain that he could not bear to have any one touch him, as it caused the most severe suffering. Suddenly another paroxysm would come on more severe than the former, and then an interval, which, however, would be very short. This state of things continued from four o'clock P. M. till one o'clock A. M., when it was decided upon to open the wound and search for the cause. The part being laid open, a neuroma somewhat larger than a buckshot was found intimately incorporated with the hard cicatrix and tightly adherent to a spiculum of bone beneath. The tumor was removed, also the bony portion to which it had been attached. The parts were then brought together by adhesive straps, and the patient rested well, having but one more spasm about four o'clock A. M., and that very light. He is now quite recovered and enjoying better health than for some months past." He was discharged from service June 19, 1863. He is not a pensioner.

In the following case an incision down to the nerve temporarily relieved the symptoms of trismus, caused by the contraction of the cicatrix. As the symptoms reappeared with increased vehemence, a portion of the nerve was dissected out, and, no relief being afforded, amputation remained the only alternative:

CASE 1196.—Private John C. Marks, Co. D, 149th Pennsylvania, aged 28 years, was wounded at the Wilderness, May 10, 1864. On May 13th he was admitted into Stanton Hospital, Washington, whence Surgeon John A. Lidell, U. S. V., reported: "Flesh wounds of both arms by a musket ball, which, after passing through the left arm, entered the right near the inner edge of the biceps muscle, and passed through obliquely, outward and downward. At the end of about six weeks both wounds had healed; the cicatrix was firm. The medial nerve was evidently included in the cicatrix of the wound of the right arm, as he suffered intense pain in the course of it, especially in the fingers, which were stiff and extended. The nutrition of the arm

was also impaired. He suffered great nervous irritation. September 16th, the pain in the forearm and hand is very severe; he has also partial trismus; his jaws are stiff, but he can open them to the extent of about an inch. He has failed in strength and appetite and is emaciated." Dr. Lidell made an incision about two inches in length through the cicatrix down to the nerve, which was loosened and laid bare to the extent of the incision. The old cicatrix was also removed. The nerve did not appear to be injured in any way. The pain was apparently caused by compression of it—by the contraction of the cicatrix. The wound was left open to heal by granulation. He had been treated to date of operation by subcutaneous injections of morphia, which relieved the pain temporarily. September 17th, pain is slight, trismus lessened; passed a comfortable night. September 18th, pain continues, trismus subsided. The injections of morphia were continued at night, and a grain of sulphate of zinc ordered thrice daily. September 30th, treatment continued to date. The operation has only afforded partial relief. The pain continues quite severe. October 6th, the wound of the previous operation has entirely healed, but he cannot use the hand in consequence of the exalted sensibility of it; the pain in it is very severe, and he is suffering much from want of sleep. He has had several paroxysms of severe tetanic irritation, with some stiffness of the jaws, one of which occurred this morning. Assistant Surgeon George A. Mursick, U. S. V., made an incision through the cicatrix of the previous operation and dissected out the median and excutaneous nerves, which were found lying in close apposition, and resected three-fourths of an inch of each of them. They were both involved in the new cicatrix. October 19th, the operation of resection did not avail anything, and his condition is as bad as ever. The pain is now so severe as to deprive him of all rest, and the sensibility of the hand is so great that he will not allow anything to touch it. His general health is suffering severely. His countenance expresses great anxiety and his appetite has failed. Surgeon John A. Lidell, U. S. V., administered chloroform and amputated the right arm at the junction of the upper with the middle third by anteror posterior flaps. Marks recovered, and was discharged May 27, 1865, and pensioned.

Including the case just detailed, amputation was resorted to in twenty-nine instances after incipient tetanic symptoms; ten of the cases resulted favorably, and in several instances it is noted that the symptoms ceased after the operation. A few of these cases are here cited in detail:

CASE 1197.—Private D. E. Isham, Co. E, 154th New York, aged 19 years, was wounded in the left foot, at Chancellorsville, May 3, 1863, and was admitted to a field hospital of the Second Corps. Surgeon C. S. Wood, 66th New York, made the following report: "The injury was caused by the explosion of a shell, which carried away most of the foot and shattered the cuneiform bone and the astragalus, leaving the foot hanging by the integument of the plantar surface. There was but little hæmorrhage, but the shock was excessive and tetanic symptoms were present; in other words the case admitted of no delay. If I remember right the patient had lain out all night. Not knowing the extent of the injury I performed Chopart's amputation, but discovering the cuneiform and astragalus bones to be so much injured I proceeded, while the patient was still under chloroform, to perform Syme's operation." The patient was subsequently transferred to hospital at Alexandria, and later to Washington, where he was discharged from service January 22, 1864, and pensioned.

CASE 1198.—Sergeant T. Lewis, Co. E, 5th Michigan, aged 26 years, was wounded in the right forearm, at Gettysburg, July 2, 1863, by a round ball, which entered on the ulmar side just above the styloid process, passed obliquely across, and came out on the radial side about two inches above the joint, comminuting both bones in its course. He was admitted to Broad and Cherry Streets Hospital, Philadelphia, July 13th, at which time his general health was not very good, the wound being inflamed and very painful. Several fragments of bone were removed, flaxseed poultice was applied, and the forearm was placed in Bond's splint. Under a treatment of tonics, with opium at night, the patient slowly improved until August 25th, when he was suddenly seized with a chill followed by threatening tetanus. In consultation the next day it was decided to amputate the forearm as a means of saving life. The operation was performed by Teal's method, at the middle third, by Acting Assistant Surgeon A. Hewson, while the patient was under the influence of ether. He reacted readily. The stump was dressed with solution of lead and laudanum, being slightly elevated on a pillow. The wound granulated rapidly, and by September 20th cicatrization was almost complete, leaving a good stump without adhesion of flaps to the bones. A slight exfoliation from the end of the radius occurred during the progress of the case. The carpus and amputated portions of the bones of the forearm were forwarded to the Museum, with the history of the case, by Acting Assistant Surgeon W. F. Keating, and constitute specimen 2794 of the *Surgical Section*. The patient was subsequently transferred to Mower Hospital, where he was discharged from service April 20, 1864, and pensioned.

CASE 1199.—Corporal P. Nelson, Co. K, 139th Pennsylvania, aged 19 years, was wounded at the Wilderness, May 5, 1864, by a musket ball, which shattered the radius and ulna of the right forearm for two inches at the junction of the middle and lower thirds, also wounding the ulnar nerve. One week after receiving the injury the man entered Finley Hospital, Washington, where he did well until June 9th, when the arm became much swollen and symptoms of tetanus ensued, including stiffening of the jaws, great pain and restlessness, and irritable pulse. On June 11th circular amputation of the arm at the middle third was performed under chloroform by Acting Assistant Surgeon D. P. Wolhaupter. All symptoms of tetanus disappeared after the operation and the patient rapidly recovered. He was ultimately discharged from service July 27, 1865, and pensioned. The two lower thirds of the bones of the fractured forearm were contributed, with the history of the case, to the Museum by Surgeon G. L. Pancoast, U. S. V., and constitute specimen 2586 of the *Surgical Section*.

CASE 1200.—Sergeant A. Smith, Co. G, 66th New York, aged 47 years, was wounded at Fredericksburg, December 11, 1862, by a shell which carried away a large portion of the right foot. Partial amputation of the foot was performed in the field by Surgeon C. S. Wood, 63th New York. The peculiarities in the case were that symptoms of tetanus were quite marked, with great exhaustion, and that relief was afforded temporarily by chloroform, and permanently by the amputation. The patient continued to do well afterwards. He was discharged from service May 1, 1863, and pensioned. The history of the case was reported by the operator.

CASE 1201.—Captain F. Schaefer, Co. I, 73d Pennsylvania, aged 26 years, was wounded at Mission Ridge, November 25, 1863, by a musket ball, which fractured the left foot and lodged. The missile was extracted the fifth day after the injury, which was followed by extensive inflammation. On December 9th symptoms of tetanus ensued, which were relieved by active purgatives, calomel, etc. Three days later the symptoms returned, and on December 13th tetanus supervened in its usual form. On December 18th the leg was amputated at the middle third, after which the tetanus subsided and the patient made a rapid and good recovery. Surgeon B. L. Hovey, 136th New York, who performed the operation, reported: "I believe, with other surgeons, that amputation cured this man of tetanus." Captain Schaefer resigned the service July 5, 1864, and subsequently became a pensioner.

CASE 1202.—Sergeant J. Henderson, Co. A, 125th New York, aged 29 years, was wounded in the right knee, at Spottsylvania, May 10, 1864, by a musket ball, which shattered the head of the fibula and the posterior surface of the tibia, lodging between the gastrocnemius and soleus muscles. He was admitted to Finley Hospital, Washington, two weeks after the injury, the wound appearing healthy and his general condition being good. A day or two afterwards the patient complained of soreness in the throat, and on May 29th marked symptoms of tetanus, such as rigidity of the muscles of the jaw and difficulty of mastication and deglutition, existed. On May 30th circular amputation at the lower third of the thigh was performed by Acting Assistant Surgeon F. G. H. Bradford, immediate relief seeming to be afforded by the operation. The following day the rigidity of the muscles had partly disappeared and improvement continued until the patient was entirely relieved. Further progress in every respect continued favorable and the stump healed. The probable cause of the appearance of tetanus was owing to a slight laceration of the external popliteal nerve, produced by the ball in its passage through the limb. On August 1, 1865, the patient was discharged from service and pensioned, having been previously fitted with a "Jewett" artificial limb. The upper portion of the bones of the amputated leg, showing the seat and extent of the injury, were contributed to the Museum, with the history of the case, by the operator.

CASE 1203.—Corporal H. Kampp, Co. A, 113th Illinois, aged 20 years, was wounded in the right forearm, before Vicksburg, May 19, 1863. He was conveyed to hospital at Memphis, and subsequently to St. Louis, where he entered Lawson Hospital one month after the date of the injury. Surgeon C. T. Alexander, U. S. A., in charge of the latter, made the following report: "The injury consisted of a compound fracture of the radius and ulna near the wrist, and was produced by a conical ball. Both bones were necrosed, and the wound was in a very bad condition at the time of the patient's admission. Numerous pieces of bone were impacted into the surrounding fleshy tissue, and pus of a fetid and unhealthy character was flowing from both wounds very abundantly. According to the patient's statement he was first taken with trismus about a week before his admission here, while he was in hospital at Memphis, though it did not appear that he had been exposed to anything unusual. As he was certainly getting worse every day it was decided to amputate as a last resort. Accordingly, on June 28th, the operation was performed about four inches below the elbow joint, the patient seeming to stand the shock very well and to gradually improve from that time. The treatment at first had consisted of a narrow blister applied along the whole length of the spine on each side, brandy and chloroform being administered every two hours. These last two remedies not appearing to do any good, one-half drachm of tincture of cannabis indica was tried every two hours, under which the patient slowly improved. An enema of beef tea and quinine had also been given three times a day from the first." The patient entirely recovered, and was discharged from service September 1, 1863, and pensioned.

The treatment of this affection was empirical to the last degree, and the formidable list of remedial agents employed in combating it presents a curious study of the diverse pathological and therapeutical views entertained by the medical profession on this subject. In the cases of recovery it is impossible to say how far any individual or class of therapeutical remedies was of avail. Chloroform, ether, opiates, stimulants, and external irritants, embrocations and fomentations, were mainly relied upon. In some instances the symptoms disappeared so speedily and permanently as to raise the question whether the same result might not have occurred spontaneously. In the fully developed cases all remedial measures failed and the cases ran on unchecked to a fatal termination. The following are the remedies which are recorded to have been used by the medical officers: Tincture of valerian, bromide of potassium, extract of cannabis indica, yellow jasmine, woorara, extract of nux vomica, tincture of aconite, assafœtida, belladonna, chlorodyn, conium, strychnia, solution of permanganate of potassa, hyoscyamus, chlorate of potassa, tartrate of antimony, Hoffmann's anodyne, chloric ether, chloroform, camphor, quinine, hyposulphites of soda and lime, nitric acid, mercurialization, castor oil, turpentine, and croton oil; stimulants and opiates were given with all of these preparations. Of external applications the following were used: Blisters, emollient poultices, warm fomentations, turpentine, ice, olive oil, creasote, warm baths, electric currents, chloroform liniment, powdered lime and opium poultice, vapor baths, powdered morphia locally, snow and salt bagged and applied to seat of injury, hyoscyamus ointment, and saturated solution of chlorate of potassa in wound.

Injections were given of sulphate of atropia and sulphate of morphia hypodermically, opiates, tobacco, turpentine, castor oil, soap and water, milk of assafœtida, vinegar, and brandy.

In the Army Medical Museum is preserved a specimen (No. 3538, *Surgical Section*) showing a shot laceration of the crural nerve in a patient who survived the injury twenty-five days and died of tetanus. The specimen and its history were contributed by Dr. William Thomson. On page 339 of the *Second Surgical Volume* a drawing illustrating its pathological histology was promised, but a careful microscopical examination of the specimen failed to indicate any abnormal conditions:

CASE 1204.—Private Alexander Fletcher, Co. F, 31st Maine, aged 21 years, was wounded at the Wilderness May 6, 1864. He was removed to the field hospital of the 2d division, Ninth Army Corps, and was transferred on May 12th to Douglas Hospital, Washington. Assistant Surgeon W. Thomson, U. S. A., reported: "Gunshot flesh wounds of left arm, and side over lower ribs. On May 20th tetanus in the form both of trismus and opisthotonos appeared. Equal quantities of laudanum and tincture of valerian were given in teaspoonful doses every two hours, which alleviated the symptoms somewhat. Death resulted on May 31, 1864, from tetanus. At the autopsy it was found that the ball had entered over the lower ribs and passed down between the muscles of the abdomen over Poupart's ligament and under the femoral vessels, wounded the crural nerve, and lodged near the middle third of the femur." The specimen of the lacerated crural nerve was contributed to the Army Medical Museum by Dr. Thomson, and is numbered 3538 of the *Surgical Section*.

In crowded field and general hospitals neither time nor opportunity was found for microscopical examination of minute structural changes, and the *post-mortem* examinations are therefore incomplete and give only negative results; no anatomical lesions of the medulla oblongata, the cerebellum, or the spinal cord in such cases were noted.

Sixteen, or 3.1 per cent., of the five hundred and five instances of tetanus were found among the colored troops, who furnished 2.7 per cent. of the total number of shot injuries.

GANGRENE.

"The necessity of the careful definition of such terms as mortification, gangrene, sphacelus, dry gangrene, moist gangrene, hospital gangrene, and gangrenous phagedæna," urged by Joseph Jones in his article on hospital gangrene,[1] has become apparent from the examination of the reports of cases of gangrene recorded during the war. According to the conception or predilection of the surgeon, these terms, in many instances, seem to have been used indiscriminately, and it has been found utterly impossible to determine with accuracy the cases of traumatic gangrene, hospital gangrene, dry gangrene, etc. For instance, there were reported, as will be shown hereafter, eight hundred and forty-six (846) cases of gangrene during the years 1862 and 1863, of which, on the hospital records, only one hundred (100) were designated as hospital gangrene, and yet Surgeon M. Goldsmith, U. S. V., in his special report on the subject, in the spring of 1863, gives a tabular statement of three hundred and forty-three (343) cases of hospital gangrene observed in the hospitals of Louisville alone during only parts of the years 1862 and 1863. An attempt to separate the various forms of this disease according to the descriptions of symptoms and treatment noted in each case failed, and it has therefore been deemed advisable to include in one tabular statement all cases of gangrene observed after shot wounds and to illustrate the various forms by examples or special reports.

The total number of cases of gangrene reported was two thousand six hundred and forty-two (2,642). Of these, sixty (60) were observed after wounds of the head, two hundred and sixteen (216) after wounds of the trunk, and two thousand three hundred and sixty-six (2,366) after wounds of the extremities, as follows:

[1] JONES (JOSEPH), *Investigations upon the Nature, Causes, and Treatment of Hospital Gangrene as it prevailed in the Confederate Armies*, 1861–1865, in *United States Sanitary Commission Memoirs*, New York, 1871, Second Surgical Volume, p. 174.

TABLE CLV.

Summary of Two Thousand Six Hundred and Forty-two Cases of Gangrene, indicating the Result and Relative Frequency.

SEAT OF INJURY.	RECOVERY.	FATAL.	UNDETERMINED.	TOTAL.	PER CENT. OF FATALITY.	PER CENT. OF RELATIVE FREQUENCY.
Flesh Wounds of Head, Face, and Neck	5	7	.....	12	58.3	... 60=2.2%
Fractures and Penetrating Wounds of Head, Face, and Neck	32	16	.....	48	33.3	
Flesh Wounds of Trunk	36	32	7	75	47.0	...216=8.2%
Fractures and Penetrating Wounds of Trunk	44	97	.....	141	68.7	
Flesh Wounds of the Upper Extremities	47	50	12	109	51.5	2,366=89.6%
Fractures of the Upper Extremities	476	245	14	735	33.9	
Flesh Wounds of the Lower Extremities	125	127	92	344	50.3	
Fractures of the Lower Extremities	596	568	14	1,178	48.7	
Aggregates	1,361	1,142	139	2,642	45.6	

Thus it will appear that 89.6 per cent. of all the cases of gangrene were observed in wounds of the extremities, 8.2 per cent. in wounds of the trunk, and only 2.2 per cent. in wounds of the head, face, and neck, although the proportion of injuries of the three regions, as shown in TABLE CXIX, page 691, *ante*, is 70.86 per cent. for the extremities, 18.37 per cent. for the trunk, and 10.77 per cent. for the head, face, and neck. Nearly two-thirds—one thousand five hundred and twenty-two (1,522)—of two thousand three hundred and sixty-six (2,366) cases of gangrene in the extremities occurred in the lower extremities, while, as has been shown before, the total number of injuries of the upper extremities slightly exceeded that of the lower extremities.

The results in one hundred and thirty-nine (139) of the two thousand six hundred and forty-two (2,642) cases of gangrene were not ascertained; one thousand three hundred and sixty-one (1,361) terminated in recovery, and one thousand one hundred and forty-two (1,142) in death, a mortality rate of 45.6 per cent.; but in a large number of these cases death was ascribed either to the injury itself or to other complications—such as pyæmia in one hundred and fifty-two (152), hæmorrhage in forty-seven (47), exhaustion in one hundred and eight (108), tetanus in eleven (11), erysipelas in two (2), and pneumonia, typhoid fever, diarrhœa, and other diseases in seventy-seven (77) instances. In three hundred and thirty-nine (339) cases the immediate cause of death was not stated. In four hundred and six (406) of the one thousand one hundred and forty-two (1,142) deaths the fatal issue was directly ascribed to gangrene. A peculiar feature in the above table is the fact that with the exception of the penetrating wounds of the trunk the percentage of fatality of the cases of gangrene after flesh wounds is larger than that after fractures. The death rate of the cases of flesh wounds of the head, face, and neck complicated by gangrene is 58.3 per cent., while that of the fractures is only 33.3 per cent.; likewise the death rate of the flesh wounds of the upper extremities attacked with gangrene is 51.5 per cent., while that of the fractures complicated with gangrene is only 33.9 per cent. In the lower extremities the mortality after gangrenous flesh wounds is 50.3, while that of the fractures is 48.7 per cent. In wounds of the trunk alone the mortality of the fractures and penetrations exceeds that of the flesh wounds, the former being 68.7, the latter 47.0 per cent.

Of the two thousand three hundred and sixty-six (2,366) instances of gangrene in the extremities, one hundred and eighty-five (185) were cases of gangrene following excisions, and in forty-six (46) of these cases amputation of the limb had to be resorted to. The great liability of excisions to this complication will be referred to hereafter.

In eight hundred and ninety-eight (898) instances gangrene was noted on the face of the stump. In a few of these cases the complication was caused by strangulation of the stump by tourniquet. In the following instance the gangrenous condition of the limb was ascribed to the tight application of bandages:

CASE 1205.—Captain J. Phinney, Co. K, 86th New York, aged 28 years, received a gunshot fracture of the left forearm, lower third, at Spottsylvania, May 10, 1864. When he was admitted to Seminary Hospital, Georgetown, four days afterwards, he was in a rapidly sinking condition, and the injured limb was gangrenous from the elbow down, owing to the circulation having been stopped by applying bandages too tight on the field. On May 15th the arm was amputated above the elbow joint by Surgeon H. W. Ducachet, U. S. V., who performed the operation by skin flaps and circular section of muscles. Chloroform constituted the anæsthetic. The patient began to improve within forty-eight hours after the amputation, and, with the exception of the formation of two abscesses in the stump, his improvement continued slowly afterwards. About June 30th he was able to walk about, and three weeks later he left the hospital on leave of absence. The history of the case was reported by the operator. The Adjutant General, U. S. A., reports that Captain Phinney died August 10, 1864.

But the large majority of the cases were instances of hospital gangrene caused by the crowded condition of the hospitals and the bringing together of many cases of extensive fractures and large operation wounds.

How far the frequency of the occurrence of gangrene was influenced by the season of the year cannot be ascertained from the nature of the reports; it can only be stated that in nine hundred and eighty-three (983) of the two thousand six hundred and forty-two (2,642) cases the month was not indicated; that eighty-seven (87) cases were recorded as having occurred in January, forty-eight (48) in February, forty-three (43) in March, sixty-four (64) in April, one hundred and seventy-five (175) in May, three hundred and one (301) in June, two hundred and ninety-four (294) in July, two hundred and twenty-five (225) in August, one hundred and ten (110) in September, ninety-eight (98) in October, eighty-nine (89) in November, and one hundred and twenty-five (125) in December; the highest number having been observed in June, July, August, May, and December; the lowest in March and February.

The frequency of gangrene according to the different years of the war is indicated in the following table:

TABLE CLVI.

Indicating the Years in which the Gangrene occurred.

SEAT OF INJURY.	TOTAL.	1861.	1862.	1863.	1864.	1865.	NOT STATED.
Flesh Wounds of Head, Face, and Neck	12	.....	.....	3	9	.....	.....
Fractures and Penetrating Wounds of Head, Face, and Neck	48	.....	3	13	31	.....	1
Flesh Wounds of the Trunk	75	.....	5	23	34	8	5
Fractures and Penetrating Wounds of the Trunk	141	.....	13	42	78	6	2
Flesh Wounds of the Upper Extremities	109	.....	3	27	69	6	4
Fractures of the Upper Extremities	735	2	37	144	510	32	10
Flesh Wounds of the Lower Extremities	344	.....	35	117	163	16	13
Fractures of the Lower Extremities	1,178	2	127	254	717	67	11
Aggregates	2,642	4	223	623	1,611	135	46

Only four cases of gangrene were recorded for the first eight months of the war in 1861; but it must be remembered that the medical reports for this period are very incomplete. In the following year, 1862, the number of cases of gangrene increased to two hundred and twenty-three. A few sporadic cases occurred in the hospital at Fort Hamilton, New York,

in the early part of September, among men wounded in McClellan's Peninsular Campaign in June and July, 1862. Of the three cases reported at that hospital by Surgeon B. Randall, U. S. A., one, at least, was that of a prisoner who had been carried to Richmond and had then been paroled. It was after the battles of South Mountain and Antietam, in September, 1862, that serious outbreaks of hospital gangrene occurred at the hospitals at Frederick and at West Philadelphia. The cases were carefully observed by Acting Assistant Surgeon W. W. Keen, whose report is here given:

"After the battles of South Mountain and Antietam, September 14th and 17th, 1862, an immense number of patients was accumulated in the hospitals at Frederick, Maryland. The old general hospital (No. 1), which had contained six hundred beds, was so crowded with patients that one thousand were of necessity placed in the wards, and one thousand eight hundred men were fed at its tables and slept somewhere. The hospital consisted of five old barracks of inferior character, a fine new one (built very much after the style of our wards at this place [West Philadelphia], with ventilation at the ridge-pole, either continuous or interrupted), together with a large, substantial old stone building of Revolutionary times, better ventilated by its fire-places than by its windows. To these were soon added two large new barracks, finely ventilated. Each of these buildings was entirely detached from the others, and would accommodate some eighty patients, with about six hundred and forty cubic feet of space to each in the old barracks and one thousand two hundred and fifty cubic feet in the new. Besides these, about thirty hospital tents, with eight beds in each, were pitched at various points. Here the allowance of air was only about one hundred and seventy-five cubic feet. The hospital was situated on a hill on the outskirts of the town and in a mountainous region. This, with the distribution of the buildings, procured the amplest circulation of pure fresh air.

"About the middle of October the number of cases in Barrack E, of which I had charge, was diminished from one hundred to seventy-eight. Excepting four or five, they were all severe surgical cases, a number of them being amputations, resections, or compound fractures of the thigh, and the wounds were suppurating freely. Every means to insure cleanliness and pure air was taken. Each patient had his own sponge. Oakum was largely used as a dressing, and chlorinated soda freely used on the dressings and the floor.

"Preceding October 19, 1862, three or four days of cold rainy weather set in, which occasioned the closing of the doors and windows to keep both warm and dry. On the second or third day I noticed three cases of decided hospital gangrene, all in the lower extremity; about twelve or fifteen wounds also, which had been progressing finely, stopped cicatrizing and assumed an unhealthy appearance. They were red and punctated; in some small new vessels were seen; they bled freely on removing the dressings; the parts already cicatrized became bluish red, and, in the worst looking cases, an areola of an inflammatory nature, red color, and with a hard base, was observed. The cases of decided gangrene were removed to a tent, with six beds and an allowance of space of two hundred and thirty-two cubic feet, where, under treatment, they rapidly recovered. Sixteen beds were removed and the barrack still more carefully ventilated. The weather became fine, and in two days the unhealthy sores recovered their original healthy appearance, and no more cases occurred. Two other outbreaks of the disease occurred in this barrack, one on November 8th and another early in December, running precisely a similar course. During the last an attempt was made to treat the cases in the ward without isolation, but it only ended in an utter failure, and they were again removed. Four days before it made its appearance in Barrack E the disease appeared in Barrack B, where its history was an exact counterpart of the one already related. From these two barracks, the most overcrowded and, by the way, the only ones in which erysipelas had appeared, the disease spread to all the others, in most cases, apparently, by contagion, in some clearly by infection, through the careless use of sponges, etc.; and yet, strange as it may seem, but one case appeared among the patients in the tents. They were, it is true, far lighter cases of wounds; but they were, apparently, much more exposed by the small allowance of space and by their greater proximity to the gangrene tents. When I left Frederick, December 11th, about fifty cases in all had occurred, of which some eight or ten were still under treatment and progressing favorably. Two cases had proved fatal, but by reason, it seemed, of other organic complications.

"On December 23, 1862, fifty patients were admitted to Ward No. 1, and one hundred each to Wards Nos. 2 and 3, U. S. A. General Hospital, West Philadelphia. Of these, twenty-five in Ward No. 1, eighty in Ward No. 2, and fifteen in Ward No. 3, one hundred and twenty in all, were gunshot wounds. There were at the same time two thousand three hundred and eighty-four patients in the hospital, of whom rather more than two hundred were wounded. The allowance of space in these three wards, which are contiguous, is nearly twelve hundred cubic feet to each man. But few of these new wounds were discharging freely, and scarcely any were more than flesh wounds of no great severity. 'At the time and after the admission of these patients, who were the first occupants of the wards,' says Dr. Lewis in his report for Ward 1 for January, 1863, kindly placed at my disposal by Mr. Knorr, 'the weather had been for some days unusually cold and blustering, and this portion of the hospital was so arranged as to afford no protection against draughts of air proceeding directly from the outside through open doors communicating with the passage-way leading to the ward.'

"One week after their admission, *i. e.*, December 30, 1862, I observed two cases of decided hospital gangrene, both of the thigh, in my own ward, and at the same time eight or ten of the other wounds began to look unhealthy. The cases of decided gangrene were immediately vigorously treated by nitric acid, but were not removed from the ward, and the fullest precautionary measures were taken to prevent the further progress of the disease. Since the patients could not be removed, I resolved to put the ward in as favorable a condition as possible. I ordered every other window on both sides to be lowered both day and night, and put a reliable patient in charge of the matter; I obtained a sponge for each man, directed the nurses to dress the gangrenous and unhealthy sores last of all, and to wash their hands carefully in dilute chlorinated soda afterward; used no dressing or bandage a second time, and had the soda freely used on the floor near those suffering from the disease. On the 31st no new cases appeared. On January 1st four more were observed, and from the 2d to the 18th nine more. In Ward 3 no cases whatever have appeared; in Ward 1 three cases appeared respectively on the 4th, 5th, and 8th of January. In Ward L, far removed from Wards 1, 2, and 3, one case broke out on January 17th. These, as far as I know, are all the cases that have occurred. They number nineteen in all: ten in the lower extremities, five in the upper, and four in the trunk.

"A marked contrast is thus seen to exist between the disease as seen at Frederick and at West Philadelphia. At Frederick it was notably contagious and spread widely and to every barrack; in West Philadelphia, although probably contagious, it did not invade many wounds in the same wards, nor did it spread widely to adjoining wards. There the patients were isolated, here they were retained in the wards; there all attempts to treat them successfully in the barracks failed, here it has been perfectly successful; there nitric acid was used as an escharotic, here both that and the acid nitrate of mercury. It should also be noted that both attacks followed a few days of bleak, cold, and rainy weather; that both occurred where a number of wounds were collected together; that in individual symptoms both were precisely alike, and that they improved immediately on the setting in of fine weather and under appropriate treatment; that simultaneously with the outbreak of the disease a number of wounds assumed an unhealthy appearance, which quickly disappeared under proper hygienic treatment and good weather.

"The disease, as I have observed it, is ushered in by from one to three days of unhealthy action such as already described, accompanied in some cases with marked fever, coated tongue, and prostration, but in by far the majority of cases with simply sleeplessness and general malaise. The patient complains of sharp, burning, pricking or stinging pain in the wound, sometimes so severe as to make him cry out, the suffering being intense; at others feeling rather as if the part had been 'asleep.' If the surgeon now examine the wound he will find a layer of ash-colored matter, which, as Guthrie describes it, 'covers the face of the ulcer and adhers so firmly as not to be readily removed; or, if separated, shows that it is a substance found upon the surface and constituting a part of the granulations themselves;' the edges rugged, everted, or, more commonly, undermined, or violet or livid in color; a marked areola, almost erysipelatous, surrounding the wound, an indurated base feeling very like that of a hard chancre; the discharge thin, watery, bloody, ash-colored or darker, and the wound considerably enlarged, and enlarging with aggravated symptoms, day by day, regardless of Nature's best efforts; and benevolent Art now interferes to relieve the oft-time wretched sufferer. The smarting pain and the extension of the wound (usually conjointly, but

sometimes separately) I have found to be the most distinctive characteristics of the disease. The enlargement is usually confined to the skin and superficial fascia; occasionally, however, it extends to the intermuscular cellular tissues, and, in rare instances, to the muscles themselves; arteries, large nerves, and bones resist its destructive tendency with great perseverance. The following case will illustrate the disease:

"CASE 1206.—Corporal H. H. Kuhn, Co. A, 10th Pennsylvania Reserves, aged 23, was admitted to Ward No. 2, West Philadelphia Hospital, December 23, 1862. He had been wounded ten days before at Fredericksburg, by a ball which had passed through the right thigh postero-anteriorly and inflicted a superficial wound, the openings being about two and a half inches apart. The wounds looked well. Ordered cold-water dressings. December 30th: The wound has done well up to this date. Now, however, it is surrounded by an inflammatory areola, but without any hard base, is preternaturally hot, is not enlarged, and no stinging pain is felt. Sleeplessness is the only constitutional symptom observed; ordered flaxseed poultice and morphia sulphate, grain ¼. January 1, 1863: Wound looks worse; edges bluish and livid, undermined and thickened; the base surrounding the wound hard, the areola marked both in color and size; the pain sticking or pricking, and quite severe; the surface ashy gray and punctated; it bleeds freely on removing the dressings; the two openings are coalescing, and the intervening sound flesh is unhealthy and partially destroyed. I opened it thoroughly, cut away the intervening unhealthy flesh and applied strong nitric acid to the entire surface, the patient being under ether; ordered flaxseed and laudanum poultice covered with oiled silk, and morphia sulphate, grain ¼. January 5th: The heavy slough from the cicatrization has partly cleared off, but the surface is still looking unhealthy and the pain still exists. I discontinued the acid wash and again cauterized by the nitric acid, and ordered poultice as before. The sloughing surface being large, some six inches long, I ordered 20 drops tincture of iron three times a day; still no constitutional symptoms are seen. January 9th: The slough is all gone, and fine healthy granulations are found covered with thick yellow pus; ordered the acid wash to be reapplied. January 11th: Again slightly unhealthy; ordered acid wash continued, adding five drops of nitric acid to the ounce. He now did finely, and the acid wash was gradually diluted and then simple cerate substituted until January 23d. Two or three days of stormy weather having occurred, the wound again looks unhealthy. The cicatrix is invaded at one point and looks bluish, and the discharge is less in amount and rather unhealthy in character. There is, however, no pain nor ashy surface; no areola, and no extension other than that noticed. Ordered tin foil to be applied. January 25th: The wound is vastly improved, so that I ordered the foil discontinued. January 30th: Left on thirty days furlough, doing finely.

"The question has almost uniformly been raised by authors, whether the disease is constitutional or local. Without quoting particular authorities, suffice it to say that rather the larger number regard it as a local disease, 'sometimes,' in the language of Guthrie, 'preceded by and accompanied with constitutional symptoms.' But the concurrent constitutional symptoms are no proof of a similar character in the disease, for the removal of a benign tumor, an amputation, or a gunshot wound is followed by the same. No one as yet has ever seen the disease *originate* constitutionally, but *always* locally. Wounds may become gangrenous; but hospital gangrene never gives rise to ulcers. Even where the constitutional symptoms are present, as I have seen the disease, they have been very slight, and rarely exceeded anorexia, sleeplessness, and a slight irritative fever. Of the fifty cases in Frederick I have statistics of twenty-five. In these the constitutional symptoms preceded the disease in but five cases, accompanied it in four, leaving sixteen unaffected constitutionally. Of the nineteen cases here seen there were two in which they preceded and four in which they accompanied the disease, leaving thirteen with no constitutional disturbance. The following is a case in which the constitutional symptoms were first manifested and then the local:

"CASE 1207.—Private William P. Trump, Co. D, 8th Pennsylvania Reserves, miner, aged 22, was admitted to Ward No. 2, West Philadelphia Hospital, December 23, 1862, having been wounded on the 13th at Fredericksburg. The ball grazed slightly the right shoulder, and the wound did finely under cold-water dressings. January 2d: An active fever has set in, with loss of appetite, coated tongue, and costiveness; ordered three compound cathartic pills, and tartar emetic one-eighth of a grain three times a day. January 6th: The constitutional disturbance is about the same, but local trouble has manifested itself. The usual symptoms of hospital gangrene have become developed, the wound is enlarging, and the pain is so great as to deprive him of all rest and to cause him to disturb the whole ward with his outcries. I cauterized the wound freely with nitric acid and ordered a poultice with morphia sulph. gr. one-quarter h. s. The pain ceased from that moment; he slept well; in three days the slough separated. I applied the acid wash, and he soon recovered sufficiently to desert."

"The offensive odor I have observed but in four cases, two at Frederick and two here. In cases so severe as those observed by Macleod and others, in which death occurred in sixteen hours, it was, no doubt, one of the most marked and disgusting symptoms. The case in Ward L, bed 7, was so offensive that its odor could readily be observed in the corridor, and one of those in Ward 1 was no less so. The experience of Dr. Lewis in Ward 1, as detailed in his cases, gives the most marked efficiency to the permanganate of potash in ten grains to the ounce as a deodorant. It controlled the odor when charcoal and fomenting poultices of porter and corn meal seemed to have not the least effect. It deserves further trial.

"The circular form, also alluded to by other writers, is by no means so frequent in these lighter cases; nor have I yet seen a case of secondary hæmorrhage, although I have seen the anterior tibial and the femoral itself pulsating at the base of such gangrenous sores, and in one case at Frederick, of ligation of the external iliac, the disease being communicated by a sponge, attacked the wound; and yet the artery resisted both the disease and the remedy. Should such a misfortune occur, I should unhesitatingly ligate higher up, and with the greatest precaution against infection. I should, if disease attacked the new wound, apply the escharotic immediately. But it will not

always attack every sore, and this is a serious argument in favor of its local character. I have often seen it attack a wound of entrance or of exit, and leave the other free; I have seen it attack an abrasion over the head of the fibula and leave untouched a compound fracture of the same thigh; attack an ulcer on a leg, and pass by the granulating stump, three inches lower down. I have yet to learn of a single case occurring among patients in the field—a fact fully corroborated by other surgeons who have had greater opportunities in the field than myself, and which I can only explain by the reason that the patients are usually placed in houses, or on the field itself, where free ventilation is attained, and are speedily removed into hospitals.

"As to the treatment it has been pretty fully illustrated in the cases cited. As soon as the disease is recognized I have applied either nitric acid or the acid nitrate of mercury. The former, alone, was used at Frederick; but here I have used the acid nitrate of mercury in six cases, and with the most favorable results. I prefer it, now, to the nitric acid, since it causes less pain—indeed, often it saves time vastly by requiring no anæsthetic to be used; the pain continues for a shorter time, the slough appears to be more thoroughly destroyed and disintegrated, and it separates in from twelve to thirty-six hours sooner than that from the acid. I have not yet met with a case of ptyalism from its use. The relief obtained from the severe stinging pain is often almost instantaneous, and if the disease has been thoroughly checked it does not recur. Should I have any other cases, I should also desire to make trial of a forty-grain solution of corrosive sublimate to an ounce of glycerine. But whatever escharotic be used, I cannot insist too strongly upon the necessity of its thorough application. The disease, especially in the milder form noticed here, can be eradicated by this, and by this only. It must be unsparingly applied to every spot and surface involved. Stumps must be laid bare and apparently ruined; sinuses must be fully exposed, and the disease relentlessly pursued to its furthest refuge. The timid hand, according to De Quincey the opprobrium of our profession, will not do here. The work must be thorough and complete and the remedy applied everywhere—not only to the surfaces diseased, but also to those laid bare by the knife, and even somewhat to the sound parts beyond, or the disease will spread inevitably, and kindness well meant will be really unintentional cruelty. I generally used, as a means of application, a stick rather than a mop, since, if sharp pointed, it penetrates to places which will remain untouched if a mop is used. I have then usually applied a flaxseed poultice with one drachm to a half-ounce of laudanum till the slough has separated. Poultices of meal and yeast or porter are also good. Then, if any unhealthy spots were still seen, and especially if the stinging pain had not subsided, I again made use of the escharotic, followed by a poultice. As soon as a healthy surface is obtained I began with a stimulating lotion such as the 'acid wash' already alluded to, varying its strength to the necessities of the case. Under this they have usually made a rapid recovery. In five cases I have used tin-foil applied directly to the wound, surrounded with charpie, for purposes of cleanliness, and have found it a most excellent remedy where wounds have refused to respond to other stimulants.

"I have scarcely ever used the escharotic unless the two principal symptoms, viz, the peculiar pain and the enlargement of the wound, were both present, along with the unhealthy condition of the sore. On inspection I have often been tempted in several cases to apply the acid; but finding the one or the other absent I have refrained and applied vigorous stimulation, as, *e. g.*, the 'acid wash,' sometimes further fortified by some little nitric acid, and I have been gratified to find a successful result. Tin-foil itself will sometimes alone change their character vastly for the better.

"The constitutional treatment is, I take it, of far less importance than the local, just as the constitutional symptoms are less grave than the local. Frequently they will subside entirely after the vigorous local treatment advocated. The fever will abate, the patient will sleep well, the tongue clean, the bowels relax, and he will tell you the next morning that he has eaten an excellent breakfast and 'feels first rate.' If fever sets in, I treat it as usual in any irritative fever; if the appetite and strength fail, by tonics and stimulant's and good diet. The tincture of iron, quinine, milk punch, and beef tea are the most valuable auxiliaries in such cases.

"'Hospital gangrene, the typhus of wounds,' is, in its most marked form, a fearful and unwelcome guest in any hospital, most of all in a military hospital. It claims many victims in its fierce attacks, and often puts to naught all the resources of the most skilful surgeon. But in its milder forms, such as I have seen it, and such as I have attempted to describe, the means already indicated will, I feel confident, arrest its progress and baffle its worst endeavors."

The next appearance of hospital gangrene, more serious in its character than that observed at Frederick and West Philadelphia, was at Annapolis. It appears from the report of Surgeon J. H. Brinton, U. S. V., who had been sent there to "inquire into the origin of the affection and the means which had been adopted for its treatment and for checking its progress," that on January 11, 1863, one hundred and fifty-three (153) patients were brought to Annapolis from Richmond. Very many of these men were wounded, and all had been closely confined in the prisons and prison hospitals of that city. Of these one hundred and fifty-three men, four had hospital gangrene at the time of admission and thirty-one contracted the disease within a short time. On January 29th four hundred and twenty-one additional patients were admitted from the same place and under the same circumstances; of these, gangrene existed in fourteen at the time of their admission. By February 7th the number of affected patients amounted to sixty. All cases in which the process of destruction was advancing, or in which reparation and cicatrization had not fairly set in, were collected in special wards isolated from all other buildings, and special bedding, blankets, utensils, sponges, surgical dressings, and instruments were provided for them. In this manner the disease remained almost entirely confined to the paroled prisoners. All agreed that the origin of their sores must be referred to their confinement in the Libby Prison at Richmond and the adjacent hospitals. In the prison they were much crowded, and the majority were unprovided with beds or cots, sleeping on straw which was foul and affected with vermin. Their diet, although sufficient, was of poor quality. In the hospital they received better care and every medical attention possible under the circumstances. In both prison and hospital gangrene was prevalent; many cases were said to have died, and others were stated to be in such condition from their sores as to forbid removal. The paroled prisoners who had been taken on western battle-fields referred the development of their gangrenous ulcers to tedious and painful transportation from the West to Richmond. The cars used were closely boxed; the food on the road was deficient and miserable; many of them had been altogether deprived of food for two or three days.

The treatment adopted in the Annapolis Hospital seems to have been judicious and successful. It consisted chiefly in the limitation of the ulcerative process by the application of fuming nitric acid to the edges of the sore, to its surface, and especially to the healthy integument beyond the line of diseased action. In some cases nitrate of silver had been successfully applied. The cleansing means employed during the separation of the slough were chiefly Labarraque's solution, creasote and vinegar washes, yeast, cinchona, and charcoal poultices, etc. The patient's constitution at the same time had been supported by the internal administration of muriate tincture of iron and quinine, and by the free use of stimulants, malt liquor, beef tea, and a general nutritious diet.

A few weeks after the appearance of the disease at Annapolis, Assistant Surgeon J. J. Woodward, United States Army, was sent there for the purpose of examining into the microscopical appearances of hospital gangrene. His observations are embodied in the following report:

"Arriving at Annapolis I visited the patients affected with hospital gangrene on the morning of February 18, 1863. I found that the progress of the disease was not yet arrested, and that one or two new cases were occurring almost daily. No one had, however, suffered from it except returned prisoners from Richmond, and the affection was proving much less fatal than European experience would cause us to anticipate. The patients were isolated from the rest of the hospital, in separate buildings. The number of cases in which the characteristic appearances of the earlier

stages of the disease could be observed was only three or four, and about the same number presented vast sloughing excavations, which were still enlarging in spite of treatment. In all the other cases granulating surfaces of various sizes, and in various stages of the reparative process, indicated the former extent of the disease. As the description, history, and treatment of these cases has been made the subject of special observations which will be duly reported to the department by Surgeon J. H. Brinton, U. S. V., I shall limit myself as much as possible in this report to pathologico-histological considerations.

"In its destructive progress hospital gangrene, as observed by me in these cases, appears to follow at least two diverse modes of extension, which, however, are frequently combined in different portions of the same excavation.

"I. On the one hand the tissues immediately adjacent to the slough, which have been slightly reddened without being increased in thickness, become greenish-brown, or black; the slough steadily progressing in this manner into the sound tissues, from which it is not separated so long as it continues to extend by any pus-producing or ulcerative action or any true line of demarcation.

"II. On the other hand the tissues about to be invaded become not only reddened, but hard and swollen, elevating the edges considerably, and causing, therefore, the cavity to appear deeper than it really is. This thickened mass breaks down rapidly into a fetid yellowish ichor and is thus quickly eroded, but in such a manner that the subcutaneous connective tissue is more speedily destroyed than the skin which overhangs, therefore, the jagged, irregular underminings of the morbid process. The sloughs in this case are ash-colored, yellowish, or greenish-yellow, occasionally brownish or blackish, in which latter case it will generally be found that the dark color is due to the putrid mass drying into a species of scab.

"In both these varieties the slough attacks chiefly the skin and subcutaneous connective tissue and adipose layer. The second variety, however, more frequently than the first, may penetrate beneath the deep fascia of the part, still affecting especially the connective tissue septa, dissecting thus profoundly between the muscles and tendons, which resist longer the destructive process, and retain often their general form and appearance even after they have been completely undermined and separated, except at their extremities, from their normal connections.

"In the first variety an examination of the slough as close as possible to the living tissues showed nothing but the normal form elements of the affected part in various stages of putrefactive decomposition. None of the lymph or pus-forms which usually result from inflammatory action could be observed. The small vessels and capillaries of the living tissues near the slough were gorged with blood, which, in the vessels immediately adjacent to the dead parts, was completely stagnant. In proceeding in the investigation of the sloughs of this character from the living tissues through the slough to the central cavity exposed by the disease, the elementary forms were found to be more and more completely obscured by the putrefactive changes until a granular opaque mass remained in which no form elements could be observed, except perhaps a few yellow elastic fibres which had resisted decomposition. Associated with these changes was a tendency to break down into a fetid, diffluent semi-liquid, and thus to leave a cavity which in this class of cases was usually bounded below by the superficial surface of the muscles of the part. In these cases it was generally observed that while the disease continued to spread peripherally, a line of demarcation was formed by a true ulcerative action with pus-formation between the superficial slough and the subjacent muscles, the pus being formed in at least some of the cases at the expense of the muscular tissue, as will be seen in the sequel.

"In the second variety an examination of the thickened and hardened edges into which the eroding process was extending showed the tissues to be transformed into a mass of cell forms, of which the most numerous were spherical granular cells, quite identical in individual aspect to ordinary pus corpuscles, but embedded in a granular mass, and thus constituting what has been variously called croupous fibrine, croupous lymph, and corpuscular lymph. This is the condition described by Rokitansky as the 'death of textures replete with fibrino-croupous exudates,' to which category he refers hospital gangrene. Embedded in the same mass can also be seen occasionally connective tissue cells in various stages of enlargement and multiplication by division. By the liquefaction of the granular mass in which these elements are embedded they float out free, forming a scanty ichorous pus. The process, therefore, in this variety consists of two stages: In

the first there is an extremely rapid cell multiplication, resulting in the formation of the innumerable cells of croupous lymph with which the tissues are crammed; in the second the death of the infarcted tissues occurs either *gradatim* as an eroding ulcer or in mass as a bulky slough.

"In cases of either variety in which a favorable termination is attained after the sloughs are thrown off, granulations sprout from the bottom and sides of the cavity and gradually fill it up. In one or two cases in which this process had advanced to commencing cicatrization nothing was observed different from what may be seen in the healing of ordinary ulcers of considerable size. In many favorable cases, however, granulations sprout from the exposed muscles at the bottom of the excavation even before the extension of the sloughing at the margin is arrested. I found in these cases, as well as in the ulcerative process previously mentioned, by which the black sloughs of the first variety are separated from the subjacent muscles, a good opportunity to study the process of pus-formation in the muscular tissue. The observations made here confirm precisely, as do many others made by me heretofore, the opinion that the muscular fibre, when involved in the inflammatory process, contributes its share to the formation of the products of inflammation. The form elements involved especially are the so-called nuclei of the sarcolemma, concerning which there is a difference of opinion as to whether they are to be regarded as an anatomical portion of the muscular fibre or as belonging to delicate connective tissue cells wound spirally around it. These, whatever their nature, enlarge, elongate, multiply by division, and produce broods which encroach on the proper substance of the fibre. The transverse striæ become pale, indistinct, and at length are replaced by a granular appearance. Finally the whole substance of the fibre is occupied by spherical granular cells, the destiny of which may be on the one hand to develop into granulations, or, on the other, to be set free as pus by the liquefaction of the matrix in which they are embedded.

"With regard to the constitutional conditions present in these cases of hospital gangrene the patients were pale, the countenance anxious, the pulse frequent, small, feeble, the bowels sometimes affected with diarrhœa but in other cases constipated. The appearance of the patients in some cases indicated the presence of a scorbutic taint. In other cases the yellow complexion and the enlarged spleen indicated constitutional disturbances due to malarial poisoning. In all it was observed that a needle inserted into the finger to obtain a drop of blood for examination required to be carried deeper than usual to obtain it. The blood thus obtained presented in every case a noticeable increase in the proportional number of white blood corpuscles, which were also, as a rule, larger than normal ($\frac{1}{2800}$ to $\frac{1}{2500}$ of an inch in diameter). This condition was developed in some cases much more than in others, but in none attained to an exquisite degree. The red blood corpuscles were scanty, pale, and showed less tendency than in healthy blood to aggregate into nummular rolls.

"If now, in appreciating the foregoing observations, an attempt be made to recognize the etiology of the affection, we shall seek for the efficient causes in the exposures, the privation, the want and depressing agencies to which these men had been exposed in the crowded prison hospitals of Richmond. It was there that the affection originated, and although new cases still from time to time occur in Annapolis, it will be borne in mind that, as previously stated, these cases occur only among the wounded of the returned Richmond prisoners. The escape of these unfortunates to the open wards, the generous treatment and good diet of the United States General Hospital, will account for the small mortality that has occurred.

"In conclusion, an allusion may be made to the idea that the peculiar characteristics of this disease are due to the local presence of microscopical fungi. This idea is not borne out by facts. Accurate examination with a high magnifying power of cases in every stage, both where nothing but an ordinary water dressing as well as in cases in which various forms of antiseptic and caustic washes had been employed, utterly failed to demonstrate any cryptogamic organisms except the ordinary bacteria which are to be observed in every decomposing animal substance."

While, at Annapolis, the cases of hospital gangrene had been produced by infection, the disease at Nashville, where it appeared a month or two later, in April, 1863, was undoubtedly of an indigenous origin. Thirty-eight cases occurred at hospital No. 8 within a few days, and Surgeon M. Goldsmith, U. S. V., who had been sent there to look into the origin and progress of the disease, found that—

"I. All of the cases occurred in Ward No. 1. II. All the cases occurred in the row of beds

next the windows opening upon an alley. III. All the cases occurred prior to the 24th of April, or during the time when the external atmosphere was colder than that of occupied houses, enclosed cellars, or underground drains. IV. The cellar under the hospital had passing under and opening into it by several apertures the common sewer of that part of the city. V. The soil pipes from the privies of the several wards traversed this cellar and emptied without a trap into the common sewer. VI. This soil pipe was made of tin and leaked badly. VII. In wet weather the cellar bottom was overflowed by the contents of the soil pipes and sewer. VIII. This cellar had but two openings, one in the front of the building and one on the alley. IX. The alley was long, narrow, and high (five stories). X. The area of the adjacent building received the drainings of the garbage of the kitchen, and this area formed a part of the alley. XI. Ward No. 1 derived its ventilation almost entirely from windows opening on the alley. On the opposite side there was but one opening, a door, leading to a hall which had no window. On the end next the street there were but three windows. XII. The prevailing winds during cold weather sweep the street on the front of the building, leaving the atmosphere in the alley almost still. XIII. The emanations from the area of the adjoining building, as well as those from the cellar, were most offensive at all times, and were disgustingly perceptible in the evening when the external atmosphere began to grow cool. XIV. No cases of hospital gangrene occurred after the weather grew so warm that the outer air was warmer than the air in the cellar and sewer (after April 24th). XV. The building on the opposite side of the street (the alley running through only one square) prevented any wind from sweeping it below the second story.

"In the early part of the season one patient was brought into the ward with hospital gangrene. In a few hours six other cases were developed in wounded men laying adjacent to him. The disease did not spread, and with the termination of these cases disappeared for a season. When it broke out again it attacked those who came into the ward without any appearance of a gangrenous condition in their wounds at the time of their admission. It will appear from the fact related that the miasm generated by putrefying animal matters in the cellar, and perhaps in the area, are given off at all seasons, and that just during that season when, from the relations of temperature, the atmosphere of the cellar would ascend in the alley and the currents would enter the wards most constantly—*i. e.*, when it was necessary to heat the ward with stoves, the cases of gangrene occurred; and that they occurred in just that locality in which the gases would impinge upon the patients in most concentration; and that when the miasm of the cellar would flow downward, *i. e.*, when the external air was warmer than the air of the cellar, and when from the extinction of fires no air was drawn in at the windows, the disease ceased.

"The testimony of the surgeon having the ward and cases in charge is all the more valuable that he did not anticipate or interpret the facts. He noticed, without peculiar interest, the occurrence, and, as he expressed himself to me, supposed that by some singular accident the patients having the 'lowest vitality' were placed in that row of beds; and he marveled greatly that the cases should occur when the ventilation was best, because the windows in the alley were the only available outlets for air in the whole ward, and were opened fully and diligently four times a day in even the coldest weather, and some part of the windows were kept open all the while.

"I think that the records of surgery do not afford a more unique or striking example of one of the methods of the production of hospital gangrene, or afford a more pertinent commentary upon the use of buildings constructed in utter disregard of all hygienic rules. It is due to the Medical Director at Nashville to state that he had closed this hospital, and reopened it only when the crowd of patients coming from the front was so great that they could not be accommodated otherwise, either in Nashville or at Louisville, and also to state that the attention of the Quartermaster's Department had been called to the condition of the building.

"I found some cases of hospital gangrene in process at the field hospital at Murfreesboro', Tenn. The wounds in the same and adjoining tents had an unhealthy look, and some were attended with profuse and unhealthy suppuration. A few of the cases were already laboring under the ichorous infection (pyæmia). The general police and attention to sanitary regulations were good except in one particular—a particular to which, I fear, but little attention is commonly paid—I refer to the privies. The tents are arranged on two sides of the square, end to end, along parallel streets laid out in squares, each row, I believe, being regarded as a ward. The privies are placed along a middle line bisecting a square, and distant, as near as my memory serves, about twenty or

thirty yards from the tents. These privies are open sheds placed over shallow sinks, nowhere deeper than an ordinary field latrine. The flooring is so loose that the whole arrangement is the equivalent of three square, large field latrines, with only this difference, that in the field they can be policed by throwing in earth, while, in the present case, they were broad and shallow pits filled almost to the surface with a pestilent semi-fluid mass, the excrement of men affected with typhus, dysentery, diarrhœa, etc., etc., and incapable of the ordinary treatment of field latrines. At the time of my visit the streets surrounding the square were filled with the odor of these sinks—an odor such as is only to be perceived in the neighborhood of such collections—a nauseous odor, not mere ammoniacal odors, but a sickening phosphorescent odor. For some days prior to the appearance of the hospital gangrene the atmosphere had been remarkably still and damp and the weather warm and cloudy; what little wind there was had been from the east. The tents holding the wounded were at the westward of the privies. I state these facts not for the purpose of intruding upon the province of the medical inspectors, or as a text for any comment other than that in them I can see clearly the operation of causes proverbially potent in giving rise to hospital gangrene, erysipelas, and congeners.

"In Nashville I found a few sporadic cases of hospital gangrene, some of which had been treated with bromine unsuccessfully. In examining the methods of applying the remedy I found that the applications had not been properly made. I requested permission to show the surgeons my methods on one of the cases. I dressed the first case in the presence of a number of medical officers. This method was applied to all the other cases in the city on the same afternoon, and I had the satisfaction of seeing that every one of them yielded to a single application of bromine, and in less than forty-eight hours were granulating throughout the whole extent of the diseased surface. The affair of these cases, I am informed, has settled all doubts lingering in the minds of some of the surgeons on duty at that place in regard to the efficacy of the bromine treatment of hospital gangrene."

As a prophylactic against this disease, Medical Director M. Goldsmith, U. S. V., ordered the following compound solution: "Bromine, one Troy ounce; bromide of potassium, one hundred and sixty grains; distilled water, enough to make four fluid ounces of the entire mixture. At the same time printed directions for its use were issued as follows:

"1. *For Fumigation:*—Place vessels containing *one ounce* of the solution at different points of the ward, and in number sufficient to secure in the latter the constant presence of the odor of bromine. It should be borne in mind that if the vapor of bromine comes in contact with the vapor of water, hydro-bromic acid is formed; therefore, when there is much of the vapor of water disengaged in the apartment the quantity of the vapor of bromine must be correspondingly increased.

"2. *Topical application of the vapor:*—A piece of *dry* lint is to be placed over the diseased part; over this is to be placed another piece of lint *moistened with the solution of bromine;* over this, a *third* piece *spread with simple cerate;* the whole to be covered with oiled silk and bandage, so arranged as to retain the vapor in contact with the diseased surface as long as possible. The solution is to be renewed as often as it becomes exhausted by evaporation.

"3. *The solution, in substance, as a direct application in Hospital Gangrene, Diphtheria, Gangrene of the Tongue,* and other diseases of this nature:—The parts are first to be dried by the application of charpie; then the sloughs, if thick, should be trimmed out with forceps and scissors as much as possible, for the thinner the slough the more effective is the remedy. The parts having again been dried, the solution is applied by means of a mop, or a pointed stick of wood, in quantity sufficient to saturate the sloughs. If the sloughs undermine the skin, or dip down into intermuscular spaces, the solution must be made to follow, with the pointed stick or by means of a glass syringe with a long nozzle. If the application has been effectual, all odor from the diseased surface ceases and the sloughs become somewhat hardened. The remedy should be reapplied every second hour as long as any odor of putrefaction is present, or as long as the sloughs appear to be diffluent. It is not always necessary, especially when the sloughs are diffluent and thin, to use the solution in its full strength; it may be weakened by the addition of water as the disease subsides.

"The points to be especially attended to, in the use of the solution of bromine, are two: 1. The solution should be applied in strength and frequency sufficient for the impregnation of *the whole of the sloughs.* 2. To secure this end, the application *should be made by the surgeon himself,*

and never be trusted to a nurse. If the sloughs are thick and cannot well be trimmed, the bromine may be introduced into the thickness of the slough by means of a hypodermic syringe. After the topical application of the solution the parts, when so situated as to render it practicable, should be subjected to the influence of the vapor. (See par. 1.) Surgeons will do well to bear in mind that bromine is a new remedy for the purposes indicated above. The directions for its use, given here, are those followed in the military hospitals of this city; it may be found advisable to modify them as experience with the remedy accumulates. It is, therefore, earnestly recommended that the subject be studied diligently, that the effects of the remedy be carefully watched, and that the application be varied as new facts are developed in its use."

The action and influence of bromine thus employed will be best understood from the reports made to Surgeon Goldsmith by several surgeons in charge of hospitals under his direction in which the disease occurred. Surgeon B. Woodward, in charge of the Park Barracks Hospital, Louisville, Kentucky, reported:

"In hospital gangrene the most remarkable effects of the use of bromine have been seen. At hospital No. 7 there is one case of gunshot wound of the foot in which the gangrene included the whole upper part of the foot from the toes to the tarsus. The integuments and muscles had all sloughed away, leaving the extensor tendons bare and isolated. The local use of the bromine had arrested the slough, and the line of demarcation was well marked. Another was at the same hospital of wound of the leg by a piece of shell; the gastrocnemius and soleus were bared for a space of eight inches by three inches; after the direct application of bromine the line was well marked, and the wound took on healthy action. In a third case at the same hospital the tibia was bared and denuded of periosteum, but the same good results were had from the use of bromine. At hospital No. 3 I was shown two cases of gangrene; in one the slough had destroyed not only the muscles of the right arm, but the humeral artery had sloughed and had been ligated. Another and perhaps the worst case at the same hospital, where the slough had carried away integument, obliquus externus and obliquus internus, so that for a space of eight by five inches there was nothing left but the tendons of the obliquus internus and the peritoneum, the sloughing had been arrested, and the whole wound was covered with healthy granulations. In all these cases the peculiar fetor of gangrene had disappeared. All these cases were mixed in with sick and badly wounded men, and yet there had not been an instance in which others had taken the disease. All of these cases were gangrenous when they were brought from the front to this city, and I cannot find an instance in which it has originated here. This, as Dr. Goldsmith, in charge of hospital No. 7, said, 'can only be attributed to the prophylactic power of the vapor of bromine in the wards,' and, to use his own words, 'we are doing with the greatest impunity what, a year ago, we should not have dared to do, viz, putting these cases in the wards with other wounded men.'"

Surgeon Thomas H. Mercer, U. S. V., records in detail in the following case the manner in which bromine was employed at hospital No. 13, Louisville:

"CASE 1208.—Corporal Jesse Havens, Co. F, 69th Regiment Ohio Volunteers, was admitted to hospital No. 13, Louisville, Kentucky, January 14, 1863, having been wounded at the battle of Murfreesboro', December 31, 1862, by a conical ball in the anterior tibial region, lower third of leg; flesh wound. The wound did not bleed at all at the time of the injury, but appeared to remain from that time until January 13th in about the same condition, with no disposition to granulate or heal. At that time, or very soon after, the edges of the wound and flesh in the vicinity began to assume a purplish hue and unhealthy look. Water dressings used up to February 1st; wound and surroundings growing worse daily. The wound then commenced sloughing and extending, with a dark gray and blackish appearance. At this stage of the disease was commenced the antiseptic treatment, the yeast poultice with cinchona and charcoal; after a few days nitric acid, diluted one-half, applied directly to the wounded surface and gangrenous surroundings, with some slight improvement. This was continued for several days. Bromine was then commenced, twenty drops to one ounce of alcohol, as a substitute for the acid, with the cinchona and yeast poultice applied immediately after the use of the bromine. Up to this time, February 20th, Acting Assistant Surgeon John Logan had the care of the case; the treatment constitutionally was sustaining. The gangrenous sloughs were becoming detached and the surface of the wound was looking well, but very pale after removal of the sloughs. February 21st: Wound cleaning; some soft, pultaceous sloughs remaining on the inferior third of the ulcerated surface. This wound, not exceeding a twenty-five-cent piece in size when the patient was admitted, now extends some seven inches inferiorly and superiorly, and about five inches—two and a half on either side of the leg; applied the bromine twice a day over the surface of the wound and around the edges for an inch or more. Ale, sulph. ferri gr. 1 every four hours; diet generous. February 22d: Soft pultaceous masses of slough removed with forceps and scissors. Bromine, ale, and iron continued. Appetite improving. Yeast and cinchona poultice as usual. February 23d: Pearly edge developing around the ulcer; pulse 92; general surface of the wound looking well, and some disposition to granulation. Tongue slightly furred, appetite pretty good; patient more cheerful. Ale, iron, etc., continued. February 24th: Tongue improved, pulse 90; improvement in general appearance. Skin clear, mind tranquil, granulations appearing over the entire surface of the wound, except a gangrenous spot about the size of a dime on the inner surface of the tibia, about the central portion of the wound, involving the periosteum. Appetite improving. Bromine, ten drops to the ounce of alcohol, proves as much as he can bear. Continue treatment as before. Generous diet. February 25th: Tongue clean, pulse 90, appetite good;

gangrenous spot lessening; granulations increasing; surface ulceration improving in color; treatment the same as before. February 26th: Tongue clean, pulse 96, appetite good; gangrenous spot lessening in width, slightly increasing in length; wound still improving and filling up with fine healthy granulations. February 27th: Feels better; tongue clean, pulse 88, appetite good; gangrenous spot about the same; granulations improving all the time; feels cheerful and hopeful. February 28th: Pulse 84, tongue slightly furred; application of bromine quite painful for an hour or so after its use. March 1st: Pulse 84, tongue cleaner, wound looking well; bowels in good order throughout since February 20th, previous to which time he had frequently suffered from sharp attacks of diarrhœa. March 2d: Tongue clean, pulse 86, wound filling with fine healthy granulations; bowels not so easy; some griping pains in epigastrium; countenance, however, cheerful. Gangrenous spot entirely devoid of the soft pultaceous mass, leaving the periosteum exposed about the size of a five-cent piece and black as ink. Appetite not so good; ordered wine to substitute the ale; diet generous. March 3d: Pulse 88, tongue slightly furred, wound improving, bowels better; cheerful and hopeful; appetite good; treatment continued. March 4th: Pulse 86, wound about the same; tongue clean, bowels in good condition; gangrenous spot still the same. Diet generous and full. March 5th: Pulse 88, tongue slightly furred, appetite good, wound gradually and steadily improving. Application of the bandage to the foot up to the edge of the wound to prevent burrowing. March 6th: Pulse 88. Complains of some pains in the right side of the chest on taking a long breath. Wound still improving, appetite good. Ordered mustard sinapism to chest, and Dover's powder, grains 15, at night. March 7th: Pulse 90, tongue clean; pain in chest relieved; appetite good as usual; wound still improving. March 8th: Pulse 108, tongue coated; pain returned to the right side; not as well to-day; spirits depressed, appetite still good, bowels regular. Mustard sinapism to chest; pulv. Doveri, grains 25, in four powders, one every three hours; same treatment of wound. March 9th: Pulse 96, tongue about the same; general condition much improved; pain in side relieved, appetite good, and in good spirits; wound healing. March 10th: Pulse 88, tongue cleaning, wound painful, but improving in appearance; appetite good. Treatment the same. March 11th: Pulse 96; condition about the same as yesterday. Treatment and diet continued; wound healing rapidly and prettily. Bromine has acted like a charm, and still possesses a biting character when applied, from which he suffers for an hour or so after its use."

Surgeon Goldsmith gives a statistical summary of three hundred and thirty-four (334) well authenticated cases of hospital gangrene treated at the military hospitals at Louisville, Kentucky, Nashville and Murfreesboro', Tennessee, and New Albany, Indiana, and remarks that the testimony of these cases will establish the value of bromine in hospital gangrene sufficiently at least for the purpose of challenging investigation.

TABLE CLVII.

Summary of Three Hundred and Thirty-four Cases of Hospital Gangrene, giving Treatment and Results.

TREATMENT.	TOTAL CASES.	RECOVERED.	DIED.	AMPUTATIONS.	AVERAGE DURATION OF TREATMENT.	PERCENTAGE OF MORTALITY.
Treated with Bromine in different ways	152	148	4	.....	5 days 14 hours	2.6
Treated with Pure Bromine exclusively	27	25	2	.....	2 days 22½ hours	
Treated with Pure Bromine in solution exclusively	86	84	2	.....	6 days 11½ hours	
Treated with Pure Bromine after the solution failed	8	8	.....	.....	12 days 16 hours	
Treated with Pure Bromine after Nitric Acid failed	23	22	.....	1	3 days 16½ hours	
Treated with Bromine after other remedies failed	8	8	.....	.....	2 days 4 hours	
Treated with Nitric Acid exclusively	13	5	8	....	3 days 14⅔ hours	61.5
Treated with other remedies exclusively	13	7	5	1	7 days 13⅗ hours	38.4
Treated with other remedies after Bromine failed	4	4	.....	.....	.....	.....
Aggregates	334	311	21	2	.....	6.2

Surgeon J. H. Brinton, U. S. V., who had examined the outbreak of hospital gangrene at Annapolis, reports of the cases at Nashville that—

"Although of an analogous form the disease did not appear to me to be of so virulent a grade; whether this was due to the original character of the affection, or to the effect of the remedial measures employed, I am not prepared positively to decide. Nearly all the cases observed by me were in the stage of reparation, and but very few in the period of progress. The shape of the ulcers was characteristic, as was also the appearance of the gray slough, but the tendency of the sores to burrow deeply and to extend rapidly was not well marked at the time I examined the cases, some thirty in number. The treatment almost universally adopted in the Louisville hospitals is that originated and introduced by Surgeon Goldsmith, U. S. V. It consists in the direct local application of bromine, either pure or in solution, to the surface of the sloughing sore. Due care is always first taken to remove as thoroughly as possible the sloughs, so that the agent may act on the living tissues and permeate them to some extent. In cases in which the burrowing is so extensive and deep seated as to render the application of bromine difficult or incomplete, Dr. Goldsmith resorted to hypodermic injections of bromine at the circumference of the sore. The

punctures with the point of the syringe are made at intervals of from one-half to three-fourths of an inch, and one drop of the pure bromine is thrown into the tissues at each application. The mode of dressing the surfaces of the sores with the bromine was exhibited to me by Dr. Goldsmith. From my observation of the immediate effect of the reagent upon the diseased tissues, and of the condition of the sores upon which it had been previously applied, I am inclined to look upon the remedy as one of great value and well deserving of a fair and extended trial. * * I would here remark that in the Louisville hospitals but little tendency has been observed in the disease to spread from bed to bed, although isolation of the gangrenous patients has not been enforced. In my own judgment the absence of this tendency to infection tells strongly against the supposed virulence of the affection, and would ever throw doubts on its true nature—at all events in some instances. Assuming the disease, however, to be the veritable hospital gangrene, the facts connected with its origin were peculiar. The disease occurred almost always in patients who had been wounded at the battle of Murfreesboro', and who had been retained for some time in crowded hospitals previous to their transportation to Louisville. I am informed by Surgeon Thurston, U. S.V., Medical Director of the Nashville hospitals, that no one upon whom the gangrene had already appeared was ever sent from Nashville, and yet many were so infected when admitted to the Louisville hospitals. The development of this disease on the route seems to have been owing to the fact that the transportation of the wounded was effected by means of crowded and illy ventilated boats, and that the trip by the Cumberland and Ohio rivers frequently occupied several days. During this time these patients, who had already undergone much suffering, were exposed to all the influences most apt to engender this disease. In contrast with this fact it was found that as soon as the Louisville and Nashville Railroad was opened so that the wounded could be conveyed from city to city in hospital trains in one day, all importations of gangrenous sores into Louisville ceased. The development of hospital gangrene during the boat transportation is a noticeable fact, and is strikingly analogous with the same phenomena observed among our paroled wounded prisoners from Richmond received into the Annapolis general hospitals some months since."

It is well to state here that a few at least of the surgeons at Louisville and elsewhere did not entertain the favorable opinion in regard to the use of bromine in cases of hospital gangrene expressed by Drs. B. Woodward and M. Goldsmith. Acting Assistant Surgeon John E. Crowe, in charge of General Hospital No. 4, Louisville, reports in July, 1863, that it was efficacious in "very superficial wounds attacked with hospital gangrene; but when the disease attacks a large or deep-seated wound it has failed, after repeated trials, to exert any beneficial influence. Creasote is superior to it in this class of cases; yet creasote has failed in several instances." Dr. W. W. Keen considered bromine a poor agent, painful, inconvenient; the suffocating fumes preventing a close inspection of the wound. Surgeon J. E. Summers, Medical Inspector, Department of Tennessee, believed that there was a "tendency on the part of surgeons interested in the bromine treatment to regard every slough as gangrene."

In February, 1863, a number of cases of hospital gangrene occurred at the Douglas Hospital, Washington, D. C., and were observed by Assistant Surgeon William Thomson, U. S. A., who, in a special report to the Surgeon General, gives the following interesting account of the pathology and treatment of the cases. In several instances later information has been added to the cases cited by Dr. Thomson:[1]

"The victims of this disease were wounded at Fredericksburg, December 13, 1862. For several weeks previous to this battle the army had been resting on the Rappahannock and had been exposed to no great hardships. It had been amply supplied with good and varied food, and the men were free from any scorbutic or other cachectic taint.

"It is well known that the fullest preparations had been made by Surgeon Letterman for that engagement. The operations were performed promptly, and the wounded probably received better care than ever before in the history of the war.

[1] The report has been published in the *American Journal Medical Sciences* for April, 1864. Vol. XLVII, p. 378.

"On the 26th of December, 1862, about two hundred wounded from the battle of Fredericksburg were received into the Douglas Hospital.

"I cannot speak of their treatment, medical, surgical, or hygienic, as at that time I was not connected with the hospital. I am, however, aware that the building in which the gangrene appeared contained fifty badly wounded and recent cases; that there was a deficiency of medical officers and dressers to insure the necessary cleanliness, and that the sanitary condition of the ward was far from perfect.

"This hospital consists of the three brick houses known as 'Minnesota Row,' and two large wooden pavilions, each divided into two wards. The ward in which this disease originated is one hundred and forty-three feet in length, twenty-three feet in breadth, and sixteen feet in height (eighteen feet at the cone and fourteen at the eaves of the roof), and contains beds for fifty patients, thus giving 1,050 cubic feet of space for each bed. There are two rows of windows, the lower of which contains two, the upper one sash each; the upper windows so constructed as to be opened by means of a cord, but when opened directing a current of cold air immediately downward upon the beds beneath.

"On the 16th of Feburary, 1863, I took charge of the hospital, and found the ward mentioned in the following condition: There was no ridge ventilation, nor was there any egress for foul air except through two large wooden shafts connected with two of the stoves, which had been placed there only a few days previously. The ward was heated by ordinary sheet-iron radiating coal stoves, and no provision had been made, until a few days before, to introduce any supply of fresh air. It contained from forty to fifty patients, all wounded, many of them very severely. The police was not unexceptionable, too little attention having been paid to the removal of offensive discharges. The medical officer in charge preferred to water as a dressing either simple cerate or mutton tallow, which had been issued to the hospital, and which had become rancid. The attendants were, from a want of strict discipline, careless and inattentive. There was a perceptible and offensive odor in the ward, which felt close and badly ventilated; and this condition of the atmosphere seemed to have a marked effect on the spirits of the men; they were all gloomy, despondent, and homesick.

"On February 17th, when making my first visit with the officer in charge of the ward, I discovered:

"CASE I.—Sergeant Otto Kosack, Co. K, 2d Maryland, who had been struck by a shell, December 13, 1862, which made it necessary to amputate his left leg at the middle. The operation was done ten minutes after the injury. He was received here on the 25th of December. The stump closed by granulation, a small portion of the tibia having been removed by exfoliation. The cicatrization had been almost complete, when, a few days previous to the 17th, the still open wound commenced to slough. He was anæmic, very pallid, haggard, and with an expression of great depression in his features; his pulse was very feeble and rapid; he had been 'feeling very badly' for several days, and complained of a burning pain in the stump. On the outer side of the tibia there was an ulcer one inch in diameter, covered with a yellowish-gray pultaceous slough, and a serous and very fetid discharge; the edges were thickened and everted, and an areola of purple livid congestion extended for half an inch from the margin, which was undermined. This sore was at once treated with pure nitric acid, applied both to the ulcer and to the areola; the ulcer was dressed with an antiseptic solution of creasote, and citrate of iron and quinine, with stimulants and nutrients, were freely given. On the 18th the sloughing had extended to the border of yesterday's livid areola, but was now more superficial, and the areola, which had likewise invaded the surrounding skin, was more florid. The ulcer was now two inches in diameter. As there was some doubt as to its specific character, the patient was not removed from the ward until the 23d, when he was transferred, with several others, to a small ward prepared in the brick building, and completely isolated from the other wounded men. The iron and quinine were found to disturb his stomach and destroy his appetite, and was replaced by a mixture of nitro-muriatic acid and tincture of opium. March 3d: The sore was now perfectly healthy and was granulating rapidly. [The patient was discharged June 15, 1864, and was a pensioner in 1882. A plaster cast of the stump is preserved in the Army Medical Museum and is numbered 6706 of the *Surgical Section*.]

"This was a mild case, treated in its incipiency with nitric acid most thoroughly. The ulceration had not extended so deeply, nor so far beneath the margin of the skin, as to make it almost impossible to reach every portion of the diseased surface. There was no scorbutis. The gums were firm and hard. The patient was very pallid, his heart feeble, and his pupils dilated. The mucous membranes were very pale, and the expression of the face haggard and anxious. He recovered rapidly with a good stump, and was seen, several months after, walking with great ease on an artificial leg.

"CASE II.—L. D. Thurston, Private, Co. A, 16th New Hampshire, aged 42 years, was struck by a fragment of shell on December 13, 1862, at Fredericksburg, which caused a severe but superficial wound of the integuments on the outer side of the left thigh. When seen, February 17, 1863, there was a wound at the middle of the thigh, on its outer aspect, three and a half inches long by two and a half wide, exposing the muscular tissue slightly, the surface of which was glazed and dry. On the 10th of February it had been found desirable to open an abscess three inches below the left greater trochanter. On the 13th this had assumed an unhealthy look, and when I saw it on the 17th the incision made by the lancet, half an inch in length, was surrounded by a border of sphacelus one inch in width, and by an areola of purple congestion, in which there seemed to have occurred a complete stasis of the circulation. There was no pus, but a discharge of very fetid dark-colored serum. There was

no swelling, ulceration, or eversion of edges of the incision, which, although mortified, remained as sharp as when first made. There was profound nervous prostration, which was indicated by his rapid, feeble, and irritable pulse; by his sallow hue; his haggard and anxious expression of countenance; his weary and helpless decubitus and great mental despondency. He was treated internally with stimulants, the most condensed and nourishing food, and citrate of iron and quinine; nitric acid was applied locally, followed by a weak solution of creasote, three drops to the ounce of water, as an antiseptic dressing. The sphacelus extended in all directions rapidly, unchecked by this treatment, from which I hoped little, since it was impossible to bring the acid into contact with the diseased tissues, although it was injected into the incision. The constitutional symptoms also became more grave. On the night of the 20th there was quite a severe hæmorrhage from the incision, oozing slowly, and very difficult to restrain, since it was caused by the erosion of vessels at a distance from the small incision. There was now a circular patch of sphacelus surrounding this small incision, three inches in diameter. On February 23d he was removed to the ward in the brick building. The original wound, hitherto unaffected, now began to be black and offensive. The sphacelus extended from these two centres at the rate of one inch daily, preceded by the above-mentioned areola of purple stasis. No treatment, local or constitutional, produced the least effect. Stimulants were given in every possible form, until the stomach refused to retain them. Pure nitric acid was freely applied to the diseased surfaces with no benefit. He fell into a typhoid condition, with muttering delirium, subsultus tendinum, etc., and finally expired February 28th. The sphacelus then extended from the trochanter major to three inches above the outer condyle, and from the median line in front to a corresponding point behind. There had never been any ulceration, but the tissues seemed to perish *en masse*. The incision made by the lancet was yet plainly seen in the centre of any extensive surface of mortification. This man was 42 years old, had had chronic diarrhœa, and was in a feeble state of health when wounded. No benefit was observed from any treatment. He took in addition to the nutrients and tonics the acid mixture with tincture of opium. [A wet preparation of the thigh, exhibiting the ravages of hospital gangrene, is *Specimen* 1001 of the *Surgical Section*, A. M. M.] * * *

"CASE V.[1]—Isadore Wick, Co. D, 1st New York Artillery, aged 32 years, had his right thigh amputated on the field, for comminuted fracture of the tibia, received December 13, 1862, at Fredericksburg, caused by a minié ball. He was admitted December 26th. I regret that I can give no account of his progress, but I learn that the flaps had been insufficient, and that the stump had been closing by tedious granulation. There had been a free discharge, and his general condition was, therefore, unfitted to withstand the depressing influence of hospital gangrene. His bed was on the same side of the ward, and in close proximity to the first case reported. The operation had been a circular one; the granulation had entirely covered the end of the bone, and there was, when seen on the 18th of February, only a narrow strip, not yet cicatrized between the margins of skin. This was now covered with a gray slough and had the characteristic fetid odor. It was dressed simply with the creasote solution, my faith in the acid treatment having been shaken by the reports of medical officers who had visited the cases at Annapolis. February 23d: The case was now considered an unequivocal one of hospital gangrene, and was removed to the ward selected for such cases. The cicatricial tissue had all yielded to the sloughing, and the subcutaneous connective tissue had been destroyed for two inches beneath the skin at the outer angle of the original incisions. No change was made in the local treatment, as the creasote was a perfect deodorant, and as good results were hoped for from its local use, as had been reported from Annapolis. The destruction was limited to the connective tissue until March 9th, when there was a margin of sphacelus half an inch wide in the true skin. The constitutional symptoms had been growing more grave. His mental despondency was most marked, his face pale and anxious, his pupils dilated, his pulse 100 per minute and feeble, and his skin very moist; a free diarrhœa had also commenced. The tonics and stimulants, having produced anorexia and nausea, were replaced by a mixture of tincture of opium and hydrochloric acid in such proportions that he took gtt. xvi of tr. opii and gtt. iv of acid. hydrochlor. every fourth hour. Beef essence and milk punch were given as freely as his stomach would tolerate them. 11th: As his general condition became less favorable the local action was changed from molecular death to sphacelus. The whole face of the stump has now a margin of black mortification of the skin, outside of which was the usual areola of purple congestion—the complete stasis of to-day becoming the sphacelus of to-morrow. The end of the femur, protected by rosy granulations, now protrudes from the black mass of sphacelus, the integument having become loosened by the destruction of the subcutaneous connective tissue and retracted. The presence of this mass of putrefaction seems to add to the nervous prostration, if indeed the absorption of such peccant material is not its sole cause. Pure nitric acid had been applied several times, but it had been found impossible to convey it into the depths of the ulcer. 21st: No change except for the worse had occurred. Stimulating poultices of cinchona, ginger, and flaxseed had been used locally, but with no benefit. Antiseptics, such as the solutions of chloride of soda, creasote, and permanganate of potash, were necessary to purify the ward and render it endurable for his attendants. Nutrients and stimulants had been pushed to the last extent, and opium had been largely given for its supposed specific effect in the disease as well as to allay suffering. The symptoms had been typhoid for several days; emaciation had gone on rapidly; there had been subsultus tendinum and muttering delirium with extreme prostration until this date, when death occurred. The limb was removed after death and the specimen sent to the Army Medical Museum. [*Specimen* 1000, *Surg. Sect.*] The sphacelus had involved all the tissues for five inches above the divided bone, and there seems to have been a faint effort to form a line of demarcation.

"This was, at first, a very mild case, with no very decided constitutional depression until the system seemed to be poisoned by the absorption of the products of the gangrene, when the ulceration became more rapid, and was finally, as the strength succumbed, converted into uncontrollable and rapidly extending sphacelus, accounting satisfactorily for the unfortunate result. The treatment locally had been, first, weak solution of creasote, made soluble by one drachm of alcohol, four drops to one ounce of water; and second, strong nitric acid, never fully applied, however, to the depths of the diseased tissues. The constitutional treatment was stimulating, sustaining, and tonic.

"CASE VIII.—John Jordan, Private, Co. H, 2d Maine, aged 20 years, was struck at Fredericksburg, December 13, 1862, by a fragment of shell, which passed across the right thigh below Poupart's ligament, through the scrotum, destroying the right testicle, and behind the left thigh, producing in its course very extensive but superficial wounds of the anterior portion of right and posterior portion of left thigh. He was admitted December 26, 1862, and placed in ward No. 5. February 27, 1863, he had febrile disturbance and anorexia, a yellow, furred tongue, an anxious, restless expression of countenance, and a burning pain in his left thigh. There was on the right thigh a granulating surface three by two inches in dimensions, level with the integument, and cicatrizing rapidly. A smaller, equally healthy surface remained unhealed on the scrotum, while on the posterior portion of the upper part of the left thigh an ulcer three by two inches in extent was found, oval in shape, covered with an ashy gray slough, with its margin thickened and everted, surrounded by a livid areola, and, instead of normal pus, discharging a thin fetid serum mixed with débris. He was at once removed to the house; the whole diseased surface was touched with pure nitric acid and dressed with the creasote lotion; stimulants and the best extra diet, with beef essence and milk punch at short intervals, and citrate of iron and quinine three times daily, were ordered. March 5th: The attempt to push the nutrients and stimulants produced, as it generally does, anorexia, nausea, vomiting, and diarrhœa. The tongue became thickly coated with a yellow fur and dry and red at the tip; and so great was the gastric disturbance that all medicines were discontinued and the stomach allowed to recover its tone by rest, no longer being teased either by drugs or excessive and undesired nutriment. No benefit followed the local application, and the ulceration had extended in every direction. There was the characteristic margin,

[1] Space will not permit to introduce all cases cited by Dr. THOMSON. CASES III, IV, VI, and VII have been omitted here.

preceded by the areola of livid stasis, preparing the tissues for their rapid destruction. The connective tissue beneath the skin had been destroyed, so that the skin for one inch from its margin was perfectly movable. The muscles separated from each other by the death of their connective tissue lay in the wound bathed in its discharge, but rosy and florid, and resisting the advance of the disease. This sore was so unmistakably hospital gangrene that several pictures of it were taken by direction of Surgeon Brinton, which represent well the surface of the ulcer dripping with its thin serous discharge, mingled with threads of dead connective tissue, its 'piled-up,' thickened, and everted margin surmounted by a thin line of vivid redness, and its broad zone of purple congestion shading away into a bronze hue, the depth of color in the areola indicating the engorgement of the small vessels and its hue the feebleness and slowness of the movement of the blood. It was determined to try the opium treatment, with hydrochloric acid as a tonic, and this mixture was given in the proportion of 16 drops of tincture of opium with four drops hydrochloric acid every three hours. The sore was dressed with a stimulating poultice composed of flaxseed, cinchona, and ginger mixed with porter. Under the use of the acid internally the tongue has become clean and moist, the tone of the digestive apparatus improved, and a fair quantity of food had been taken. Porter and ale had been given as the stomach would retain them. But little change had taken place in the character of the ulcer, which was eight inches in length by seven in breadth, extending to the perineum, and irregularly oval in shape. The muscles exposed (the semi-membranosus and biceps) had yielded and were now almost divided. The sores on the right thigh and scrotum had not been in the least affected, but were cicatrizing rapidly. The entire surface of the gangrenous sore was now thoroughly cleaned, all sloughs and shreds removed with forceps and scissors, was well dried with lint and carefully painted with pure nitric acid. The brush, charged with acid, was passed beneath the excavated margin in some places more than an inch. The patient was etherized, and this acid application was made most carefully and completely. This was considered a dernier resort, for although the capacity for taking and assimilating food seemed to have been increased by the acid treatment internally, yet his strength was daily diminishing from the exhausting discharge and from the absorption of the products of the gangrene. On the succeeding day an entire change in the sore was observed; there had been no extension of the gangrene, the fetid odor was gone, and the discharge was more consistent and less serous. In a few days more all the shreds of dead fascia were removed, and the surface was found to be perfectly healthy. The contrast between the ragged, offensive, yellow-colored ulcer before the last application of acid, and the florid, perfectly normal granulating surface which replaced it, was as gratifying as it was surprising. With the local there was also a constitutional improvement. The appetite became voracious, the patient slept well; there was no pain, and the process of repair was very rapid. The acid was continued internally. April 1st: The sore was now two by three inches in extent and cicatrizing rapidly; but a small surface yet remained unhealed. The patient was in perfect health, had gained flesh very rapidly, and was now on crutches. There was some contraction of the flexors, as the biceps and semi-membranosus were both involved in the destruction. [Jordan was discharged June 9, 1863, and pensioned. Examiner J. C. Weston reported, September 11, 1869: "At the biennial examination in 1865 atrophy and increased weakness of right thigh and leg had occurred. His gait is always affected; he has severe pain in region of cicatrix of left thigh; this cicatrix is six by three inches, is depressed, indurated, adherent to muscles, and sensitive on account of rigidity and emaciation; he cannot fully extend the leg." His condition had not improved when examined in 1873.]

"The most remarkable circumstance in this typical case is the fact that when the gangrene attacked the granulating surface of the left thigh the equally large granulating surface of the right thigh was unaffected; and that while the gangrene was ravaging the left thigh the rapid cicatrization of the right proceeded uninterruptedly. The discharge from the left thigh was so profuse that no precaution would have prevented the virus from coming in contact with the excoriated surfaces of the scrotum and right thigh. If, therefore, the disease be propagated by inoculation, all the circumstances were favorable; since the proximity of the thighs at their upper part, and a denuded surface on the scrotum, that might act as a link, render it certain that a portion of the great discharge from the left must frequently have been placed in contact with both of the other sores. If, on the other hand, the gangrene be not a local but a constitutional disease, why should it spend itself on one granulating surface when there were two others equally obnoxious? The contrast between these sores was marked; for while the tissues of the left thigh were melting away under one's very gaze, the process of repair in the scrotum and right thigh was progressing as rapidly as under the most favorable circumstances. In its earlier stages this case was twice treated with nitric acid, and perhaps imperfectly, from its not having been carried into the recesses of the ulcer. The system of urging nutrients, stimulants, and tonics irrespective of the natural desires of the patient is, I am satisfied, pernicious. The vital energy being depressed, the digestive organs are enfeebled; and the introduction of milk punch, beef essence, eggnog, and with stimulants porter, ale, etc., into an unwilling stomach, simply produces anorexia, nausea, vomiting, and diarrhœa. The tongue became furred and dry, and there was a perfect disgust for all food. The hydrochloric acid was given to correct this condition; and whether its action was confined to the stomach in rendering soluble the aliment given in very small quantities, or whether its action was catalytic or eliminative, I shall not pretend to state, but under its influence the tongue became moist and clean and the patient made known his desire for food. Nutrients were then given more freely as his appetite returned. The recovery of this man is due, firstly, to the thorough application of nitrid acid to every portion of the ulcer, which changed its specific nature immediately; and, secondly, to the combined effect of acid and opium internally. After the last complete application of acid the sore was changed in character, the areola disappeared, the surface became clean, the margins lost their elevated appearance, the serous discharge became purulent, and the offensive odor was entirely destroyed. An equally marked improvement occurred in his general condition.

"Case IX.—George Zilch (Zuelch), Sergeant, Co. K, 7th New York, aged 25 years, had his left leg amputated at its upper third for a bullet wound received at Fredericksburg, December 13, 1862. He was admitted to Douglas Hospital December 26th,

and placed in ward No. 5. The stump had closed slowly by granulation until there remained an ulcer as large as a half dime on its face. April 14, 1863, this ulcer was inflamed around its edges and covered with a white pultaceous slough; there was no constitutional disturbance, and the patient was allowed to remain on his crutches. The ulcer was cauterized with nitric acid and dressed with solution sodæ chlorinatæ. 18th: The ulceration and areola are both enlarged, and the slough, yet very tough, is thicker. Acid was again used locally. 21st: He is feverish and inclined to nausea; his pulse 120, skin hot, and tongue thickly coated. The ulcer is extending in depth, and he was removed to the gangrene ward. 22d: The solution of bromine was applied to the sore after cleansing the surface as much as possible of the tenacious slough. His general condition was unfavorable, and there was a tendency to diarrhœa and perspiration. Internally he took muriatic acid, with extra diet and stimulants. 24th: Bromine was again applied to the surface and used in the form of vapor. The ulcer was now three inches in diameter, irregularly circular in form, with ragged, everted, and thickened edges, and surrounded by a purple areola. The slough was one inch in thickness, and resisted the action of the bromine. 26th: The sore is looking better; it has been disinfected since the first application of bromine, and the constitutional symptoms are better. 27th: A painting in oil was made to-day by Surgeon Brinton's direction, which would be pronounced a good representation of hospital gangrene. 28th: The slough is much thinner to-day, and the granulations are showing the thin gray covering. 29th: The sore is much better, is becoming covered with granulations, and has lost almost entirely its specific appearance. There is no constitutional disturbance, no fever, no headache, the tongue is cleaning off, and there is a return of the appetite. The bromine vapor was discontinued, and sol. sod. chlorinat. substituted. 30th: The livid areola has been changing daily in hue under the bromine treatment, has now entirely disappeared, and the sore is perfectly healthy. May 6th: He is still improving, and is taking tonics and nutrients. 20th: The sore is reduced to half its original size and is now cicatrizing rapidly. 24th: There is now a surface as large as a penny unhealed; health is very good; he is about the ward on crutches, and is no longer considered an interesting case. This man steadily improved; recovered with a good stump, and was finally sent to New York to be mustered out of service. He was discharged May 8, 1863, and died July 2, 1878, of valvular disease of the heart and cardiac asthma.

"We have in this case another instance in which the acid, locally used, proved useless, and in which the solution of bromine caused an immediate improvement. It was found necessary to apply the caustic solution to the ulcer three times, owing to the thickness of the slough, which was too closely attached to be removed by spatula or forceps. Its action here seemed to correct the fetor at once, to check the molecular death, and to change the hue of the areola, by causing a more healthy action in the capillaries. The gnawing burning pain was relieved, and the patient was able to sleep in comfort. The absorption of the virus produced in the ulcer was prevented by its destruction, and the nervous system quickly regained its tone. I will conclude this brief history by a short summary.

"*Etiology.*—This disease made its appearance in a wooden pavilion containing fifty beds, most of them occupied by very seriously wounded men unable to leave the building, with a cubic capacity of 1050 feet to each bed, heated by ordinary radiating coal-stoves, devoid of any system of ventilation, and having no ingress for pure air nor egress for foul, except through the windows and doors. This want of pure air was combined with a want of strict police and a careless and unscientific method of dressing the wounds, rancid ointments being largely used instead of the ordinary water dressing. No case of gangrene was received as such into the hospital, nor is it probable that it was otherwise introduced. Although a majority of the cases in this ward escaped gangrene, yet there was evidently some depressing agent at work, since but few wounds healed rapidly. The patients seemed also dispirited, homesick, and moody. Those who were attacked were removed to a ward in the brick house, where they were isolated and at the same time placed under better hygienic influences. Two shafts for foul air, connected with the stoves, which withdrew the foul air from near the floor, had recently been placed in the ward by order of the Surgeon General. This was not considered sufficient, and the long doors of these foul-air shafts were kept constantly open. Strict attention to cleanliness and careful dressing was enforced, and what might have been a very severe epidemic was confined to few cases. The upper row of windows were rehung in such a manner as to direct the currents of cold air admitted in a line with the roof, and, to crown all, the ridge ventilation was applied to the pavilion. These precautions, and an improvement in the diet of the house, giving more vegetables and antiscorbutics, enabled me to prevent any further serious manifestations.

"There were three other wards of like construction with Ward No. 5, but two of them were unoccupied and the third one contained fewer and less serious cases. The table on the next page indicates that of the nine unmistakable cases reported, eight appeared in Ward No. 5; and that of these eight, five occurred on the west and three on the east side of the ward. Although these facts would suggest the probability of inoculation, yet I cannot but remember that there were at least thirty-five other wounded men in this ward who escaped, although the disease had been in existence several days before February 17th, when I took charge, and no precautions against contagion had been employed. I shall not attempt to argue here the long-disputed point of contagion or non-contagion, but simply state it as the result of my observation that I saw no well-marked instance of inoculation, while I did see many wounds escape this influence where inoculation was not only possible but probable. Nor was it necessary to invoke the aid of any specific virus, since the

TABLE CLVIII.

Summary of Nine Cases of Hospital Gangrene, showing Date of Attack and Grade of Disease.

No.	NAMES.	WARD.	SIDE.	DATE OF ATTACK.	GRADE OF DISEASE.	RESULT.	TREATMENT.
1	Otto Kossack	5	West	February 15, 1863	Ulceration	Cured	Nitric Acid.
2	L. D Thurston	5	West	February 15, 1863	Sphacelus	Death	Nitric Acid.
3	Samuel Fossett [Fawcett]	5	West	February 18, 1863	Ulceration	Cured	Nitric Acid.
4	C. Underwood	3	East	February 20, 1863	Ulceration, mild	Cured	Nitric Acid.
5	J. [J.] Wick	5	West	February 28, 1863	Sphacelus	Death	Nitric Acid.
6	Patrick Morrissey	5	West	March 6, 1863	Ulceration	Cured	Nitric Acid.
7	J. Jordan	5	East	February 27, 1863	Ulceration	Cured	Nitric Acid.
8	R. W. Plummer	1	Building	March 9, 1863	Ulceration	Cured	Bromine.
9	George Zilch	5	East	April 14, 1863	Ulceration	Cured	Bromine.

NOTE.—Space would not permit to give the details cited by Dr. Thomson of the cases of Thurston, Fossett, Morrissey, and Plummer, referred to in this table.

unfavorable hygienic influences which had surrounded these men from the date of injury, December 13th, and the date of admission into hospital, December 26th, 1862, to February 15th, 1863, were sufficient to produce, in all the cases treated in Ward 5, a well-marked cachexia—neither scorbutus nor anæmia, but more unmanageable than either, and due, most probably, to the absence simply of fresh pure air in sufficient quantities. With no further improvements than those mentioned, a marked change for the better took place in the other inmates of this ward. Their wounds became healthy and healed rapidly, and their spirits became cheerful. It will be observed from the table that I have described two grades of hospital gangrene, the one mild, generally manageable, and characterized by ulceration or molecular death of the tissues, spending itself generally in the subcutaneous and intermuscular connective tissue; the other, more rapid in its course, more fatal, less amenable to treatment, and distinguished by sphacelus or mortification *en masse* of the invaded tissues. It will be seen that, of the nine cases, seven are described as ulceration and two sphacelus, and the latter both fatal. These two cases last mentioned were entirely uninfluenced by the treatment employed. The rapid invasion and advance of the mortification, and the impossibility of reaching it with nitric acid to influence it locally, left but little to do but to observe its profoundly depressing effect on the vital forces. Bromine may prove the antidote in such cases, but its virtues were then unknown to me. Treatment: Recognizing the depressed condition of the first few cases, I endeavored to remedy it by giving, at short intervals, nutrients and stimulants, with such tonics as seemed proper; and milk punch, alternating with beef essence, porter or ale, and eggnog was at first given, regardless of the desires of the patient. The citrate of iron and quinine with sherry wine was given in doses of 6 to 10 grains three times daily. This system was found injudicious, since it overpowered the feeble digestive organs and caused nausea, vomiting, and diarrhœa; it was suspended, and four drops of hydrochloric acid, in combination with 16 drops of tincture of opium, were given every three hours. Under this treatment the tongue became moist and clean, and the appetite returned sufficiently to cause the patient to ask for and enjoy a reasonable quantity of food. The opium was given to allay the gnawing pain and to give rest and sleep, as well as to obtain any specific influence over the disease which it might possess as claimed for it by the older writers. The local treatment consisted at first in the use of undiluted nitric acid freely applied to the entire surface of the ulcer. The table indicates the success of that treatment. Of the nine cases, all were treated with the acid in the early stages. Of these, two were fatal and two resisted the acid—or, in other words, in four cases it was useless. Of these four, the two fatal cases were not treated otherwise, while the other two were treated with success with bromine. The five cases treated successfully with acid are marked ulceration, and were milder than those that proved fatal or those that were treated with bromine successfully. The dressing, after the use of the acid, was an antiseptic wash, either creasote or liq. sod. chlor. in a dilute solution of bromine in water and bromide of potassium, proposed by Surgeon Goldsmith, U. S. V. Two cases were treated with this agent, in both of which nitric acid had failed. One of these would, doubtless, have proved fatal, while the other was progressing rapidly, although the acid had been used several times without benefit.

"The action of the bromine is that of a caustic; all the necrosed tissues are converted into

tough yellow shreds and are perfectly deodorized. The ulceration seems to be checked at once, while the nervous system, no longer depressed by the absorption of the fetid products of the mortification, soon recovers from its depression. The areola loses its livid hue, becomes more crimson, and finally disappears; the sloughs are rapidly thrown off and a rosy, florid surface appears beneath. The bromine was also used in the form of vapor, confined to the surface by oiled silk. Its antiseptic influence is very powerful, since not the least odor could be perceived on dressing these gangrenous sores, even when they had been covered closely with oiled silk for twelve hours. From its antidotal efficacy in these two cases I have formed a high opinion of its value in the local treatment of this disease.

"*Microscopy.*—The discharges from several of these cases were examined to ascertain whether some of the speculative views in regard to the presence of fungi and their influence in producing the disease could be sustained, but no fungi were found. The discharge consisted of fluid, granular matter, and débris. The connective tissue seemed to have been broken down into unrecognizable granular material. The fibrous tissue was softened and easily teazed out, and in the muscular tissue the striated appearance was lost before the fibrous.

"No evidence of textural growth was found in the discharges, although the 'piled-up' and thickened margins of the ulcers would probably reveal, on examination, a multiplication of the connective tissue-corpuscles, as reported in a similar group of cases at Annapolis by Assistant Surgeon Woodward, U. S. A. Since the preceding report was drawn up four other cases of hospital gangrene have been observed, occurring sporadically, and treated with success with bromine. Their clinical histories are very briefly offered for consideration, in addition to those already submitted. No other cases have occurred in this hospital. It will be observed that three of these four cases were fully treated with pure nitric acid without benefit, and that the four did yield eventually to the local application of bromine. Where that remedy has required heretofore several repetitions, it would now be used more energetically. The diseased surface would be thoroughly cleansed of all sloughs by removing those portions dead, yet tenaciously adherent, with the forceps and scissors, and pure bromine would be freely used by means of a glass pipette or a syringe. A number of the cases reported I am now satisfied would have proved fatal but for this local treatment, and it will be a proud satisfaction to Surgeon Goldsmith to know that he has not only already been instrumental in preserving so many valuable lives, but that he has provided the military surgeons with a defence against one of the most deadly and obdurate of his antagonists."

Sporadic cases of gangrene had occurred in the hospitals at Memphis, Tenn., in May, 1863, and during the latter part of this month the number of cases increased so rapidly that, on June 19th, an order was issued for the organization of Church Hospital for the special care of patients afflicted with this complication. The hospital was placed under the charge of Acting Assistant Surgeon C. H. Cleveland, whose detailed report of the progress and treatment of the disease is here appended:

"*General History:* Although I have been at no inconsiderable pains to obtain a history of hospital gangrene as it has appeared in the military hospitals of this city, I am convinced that I have been unable to collect all the facts necessary for a complete history, and therefore shall confine myself mainly to such as fell under my own observation.

"The first cases of this disease which came under my notice were those of Lieutenants Alban, Dallmyer, Letner, and Davis, who were brought to Officers' Hospital, of which I then had charge. They were received from the hospital boat on the evening of May 27, 1863, and each had gangrene of several days' standing when admitted, and were expected to survive but a few hours. In fact, Lieutenant Letner, who had gangrene of the stump of the left leg, died on the 29th, the second day after admission. Although the flaps sloughed away from the stump of Lieutenant Dallmyer so as to leave the bone uncovered for at least two inches, still, the periosteum remained vitalized. The gangrene was quickly arrested by the application of Labarraque's chlorinated soda solution, under the vigilant care of Cadet Randall, who attended to the dressing of the patient. Granulations sprang up all over the surface of the bone, a fine conical stump was formed, and on the 12th of June, about a fortnight after admission, he was dismissed on leave of absence, and went to his home. About this time, and later, a number of cases occurred in the different hospitals, but their

nature was not always understood by attendant surgeons. When attention was especially called to this disease by Surgeon Irwin, Superintendent of Military Hospitals here, cases were found in the Union Hospital to the number of twelve (12) June 25th; and soon thereafter at the Jackson, Gayoso, and Overton hospitals. The surgeon in charge of Adams Hospital reports the case of a man who came from the vicinity of Vicksburg on the 18th of February. He says that is the only case which has occurred in that hospital this year—a statement evidently erroneous, as Corporal Fuller was sent here, from there, with gangrene of right ankle, on the 9th of August. A similar error occurred in the report of the surgeon in charge of the Webster Hospital, who says but one case has occurred in his hospital; and yet he has sent to us Privates Alt, McEvoy, Cloud, McClure, and Butler, all with unmistakable gangrene. From the Overton Hospital we have received fifteen (15) patients, and how many more have had the disease in that hospital I am unable to determine, as I get no response to my applications for information. From the Jackson Hospital we have received eleven (11) patients; but from that hospital also have been unable to obtain any further information.

"Up to the first of September forty-six (46) patients have been sent to us, from other hospitals, having gangrene, which I have reason for supposing are not more than half the cases that have occurred in the hospitals. I know of seven (7) cases occurring at the Officers' Hospital which were retained there for treatment, as we have no special accommodations for officers.

"Not only have there been manifest errors in the reports from different hospitals in regard to the number of patients who have had gangrene, but the date of its appearance has been incorrectly reported. Early in the months of June the wards of Union Hospital were filled with patients from down the river, and immediately Cadet Randall reported to me that gangrene was among them. Surgeon Irwin states that, according to information in his possession, gangrene appeared *first* in the Union, then in the Jackson, the Gayoso, and the Overton hospitals; and his order for organizing and opening Church Hospital was issued on the 19th of June, one week before the disease was *reported* to have appeared in Union Hospital. The order for establishing and opening this hospital was issued on the 19th of June; yet, owing to delays in the Quartermaster's Department, no patient was received until the 30th of July, and the two days of that month are included in the report for the month of August. During its organization and until the 7th of August I was in charge of this hospital, when Surgeon George K. Weeks was assigned to its temporary charge for the special purpose of testing the use of bromine in the treatment of gangrene. Until Surgeon Weeks came we had no bromine; one ounce had been furnished to the hospital, but after the dressers had used it once it unaccountably disappeared. After that time reliance was placed mainly on the local use of Labarraque's solution of chlorinated soda applied in its full strength, although nitric acid, acetic acid, sulphate of zinc, and muriated tincture of iron were used in some cases.

"The favorable result which followed the chlorinated soda preparation in the case of Lieutenant Dallmyer at Officers' Hospital gave me considerable confidence in it, both in gangrene and erysipelas, which confidence is shown by the hospital records not to have been misplaced, as every case of erysipelas sent to us was cured by it alone in from three to five days. Private Samuel Arbothnot was sent here from Jackson Hospital, with gangrene in the palm of the left hand, July 30th, and was returned cured of the gangrene August 8th. Robert Graham was admitted from Union Hospital on the 31st of July, with gangrene of the right arm, and returned with no vestige of gangrene remaining on the 4th of August. Private William Goff was admitted from Union Hospital, August 1st, with gangrene of the right leg, and returned cured August 4th. Private T. L. Twiman was sent here from the Overton Hospital on the 31st of July, with gangrene of the right thigh, and returned cured of gangrene on the 5th of August. Private Fred. Louis came from Jackson Hospital, with gangrene of the right hand, on the 30th of July, and was returned cured on the 4th of August. Other similar cures have followed the persistent use of this remedy since that date.

"On the 8th of August, when Surgeon Weeks took charge of the treatment, he brought from Surgeon Irwin five ounces of pure bromine, which supply was exhausted on the 16th of August, and no more has been had since. On the 20th of August, Dr. Warriner, agent U. S. Sanitary Commission, gave to the hospital five bottles of Professor J. Lawrence Smith's compound solution

of bromine, which is now used in place of the pure article, but not to the satisfaction of any one connected with the hospital, it evidently being by no means equal in efficiency to the bromine in full strength. During the week that pure bromine was applied it was found, as the records show, that usually a single application sufficed to completely eradicate the gangrene. In cases of apparent failure it was afterwards found that there were some parts, deep between muscles, under the integuments, or in sulci or sinuses, which the bromine did not reach. While we had no bromine, and also when we had only the Smith's compound solution, we found it much more difficult, and in some cases quite impossible, to eradicate the disease, mainly from the impossibility of bringing the remedies directly in contact with the entire affected surface. Up to the 1st of September forty-six (46) cases of genuine hospital gangrene have been treated in this hospital. Of that number thirteen (13) died, but none directly from the gangrene. During the month fifteen (15) have been cured and transferred to the hospitals from which they came. Eighteen (18) still remain under treatment, most of whom are entirely free from gangrene, but are not restored in health sufficiently to leave the hospital. Some of these will die from the *effects* of gangrene on the system.

"*Diagnosis.*—Hospital gangrene, as it has been presented to us at this hospital, has assumed a great variety of appearances. In the earlier stages it has appeared as a dusky, almost black, mass of dead and rotten flesh, occupying the seat of the disease, surrounded by a reddish ring of slightly swollen integuments, which ring varies from one to five lines in breadth, while the adjacent tissues do not appear to be affected by the disease, except that they, as well as the whole body, contain less heat than is natural in healthy structures. Often the disease has burrowed under the integuments bordering a wound, and when the skin dies it loses its epidermis, the true skin becomes reddish, greenish, purplish, or black. When a surface already divested of its skin is affected with the disease (and most of the cases at this hospital are truly traumatic), the first invasion appears by giving to the surface an ashy-gray color, with a pultaceous consistency, and the *peculiar* odor of spoiled meat, by which the disease is readily recognized. This pultaceous ashy appearance of the surface wounds presents itself when the areolar tissue alone is attacked. When the muscular tissue becomes affected, and when small blood-vessels have become ruptured, a dark, grumous, almost black, dirty appearance of the diseased surface is presented, accompanied by a powerful fetid odor, and, usually, with an invasion of the disease under the skin, and between muscles and tendons in the connective tissues much beyond the boundary of the disease as it appears on a superficial examination. In the case of Private Milseps, who was wounded at Port Hudson, on the 27th of May, with a minié ball in the right thigh (the ball not being extracted till he came here), the disease burrowed in the fascia of the thigh until his whole thigh appeared gangrenous in the deep-seated parts, and he died suddenly from arrest of circulation. *Post-mortem* examination revealed a detached thrombus in the left auricle of the heart, plugging up the artery, which weighed four hundred and eighty-two (482) grains. One patient, Private T. D. Riggs, who was wounded high up in the right calf by a musket ball, at Helena, on the 4th of July, and brought here on the 31st, had the disease following down the tendon to the os calcis, which was necrosed. Although the entire extent of the leg was laid open it was too late to save the patient, who has since died (Sept. 2d) from the absorption of gangrenous matter. I removed from his thoracic duct a thrombus nearly six inches in length. These two cases are but extreme illustrations of the tendency of the disease to extend itself in the areola tissue, along plains, and between more solid organs and structures. But muscles, vessels, nerves, tendons, periosteum, and bone are often invaded, when the part affected turns dark, emits a peculiar (gangrenous) odor, dies, softens, and finally liquefies when not removed in the form of slough or by the dresser's instruments.

"*Preparation of Wound.*—I am convinced that many surgeons have failed in the treatment of hospital gangrene because they have not fully perceived the necessity of thoroughly cleansing the wound of all dead and diseased matter previous to the use of any local application. Private James McEvoy, who was wounded at Raymond, on the 12th of May, and had his right arm amputated near the elbow, had gangrene of the stump about the 20th of June, and was sent here on the 10th of August, with a statement that bromine had been applied, daily, for eight days. On examination it was found that there were at least two inches in extent of dead structure on the end of the stump, and the bromine had been applied to that, and not to the live tissue. All the dead and dying structures were carefully dissected from the surface of the stump, removing a large quantity

of putrescent matter, and then bromine in full strength was cautiously applied to the entire surface, and the disease was at once arrested. He remained ten days, and then was returned to Webster Hospital.

"When patients are first brought here it is often necessary to place them under the influence of chloroform while their wounds are being prepared, and obtund the pain caused by the remedies applied; and afterward it is not refused them if the dressing is likely to be very painful. The wound is washed by means of a stream of water projected from a syringe; all the pultaceous and gangrenous matter removed with soft cloths; the more tenacious diseased portions taken away with forceps, the scissors, and scalpel; and finally, all blood, water, moisture, and semi-fluid matters under the skin, or between muscles or tendons, are removed with a little swab made by winding a strip of soft cloth around a stick. . If the disease has burrowed under the skin it is better to at once open up all such retreats, as well as to carefully pare off the diseased portions of the skin on the edges of the wound, that the agent applied may come directly in contact with the vitalized structures in the parts affected. If, through carelessness or oversight, this thorough preparation of the wound is not attended to, the progress of gangrene is not likely to be stayed whatever the remedy applied.

"Soapsuds as a wash does not answer for gangrenous ulcers as well as pure warm water. It appears to combine with the fluids of the surface, producing a slimy mixture which it is difficult to remove. A diluted solution of Labarraque's chlorinated soda has been found to answer admirably in these cases, for when applied in a gentle stream from a syringe it can be made to penetrate into all the recesses of the disease, destroying all odor and dissolving and removing some of the dead matter attached to the surface of the ulcer. At about the strength of sea water it seems to properly stimulate the structures as well as cleanse them. An ordinary hard-rubber syringe with the little swabs (already described) have been found preferable to sponges or cloths for cleansing tender and delicate surfaces.

"*Local Applications.*—Any substance which has the chemical power of decomposing the specific virus of gangrene so that it no longer exists as gangrene must possess the property of a curative agent in this disease, provided it can be brought in sufficient quantities in direct contact with every atom of gangrene matter; and provided also that it does not possess sufficient power to overcome and destroy the vitality of such still vitalized structures and tissues as we wish to preserve. We have made trial of nitric acid until we have become satisfied of three things in regard to it: It will destroy all gangrenous matter with which it is brought in contact in its full strength. It is, however, extremely difficult in many cases to apply it in full strength, as in sinuses and sulci, where the moisture in those parts may so dilute it as to render it inefficient. It is unsafe, as, if brought in contact with the fine tissues, nerves, vessels, periosteum, or bone, it is almost certain to cause destruction to the parts and produce irreparable injury.

"Sulphate of zinc in solution does not appear powerful enough to arrest the disease in many instances. Acetic acid has not been applied in a sufficient number of cases to have led to any positive conclusion. The same may be said of the solution of the chloride of zinc. The muriated tincture, as well as the solution of the persulphate of iron, have both been used, but principally on bleeding surfaces and to check hæmorrhage from ruptured vessels; and while they may have a curative power, such property has not been so manifest as to give us much confidence in them as arresters of gangrene.

"Labarraque's chlorinated soda solution has proved quite efficient, applied in its full strength, as an arrester of gangrene. In all cases where the liquid could be thoroughly applied to all of the affected parts, one, or at most two or three, applications appeared to eradicate the disease. But it could not always be applied to deep-seated parts, or within sulci, without becoming diluted with the fluids already there, and so much of the solution seemed to be demanded that it was liable to flow beyond the ulcer and the healthy skin be blistered by it. But, during nearly one-half the time this hospital has been open, we have placed our main reliance on this agent, and our confidence has not been shaken. In all cases of ulceration, where no gangrene remains, we wash the surface once or twice a day with this solution, diluted, and saturate the dressings with it as often as they get dry, or once in two hours, and are well pleased with the result.

"Bromine in its full strength, however, is the agent which has given us the most satisfaction. This does not appear caustic enough to destroy healthy tissues, but is of sufficient strength to

unite with and change all the parts affected with disease. Of course a few drops will not unite with or change a large amount of gangrenous material, but in all cases under my observation where the dead matter had been properly dissected away and the wound cleansed of its pultaceous and other dead matter with the syringe, the forceps, and the swabs, and the surface dried with soft cloths, one application, or at most two or three, has obliterated all traces of gangrene and left the wound a simple ulcer. As has been observed, the wound must be thoroughly and carefully prepared before the bromine is applied. Even if all other necessary conditions are complied with, should moisture be allowed to remain in the deeper parts of the sore, that moisture may so dilute the bromine as to render it inefficient, or it may protect the subjacent parts from the remedy, and a point of gangrene will remain to infect the whole sore. Bromine can be conveniently applied by means of little swabs, like those used in cleansing the wound. First, there should be prepared and at hand a cloth spread with simple cerate, large enough to more than cover the affected surface. The ulcer should be cleansed and dried, and then an attendant, standing near the patient, holds the phial of bromine, from which he removes the stopper just long enough to allow the surgeon to insert into it a little swab, saturating it with the bromine, which is at once applied to the ulcer. This operation is to be repeated until all parts of the sore are touched with the bromine; and to parts beyond the reach of the swab bromine should be injected by means of a glass P. P. syringe, when the sore should be immediately covered with the cerated cloth to prevent evaporation of bromine and to protect the ulcer from the atmosphere. Then the part may be dressed with cloths and bandages the same as for simple sores.

"The pain which attends and follows the application of bromine is quite severe, but not more severe nor of longer continuance than follows the application of milder agents. The sense of pain appears even somewhat obtunded by the action of it, and after a short time patients express themselves as being much easier than they have been for days.

"To surgeons and attendants bromine, when incautiously used, proves very disagreeable, and this fact, doubtless, has prevented its use in many cases. If the vapor of bromine is allowed to come in contact with the eyes and air passages such parts suffer severely from irritation for several minutes, then all unpleasant effects pass away. But, with proper precaution, these parts need not be exposed to the vapor, and ten or twenty patients may have bromine applied to them in a morning without much discomfort to the surgeon.

"Whatever agent is applied to a gangrenous surface it does not appear desirable to disturb the dressing more than once a day. When bromine is used it is usually necessary to wait two or three days for the surface of the sore to become thoroughly cleansed before it is again resorted to; but if there remains a decidedly gangrenous odor on the second day, or if it appears at any future time, the parts should be carefully examined and bromine applied to all affected surfaces. Gangrene can be detected by the trained sense of smell more readily than in any other way, and for several days after the disease has disappeared wounds should be examined in this manner, as well as by the eye, and all appearance of taint followed to its source and the disease eradicated.

"On the second day, usually, after bromine has been applied the surface of the ulcer looks dark and charred; on the third day the dead portions begin to liquefy; and the fourth day the surface appears studded with healthy granulations. After the gangrene is subdued the wounds are dressed as simple ulcers, but in most cases the dilute chlorinated soda solution is constantly applied, both as a slight stimulant to the newly formed tissues and to protect it from the virus which may be in the atmosphere of the hospital. I have made considerable use of oakum, wet with a solution of chlorinated soda or of the chloride of lime, to gangrenous ulcers *the day after* the application of bromine, and to the ulcer after the wound is freed from gangrene, and am satisfied that, in general, it is preferable to lint. It is easy of application, readily absorbs the excretions, and is easily removed when the wound again requires dressing. A very convenient way of applying moisture to the sore is by means of a hard-rubber syringe. The solution may be drawn into the syringe, the pipe of which can readily be inserted under the bandage and the liquid applied directly to the oakum, filling and covering the ulcer and moistening the entire dressing. The compound solution of bromine has been extensively used by us since our stock of pure bromine became exhausted, but we do not consider it a good substitute. It does not appear to be active enough to readily destroy the gangrene. It has been applied day after day carefully, thoroughly, and faithfully, with the swab and the syringe, into parts where the gangrene has burrowed under fascia and

along tendons, as it is very apt to do, and directly to the walls of such extensions, when they have been laid open, by means of pledgets of lint saturated with it, as well as in the same manner to the original ulcer, and yet we have sometimes failed for days to arrest the disease. I have made careful trial of both the compound solution of bromine and Labarraque's solution of chlorinated soda, and cannot discover that the bromine preparation possesses any valuable properties which the chlorinated soda has not. Both destroy the disease when applied to it, but the compound solution of bromine causes more pain, does not appear to be any more active than the chlorinated solution in full strength, and very readily loses its bromine by evaporation if not quickly and cautiously covered with a cerated cloth.

"Pure unadulterated bromine seems to possess special properties which entitle it to more confidence than any other agent with which we are acquainted. The liquid readily vaporizes in the atmosphere and the vapor is easily absorbed by fluids. The vapor when brought in contact with the odoriferous emanations of gangrene at once destroys their odor, and probably their specific gangrenous character. When thoroughly applied in sufficient quantity to a gangrenous sore it at once obliterates all gangrenous odor, and no gangrene appears afterward, unless the wound receives new infection. Its ready vaporization permits its application to the bottom of sinuses and sulci which cannot safely be laid open with the knife, and which are very common in the patients of this hospital; its prompt, almost instantaneous, action precludes the necessity for a prolonged use of the remedy; while sufficient experience in its use shows that it may be applied directly to the covering of a nerve, or the periosteum, without destroying their vital integrity.

"*Contagiousness.*—Hospital gangrene is produced by infection upon an exposed surface. Several cases have come to us with the disease following the application of a blister. It has also appeared in bed-sores. One case, where the arm had been broken, badly adjusted, and splints caused abrasion, gangrene followed. A man acting as nurse to his captain who had gangrene, had small spots of inflammation on his ankle, caused possibly by mosquito bites, which he had rubbed the skin from; he also had little scratches on his fingers; gangrene set in at all these points, and he may yet lose his life as the result. In Officers' Hospital, an officer with gangrene occupied a room alone; the carpenters wished to put a water-pipe in it, and he was removed to a room in which were three other officers with wounds not then gangrenous; all four had their wounds exposed and dressed, and the gangrenous odor pervaded the apartment. Although the officer was returned to his own room in an hour, the next day gangrene appeared in the wounds of the three others who had been exposed to the infection.

"Instances have occurred in this hospital where wounds which had been free from gangrene for several days became again diseased, and doubtless from renewed infection received from others laboring under the disease. To guard against infection we have made free use of chlorinated soda, chloride of lime, a solution of the permanganate of potassa, chlorinum, and bromine, and the most scrupulous cleanliness and free ventilation. Each patient is supplied with his own drinking-cup and other utensils, and his own sponges; if he has two wounds and only one is gangrenous, each wound has its sponge, and all are kept as clean as possible. If the nurses, dressers, or surgeons have wounds or abrasions on their hands, bromine is applied and their hands exposed to the virus without fear. In cleaning a very bad gangrenous sore the scissors were found to be dull, and while sharpening them I cut out the ball of my left fore-finger; I applied bromine, and the wound healed kindly and readily. Nearly every day I have had either cuts, pricks, scratches, or other abrasions on my hands, which are freely exposed in dressing the wounds and in the dead-house, with no unpleasant consequences. I have always applied bromine to the denuded surface before exposure, and am convinced that the virus of the dead-house, as well as other animal poisons, is entirely destroyed by the action of bromine.

"*General Treatment.*—The constitution seems to require much more than the ordinary amount of nutriment in this disease, and it is only after considerable poison has been absorbed, and the heart and lungs have become affected, that digestion and assimilation are deranged. It is true that the *temperature* of the entire body is, almost invariably, below the normal standard. During the month of August the thermometer ranged, in the wards of this hospital, at 2 o'clock P. M., at from 98° to 103°, and yet the average temperature of the patients at the same hour, as indicated by the thermometer in their axillæ, was but 89°. The average daily temperature of Sergeant

Wilkie, who died from pyæmia after secondary hæmorrhage, was only 74°; and that of Private T. D. Riggs, who had gangrene of the right calf extending down the tendon to the heel bone, was only 84°. The pulse of the former averaged 114, the latter 88 beats in a minute. This low state of temperature led us to very free use of alcohol in the various forms of ale, porter, whiskey, and brandy, usually given once in two hours, and as much nutriment, beef, eggs, etc., as the patient would take. A very marked desire for acids prevailed, which was gratified by giving pickles, citric acid drinks, and acid fruits. After the disease had progressed to the serious invasion of the general system (and most of our patients were *old* cases, brought from other hospitals) a very persistent diarrhœa was common, and that was about the only condition that demanded active medication. We carefully avoided the use of cathartics and opium, and as a soother to nervous and febrile excitement used Hoffman's anodyne. In some cases, distinctly complicated with miasma (and many of the patients came from the vicinity of Vicksburg, where they had been exposed for months), we gave sulphate of quiniæ—one or two doses of ten grains each were usually sufficient.

"*Conditions favoring the appearance of Gangrene.*—While no certain *cause* for the disease except contagion has been determined, it is evident that a depression of the vital forces has been favorable to its accession. Fourteen (14) out of forty-six (46) cases of our patients were secession prisoners, and I think that all the seven at Officers' Hospital were also prisoners—a much larger number than a fair proportion, proving that exposure, privation, and a consequent depression of vital forces is a condition favoring the appearance of the disease.

"*Post-mortem Appearances.*—The tables compiled from the hospital records, and the reports of individual cases furnished by Cadets Gunn and Lloyd, together with the learned and able report on the pathology of the disease by Surgeon Weeks, who has had unusual opportunities for the study of gangrene at Louisville, Vicksburg, and this place, obviate the necessity of extended remarks on this branch of the subject. With one or two exceptions we have made examinations in every fatal case and have observed a very uniform set of conditions. In all we have found thrombi in the heart, some of which have been very large. In one we found a thrombus in the thoracic duct, and I regret that we did not examine that passage in the preceding cases. In one case of long standing the heart thrombus was softening, and the walls of the heart were tainted with gangrene. In another case, where the disease was of still longer duration, the heart thrombus was considerably broken down and liquefied, and the walls of the heart very much softened, flabby, and decidedly gangrenous. The lungs in every case were spotted with dark specks, and, being cut into, it was found that the smaller arteries were often filled with thrombi and dark matter, evidently the débris which had been washed away from a thrombus in the heart and become lodged in the smaller vessels. The disease in this case was unusually malignant and rapid. In no case have I perceived any collection of pus or softening of matter, such as is said to have been observed in the lungs of those who have died of gangrene elsewhere.

"*Curability of Gangrene.*—This disease, like syphilis in its earlier stages, seems to be entirely local, and completely curable when the parts affected are not *vital* organs, which has never been, primarily, in any case coming under my observation, and when all the parts affected can be reached by direct application of the remedy. But the *secondary* affections, as the thrombi in the heart, the pulmonary complications, and the change in the fluids, which is sometimes called *pyæmia*, are conditions which do not seem controllable by remedies. We have often had cases recover after the heart, the lungs, and the blood had become seriously implicated. But gangrene can be considered certainly curable only in cases where the system has not become seriously affected by disease. In all simple cases gangrene seems as curable as a burn, scald, or any other serious wound.

"*General Treatment.*—No remedy has yet been presented to us that has apparently any marked or positive curative power over the constitutional and organic derangements produced by the absorption of the poison of gangrene. We saturate the air of the wards of this hospital with chlorine, and we have given bromine internally for days and weeks; and while we do not know of a certainty that this course has proved beneficial to our patients, we should hesitate to deprive them of even the possible benefits arising therefrom. Pure air, full nutrition, alcoholic preparations repeated as often as once in two hours, hope, cheerfulness, and immediate removal of all causes of distress and fretfulness (for gangrenous patients are very childish), with perfect cleanliness of the bed and the person, seem preferable to any form of perturbative medication."

The largest number of cases of gangrene (1,611) occurred in 1864, when the terrible battles of Grant in Virginia, and of Sherman in Georgia, filled the hospitals to overflowing; but the disease seems to have lost its terror to the medical officers. The cases were quickly isolated in hospitals or wards specially assigned to this purpose, and under the various treatments described in the preceding pages the larger proportion of the cases were brought to successful terminations. The proportion of cases of gangrene to the number of troops engaged or to the wounded treated in hospitals during the six months of 1865 was very small, only one hundred and thirty-five (135) being found recorded on the registers. Illustrations of hospital gangrene will be found on the plates opposite pp. 739 and 928 of the *Second*, and on PLATE XXVII, opposite p. 53, of the *Third Surgical Volume.*

Instances of *Dry Gangrene*, the result of shot injuries, were rare. A case of this nature has been detailed on page 310 of this volume (Case of E. Green), and another (Case of H. Strauss) has been referred to in *Note* 2, on page 351 of the *Second Surgical Volume.* The appearance of the feet in the latter case is shown in the chromo-lithograph opposite. In these, as well as in the following seven instances, the gangrene was due to impaired arterial circulation:

CASE 1209.—Private W. Steel, Co. G, 70th New York, aged 26 years, was wounded in the left leg, at Manassas Gap, July 23, 1863, and entered Lincoln Hospital, Washington, one week afterwards. Assistant Surgeon H. Allen, U. S. A., recorded the following description of the injury: "The ball struck on the outer side of the leg, passing in a straight line inward through the upper part of the belly of the gastrocnemius, and coming out on the inner side of the calf. The bleeding was copious. Immediately after the reception of the wound the man experienced a severe pain in the ankle and was totally unable to walk, only dragging the limb after him. When admitted into Lincoln Hospital the foot had become bluish, which appearance the patient stated had come on two days previously. The pain in the ankle passed off the first evening, but when the blueness commenced the pain reappeared and continued to increase in severity until the date of amputation. The color of the foot was that of bluish stone, but not shrivelled, the toes being of a deeper hue than the rest. This appearance gradually increased up to the ankle, and then ran up posteriorly to the lower third of the leg. Amputation through the wound was performed by flap method on August 3d. After the operation the constitutional symptoms, such as pale and tremulous tongue, quick and feeble pulse, continued about the same. The flaps were pale and rather flabby, but not gangrenous. A diarrhœa set in, which was checked by August 25th; appetite capricious. By October 20th had entirely recovered, the stump having healed without exfoliating any bone." On January 30, 1864, the patient was discharged from service and pensioned, and subsequently he was furnished with a "Palmer" artificial leg. In his application for commutation the pensioner describes the stump as being in a healthy condition. He was paid December 4, 1880. A representation of the gangrenous limb is given in PLATE LXXIX, opposite p. 818.

CASE 1210.—*M. A. Gammel*, Co. G, Arkansas Regiment, aged 23 years, wounded at Antietam, September 17, 1862, by a fragment of shell just above left ankle. Leg was amputated about two weeks afterwards. On October 28th he was admitted into hospital at Frederick, Maryland. Patient suffered from a large bed-sore, and sloughing of the flaps allowing the bones to protrude; he had also a violent diarrhœa. These complications were alleviated by treatment, but his general condition continued very poor; the discharge from the stump became thin, watery, and dark colored. On December 2d dry gangrene set in, in the great toe of the right foot and also in the second toe. Pulse very feeble and rapid. General condition bad. December 4th: Gangrene involved all the toes; no constitutional symptoms developed; strength very feeble. The patient died December 5, 1862.

CASE 1211.—Private Charles Hanford, Co. I, 14th Ohio, was wounded at Chickamauga, September 19, 1863. The missile entered over the anterior border of the sterno-mastoid of the right side opposite the larynx, passed backward and inward, striking the spine and comminuting its processes at that point. Another ball passed through the right hand at the middle of the carpo-metacarpal articulation. A few spiculæ were removed from the wound in the neck. He was admitted on September 30th into the hospital at Chattanooga, Tennessee. There was complete paralysis of the lower extremities and of the right arm; unpromising case. Simple dressings were applied and anodynes given. October 3d: Large slough of skin on dorsal aspect of left foot; dry gangrene of toes of same side. No other change. Right carotid seen pulsating through wound; little reduction of general heat of body. No trace of motion in extremities and right arm; slight in leg, but being pricked with a pin said it was water falling on the part. October 6th: Motion slight in both extremities and right arm; sensibility increased; can detect pricking in leg and feet. Gangrene of toes progressing slowly; ball of right toe involved; right hand and arm swollen. Patient died October 6, 1863, with tetanic symptoms.

CASE 1212.—Walter Hill, freedman, was admitted into Freedmen's Hospital, Vicksburg, Mississippi, April 26, 1865, with a gunshot wound of the left leg, accidentally inflicted on April 15th. A conical ball entered the left popliteal space and lodged in the deep-seated tissues of the joint. Simple dressings were applied. The bullet was cut out on April 26th. Patient died May 20, 1865, of chronic diarrhœa and dry gangrene of the leg.

CASE 1213.—Private W. J. Logan, Co. K, 9th Pennsylvania Reserves, aged 23 years, received a shot wound of the left foot, at Bull Run, August 30, 1862. The bullet entered the front of the heel and passed directly upward through the top of the foot. Many pieces of bone were extracted. The patient was discharged from service at Carver Hospital, Washington, November 5, 1862, and pensioned. Dr. John Kirker, of Pittsburg, reported, April 15, 1870, that on December 23, 1869, he "amputated the

Ed. Stanch pinx.

J. Bien Chromolith.

DRY GANGRENE OF THE FEET.

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left leg at the junction of the upper and middle thirds because of dry gangrene of the foot produced under the following circumstances: He received a gunshot wound of the foot which so injured it as to compel him to rest chiefly on the heel in walking, causing, in my judgment, aneurism, which gradually developed during the summer of 1869. Dr. A. M. Pollock operated for aneurism in my presence. Dry gangrene resulted from impaired arterial circulation, it commencing in the original wound, and had involved the whole foot at the time the operation of amputation was performed." The pensioner was paid in June, 1876.

CASE 1214.—Private Peter Mon, Co. E, 2d Massachusetts, aged 27 years, was wounded at Chancellorsville, May 3, 1863. On May 7th he was admitted into Douglas Hospital, Washington. A minié ball had entered the internal portion of the calf of the right leg, lacerated the posterior tibial vessels, comminuted both bones, and lodged in the gastrocnemius muscle. When admitted to the hospital his general condition was tolerable, and the injury to the vessels was not detected, as the heat and appearance of the foot were good. On May 9th it was noticed that dry gangrene was beginning in the foot, and, after free stimulation during that day, a circular amputation was done in the lower third of the thigh by Assistant Surgeon W. Thomson, U. S. A. The patient reacted well and had no bad symptoms from the moment of the amputation. The ligature around the femoral artery separated on the tenth day, and by May 22d nearly one-half of the flap had united. A slight tendency to diarrhœa was readily checked by laudanum enemata. The patient was discharged August 26, 1863; stump quite well; patient strong and hearty.

CASE 1215.—Private W. Thompson, Co. H, 69th New York, aged 19 years, was admitted into Armory Square Hospital, Washington, April 1, 1865, with a shot wound of the posterior aspect of the right leg, received at Hatcher's Run, March 25, 1865. The ball passed upward and made its exit over the tibia five inches below the knee joint. Dry gangrene existed at the time of admission, owing to the circulation to the foot being cut off. On April 2d Surgeon D. W. Bliss, U. S. V., amputated the limb at the lower third of the thigh. Pyæmia supervened on April 12th, and the patient died from exhaustion April 15, 1865.

In all these cases the feet or the toes were the parts affected. As already stated, interference with the arterial circulation was the cause of the gangrene, although the manner of this interference may not be so clear in one or two of the cases. In the cases of Steel, Thompson, Mon, Hill, and Green, the arteries of the affected limb had been injured. In the case of Logan (CASE 1213), dry gangrene developed upon the formation of an aneurism following a shot wound of the dorsum of the foot. In Hanford's case (CASE 1211) complete paralysis of the lower extremities and dry gangrene of the toes of the left limb were the results of a shot injury of the neck with lesion of the spine. In the case of Strauss, phlebitis and dry gangrene ensued after a shot perforation of the pelvis with injury of the urethra. *Gammel* (CASE 1210) received a shell wound just above the left ankle; the leg was amputated; sloughing of the flaps and bed-sores followed, and thirty-five days after the operation dry gangrene appeared in the toes of the *right* foot. The patient died.

In five of the nine cases of dry gangrene here cited, amputation was performed after the appearance of the affection; four recovered. The remaining four cases, in which no operative interference was resorted to, proved fatal.

TRAUMATIC ERYSIPELAS.

Less frequent than the instances of gangrene were the cases complicated by traumatic erysipelas. Under traumatic erysipelas have here been considered the cases in which inflammation of the skin, originating from a wound, quickly extended over the surrounding parts, ending in rapid resorption, while the progress was accompanied by an exceedingly high fever. Cases of acute suppuration and diffuse inflammation, or of diffuse acute osteomyelitis, which have sometimes been classed with erysipelas, are not considered in this group.

The total number of cases of traumatic erysipelas was one thousand and ninety-seven (1,097), or only 0.4 per thousand of the two hundred and forty-five thousand seven hundred and ninety (245,790) cases of shot wounds recorded during the war. With regard to the various regions of the body, the cases were distributed as indicated in TABLE CLIX, on the next page.

The percentages there given, viz: 14.0 per cent. for the head, face, and neck, 5.2 for the trunk, 41.7 for the upper extremities, and 39.1 for the lower extremities, only indicate the relative percentage of the frequency of the disease in the four subdivisions of the body in regard to each other. The liability of the various portions of the body to this infection

TABLE CLIX.

Numerical Statement of One Thousand and Ninety-seven Cases of Traumatic Erysipelas.

SEAT OF INJURY.	CASES.	RECOVERY.	FATAL.	UNDETERMINED.	REGIONAL PERCENTAGE.
Head, Face, and Neck	154	107	44	3	14.0
Trunk	57	23	33	1	5.2
Upper Extremities	457	259	180	18	41.7
Lower Extremities	429	229	193	7	39.1
Aggregates	1,097	618	450	29	

is shown by comparing the number of wounds of each region with the number of cases of erysipelas reported therein. In twenty-six thousand four hundred (26,400) cases of shot wounds of the head, face, and neck, erysipelas was noted in one hundred and fifty-four, or in 5.8 per one thousand; in forty-five thousand one hundred and eighty-four (45,184) wounds of the trunk, in fifty-seven, or in 1.2 per one thousand; in eighty-seven thousand seven hundred and ninety-three (87,793) wounds of the upper extremities, four hundred and fifty-seven, or in 5.2 per one thousand; and in eighty-six thousand four hundred and thirteen (86,413) wounds of the lower extremities, in four hundred and twenty-nine, or in 4.7 per one thousand. It would seem, therefore, that erysipelas occurred most frequently in wounds of the head, face, and neck, next in wounds of the upper extremities, then in wounds of the lower extremities, and least frequently in wounds of the trunk. The prevailing opinion that erysipelas is most frequently found after wounds of the head and face is here corroborated; the frequency of erysipelas after wounds of the upper extremities has also been noted by Socin, who was unable to assign any plausible cause therefor.

The average duration of the disease was eleven days;[1] in 31.7 per cent. it subsided in from one to five days, in 31.7 per cent. in from six to ten days, in 19.4 per cent. in from eleven to fifteen days, and in 17.2 per cent. the duration of the disease exceeded fifteen days, as in the following case, in which it continued for about four weeks:

CASE 1216.—Private *G. Walker*, Co. A, 9th Louisiana, was wounded at Gettysburg, July, 1863, and was admitted on July 18th into the Louisiana Hospital at Richmond; a minié ball fractured the crest of the left ilium; the ball remained embedded in the bone and was extracted. On admission the wound had a healthy appearance and the general condition of the patient was good. On the 22d and 25th of July several loose spiculæ were extracted. On July 28th erysipelas appeared around the wound and gradually spread upward and downward until the whole abdomen, back, and chest were invaded. It there seemed to limit itself. At the first manifestation of the disease an active purgative was administered, and immediately after tincture of iron was given, twenty drops every two hours. An ointment of sulphate of iron, a drachm to an ounce of lard, was used morning and night on the whole surface affected with erysipelas. In spite of this treatment the disease, which seemed to have stopped spreading, extended to the neck, arms, and thighs. The fever increased considerably and was accompanied with delirium and great restlessness, soon followed by coma and prostration; there was also some diarrhœa; two blisters were applied to the inner part of the thighs; carbonate of ammonia, camphor, and bark, with astringent enemata prescribed in addition to the tincture of iron. In order to check the progress of the erysipelas, which threatened to invade every part of the body, a bracelet one and a half inches wide was made by cauterizing with nitrate of silver around the forearms and upper part of the legs. This treatment seemed to check the disease. August 25th: The erysipelas did not spread beyond the line of cauterization, and did not invade the head. Consciousness returned; the bowels became more regular, and the patient, after having been in a very critical condition, and although now (August 25th) very weak, is gradually but steadily recovering; the wound has a healthy appearance and discharges but moderately.[2]

[1] SOCIN (A.) (*Kriegschirurgische Erfahrungen gesammelt in Carlsruhe* 1870 *und* 1871, Leipzig, 1872, p. 34) found that the average duration of the cases observed at Carlsruhe in 1870-'71 was 10 days, and LOSSEN (H.) (*Kriegschirurgische Erfahrungen aus den Barackenlazarethen zu Mannheim, Heidelberg und Carlsruhe* 1870 *und* 1871, in *Deutsche Zeitschrift für Chirurgie*, Leipzig, 1872, B. I, p. 544) states that at Mannheim the mean average was 9 days.

[2] FORMENTO (F., jr.), *Notes and Observations on Army Surgery*, New Orleans, 1863, p. 57.

A first attack of erysipelas by no means secured the patient against a second, and as a rule it would seem that the later attacks were the more virulent. On page 433 of this volume has been detailed the case of Private *S. Prillaman* (CASE 674), in which the patient had nine separate attacks of erysipelas, and in the two following cases repeated attacks of the disease were noted:

CASE 1217.—Private H. B. Williams, Co. G, 27th Indiana, received a shot wound of the left wrist, at Antietam, September 17, 1862. He was admitted on the next day into hospital at Frederick. Acting Assistant Surgeon W. S. Adams reported: "Wrist joint much disorganized; ball passed through left wrist, comminuting the small bones; finger readily passes through the opening. September 20th: Extensive erysipelas from elbow to fingers; made a free incision along the arm to the wrist and two incisions along the dorsum of the hand. Ordered lead and opium wash to be freely applied and to take fifteen drops of tincture of iron every three hours, two ounces of brandy every two hours, and three grains of quinine every three hours; generous diet. In the course of three or four days the patient passed into other hands, and I saw no more of him until November 19th, when he again came under my care. He stated that he had had a second attack of erysipelas some time in October. At this date, November 19th, there is felt evidence of a third attack; pulse 120, feeble; some diarrhœa; tongue red and glassy. Iron, quinine, brandy, and generous diet ordered. November 20th: Patient worse; erysipelas has extended to face, which is much swollen; 21st, eyes nearly closed; treatment continued; affected parts kept continually wet with opium wash; 22d, swelling diminishing and parts assuming a darker hue; 24th, swelling almost entirely gone; appetite improving; brandy and quinine continued, but iron omitted on account of diarrhœa; 26th, diarrhœa checked; cod-liver oil ordered; 28th, stomach tolerated the oil; appetite improving; pulse 120, and small. December 2d: Erysipelas has again set in on the arm; lead and opium resumed; 3d, made several free incisions and evacuated considerable pus; 6th, patient has several unmanageable bed-sores, and was to-day placed on a water-bed. On December 10th diarrhœa again set in; he gradually failed, and died December 27, 1862. *Post-mortem:* On opening the chest the right lung was found to be firmly adherent to the diaphragm and pleura costalis. Its middle and upper portions were thickly studded with miliary tubercles, and the upper portion of the middle lobe was in a state of diffused suppuration. But few tubercles could be found in the left lung. On examining the arm the integument over the external condyle was found to have sloughed away and the bone was in a state of necrosis; the elbow joint contained pus; the inferior extremity of the ulna had ulcerated; the carpal bones were comminuted and carious. Carpal extremities of second, third, and fourth metacarpal bones near joints were in a necrosed condition and the joints opened. The lower extremity of the radius was comminuted: there was also union of an oblique fracture at its middle third." The bones of the right forearm and parts of the carpus and metacarpus were sent to the Army Medical Museum by Dr. Adams, and form *Specimen* 3838 of the *Surgical Section*.

CASE 1218.—Lieutenant *N. Austin*, Co. E, 14th South Carolina, aged 30 years, was wounded at Gettysburg, July 3, 1863. Acting Assistant Surgeon J. T. Laning reported: "Wounded in the upper part of the right thorax, causing a fracture in both the clavicle and scapula. Admitted into the Cavalry Corps hospital on July 14th. On the evening of July 17th the patient was taken with a chill, and on the 18th erysipelas developed itself on the right arm. Tincture of iron was applied to the part and given internally. By July 23d the arm was much swollen, discolored, and ecchymosed. On the 24th a free incision was made in the middle of the arm, from which a great quantity of very unhealthy pus was discharged. The patient was greatly prostrated, but improved quickly under tonics and generous diet. On August 5th erysipelatous inflammation set in over the right hip, accompanied with great swelling, but soon disappeared. On August 12th the disease appeared in the forearm, to which wet bandages were applied. On the 19th erysipelas manifested itself in the shoulder above the incision, and was combated with tincture of iodine and wet cloths to the parts." The patient was transferred on August 21, 1863, and paroled.

Generally the disease confined itself to the parts first infected, and thence extended in a centrifugal manner, showing that, as Socin expresses it, "the matter causing the inflammation spread itself abroad more by the way of imbibition than in the direction of the larger venous and lymphatic vessels;" however, swelling and abscesses in the axillary and inguinal regions were not infrequent. In the case of Pease (CASE 263, p. 114, *ante*) large inguinal and popliteal abscesses were noted after the attacks of the disease.

Sometimes the disease spread itself over the neighboring parts and affected nearly the whole body. Cases are on file in which the erysipelas made its appearance in the head and extended down the neck and chest to the pelvis, or in which the disease originated in a wound of the hand and spread over the arm and trunk and even the face; or where it first showed itself in the toes and attacked the leg, thigh, and lower portion of the trunk. In the case of *Walker*, cited on the opposite page, the crest of the left ilium was fractured; the disease spread from the wound first over the entire trunk, and then over the neck, thigh, and arms. In the case of Williams, 27th Indiana, cited above, erysipelas followed a shot wound of the wrist and extended to the face. Erysipelas in the upper and lower extremities seems to have been equally liable to attack the trunk.

CASE 1219.—Private Jesse Massey, Co. A, 129th Illinois, received a shot wound of the left hand, at Resaca, Georgia, May 15, 1864. The index finger was removed at the field hospital. On May 21st he was admitted into the field hospital at Bridgeport, Alabama. Soon after admission erysipelas affected the hand, the whole arm and trunk in succession. Several abscesses had to be opened. Iodine was applied externally. The patient recovered and was furloughed June 28, 1864, at which date the wound had healed; there was some contraction of the fingers, caused by erysipelas.

CASE 1220.—Private George Lincoln, 9th Illinois, aged 27 years, was wounded at Fort Donelson, February 15, 1862. A rifle ball passed from side to side through the arch of his foot, comminuting the anterior portion of the tarsus and the metatarsal bones. The patient was conveyed to the Academy Hospital at Nashville, where Dr. T. L. Madden, of Nashville, amputated the foot, after the method of Pirogoff, on February 25th. Erysipelas appeared upon the stump on March 2d, and extended thence over the greater portion of the body, causing death on March 8, 1862. The case is reported by Surgeon E. Swift, U. S. A.

CASE 1221.—Assistant Surgeon A. K. Smith, 1st Michigan Cavalry, remarks, on the monthly report of sick and wounded of the 1st Michigan Cavalry, near Fort Scott, Virginia, for January, 1863: "The case of traumatic erysipelas supervened on a gunshot wound of the foot received on January 9, 1863. The ball entered the dorsal surface between the last phalanges of the second and third toes, and passed out on the plantar surface an inch posterior to the commissure of the toes. The last phalanx of the second toe was shattered and the metatarso-phalangeal articulation opened. The case was not seen until the 14th. The wound and foot were then considerably inflamed, tense, and painful. Amputation was not then thought advisable in the then condition of the parts. Water dressings with cold irrigation were employed, but the wound did not assume a healthy appearance. The track of the ball did not slough; healthy suppuration did not take place, and there was no granulation. The wound continued to look dry, purple, tumid, and the slight discharge that took place was of a serous or semi-sanguinolent character. The general health, however, seemed good. On January 20th an erysipelatous blush first appeared around the wound, and in a few hours an erysipelatous inflammation of the cellulo-cutaneous variety was fully established, accompanied with febrile symptoms of an irritative type. The erysipelas spread rapidly up the limb until, on January 30th, it had reached the body. The limb was much swollen, tense, of a dusky red color, and covered in patches with vesicles. The foot was greatly swollen, tense, boggy to the touch, of a purplish hue, and covered with blebs. The wound was livid, dusky, emitting a sanious offensive secretion. Thus matters went on until January 25th, when there seemed to be great danger of gangrene of the wound and foot. The erysipelas was still spreading upward; the constitutional symptoms were becoming serious; the parts contiguous to the wound were dark, boggy, almost insensible, and the discharges from the wound were offensive. Amputation of the second toe at the metatarso-phalangeal articulation was resolved upon, notwithstanding the condition of the parts and the general symptoms. This was done on January 25th. Two reasons led to this course. First, it was thought the incisions would be beneficial by relieving the tension of the parts and by affording a free outlet for the secretions of the wound and the inflammatory effusion; and, second, it would remove a source of irritation in the fractured and shattered phalanx. The operation did not aggravate any of the symptoms but rather mitigated them. They remained about the same for four days, when a general amendment began, which has continued up to this time, February 5th. The inflammation of the leg has subsided, desquamation taking place. The swelling of the foot, though still considerable, is much reduced; the wound has put on a healthy character and is now secreting healthy pus and showing healthy granulations; the febrile symptoms have subsided and the patient's general condition is rapidly improving. He is convalescent. The treatment has been isolation, that the other wounded men might not be endangered, good ventilation, nutritious animal diet, muriated tincture of iron, and wine; locally a solution of lead wash to the limb and a solution of chlorinated soda to the wound."

Four hundred and fifty of the one thousand and ninety-seven cases of erysipelas proved fatal, a mortality rate of 41.0 per cent.

TABLE CLX.

Numerical Statement of One Thousand and Ninety-seven Cases of Traumatic Erysipelas, indicating the Results and Causes of Death.

REGION.		TOTAL CASES.	RECOVERIES.	UNDETERMINED RESULTS.	DEATHS AND CAUSES OF.						
					Pyæmia.	Gangrene.	Tetanus.	Hæmorrhage.	Other Diseases.	Not stated.	Erysipelas.
Shot Wounds of Head, Face, Neck		154	107	3	.....	.....	1	1	4	8	30
Shot Wounds of Trunk		57	23	1	3	1	....	.....	4	6	19
Shot Wounds Upper Extremities	Conservation	128	56	11	6	1	.....	1	5	11	37
	Excision	81	49	.....	6	1	.....	2	3	4	16
	Amputation	248	154	7	25	1	.....	5	20	17	19
Shot Wounds Lower Extremities	Conservation	200	109	7	4	1	....	1	6	48	24
	Excision	25	15	.....	2	.....	.....	.....	2	2	4
	Amputation	204	105	.....	14	3	4	2	22	35	19
Aggregates		1,097	618	29	60	8	5	12	66	131	168

In sixty cases death was ascribed to pyæmia, in eight to gangrene, in five to tetanus, in twelve to hæmorrhage, and in sixty-six to other diseases. In one hundred and sixty-eight instances only was the fatal issue directly attributed to erysipelas, making a fatality of 15.3 per cent. in the one thousand and ninety-seven cases attended by this complication.

Erysipelas made its appearance under the most favorable hygienic conditions. Surgeon D. Morgan, U. S. V., in the latter part of April and in May, 1862, reports from hospital No. 3, at Evansville, which was located on high ground, free from moisture, and with nothing to interfere on either side with the free circulation of air, that he had "no epidemic disease unless it be erysipelas which followed some of the wounds." It was observed that the disease prevailed less extensively in tents than in hospital buildings.

Generally the disease occurred in crowded hospitals with illy-ventilated rooms and rapidly spread from one wounded patient to another. This was the case in Louisville in November and December, 1862, where the progress of the affection, although quite virulent, was successfully checked by the use of bromine. In their reports Surgeons M. Goldsmith and B. Woodward, U. S. V., speak enthusiastically of this agent as a prophylactic against erysipelas. Surgeon Woodward remarks that "since the use of bromine in vapor not one case originated in the crowded wards of the barracks [Park Barracks Hospital, Louisville], in which, before its use, from five to eight cases of erysipelas a week had occurred." In the application of bromine in erysipelas two different methods were employed: first, by the action of the vapor of bromine on the affected part; second, by a direct application to the erysipelatous surfaces of a solution of bromine of varying strength. In the first method, the part affected was enveloped in dry lint; a cloth saturated with pure bromine was then applied over this, and the whole dressing covered with a piece of oiled silk. The only objection to this treatment was the tendency of the bromine to blister the skin by soaking through the intervening layer of dry lint. The other mode of using the bromine was to apply directly to the inflamed integument a solution of the bromine and bromide of potassium of the strength of from fifteen to forty drops of the former to the ounce of water.

The treatment of erysipelas with bromine was principally confined to the hospitals at Louisville, under the supervision of Medical Director M. Goldsmith. At other hospitals the patients were at once isolated, or sent to separate wards, where disinfectants were freely used. In the great majority of cases the disease yielded readily to a local application of tincture of iodine and cloths saturated with a solution of creasote, the former to the wound and inflamed surface, the latter a little more extensively to the neighboring parts. The internal treatment consisted of tincture of muriate of iron in small doses, often repeated, with quinine, etc., and good diet. In severe cases evaporating lotions of ether were applied to the worst points and numerous incisions or scarifications made to relieve the tension, as in CASE 78, page 37, *ante*.

Opinions differ greatly as to the origin and mode of infection of traumatic erysipelas. Billroth, in 1863,[1] believed that it might "result from retention of the secretion of a wound, and consequent reabsorption of a slight amount of putrid substance, in which case it is so much like lymphangitis that at the commencement it is often difficult to distinguish the two diseases. In many sporadic cases no definite cause can be found; in other cases epidemic influences seem to come into play, for at the same time a large number of wounded patients are attacked by the disease. Crowding such patients in badly-ventilated places

[1] BILLROTH (T.), *General Surgical Pathology and Therapeutics*, translated from the fourth German edition by CHARLES E. HACKLEY, New York, 1871, p. 313.

also develops a contagion, concerning which we are doubtful if it acts only on wounds, or, being taken in by the lungs, may induce erysipelas in the wound; the latter is not very probable." Socin[1] claims that the originally pure local inflammation may generate substances of a peculiar nature, which have the faculty of spreading very rapidly over the neighboring parts, causing similar inflammation, while at the same time the deleterious matter passes into the blood and produces high fever; or that the disease may be caused by the import of a specific agent—virus, if you wish it—of the nature of which we know very little; but it may be stated that "it must be of a very perambulating kind; that it does not necessarily depend on the presence of pus or infiltration; that it is by no means present in every case of pus or infiltration; that it maintains itself for a long period outside of the body without losing its efficacy, and finally that we know of no remedy which will thoroughly exterminate it." After his experience in the Franco-German War, 1870–'71, Billroth abandoned the idea of septic infection and ascribed the disease to specific contagion:[2] "Since I have conducted operations with disinfectants and the utmost cleanliness I have had no further cases of septic erysipelas, none but cases of erysipelas occasioned by contagion, and nearly all were observed in cases of wounds with healthy granulations. I now believe that I have inoculated the disease, in the patients who shortly after the operation were attacked by erysipelas, by sponges, bandages, etc. Whenever in the last few years cases of retention of decomposed blood or secretion occurred—a matter which cannot be always avoided—I noticed no erysipelas, but only a simple form of inflammation of the areolar texture. Genuine erysipelas can be carried into the wound at every stage; it has nothing to do with the reparative process of the wound, and is always an accident introduced from without. * * * That among the one hundred and thirty-two wounded treated by me at Weissenburg only one, and at Mannheim only a few isolated cases occurred, certainly proves that retention of secretion itself does not produce erysipelas. * * * Immediate isolation of the cases, as well as thorough ventilation of the barracks, prevents the further propagation of this fatal wound complication."

Very recent wounds were attacked by erysipelas, and again the disease occurred in wounds with perfectly healthy granulations, or which were well advanced in cicatrization, as in the following:

CASE 1222.—Private Arthur Farey, Co. C, 183d Pennsylvania, aged 35 years, was wounded at Cold Harbor, Virginia, June 3, 1864. He was admitted into the hospital of the First Division, Second Corps, and on June 11th was transferred to Philadelphia and entered South Street Hospital. Acting Assistant Surgeon J. A. McArthur reported: "Wounded by an explosive ball, which entered the right side of the thorax one and a half inches from the acromion. At date of admission the wound of entrance had entirely healed. The right arm was very much swollen and inflamed. A large abscess formed, situated immediately over the biceps muscle; general condition poor. On June 12th I opened the abscess and extracted the ball and ordered that the wound caused by opening the abscess be freely injected three times a day with a solution of chlorate of soda; painted the whole arm and forearm with tincture of iodine and applied a bandage. Flaxseed poultice, mixed with lead-water, to be applied to the wound. Four bottles of porter were given daily, and a mixture composed of sulphate of quinine one drachm, tincture of muriate of iron one drachm, water six ounces, and simple syrup two ounces, was given in tablespoonful doses four times a day. June 20th: The pain and swelling of the arm have almost disappeared; wound discharging healthy pus; general health good. Injections kept up and poultice and iodine discontinued. July 18th: From the last date the patient continued steadily improving till the present time. He is again suffering from erysipelas over the whole of the right arm. The wound over the biceps is very unhealthy and discharging a large quantity of sanious pus. Abdomen tympanitic, pulse fluttering, legs œdematous. July 20th: Gradually sinking, pupils very much contracted; semi-comatose; able to pass his urine and fæces properly. Died July 22, 1864, at 3 p. m. Autopsy: Brain healthy; heart contained two clots (fibrinous), one lying loose in the left ventricle and one occupying the right auricle and extending into the pulmonary artery. There was about six ounces of effusion in the pericardium. Stomach and small intestines healthy; about two quarts of effusion in the peritoneal cavity, and large depositions of lymph on various parts of the intestines. Liver cirrhosed. Upon laying open the wound made by the ball discovered that the missile had passed through the glenoid cavity of the scapula, partially fracturing the head of the humerus, and passing

[1] SOCIN (A.), *Kriegschirurgische Erfahrungen gesammelt in Carlsruhe* 1870 *und* 1871, Leipzig, 1872, p. 31.

[2] BILLROTH (T.), *Chirurgische Briefe aus den Kreigs-Lazarethen in Weissenburg und Mannheim* 1870, Berlin, 1872, p. 97.

around the bone lodged beneath the fascia covering the biceps muscle." The upper half of the right humerus was forwarded to the Army Medical Museum by Dr. McArthur and constitutes *Specimen* 3669 of the *Surgical Section*. There is a double longitudinal partial fracture of five inches on the inner side of the shaft. The head is carious, and necrosed bone borders the lines of separation in the shaft. A brief abstract of this case was given among the alleged instances of injuries by explosive bullets on page 702, *ante*.

CASE 1223.—Sergeant M. V. B. Carr, Co. K, 104th New York, aged 25 years, received a shot wound of the left leg, at Gettysburg, July 1, 1863, and on July 19th entered the hospital at York, Pennsylvania. A minié ball entered the outer aspect of the upper third of the left leg, passed downward and backward, and emerged on the posterior part three inches below the popliteal space. On admission the parts were swollen and the discharge of pus abundant. Simple dressings applied. On October 12th the wounds were still open; condition good. The patient was furloughed on October 28th and readmitted on December 6th. The wound of entrance became unhealthy, and on January 15, 1864, was four by two inches in extent; granulations flabby, not disposed to cicatrize, leg swollen but not painful. The parts were touched with solid nitrate of silver daily and simple cerate applied. By March 1st the wound was nearly closed though three inches deep. April 1st: Wound closed; no swelling of part, nor pain; leg lame. April 10th: Wound of entrance reopened; discharge slight. May 1st: External part of leg red, painful, and swollen for several days; abscess discharged. Wound of exit reopened May 19th; wound of exit nearly closed; leg less swollen and painful. On May 21st the patient was transferred to Ladies' Home Hospital, New York. Acting Assistant Surgeon G. M. Smith reported that "on admission the wound was healed, but the patient was quite lame. He was soon after attacked with erysipelas of the left leg. A lotion composed of three ounces of spirit of mindererus, one of alcohol, and twelve of water was applied to the limb, and muriated tincture of iron given internally. In the subsidence of the erysipelas he soon regained his general health. He was discharged from service July 28, 1864. The wound in the left leg had healed, but the limb was purple and œdematous and the patient quite lame."

Erysipelas was noted in four hundred and fifty-two cases of amputations and in one hundred and six cases of excisions. Of the four hundred and fifty-two amputation cases the disease occurred in one hundred and fifty-one instances before, and in three hundred and one after the operation. Of the one hundred and six cases of excisions the complication made its appearance in all but four cases after the operation, and here again the liability of this operation to be complicated by erysipelas will be noted.

Regarding the years in which the erysipelas was recorded, it can only be stated that the disease was most frequent in periods in which the number of wounded under treatment was the largest. Five cases were noted in 1861, one hundred and forty-three in 1862, three hundred and one in 1863, four hundred and forty-nine in 1864, one hundred and thirty-two in 1865, and in sixty-seven cases the year was not stated. The same may be said of the seasons of the year, although it was generally more frequent in cold and damp seasons and at times when it was necessary to keep the doors and windows of hospital buildings closed. Thirty-nine cases originated during January, twenty-nine in February, thirty-eight in March, seventy-seven in April, one hundred and thirty-one in May, one hundred and twenty-four in June, one hundred and seven in July, seventy in August, fifty-nine in September, fifty-seven in October, thirty-five in November, thirty-six in December, and in two hundred and ninety-five cases the month in which the disease manifested itself was not recorded.

The wounded among the colored troops seem to have been seldom affected by this disease, as only eleven were attacked by it; but five of the eleven cases proved fatal—four in consequence of erysipelas, and one of pleuritis and erysipelas.

PYÆMIA.

The terms septæmia, septicæmia, ichorrhæmia, pyæmia, pyohæmia, toxæmia, etc., found on the surgical reports of the war, were probably used by the surgeons as expressing, in their opinions, certain degrees or phases of blood poisoning, intelligible to themselves, but which the descriptions of the cases fail to reveal, and which, therefore, have not been adhered to here. Nor have the many careful investigations since the war enabled writers on surgery to reconcile the differences of their views. Lidell[1] believes that pyæmia is the

[1] LIDELL (J. A.), *On Pyæmia*, in *United States Sanitary Commission Memoirs*, New York, 1870, Surgical Volume I, page 511.

"variety of septæmia in which some local suppuration constitutes the primary focus or source of infection. In the other varieties of septic blood poisoning the source or focus from which the poison proceeds, and the symptoms, or secondary disturbances and structural lesions induced by it in distant organs, are of quite a different nature, as, for example, we may see, in cases of dissection wound, gangrene from injury of blood-vessels, senile gangrene, spreading inflammatory gangrene, and hospital gangrene." Hueter declares that the "first wound fever is essentially a septicæmic fever. * * In the course of a few days the wound fever gradually loses the character of the simple septicæmic fever, and with the appearance of suppuration changes into a septico-pyæmic fever; and, finally, with the extinction of the putrescent process and the continuance of suppuration into a simple pyæmic fever."[1] Socin claims that the various forms of the primary wound fever caused by the reception into the blood of putrid fermentative products should be designated as septicæmic fevers, and those caused by the resorption of certain pyogenic products of pus as pyæmic fevers.[2] Billroth contends that septicæmia most frequently appears in the first days after severe injuries, at a time when pus has not yet formed in the wound, and that pyæmia is found after local suppuration has been established, and adds: "I have not seen a single instance of this disease in which there was not found, either on the living subject or on the cadaver, a deposit of pus or ichor, from which it had originated."[3] A similar fact was noted by Lidell. In not one of the fifty-seven cases observed by him at the Stanton Hospital did "pyæmia make its appearance previous to the establishment of local suppuration."[4] Arnold, who cites detailed accounts of numerous *post-mortem* examinations in cases of traumatic pyæmia, discriminates between simple septicæmia and septico-pyæmia accompanied by metastatic abscesses, which latter he designates as pyæmia.[5]

The reports of the cases of blood poisoning of the American civil war are not sufficiently clear and indicative to follow the hypothetical discriminations pointed out by the authors cited, and the entire series will here be considered under pyæmia.

The total number of cases of pyæmia after shot wounds was two thousand eight hundred and eighteen (2,818), of which seventy-one (71) recovered, and two thousand seven hundred and forty-seven (2,747) terminated in death—a mortality rate of 97.4 per cent. In twenty-one (21) only of the two thousand seven hundred and forty-seven (2,747) fatal cases were other causes than pyæmia mentioned as having influenced the fatal issue, viz: hæmorrhage in seven, gangrene in six, tetanus in two, erysipelas in one, peritonitis in one, and typhoid pneumonia in four. In the remaining two thousand seven hundred and twenty-six (2,726) fatal cases death was ascribed to pyæmia.

Whether in the cases attacked by pyæmia the wounds were in the head, the face, the neck, the trunk, or the extremities; whether the injuries were only flesh wounds or accompanied by fractures; or whether they were treated conservatively or by operative interference, seemed to be immaterial; all were alike fatal, as shown in TABLE CLXI, on the opposite page.

Over one-half of all of the cases of pyæmia were found after wounds of the lower extremities; in eighty-six thousand four hundred and thirteen (86,413) injuries of this class, one thousand five hundred and sixty-four (1,564, or 18.1 per thousand) cases of

[1] HUETER (C.), *Die chirurgische Behandlung der Wundfieber bei Schusswunden*, in VOLKMANN'S *Sammlung Klinischer Vorträge in Verbindung mit Deutschen Klinikern*, No. 22, p. 101.

[2] SOCIN (A.), *Kriegschirurgische Erfahrungen gesammelt in Carlsruhe* 1870 *und* 1871, Leipzig, 1872, p. 27.

[3] BILLROTH (T.), *Chirurgische Briefe aus den Kriegslazarethen in Weissenburg und Mannheim* 1870, Berlin, 1872, pp. 108, 109.

[4] LIDELL (J. A.), *On Pyæmia*, in *United States Sanitary Commission Memoirs*, New York, 1870, Surgical Volume I, p. 511.

[5] ARNOLD (J.), *Anatomische Beiträge zu der Lehre von den Schusswunden, gesammelt während der Kriegsjahre* 1870 *und* '71 *in den Reservelazarethen zu Heidelberg* Heidelberg, 1873, p. 194.

TABLE CLXI.

Summary of Two Thousand Eight Hundred and Eighteen Cases of Pyæmia, indicating Location of Injury and Result.

SEAT OF INJURY.		CASES.	RECOVERIES.	DEATHS.	DEATH RATE.
Head, Face, and Neck		66	3	63	95.4
Chest, Abdomen, and Pelvis		270	8	262	97.0
Upper Extremities	Conservation	338	8	330	97.6
	Excision	165	3	162	98.2
	Amputation	415	9	406	97.8
Lower Extremities	Conservation	709	24	685	96.6
	Excision	55	2	53	96.3
	Amputation	800	14	786	98.2
Aggregates		2,818	71	2,747	97.4

pyæmia being reported. Of eighty-seven thousand seven hundred and ninety-three (87,793) injuries of the upper extremities, nine hundred and eighteen (918, or 10.4 per thousand), of forty-five thousand one hundred and eighty-four (45,184) injuries of the trunk, two hundred and seventy (270, or 5.9 per thousand), and of twenty-six thousand four hundred (26,400) injuries of the head, face, and neck, sixty-six (66, or 2.5 per thousand), were followed by this complication.

In one thousand seven hundred and twenty-one (1,721) cases the day of the appearance of the pyæmic symptoms after the injury was noted as follows: On the

2d day in	5 cases.	12th day in	50 cases.	22d day in	55 cases.	35th to 40th day in	89 cases.
3d day in	6 cases.	13th day in	59 cases.	23d day in	42 cases.	41st to 45th day in	55 cases.
4th day in	13 cases.	14th day in	54 cases.	24th day in	40 cases.	46th to 50th day in	42 cases.
5th day in	16 cases.	15th day in	60 cases.	25th day in	42 cases.	51st to 100th day in	151 cases.
6th day in	17 cases.	16th day in	76 cases.	26th day in	50 cases.	101st to 150th day in	30 cases.
7th day in	24 cases.	17th day in	68 cases.	27th day in	31 cases.	151st to 200th day in	8 cases.
8th day in	29 cases.	18th day in	70 cases.	28th day in	36 cases.	201st to 250th day in	9 cases.
9th day in	38 cases.	19th day in	66 cases.	29th day in	31 cases.	251st to 300th day in	5 cases.
10th day in	37 cases.	20th day in	65 cases.	30th day in	20 cases.	Above 300th day in	4 cases.
11th day in	37 cases.	21st day in	56 cases.	31st to 35th day in	135 cases.	Total	1,721 cases.

From the second day after the injury the number of cases increases gradually and almost regularly until the sixteenth day, on which the highest total, viz, seventy-six, is recorded; from the seventeenth to the thirtieth day after the injury the number decreases; after that period the disease appeared at desultory intervals, in some instances as late as two hundred and three hundred days, and, in one case, a case of recovery, the pyæmic infection was ascribed to the wound over four and a half years after the injury.

In the above statement the days of appearance of the pyæmia after the injury are given; but frequently the disease was not noted until excision or amputation had been performed, and it is safe to say that in many, perhaps in the large majority of these cases, the pyæmic infection was induced or influenced by the operative interference. In TABLE CLXII, on page 860, the day of the appearance of the disease is indicated in the conservatively treated cases from the day of the injury—this includes a number of cases in which pyæmia existed at the time operative interference was decided upon; in the cases of excision and amputation, from the day of the operation. In the cases treated without operative interference the disease most frequently appeared from the tenth to the twentieth day, while in the cases of excision and amputation by far the larger number occurred from the first to the sixth or seventh day.

Table CLXII.

Indicating day of Appearance of Pyæmia after Injury and after Operation.

Day of Appearance.	In Conservative.	After Excision.	After Amputation.	Day of Appearance.	In Conservative.	After Excision.	After Amputation.	Day of Appearance.	In Conservative.	After Excision.	After Amputation.
1st	7	37	13th	28	5	18	25th	20		12
2d	3	10	33	14th	27	1	35	26th	17		10
3d	4	11	45	15th	30	4	18	27th	10		16
4th	8	12	37	16th	34	5	26	28th	11	3	11
5th	7	8	34	17th	30	2	28	29th	11		5
6th	8	7	32	18th	34	2	20	30th	8	2	2
7th	18	5	31	19th	33	4	19	31st to 35th	67	4	24
8th	18	6	21	20th	37	5	28	36th to 40th	36		17
9th	19	5	27	21st	29	3	17	41st to 45th	25	2	11
10th	25	4	26	22d	22	1	19	46th to 50th	19		4
11th	21	4	23	23d	17	3	18	51st to 100th	80	1	20
12th	24	3	32	24th	13	3	9	Above 100th	28	2	1

The duration of the pyæmia from the day on which the first symptoms were observed to the day of death was reported in one thousand six hundred and eighty-seven cases. The deaths occurred on the—

1st day in ..... 71 cases.
2d day in ..... 96 cases.
3d day in ..... 172 cases.
4th day in ..... 171 cases.
5th day in ..... 204 cases.
6th day in ..... 161 cases.
7th day in ..... 148 cases.
8th day in ..... 123 cases.
9th day in ..... 92 cases.
10th day in ..... 81 cases.
11th day in ..... 64 cases.
12th day in ..... 50 cases.
13th day in ..... 41 cases.
14th day in ..... 29 cases.
15th day in ..... 24 cases.
16th day in ..... 17 cases.
17th day in ..... 21 cases.
18th day in ..... 14 cases.
19th day in ..... 12 cases.
20th day in ..... 15 cases.
21st to 25th day in ..... 33 cases.
26th to 30th day in ..... 18 cases.
31st to 35th day in ..... 12 cases.
36th to 40th day in ..... 11 cases.
41st to 45th day in ..... 3 cases.
46th to 50th day in ..... 1 case.
Above 50th day in ..... 3 cases.

About two-thirds of the cases died within the first seven days; the largest number of deaths was recorded on the fifth day; in eighty-one only of the one thousand six hundred and eighty-seven cases did the patients survive the twentieth day after the appearance of the disease.

Traumatic pyæmia was seldom noticed unless the bony structure was injured. Of one hundred and sixty-five thousand eight hundred and twenty-one (165,821) wounds without lesion of the bones, only five hundred and sixty-four (564), or 3.4 per thousand, were followed by pyæmia, while of the seventy-nine thousand nine hundred and sixty-nine (79,969) shot fractures, two thousand two hundred and fifty-four (2,254), or 28.1 per thousand, were followed by this complication.

Very little is to be said of the treatment of pyæmia; tonics, stimulants, and a supporting diet were given, but, as has already been seen, with very little effect, as 97.4 per cent. of all the cases proved fatal. In the early stages of the disease sulphate of quinine in large doses would greatly reduce the temperature; but the improvement seemed to be only temporary unless the treatment was continued for some time, which, frequently, the patients were unable to bear. The disease appears to have been controlled in this manner in the following case:

Case 1224.—Private George Leigh, Co. C, 3d Artillery, aged 19 years, was wounded at Robinson's Ford, September 23, 1863, by a shell fragment which carried away a portion of the right foot. Amputation at the ankle joint was performed on the field by a modification of Syme's method. The heel being injured, the flap was taken from the dorsum of the foot. On September 25th he was admitted into Stanton Hospital, Washington. Surgeon John A. Lidell, U. S. V., reported: "His general condition was then far from satisfactory, as he was pale and very feeble. He was put upon the use of stimulants, tonics, and a good diet. Simple dressings were applied to the stump and he was directed to take an anodyne at night. September 29th: Half of

the flap sloughed off; granulations pale; discharge thin and serous; Labarraque's solution, diluted, was applied to the stump. October 11th: had a severe chill this morning, and complains of a good deal of pain in the right knee; twenty grains of sulphate of quinine and an ounce of whiskey were given every six hours. 12th: had another severe chill; knee red, hot, and very much swollen, pulse frequent and weak, tongue dry and coated, complexion assuming a bronzed hue; quinine repeated, and five grains of citrate of iron and quinine, in pill, ordered to be given night and morning. A lotion of acetate of lead and opium was applied to the knee and lime water to the stump. 13th: had another chill to-day, but it was not so severe as the others; temperature of inflamed knee lessened; had slept well during the night; no change in the treatment. 14th: swelling of the knee much less; treatment unchanged. 15th: had a slight chill about noon, but his general appearance is much better; same treatment continued. 18th: had vomiting, produced apparently by the large doses of sulphate of quinine, which were discontinued; but the other treatment was continued. 20th: bowels constipated; five grains aloes and fifteen of rhubarb were ordered. 25th: swelling disappearing from knee rapidly; stump looks much better; granulations more fluid and healthy; discharge more laudable. October 30th: decided daily improvement; continued the stimulants, together with the citrate of iron and quinine, and the lead and opium lotion to the knee and lime water to the stump. The knee joint remained slightly swollen, hot, and tender for a long time; indeed, the symptoms of inflammatory action in it did not entirely disappear till about the first of February, 1864. February 20th: the amount of mobility at the knee is small (false anchylosis); patella now adherent; knee natural in size and shape. Stump sore on account of having bruised it recently; general condition excellent. March 29th: the stump has refused to heal; there is an indolent excavated ulcer about the size of a franc piece situated at the posterior part of the face of the stump. The stump is otherwise unserviceable on account of the delicate character of its covering, which had been taken from the dorsum of the foot. There being now no prospect that it would ever become useful, the leg was reamputated about the junction of the middle with the inferior third by the double-flap method, the anterior flap being considerably shorter than the posterior one. The tibia was sawn off obliquely, as directed by Sanson; anæsthetic sulphuric ether. April 18th: patient's general condition excellent." This soldier was discharged September 17, 1864, and pensioned; he died September 13, 1871. The amputated stump was contributed to the Army Medical Museum by Dr. Lidell, and is numbered 2165 of the *Surgical Section.*

In the well established cases of pyæmia all remedies were found ineffective. In wounds of the extremities amputation has been recommended for the removal of the infection when first observed; but even this extreme remedy seemed to be of little avail. Three or four cases are reported in which limbs were removed while the patients were in a pyæmic condition, and from the successful issue it may be presumed that the removal of the infectious focus had a beneficial influence, as in the following cases, in which chills had occurred shortly before the operation:

CASE 1225.—Corporal C. Killan, Co. H, 2d Michigan, received a shot wound of the right elbow joint, at Fair Oaks, May 31, 1862. He was admitted on June 2d into hospital at Annapolis, Maryland. Surgeon T. A. McParlin, U. S. A., reported: "The ball entered close to the external condyle of the humerus, fractured the olecranon process of the ulna, and passed out just below the internal condyle of the humerus. On admission the arm was much tumefied; intense inflammation. Constant application of iced water was made to the parts for two days by means of a syphon; the inflammation having somewhat subsided, an attempt was made to save the arm by making a crucial incision and removing the olecranon process by means of a metacarpal saw. All splinters were removed and the parts brought together with sutures and adhesive straps. The joint was kept from the air by means of an albumen scab. The arm was kept at perfect rest by a splint, and water dressings used. For ten days the arm did well, when sudden tumefaction of the entire limb supervened, with intense inflammation. The dressings were removed, save such as were required to keep the wound from the air. A heavy chill with evidences of pyæmia came on. The patient was stimulated and supported by generous diet, but the evidences of inflammation were so marked that the arm was amputated at the lower third." Killan was discharged August 15, 1862, with a good stump, and pensioned.

In a case of shot wound of the knee with pyæmic symptoms, in which the lymphatic glands of the knee were greatly enlarged, amputation at the junction of the middle and lower thirds of the femur was performed and the patient recovered with a fine stump:

CASE 1226.—Private Joseph Jones, Co. K, 13th Tennessee Cavalry, aged 26 years, was wounded at Morristown, Tennessee, November 13, 1864, in the right knee. The ball entered near the upper edge of the patella, passed upward and backward, grazing the patella, and emerged two inches above the inner condyle of the femur. He was admitted on the same day into Asylum Hospital, Knoxville. The early progress of the case is not recorded. On May 10, 1865, a condition of pyæmia existed; the patient was scarcely more than skin and bone. The lymphatic glands in the groin were greatly enlarged; appetite nearly entirely gone; tongue dry, hard, and glassy; pulse about 120, weak; nausea and occasional vomiting. Knee and leg very much swollen; discharge very profuse and extremely offensive; soft structures of joint nearly entirely destroyed, articular surfaces very much corroded, and pus burrowing extensively about and below the knee. Acting Assistant Surgeon T. W. Baugh amputated the thigh, at the junction of the lower and middle thirds, by the circular operation. The case progressed nicely; a drachm of bisulphite of soda was given each day for the first five days, together with whiskey. After this the bisulphite was decreased to a half drachm, and quinine, iron, and whiskey added. The patient recovered with a beautiful stump. He was discharged from service August 22, 1865. The case is reported by Surgeon F. Meacham, U. S. V.

From the numerous autopsies reported in cases of pyæmia the following have been selected as indicating the conditions of the different organs in the fatal cases of this disease:

Condensed Summary of Forty-eight Post-

No.	Name, Injury, etc.	Lungs and Pleural Cavity.	Liver.	Kidneys.
1	Pt. J. Brown, H, 4th Mich., age 35. Wounds of back and hand.	Blood effused in tissue of lungs in spots; no abscesses; costal pleura strongly injected.	Flabby, ochre and slate colored on surface; homogeneous and spot'd on sect'n.	Healthy
2	Pt. G. H. Guernsey, E, 17th Conn., age 33. Flesh wound elbow; amputation.	A few inflamed, indurated, suppurating lobules in lower lobes of lungs.	Large, pale, clay colored, and somewhat fatty.	Healthy
3	Pt. N. Young, B, 108th N. Y. Fracture knee joint.	R't lung compressed; upper and middle lobes studded with abs.; left filled with abs.; cavity of lymph ¼ inch thick on pleura.	Large abs. in middle lobe cont. 4 oz. pus; tissues around indurated.	
4	Corp'l D. Ward, H, 13th Virginia; age 19. Fract. femur; amputation.	Lungs; lower lobe left carnified; hypostatic congestion in right; pleuritic effusion in left sac.	Enlarged, heavy, light colored, finely granulated in appearance and quite solid.	Natural in size, light in color.
5	Pt. W. Fader, A, 140th New York, age 20. Fracture sacrum.	Lungs; left, inf. lobe congested, both lobes infilt. with serum; masses of fib. matter in upper and lower lobes; right, same condition. Left, 22 oz., right, 24 oz.		Normal; rather pale. Ri't, 7 oz., left, 7 oz.
6	Pt. G. Shaumway, C, 10th New York Heavy Artillery. Cont. wound over right eye; age 28.	Some congestion both lungs; small abscesses in left; old pleuritic adhesions. Right, 22 oz., left, 14 oz.; effusion.	No apparent disease; gall perfectly black. Weight, 27 oz.	Small masses white substance in both. Weight of each, 6 oz.
7	Corp'l N. M. Hildreth, B, 94th New York, age 21. Fracture femur; amputation.	Metastatic abscesses in both lungs. Left lung weighed 1 lb. 12½ oz.	Abscess in right lobe; organ light colored, mottled, and finely congested on surface. W't, 5½ lbs.	Light colored, flexible, and easily torn; no abnormality observed. Weight of each, 7½ oz.
8	Capt. W. Bogardus, G, 86th Illinois, age 43. Wound over right sacroiliac symphysis.	Lungs congested; portion lower lobe right collapsed and carnified; metast. deposits in low. and masses of white substance in up. and low. lobes left lung. Weight, left, 18 oz. 4 dr., right, 18 oz. 3 dr.	Reddish brown externally, bile tinted on section; friable and nutmegged. Weight, 3 lbs. 14 oz. 4 dr.	Yellow tinged. Weight, left, 5 oz. 3 dr., right, 6 oz. Supra-renal capsules distended with bloody fluid.
9	Pt. E. Satterfield, F, 12th West Virginia, age 40. Fracture elbow joint; amputation arm.	Lungs flaccid and speckled; small yellow masses in left. Weight, right, 2 lbs., left, 1 lb. 10 oz.	Large, mottled externally, soft and congested; unpleasant odor. Weight, 7 lbs. 1 oz.	Mottled, flabby, light colored on section. Weight, right, 7 oz., left, 8 oz.
10	Pt. M. McColligan, C, 56th Mass., age 17. Fract. hum.; amp. at shoulder joint.	Both lungs collapsed and containing abscesses; pleural adhesions.	Normal	Healthy
11	Pt. A. H. Comins, K, 34th New York, age 25. Fract. fib.; amp. thigh; lig. femo. art. in cont.	Lungs dark colored posteriorly; numerous abscesses in discolored portions; ribs of pigmentary matter in upper lobe. Weight, r't, 10¾ oz., left, 9¼ oz.	Light reddish brown, hard, and full of blood. Weight, 78½ oz.	
12	Pt. E. Gallagher, F, 69th New York, age 37. Fract. ankle joint; amputation leg.	Right lung adherent to thorax; low. lobe of left conges., red col'd; fatty secretion with blood exuded; upper lobe dull slate col'd; copious frothy dirty-white secretion exuded.	Upper half of right lobe studded with small abscesses.	
13	Pt. J. Brown, F, 5th New York Cavalry, age 34. Fracture wrist joint; amputation forearm; reamp. arm.	Low. lobe right lung consolidated and partly hepatized; hard tubercles in apex and inferior portion third lobe; second lobe left lung consolidated, parenchyma unhealthy. Weight, right, 35½ oz., left, 25½ oz.	Thick, firm, acini well marked; nutmegged appearance; blackish color externally; no gall in bladder. W't, 63 oz.	Congested. Weight, rig't, 7 oz., left, 6 oz.
14	Pt. C. T. Munn, G, 77th New York, age 22. Fracture scapula.	Right lung adherent between lobes and to right costal pleura; organ somewhat pneumonic and infiltrated with pus; left lung healthy.	Enlarg'd, yellowish br'wn, soft, flabby, and fatty.	Reddish buff and mottled on surface; flabby and fatty.
15	Corp'l C. Putnam, E, 64th New York, age 27. Fracture left knee joint; amputat'n thigh.	Pyæmic patch in posterior lobe of left lung; lungs otherwise healthy; no pleuritic adhesions.	Normal size, yellow, granular, and brittle.	Healthy
16	Corp'l J. Crowley, A, 7th New York, age 25. Fracture knee; amputation thigh.	Lungs adherent to pleura and diaphragm, and interspersed thickly with pyæmic abscesses.	Contained several indurated spots supposed to be pyæmia.	Small and apparently softer than usual.
17	Pt. S. Hackett, F, 11th Penna. Res., age 25. Fracture tars. bones; Chopart's amput'n.	Metastatic abs. in lungs; large excavations partially occupied by dead tissue above right lung; pleuritic adhesions.	Large, heavy, and mottled; rough to the touch.	A little pale but natural
18	Pt. A. Hammond, H, 111th New York, age 47. Fracture left knee joint; amput'n thigh.	Posterior lobes of both lungs solidified and collapsed.	Softened; no abscesses	Softened; no abscesses
19	Pt. C. Rhodes, C, 2d Massachusetts Cavalry, age 20. Fracture right ulna.	Lungs filled with circumscribed abscesses; pleura covered with broken down lymph; effusion in left pleural cavity.	Congested; large abscess in superior lobe opening into peritoneal cavity.	
20	Pt. S. H. Stevenson, E, 34th Ohio, age 26. Wound of r't second finger.	Posterior lobes of lungs congested; tubercles in both, abscess in left; effusion in each pleuræ.	Much enlarged and very soft.	Normal
21	Capt. G. Reis, C, 15th Missouri, age 31. Fracture forearm; amputation arm.	Both lungs gorged with dark venous blood	Enlarged and congested	Natural size and healthy
22	Pt. J. Stuart, C, 8th Michigan, age 30. Fracture 8th rib.	Abscesses in lungs; left pneumonic and hepatized; old pleuritic adhesions in right; effusion in cavity.	Enlarged, soft, and yellow; fatty.	Enlarged; the two w'g'd 21⅛ oz. Mottled; capsule peeled readily; cortical port'n thickened; pale yellow.

mortem Examinations in Cases of Pyæmia.

No.	Spleen.	Intestines.	Joints.	Blood Vessels.	Remarks.
1	Large, 7×4, and flabby.	Healthy		No inflammation of neighboring veins observed.	Heart large and flabby. Recent pleuritis of right side; thin pseudo-membrane formed on lung, not adherent to costal pleura
2	Healthy	Slight patches of inflammation in lower part small intestine.		Axillary vein thick'd; clot partially brok'n down into puruloid matter.	Heart healthy; wound gangrenous.
3			L'ge abs. comm. with knee j't; syn. memb. soft and brok'n down by ulceration.		Cyst on right side containing 2 quarts serum, one on left containing a pint. Heart normal.
4	Dark purple, twice natural size; 2 fib. masses at mid. post. border; pus in low. border.	Several mesenteric glands enlarged; intestinal canal natural.		Veins of pia mater cov. cerebral filled with blood; white elas ic thromb. 2 in. long in ex. fem. vein.	Fibr. clot in ventr. of heart extending from auricle adh. to valve; clot in left ventr. near valve; clot 5 lines long in femoral artery; brain, slight opacity of arachnoid; some congestion. Stomach abnormally large.
5	Discolored inferiorly, and easily pulpified. Weight, 22 oz.	Discolored; odor putrefactive. Weight, 5½ lbs.			White fibrinous clots in heart. Weight, 11½ oz. Pancreas much enlarged and reddened.
6	Light colored along exterior and anterior border. W't, 1 lb.	Portions of ileum and large intestine congested; jejunum discolored.			Clots in heart; blood generally fluid; some conges. of brain; abs. between left supra renal capsule and kidney; pancreas enlarged. W't, 4 oz. Congestion of fundus of stomach.
7	Light colored, flexible, and speckled on section. Weight, 12 oz.	A few blood spots and some thinning of mucous membrane; otherwise natural. Weight, 4 lbs.		Clot in femoral artery of stump; another in femoral vein.	Clots in ventricles and auricles of heart. W't of organ, 7½ oz. Brain, clear serum in both lateral ventricles. Weight, 3 lbs. 9 oz.; pancreas normal.
8	Dark colored externally and internally. Weight, 9 oz. 4 dr.	Large intestine generally dark colored and containing patches of lymph; same in jejunum.			Heart, clots in both auricles and ventricles. Weight, 9 oz. Brain, serum in arachnoid and lateral ventricles; some congestion. W't, 3 lbs. 7 oz. Gall bladder contained 1½ oz. viscid tenacious bile; pancreas normal.
9	Large, flabby, light colored, and soft.	Jejunum tinted gray, mottled, speckled, and hyperæmic; ileum congested; large intestine dark col'd and hyperæmic.			Heart, large, flaccid, and containing clots. Weight, 1 lb. Brain, surface exsanguine, organ flabby. Serum in lateral ventricles. Weight, 3 lbs. 2 oz. Pancreas. Weight, 3 oz. Stomach large, mottled in fundus.
10	Abscesses in posterior superior surface.	Normal		Axillary vein clotted; contained pus and oil globules; no pus in femoral vein.	Large abscess in parietes of abdomen at insertion of rectus muscle.
11	Dark colored, solid, and quite full of blood. Weight, 11¼ oz.	Omentum extended ½ way to pubis. Intestines weighed 49 oz.		Fem. art. and vein diseased and eroded below lig.; vein inflamed above and cont'd purulent matter.	Heart surrounded by adipose tissue; 5 oz. fluid in pericardial sac. On opening skull large quantity of blood escaped; 2 clots adherent to bone internally; inguinal glands enlarged.
12	Natural		Right knee joint filled with apparently healthy synovia.	Apparently healthy.	Heart 5½ in. wide, 2½ in. thick, weighed 17¼ oz. Brain normal; diaphragm dull slate colored, with spots of lobular pneumonia and copious frothy secretions.
13	Dark mulberry color, and softened. W't, 11½ oz.	Inflated with gas	Pyarthrosis left elb'w joint; pus in cavity; articular surface partly denuded of cartilage.		Fibrinous clot in both sides heart; œsophagus pale and yellow; trachea purple and yellow; pancreas moderately soft; pale white color.
14	Large and flabby, containing about a doz. small puruloid foci.	Healthy		Veins of both upper extremities healthy.	Heart large and flabby; left ventricle dilated; white fibrinous clot in right ventricle and pul. art. Several abscesses in both upper extremities.
15	About the normal size, but softened.		Pus formations in r't hip joint.		Heart; large clot in r't ventricle, extended into auricle, inf. and sup. cavæ, and pulmonary art. and branches; clots in left ventricle; bladder contracted to size of walnut; abs. in thigh.
16	Enlarged, and almost of the consistence of pulp.	Seemingly healthy	Right hip joint literally filled with pus.	Veins of stump near end loaded with d'rk soft clots; higher up fill'd with pus nearly to Poupart's lig.	On section of right femur cavity found nearly filled with pus; extensive intermuscular abscess in thigh.
17	Normal in appear'ce; attached to diaph'm and containing pus.				Abscess through both hemispheres of brain; inguinal glands greatly swollen; deep abscess below popliteal space.
18	Softened; no abscesses.		3 oz. pus in right hip joint.	Left femoral vein filled with clots up to ext. iliac; fem. art. healthy.	Clots in right side of heart; medulla and cancellated structure of left, and medulla of r't femur red and disorganized; no abscesses in viscera.
19	Fairly congested	Congested; some adh. of transverse and ascending colon, and ulceration of small intestine.	Right elbow joint filled with pus; pus in right shoulder joint.		Walls of heart thin and flabby; valves like finest tissue paper; 2 oz. yellow serum in pericardium; brain soft; serum beneath dura mater and pia mater, and in lateral sinuses; abscess on back of left hand.
20	Soft and enlarged	Normal		Veins leading from forearm and hand diseased.	Pericardium distended with serum. Forearm and hand infiltrated with pus; gangrene; abscess on dorsal aspect left hand.
21	Considerably enlarg'd but without structural change.	Mucous lin'g of intestin'l can'l d'k venous col'd; ecchymoses.		Pulmonary veins filled with tough cord-like clots of fibrin.	Heart flabby and pale; right ventricle filled and soaked with blood.
22	Enlarged; more than ⅓ normal size; pale blue, and soft.				Large thrombi in right ventricle and auricle of heart; small thrombi in left side of organ.

No.	Name, Injury, etc.	Lungs and Pleural Cavity.	Liver.	Kidneys.
23	Pt. P. Ostre, H, 72d New York, age 21. Fracture ankle; amputation at knee.	Numerous small abscesses and patches of lobular pneumonia in both lungs.	Enl'g'd, pale, yellow, fatty, and softened.	No abnormal appearances.
24	Pt. J. Davis, L, 1st Michigan Cavalry, age 22. Fracture tarsus; resection.	Abscess in left lung filled with dark fetid pus; small abscess in right lung; effusion in left pleural cavity.	Enlarged and softened ...	Normal .....
25	Serg't W. Norton, I, 5th Wisconsin, age 20. Fracture neck right troch. major of femur.	Nearly whole of left lung inflamed	No abscesses; fatty	No abscesses; fatty .....
26	Pt. J. Thompson, D, 9th Virginia, age 21. Flesh wound left thigh.	Several abscesses in left lung; right lung healthy; 12 pints pus in left pleural cavity.	.....	Abscesses in both kidneys; pus in both ureters.
27	Serg't D. A. Lent, A, 6th New York Heavy Artillery, age 24. Flesh wound right leg.	Lungs congested; large abscess in upper lobe right lung filled with thick pus.	Normal	Small abscess in cortical portion of each; pus in ureters.
28	Pt. J. P. Yocum, A, 89th Illinois. Fracture left thigh; excision.	Left lung hepatized; 6 oz. pus in pleural cavity.	....	.....
29	Pt. *J. Wallace*, F, 21st Georgia, age 38. Fracture femur; excision.	Lungs adherent and studded with pyæmic patches; serous effusion in left pleural sac; pleurocollesis both sides.	Healthy but somewhat soft.	Healthy.....
30	Corp'l *A. W. Davis*, F, 14th N. C., age 24. Fracture tars. and met.; amputation leg.	Small abscesses in lower lobes both, and upper lobe right lung. Weight, right, 13½ oz., left, 11½ oz.	Normal	Healthy. Weight, right, 8½ oz., left, 7¾ oz.
31	Corp'l H. Darragh, K, 106th Penna., age 40. Fracture r't shoulder joint; excision.	Right lung adherent to walls of thorax and diaphragm; frothy fluid exuded from lobes on section; left lung healthy. Weight, right, 21 oz.; left, 11½.	Small, contracted, mottled, and convoluted; resembled brain more than liver. Weight, 51 oz.	.....
32	Pt. J. F. Bowser, B, 11th Pennsylvania, age 18. Fracture right knee joint; amputation thigh.	Lungs adherent; lower lobe, right, pneumonic and studded with hardened pyæmic patches; patches contained no pus; slight congestion left lung; effusion in right side.	Soft and fatty.....	Decidedly fatty .....
33	Pt. J. D. Crowter, D, 4th New York Heavy Artillery, age 24. Fracture right ankle joint; amputation leg.	Lungs; lower lobes carnified; adherent to surrounding tissue; large pyæmic patch in upper lobe, left; about 20 abscesses in lower lobe, right; effusion in each side of cavity.	Enlarged ⅓; in a state of fatty degeneration; gall bladder nearly empty; stricture near middle.	Apparently healthy.....
34	Pt. C. Smith, B, 7th Maryland, age 21. Fracture left fibula.	Lungs; lower lobes hepatized and dotted with pyæmic patches; recent adhesions about right; 20 oz. effusion.	Somewhat fatty	Somewhat fatty .....
35	Pt. C. W. Allen, C, 1st Maine H. A., age 23. Fracture left elbow; amputation arm.	Lungs slightly adherent to thorax; right lung considerably congested and containing a small abscess. Weight, right, 11½ oz., left, 9½ oz.	Abscess in right lobe filled with creamy pus. W't, 59 oz.	Apparently healthy.....
36	Pt. J. Hiles, I, 1st Nebraska, age 20. Fracture left radius; amputation arm.	Lungs; lower lobes studded with metastatic abscesses; recent deposit of lymph on both pleural surfaces.	No abscesses in liver.....	No abscesses in kidneys...
37	Pt. F. Guthberlet, K, 27th Massachusetts, age 26. Fracture right elbow; exc.; amp. arm.	Pyæmic abscesses in lungs; left collapsed; both congested and adherent to pleura.	Decomposed abscess in left lobe size of a small shot.	....
38	Pt. P. Scanlan, G, 69th New York, age 34. Fracture knee joint; amputation thigh.	Lungs, strongly marked carbonaceous deposit on; lower and posterior parts engorged; right congested and containing abscesses; pleuritic adhesions on left side.	Enlarged, adherent to diaphragm, stomach, and transv'se colon; abs. in r't lobe and on up. and r't side.	Enlarged, pale, and indurated.
39	Pt. G. Laforce, E, 26th New York. Wounds arm and knee joint; amputation arm.	Lungs black, mottled, and reticulated; melanic deposit.	Large and finely mottled..	Large and pale.....
40	Pt. J. Moore, E, 8th Pennsylvania Reserves, age 20. Fracture leg; amputation.	Lungs slightly congested; melanic matter present; abscesses in both. Weight, left, 22½ oz., right, 15½ oz.	Light coffee colored, finely mottled, and large. W't, 82½ oz.	Kidneys. Right weighed 6 oz., left, 6½ oz. Suprarenal capsules much enlarged. W't, both, ¾ oz.
41	Pt. S. McCan. F, 1st U. S. Cavalry, age 23. Fracture right ulna.	Lungs congested and coated with broken down lymph; right filled with small abscesses; effusion in left pleural cavity; each weighed 25 oz.	Three abscesses in, containing 2 oz. pus each. Weight, 5 lbs. 2 oz.	Congested. Weighed 6 oz.
42	Pt. C. Crealman, H, 118th Pennsylvania, age 21. Fracture right humerus.	Lungs contained numerous abscesses; both partially adherent and hepatized; pleura broken down and adherent to lungs; effusion in cavity. Right weighed 25½ oz., left 19 oz.	Enormously enlarged, and containing numerous abscesses.	Both contained abscesses; cortical substance congested; left enlarged; right weighed 7½, left 9 oz.
43	Corp'l J. H. Higley, A, 96th Pennsylvania, age 20. Fracture upper third femur.	Lungs congested; recent indurations as large as an egg in middle part of both near base; not converted into pus.	Nutmeg appearance on section; no abscesses in.	Contained no abscesses....
44	Pt. J. Merrow, D, 12th Massachusetts, age 31. Fracture knee joint; amputation thigh.	Two abcesses, size grain of maize, in apex left lung; surroundings of abscesses for about ½ inch of a dark pink color and denser than surrounding tissue.	Healthy.....	Pale, firm; cortical substance same hue as pyramidal.
45	Pt. J. Somers, E, 64th New York, age 21. Fracture knee joint; amputation thigh.	Abscesses in both lungs; left compressed, adherent, and carnified; right pneumonic; copious effusion in pleural cavities.	Normal	Normal .....
46	Pt. M. Casey, K, 7th Veteran Reserve Corps, age 25. Fracture right carpus.	Pyæmic patches in lower lobes of lungs; large abscess in posterior lobe of right; slight adhesions; no effusion in cavities.	Healthy.....	Pale, otherwise healthy...
47	Pt. G. McCoy, E, 62d Pennsylvania, age 32. Fracture foot; amputation leg.	Abscesses in both lungs.....	In a state of acute hepatitis and quite friable.	....
48	Pt. W. Ramsey, H, 6th Virginia, age 19.	Lungs slightly congested at posterior lobes; small pyæmic patch in right inferior lobe of right.	Normal	In a state of putrid decomposition.

No.	Spleen.	Intestines.	Joints.	Blood Vessels.	Remarks.
23	Not enlarged; paler than natural, and softened.	.....	.....	Thrombus of superf. fem., profunda, and external iliac veins.	Large thrombus in right ventricle and auricle of heart; small ones in left. Muscles of thigh infiltrated with pus.
24	Enlarged and softened.	.....	Pus in ankle joint; also in astragalo-scaphoid articulation.	Femoral vein thrombosed.	Clots in both ventricles of heart; cancellous structure of calcaneum gangrenous; osteomyelitis.
25	Not enlarged or softened.	.....	Hip joint and parts infiltrated with a dark thin fetid pus.	.....	No chills occurred although the disease lasted 42 days.
26	Large abscess in; discharging pus into abdomen; organ enlarged.	.....	Left knee and wrist joints examined; no pus.	Veins as far as examined healthy.	Heart healthy; 3 oz. serum in pericardium. Abscesses in and pus at points of right cerebrum. Pus burrowed among muscles of thigh from knee to hip.
27	Normal	Normal	Pus in right knee and wrist joints; none in ankle.	.....	Heart; right ventricle filled with a semi organized clot. Pancreas and stomach normal.
28	.....	.....	.....	.....	Parotid gland enormously enlarged and distended with pus; cartilaginous but no ossific union of fracture.
29	Enlarged but not softened.	Healthy.....	.....	Old, partially disintegrated blood clots in fem. vein; walls of vein thickened; femoral art. healthy.	Heart healthy; brain, large amount of serous subarachnoid effusion. Lymphatic glands, left groin, enlarged.
30	Soft and pulpy. W't, 12½ oz.	Cæcum congested; otherwise healthy.	.....	.....	Small clot in right side heart. W't, 9½ oz.; tissues of stump in sloughing condition; structures of bones full of oil globules.
31	Much enlarged, firm, not pulpy. Weight, 9 oz.	.....	.....	.....	Heart; fibrinous clot in both ventricles. W't, 9 oz. Arm and wound gangrenous.
32	Softer than usual.....	.....	Contained no pus.....	Femoral vein inflam'd and filled with dark clots; art. healthy.	Marrow of femur red and soft; in portion gangrenous, and entirely gone for 3 inches in lower end.
33	Considerably softened, and dark colored.	Apparently healthy..	Knee joint not involved.	Pus in one of the veins; clots in the others.	Abscesses between muscles of stump; 2 small ones near bone.
34	Healthy.....	.....	.....	Dark clot partly filled femoral vein; inside coat of vein red and inflamed; post. tib. art. oblite'd in w'd.	Large fibrinous clot in left auricle and ventricle, and long thin clot in right auricle extending into pulmonary artery.
35	Apparently healthy. Weight, 9 oz.	Apparently healthy ..	Fluid resembling pus in left shoulder joint.	Arteries and veins of stump healthy.	Large fibrinous clot in right side heart; extremity of median nerve bulbous; small abscess throughout tissues of stump to shoulder joint.
36	No abscesses in spleen	.....	No pus in joints.....	Closure of vein about 1½ inches from extremity of bone.	Fungous mushroom protrusion of medulla and other marks of osteomyelitis.
37	A grumous dark purple mass; very soft; complet'ly disorg'd.	Normal	Large abscess in shoulder joint; pus healthy.	Ves'ls of arm normal; firm black clot filled axill'y vein; no pus.	Heart normal; stump œdematous and filled with serum; bone semi-purulent throughout.
38	Enlarged, softened, dark purple, and adherent to diaphragm and peritoneum.	Transverse and descending colon and rectum reduced in calibre.	.....	Vessels of dura mater congested.	Heart livid in color and flabby; clots in right and left ventricles; dura mater tense; coats of stomach pale, soft, and injected in spots.
39	Enlarged, hard, and very light colored.	Full of gas; colon especially distended	Fibrinous, flaky, tenacious pus to hip j't; abscesses extended to knee j't; cartilages of knee j't erod'd.	.....	Bronchial glands enlarged and as black as ink; gall bladder light colored.
40	Weighed 4½ oz.....	Inflated, mottled, and streaked.	Pus in left knee joint; synovial membrane destroyed; cartilage eroded; pus in r't sh. j't; none in hip j'ts.	Phlebitis with total disorganization of fem. vein; bel. knee vein occupied by tubo filled with pus.	Brain; effusion of serum into lateral ventricles; large abscess with black walls about middle third femur; medulla of tibia softened.
41	Much congested. Weighed 10 oz.	.....	Carpus filled with pus.	.....	Heart healthy. Weighed 7 oz.
42	Soft, and of dark brown hue. W'd 8 oz.	Small intestines somewhat congested; cæcum sphacelous throughout.	.....	Vessels of fractured arm healthy.	Clot in left, and abscesses in r't ventricle of heart; trach. and bron. tubes congested; cardiac orifice of stomach congested; pancreas broken down and softened.
43	Many small abscesses in spleen; not much enlargement.	.....	.....	Thrombi in smaller veins from side nearest broken bone extend into fem. vein.	Abscess below knee broke, discharging offensive matter.
44	Dark purple color, faintly granulated; not very firm.	Healthy.....	.....	Femoral vein filled with a grayish black clot; artery filled with partially decomposed clot.	Medullary subst. yellowish, ochre-colored, and protruding from femur; no inflammation in thigh, or any of the organs; muscles attached to femur healthy; periosteum firmly adherent.
45	About the usual size and consistence.	Normal	.....	Femoral vein filled with partially softened clots nearly to Poupart's ligament.	Entire exterior of femur in a gangrenous condition.
46	Healthy.....	.....	Formation of pus in left shoulder joint.	No clots discovered ..	Soft parts of forearm, except vessels, thoroughly disorganized.
47	.....	.....	No pus in the joints	Suppurative inflammation of veins of leg.	Pericardium filled with serum; 2 oz. serum in lateral ventricles of brain; no pus, but an unusual amount of serum in all the serous cavities.
48	Decidedly softened ..	.....	.....	Thick creamy pus from face of stump to Poupart's ligament in fem. vein.	Fibrinous clot in right ventricle of heart; pyramidal bodies becoming invisible.

Abstracts of forty-eight *post-mortem* examinations are recorded in the preceding table. Metastatic abscesses were found in the lungs in thirty-five, in the liver in nine, in the kidneys in three, in the spleen in four instances, and in sixteen cases pus was found in the joints. The lymphatic glands of the groin were swollen in three cases, and in a case of a fracture of the femur (No. 28, p. 864), the parotid gland was enormously enlarged and distended with pus. Several other instances of swelling of the parotid glands were recorded in cases in which no autopsies were made:

CASE 1227.—Private Henry M. Smith, Co. G, 82d Pennsylvania, aged 28 years, received at Amelia Springs, Virginia, April 6, 1865, a compound comminuted fracture of the right knee. His right thigh was amputated in the middle third, by lateral flaps, April 6th. He was admitted to division No. 1, Annapolis General Hospital, April 15th, from City Point. When first seen, on April 28th, by Surgeon B. A. Vanderkieft, U. S. V., who reports the case, the patient was in a state of great debility, with delirium and other symptoms of pyæmia. The stump was in a very unhealthy condition, the discharge of pus sanious, and the end of the femur protruding an inch. The stump was kept clean by the use of soap and water, and oakum dressings were applied. Tonics and stimulants were administered internally. On May 2d the pyæmic symptoms were still more fully developed, the skin having assumed a yellow hue. The right parotid gland was swollen, and its external appearance indicated that an abscess had formed. The patient now lay in a lethargic state, the discharges from the bowels became involuntary, and he gradually sank. He died May 7, 1865. No *post-mortem* examination was made.

CASE 1228.—Corporal *Robert A. Wheedon*, Co. K, 47th North Carolina, aged 24 years, received a compound comminuted fracture of the right thigh, at the battle of Gettysburg, July 3, 1863. Amputation was performed in the hospital of the 2d division, First Corps, July 7th, at the upper third of the thigh. On July 12th secondary hæmorrhage occurred, supposed to proceed from a large muscular branch; was arrested, after about four ounces of blood had been lost, by elevating the stump and making pressure over the femoral artery. Pyæmia was recognized July 16th. An abscess developed in the region of the left parotid gland, which was incised July 21st, when a slight discharge of pus oozed from the incision. Quinine, stimulants, and nourishing diet were employed. The patient died July 23, 1863. No *post-mortem* examination was made. The case is reported by Surgeon W. B. Chambers, 97th New York.

CASE 1229.—Private John Kreps, Co. C, 29th Iowa, aged 16 years, received on April 30, 1864, a shot wound of the right thigh; the femur was fractured at the junction of the lower with the middle thirds, and the bone was splintered to the knee joint. He was admitted to hospital at Little Rock, Arkansas, on May 3d. The ends of the bone at the point of fracture became carious, and on July 9th amputation was performed at the junction of the upper and middle thirds of the thigh by the antero-posterior flap method; there was little hæmorrhage; chloroform was used. The patient did well till the 20th day, when abscesses formed in the stump and in the parotid gland. The patient died of pyæmia August 8, 1864. No autopsy was held. The case is reported by Assistant Surgeon E. A. Clark, U. S. V., who performed the amputation.

CASE 1230.—Private J. F. Smith, Co. C, 61st New York, aged 17 years, received, at Burksville, Virginia, April 8, 1865, a shot fracture of the right knee. On the following day (April 9th) amputation through the lower third of the thigh was performed. He was treated in field hospital, and subsequently, on May 14th, he was admitted to Armory Square Hospital at Washington. The symptoms of the case are briefly noted on the bed-card by Acting Assistant Surgeon C. H. Brown: Metastatic abscesses of surface; swelling of joints; icteric tinge of skin and conjunctiva of eye; swelling of submaxillary, sublingual, and parotid glands; joints painful? chills, and change of chill to that of burning heat; profuse diarrhœa; nausea, headache, and delirium. Death on May 24, 1865, of pyæmia and exhaustion. No autopsy was made.

CONCLUDING OBSERVATIONS ON SHOT WOUNDS.

The details of the treatment of special shot injuries and of the most serious complications have been fully described under the proper headings in this and the preceding volumes, and it is, therefore, only necessary here to allude briefly to the immediate care of the wounded after battles and engagements, and to a few points of a general character applicable to shot wounds.

Slight wounds were examined and dressed at the primary stations; those of greater severity received such care as their condition demanded, and were at once sent by the ambulance wagons to the field hospitals. The importance of an early and complete examination of the wounded seems to have been fully realized by the surgical staff. This examination was generally conducted under the influence of anæsthetics for the purpose of accurate diagnosis; in its course, balls and foreign bodies were extracted, bleeding vessels secured, and splinters of bone removed; upon its conclusion such operations were performed as in the judgment of the surgeon were necessary. In determining the extent of injury it was not unusual to enlarge the wound caused by the missile, especially in cases where the

advent of swelling caused difficulty or uncertainty of touch, or where it became necessary to remove splinters or foreign bodies. In the examination of a wound experience confirmed the common view that the finger is the surest and most intelligent probe. With regard to the removal of splintered bone and foreign bodies, experience seems to warrant all reasonable means for their removal, since they are liable to become sources of irritation and danger. The ends of splinters of bone still attached may be cut off, but forcible detachment must be avoided. Missiles should be extracted if they can be readily found and it can be done without risk to vital parts; but it should also be borne in mind that they may become encysted, giving no further trouble.

The primary dressing of wounds and operations was always of the simplest character; a piece of lint or linen held in place by the turns of a roller bandage and kept well moistened with water. Instances have been cited of great inconvenience and even of serious complications, such as gangrene and tetanus, being caused by tight bandaging. The presence of maggots in wounds, in the field and camp hospitals, was frequently an annoying complication. After protracted battles, such as the fighting on the Peninsula in June and July, 1862, and after the Wilderness and Spottsylvania, in 1864, when the means of transportation were not sufficient to move the wounded rapidly to permanent hospitals, and when the number of attendants was entirely inadequate to the demand, maggots were found in abundance in and beneath the dressings and in the wounds. Surgeon D. Prince, U. S. V., cautions "against the use of too much dressing, as the impression that the work of flies will be frustrated thereby is erroneous. While the dressings are wet flies will deposit their eggs through several thicknesses of muslin, and also along the border of the dressings, and once hatched the little ravenous maggots will insinuate themselves among all the layers of dressings and under them into the wound itself. Nothing but frequent dressing will keep them from developing in the wound. Oil of turpentine and infusions of tobacco were used to kill these pests. Petroleum or kerosene oil was tried in some cases with markedly good effect, but the most effectual remedy was a thorough examination of the dressing every two or three hours." In well established general hospitals the presence of maggots was rarely noted.

Climatic, Hygienic, and Moral Influences.—Of the effects of climate on the treatment and result of wounds the reports of the war afford but little information. Casual remarks were occasionally made by medical officers that in certain climates and localities wounds "did well," or otherwise; but so vague a statement proves of little value, as it is more than probable that insufficient consideration was given to other closely related conditions which may have exerted a stronger influence than climate itself. The change of climatic conditions experienced by our armies during the operations of the war in a sudden transition from the cool and more healthy regions of the north to the warm semi-tropical and malarious climates of the south could not fail to make itself felt on the general organism, aside from any of the concurrent exposures, hardships, or privations incident to the soldier's life. To what extent the health, vigor, and efficiency of the troops campaigning in the southern regions was impaired by causes due to climatic origin is shown in the medical portion of this work. Suffice it to say that under these acquired conditions wounds and surgical diseases suffered a corresponding modification. Laying aside the consideration of other factors, it seems that continuous dry heat is not unfavorable to the satisfactory progress of gunshot wounds; the same may be said of the same quality of cold—both probably

act as tonics to the system at large. Moist climates with continuous heat are relaxing and weakening, rendering the body less capable of resisting the onset of prevailing diseases, and cannot be considered advantageous. It has been claimed, however, that the moist climate of parts of the southern seacoast was exceedingly favorable to the healing process of wounds; it may be that the especial qualities of sea air afforded a desirable element. The pure bracing air of the highlands of Virginia, Tennessee, and Georgia were, without doubt, especially favorable to the recovery of the wounded. The successful results of wounds and operations in General Sherman's campaign from Atlanta to the sea was especially marked, though it must be admitted that very important factors other than that of mild equable climate had their full influence upon the men of that command. Sudden and extreme variations of temperature and humidity were decidedly prejudicial to the course of wounds, and seem especially to favor the access of tetanus. Prolonged cold and moisture were generally regarded unfavorably as favoring the presence of surgical complications, as erysipelas and gangrene, though here the probable explanation is that these diseases were engendered by the want of free ventilation.

The subject may be briefly summed up in the statement that those conditions of climate, wherever found, which allow the fullest and freest exposure to pure fresh air, are undoubtedly those most favorable to the rapid and uncomplicated recovery from wounds, while such conditions as tend to prevent a free out of door life, or compel the exclusion of large quantities of free air from the wards of hospitals and from barracks and tents, or such as favor the rapid decomposition of vegetable and animal matter, are to be considered as more or less prejudicial and harmful to the course and treatment of wounds.

The influences of hygienic conditions, food, and concurrent diseases, upon the results of shot injuries in time of war are similar to those observed in cases treated in time of peace in civil hospitals. The influence of the mental condition on the results of wounds is undeniable. All reports agree that the wounded of victorious troops, elated by the successes achieved by their own bravery and that of their comrades, did better than those of defeated armies. The most striking example of this influence of the mental condition on the successful treatment of wounds in modern times is the fearful mortality among the French, after shot wounds of all kinds, in the war of 1870–'71. The excessive mortality of that campaign, repeatedly pointed out in the chapters on special wounds, was undoubtedly largely owing to the mental depression caused by a succession of reverses rarely met with in the history of warfare.

Multiple Wounds.—There is no doubt that in a large proportion of the killed on the battle-field death was caused by several wounds simultaneously received; but many cases of recovery after multiple wounds have also been recorded. It is impossible to give even an approximate estimate of the frequency of the cases in which several wounds were found in the same individual. The cases were classed with those injuries which seemed to be the gravest. In the following instance there were no less than twenty-six wounds of entrance and exit. The patient died twenty-eight days after the receipt of the injuries:

CASE 1231.—Private Franz Metzel, Co. A, 11th Massachusetts, aged 31 years, was wounded at Spottsylvania, May 12, 1864. On May 25th he was admitted into Armory Square Hospital, Washington. Surgeon D. W. Bliss, U. S. V., reported: "This soldier accidentally got between or in the range of cross-firing and received twenty-six separate wounds of entrance and exit, and when admitted was sufficiently strong to converse and relate his sad fate. The wounds were by minié balls, as follows: 1st entered just anterior to external malleolus of left ankle and emerged about the middle of the sole of the foot; 2d entered left leg just above external malleolus, passed upward, and emerged five inches above the heel; 3d ball entered left leg six inches above external malleolus, and made its exit on the inner side four inches below the knee joint; 4th entered just below the head of the left fibula, and emerged on the internal aspect nearly opposite point of entrance; 5th entered left thigh exter-

nally, three inches above knee, and emerged on inner side opposite point of entrance; 6th entered left thigh on the external and middle part, passed through, and emerged opposite point of entrance; 7th entered just above the coccyx and remains in parts unknown; 8th entered the back three inches above left hip, and remains; 9th entered just below inferior angle of left scapula and remains in parts unknown; 10th, left arm, two wounds below and three above the elbow, the bones above and below being fractured; 11th entered right leg above the middle and made its exit on the calf opposite point of entrance; 12th entered about three inches below the right knee, a little internal, and remains; 13th entered right thigh externally, about the middle, and made its exit on the inner side opposite point of entrance; 14th entered upper third of right thigh, on the external side, and remains in parts unknown. He died May 30, 1864."

In the following case the patient made a good recovery after receiving four shot wounds, three of which were of a serious nature:

CASE 1232.—Private Charles Sebring, Co. F, 48th Indiana, was wounded at Iuka, Mississippi, September 19, 1862, and admitted into hospital at Jackson, Tennessee, September 19th. Assistant Surgeon J. P. Wright, U. S. A., reported: "He was first disabled by a musket ball, which passed through the hamstring muscles of the left thigh; and in this helpless condition, stricken down in the thickest of the fight, he received three other wounds from musket balls—one ball impinging upon the left parietal bone and furrowing the scalp without causing fracture; another passing through the left forearm, in its lower third, fracturing and comminuting both bones; and a third passing through the middle third of the right arm and emerging on the posterior and inner aspect, causing a comminuted fracture of the humerus. The flesh wound in the thigh healed rapidly; the wound in the left forearm continued to discharge for four months, and, after the removal of several fragments of bone, ultimately healed with loss of pronation and supination, and with contraction of the flexor tendons; it seemed, however, to cause little constitutional disturbance. The fracture of the left humerus gave to the case its peculiar interest. In November, 1862, when the case first came under my own supervision, the arm was much swelled and very intolerant of manipulation; there had been no attempt at bony union, and the exsanguineous and emaciated condition of the patient augured a speedy and fatal issue. There was a profuse discharge from both orifices of the wound, the character of which, however, was healthy; light dressings were applied and a nourishing diet enjoined. Two weeks later the limb was seized with phlegmonous erysipelas; the pain was excessive and the swelling so great that the tense and glistening integument threatened to burst. Great constitutional disturbance ensued; the stomach rejected everything that was offered, colliquative diarrhœa supervened, a harassing cough racked the patient's frame, already reduced to a skeleton by months of suffering and exhaustive suppuration, the conjunctiva became icteroid, and profuse sweats by day and night gave additional evidence of the great prostration of the vital powers. No pus was detected in the alvine evacuations; but it was strongly suspected in the sputa, and indicated by every test attainable. The local treatment adopted was scarification of the affected part, followed by warm fomentations of infusion of elm and laudanum, in which the whole limb was enveloped. The constitutional treatment was mainly supporting. About four days from its inception the erysipelatous action showed signs of abatement, attended with marked improvement of the constitutional symptoms. This favorable change continued for about three weeks, and the improved appetite and cessation of diarrhœa and exhaustive sweats again afforded encouragement. But the condition of the arm was not promising; the discharge had become very fetid, and the tissues, to the fingers' ends, infiltrated with serum. With the limb in this condition, the most favorable result to be anticipated from a second attack of erysipelas would be gangrene of the extremity; and yet, although about this period the morbid action returned, scarcely less threatening in character than before, it yielded promptly to free scarification followed by warm formentations, the only inconvenience resulting therefrom being a considerable amount of sloughing of the integument. On the subsidence of this second attack the utter prostration of the vital powers seemed almost to preclude the hope of recovery. A stimulating and nourishing diet was enjoined, ale or milk punch, according to the patient's wish, being administered several times daily, together with compound tincture cinchona, which was exhibited continuously for many weeks. From this period convalescence began." Sebring was discharged from service April 8, 1863, and pensioned. In May, 1863, his left arm was amputated near the shoulder,[1] at his home, by Drs. Grimes and Badger. He was last paid in September, 1881.

CONSERVATION, EXCISION, AMPUTATION.

The shot wounds of the extremities number one hundred and seventy-four thousand two hundred and six (174,206), or over two-thirds of the total number of shot injuries. Of these, one hundred and forty thousand one hundred and twenty-four (140,124) were treated without operative interference, four thousand six hundred and fifty-six (4,656) were followed by excision, and twenty-nine thousand four hundred and twenty-six (29,426) by amputation. To the cases of amputation should be added three hundred and five (305) amputations following excisions, and two hundred and forty-nine (249) re-amputations,[2] making the total number of amputations twenty-nine thousand nine hundred and eighty (29,980). The tables on the next two pages contain numerical summaries of the shot fractures of the

[1] See TABLE LXXXIV, No. 104, page 778, *Second Surgical Volume.*

[2] In the Surgical portion of this work the extremities have been subdivided as follows: Upper Extremities—hand, wrist, forearm, elbow joint, shaft of humerus, and shoulder joint; and Lower Extremities—foot, ankle joint, leg, knee joint, thigh, and hip joint. Under re-amputations, here referred to, are understood cases in which, for instance, the original amputation was in the leg and the subsequent operation at the knee joint, thigh, or hip joint. It was impossible to indicate in this TABLE the cases of re-amputations in the same subdivisions; as, for instance, amputations in the lower third of the thigh, with re-amputation in the middle or upper; and likewise in the leg and arm and forearm, although a great number of such instances are reported.

TABLE

Tabular Statement of Eighty-seven Thousand Seven Hundred and Ninety-three Cases of Shot

Number.	SEAT OF INJURY.	CASES.					TREATED BY CONSERVATION.				TREATED BY EXCISION.			
		Total.	Recovery.	Fatal.	Undeter.	Percent. of Fatal.	Total.	Recovery.	Fatal.	Undeter.	Total.	Recovery.	Fatal.	Undeter.
1	Flesh and Periarticular Wounds	54,801	53,161	1,640	.....	2.9	54,719	53,118	1,601	.....	.....	.....	.....	.....
2	Contusions and Fractures of Hand	11,369	9,644	316	1,409	3.1	3,092	2,781	59	252	116	104	10	2
3	Contusions and Fractures of Wrist	1,509	1,305	193	11	12.9	716	653	54	9	109	94	15	.....
4	Contusions and Fractures of Forearm	5,194	4,636	482	76	9.4	2,971	2,740	191	40	1,019	883	114	22
5	Contusions and Fractures of Elbow	2,816	2,211	532	73	19.4	938	828	96	14	731	518	159	54
6	Contusions and Fractures of Arm	8,245	6,249	1,639	357	20.7	2,960	2,385	444	131	947	653	264	30
7	Contusions and Fract. of Shoulder Joint	1,579	948	492	139	34.2	541	383	149	9	835	432	277	126
8	Contusions and Fract. of Clav. and Scap.	2,280	1,936	314	30	13.9	2,196	1,876	295	25	84	60	19	5
9	Total	87,793	80,090	5,608	2,095	6.5	68,133	64,764	2,889	480	3,841	2,744	858	239
10	Amputations following Excisions of the Hand													
11	Amputations following Excisions at the Wrist													
12	Amputations following Excisions in the Forearm													
13	Amputations following Excisions at the Elbow													
14	Amputations following Excisions in the Arm													
15	Re-amputations following Amputations of Hand													
16	Re-amputations following Amputations at Wrist													
17	Re-amputations following Amputations in Forearm													
18	Total Amputations and Re-amputations													

TABLE

Tabular Statement of Eighty-six Thousand Four Hundred and Thirteen Cases of Shot Injuries

Number.	SEAT OF INJURY.	CASES.					TREATED BY CONSERVATION.				TREATED BY EXCISION.			
		Total.	Recov'y.	Fatal.	Undeter.	Percent. of Fatal.	Total.	Recov'y.	Fatal.	Undeter.	Total.	Recov'y.	Fatal.	Undeter.
1	Flesh and Periarticular Wounds	59,139	56,219	2,920	.....	4.9	58,938	56,150	2,788	.....	.....	.....	.....	.....
2	Contusions and Fractures of the Foot	5,859	4,968	451	440	8.3	3,587	3,137	136	314	97	75	18	4
3	Contusions and Fractures of the Ankle	1,722	1,247	460	15	26.9	525	414	99	12	33	22	9	2
4	Contusions and Fractures of the Leg	9,171	6,491	2,402	278	27.0	4,116	3,442	539	135	388	276	108	4
5	Contusions and Fractures of the Knee Joint	3,398	1,566	1,819	13	53.7	901	360	532	9	56	9	44	3
6	Contusions and Fractures of the Thigh	6,738	3,115	3,434	189	52.4	3,620	1,800	1,719	101	186	55	123	8
7	Contusions and Fractures of the Hip Joint	386	59	327	.....	84.7	304	55	249	.....	55	2	53	.....
8	Total	86,413	73,665	11,813	935	13.8	71,991	65,358	6,062	571	815	439	355	21
9	Amputations following Excisions of the Foot													
10	Amputations following Excisions at the Ankle													
11	Amputations following Excisions in the Leg													
12	Amputations following Excisions at the Knee													
13	Amputations following Excisions in the Femur													
14	Re-amputations following Amputations of Toes													
15	Re-amputations following Amputations of Foot													
16	Re-amputations following Amputations at Ankle													
17	Re-amputations following Amputations in Leg													
18	Re-amputations following Amputations at Knee													
19	Re-amputations following Amputations in Thigh													
20	Total Amputations and Re-amputations													

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CLXIII.

Injuries of the Upper Extremities, indicating Seat of Injury, Mode of Treatment, and Final Result.

Number.	Followed by Amputation.				Amputations— Of Hand and Fingers.			At the Wrist.			In the Fore-arm.			At the Elbow.			In the Arm.			At the Shoulder.		
	Total.	Recovery.	Fatal.	Undeter.	Recovery.	Fatal.	Undeter.	Recovery.	Fatal.	Undeter.	Recovery.	Fatal.	Undeter.	Recovery.	Fatal.	Undeter.	Recovery.	Fatal.	Undeter.	Recovery.	Fatal.	Undeter.
1	82	43	39	.....	.....	.....	.....	..	..	....	11	3	....	...	.....	.....	27	27	.....	5	9	...
2	8,161	6,759	247	1,155	6,551	198	1,153	38	4	...	151	28	1	.....	.....	.....	19	17	1	.....	.....	...
3	684	558	124	2	.....	....	....	19	3	1	507	93	1	4	.....	.....	28	26	.....	.....	2	...
4	1,204	1,013	177	14	.....	.....	.....	.....	.....	....	772	101	11	26	2	1	213	72	2	2	2	...
5	1,147	865	277	5	.....	.....	.....	.....	.....	.....	.....	.....	....	5	1	....	847	272	5	13	4	...
6	4,338	3,211	931	196	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,777	780	175	434	151	21
7	203	133	66	4	.....	.....	.....	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	133	66	4
8	....	.....	.....	.....	.....	.....	.....	.....	..	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
9	15,819	12,582	1,861	1,376	6,551	198	1,153	57	7	1	1,441	225	13	35	3	1	3,911	1,194	183	587	234	25
10	9	7	2	.....	.....	.....	.....	.....	.....	.....	7	2	...	.....	.....	.....	.....	.....	.....	.....	.....	.....
11	13	9	4	.....	.....	.....	.....	.....	.....	.....	6	2	...	.....	.....	.....	3	2	.....	.....	.....	.....
12	76	50	25	1	.....	.....	.....	.....	.....	....	17	3	...	.....	.....	.....	33	22	.....	1	.....	...
13	64	39	25	.....	.....	.....	.....	.....	.....	...	.....	.....	.....	.....	.....	.....	39	25	.....	.....	.....	...
14	64	37	27	.....	.....	.....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	33	16	.....	4	11	...
15	71	51	20	.....	.....	.....	.....	3	....	....	30	13	....	1	....	....	15	7	.....	2	.....	...
16	16	12	4	.....	.....	.....	.....	....	..	..	2	.....	...	.....	.....	.....	9	4	.....	1	.....	...
17	15	12	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11	3	.....	1	.....	...
18	16,147	12,799	1,971	1,377	6,551	198	1,153	60	7	1	1,503	245	13	36	3	1	4,054	1,273	183	596	245	25

CLXIV.

of the Lower Extremities, indicating Seat of Injury, Mode of Treatment, and Final Result.

Number.	Followed by Amputation.				Amputations— Of Toes.			Of Foot.			At Ankle.			In the Leg.			Knee J't.			In the Thigh.			Hip J't.	
	Total.	Recov'y.	Fatal.	Undeter.	Recov'y.	Fatal.	Undeter.	Recov'y.	Fatal.	Undeter.	Recov'y.	Fatal.	Undeter.	Recov'y.	Fatal.	Undeter.	Recov'y.	Fatal.	Undeter.	Recov'y.	Fatal.	Undeter.	Recov'y.	Fatal.
1	201	69	132	..	1	..	..	..	..	....	..	..	..	30	33	....	1	5	..	37	94	....	.....	.....
2	2,175	1,756	297	122	1,093	29	105	221	51	16	104	37	1	334	174	....	1	3	..	3	3	...	.....	.....
3	1,164	811	352	1	.....	..	....	...	....	..	14	1	1	789	319	....	1	10	..	7	22	....	...	...
4	4,667	2,773	1,755	139	.....	.....	.....	.....	.....	...	.....	.....	.....	2,383	1,244	138	43	64	1	347	447	....	...	...
5	2,441	1,197	1,243	1	.....	..	.....	...	.....	.....	...	..	..	.....	.....	....	29	24	1	1,168	1,219	....	.....	.....
6	2,932	1,260	1,592	80	.....	.....	.....	..	..	....	....	..	..	.....	.....	.....	.....	.....	..	1,257	1,566	80	3	26
7	27	2	25	....	.....	..	....	..	..	....	..	..	...	.....	.....	.....	..	.....	.....	.....	.....	....	2	25
8	13,607	7,868	5,396	343	1,094	29	105	221	51	16	118	38	2	3,536	1,770	138	75	106	2	2,819	3,351	80	5	51
9	11	8	3	.....	.....	.....	.....	1	....	..	....	...	..	5	3	....	1	.....	..	1	.....	.....	.....	.....
10	4	3	1	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	1	....	.....	.....	.....	.....	.....	....	.....	.....
11	50	27	23	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15	6	....	2	3	..	10	14	....	.....	.....
12	7	1	6	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	6	....	...	...
13	7	2	5	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	.....	.....	..	2	4	....	....	1
14	12	5	7	....	.....	.....	.....	1	1	....	....	2	..	4	3	....	....	1	..	.....	.....	....	.....	.....
15	13	12	1	.....	.....	.....	.....	.....	.....	.....	1	.....	...	11	1	....	.....	.....	..	.....	.....	....	.....	.....
16	28	21	7	....	.....	.....	.....	.....	.....	.....	.....	..	...	21	6	....	.....	.....	..	.....	1	...	..	...
17	73	42	31	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	1	..	38	30	....	.....	.....
18	12	7	5	.....	.....	.....	..	.....	.....	..	.....	..	..	.....	.....	.....	..	.....	..	7	5	....	.....	...
19	9	6	3	.....	.....	.....	.....	....	..	..	....	..	...	.....	.....	....	..	....	..	.....	.....	..	6	3
20	13,833	8,002	5,488	343	1,094	29	105	223	52	16	119	40	2	3,595	1,790	138	82	111	2	2,878	3,411	80	11	55

upper and lower extremities, indicating the seat of injury, mode of treatment, and terminations of cases.

Eighty-seven thousand seven hundred and ninety-three (87,793), with eighty thousand and ninety (80,090) recoveries, five thousand six hundred and eight (5,608) deaths, and two thousand and ninety-five (2,095) unknown results (a mortality rate of 6.5 per cent.), were shot injuries of the upper extremities. Of these, thirty-two thousand nine hundred and ninety-two (32,992) were wounds complicated by fracture, and fifty-four thousand eight hundred and one (54,801) were flesh wounds; of the latter, eighty-two (82) were followed by amputation. Of the thirty-two thousand nine hundred and ninety-two (32,992) shot fractures of the upper extremities, three thousand eight hundred and forty-one (3,841), or 11.6 per cent., were followed by excision, fifteen thousand seven hundred and thirty-seven (15,737), or 47.7 per cent., by amputation, and thirteen thousand four hundred and fourteen (13,414), or 40.7 per cent., were treated without operative interference beyond the removal of bone splinters, of missiles, or other foreign substances.

Eighty-six thousand four hundred and thirteen (86,413) were shot injuries of the lower extremities; the results were not ascertained in nine hundred and thirty-five (935) cases; seventy-three thousand six hundred and sixty-five (73,665) resulted in recovery, and eleven thousand eight hundred and thirteen (11,813) in death—a fatality rate of 13.8 per cent. Fifty-nine thousand one hundred and thirty-nine (59,139) were flesh wounds, of which two hundred and one (201) were followed by amputation. Twenty-seven thousand two hundred and seventy-four (27,274) were shot injuries involving the bones of the lower extremities; of these, eight hundred and fifteen (815), or 3.0 per cent., were treated by excision, thirteen thousand four hundred and six (13,406), or 49.1 per cent., by amputation, and thirteen thousand and fifty-three (13,053), or 47.9 per cent., without operative interference. In reality the percentage of cases treated by amputation in the upper as well as in the lower extremities was somewhat larger than here stated, as in three hundred and five (305) instances (two hundred and twenty-six in the upper extremities, ninety-two in the lower extremities) the excisions were subsequently followed by amputations, as is indicated in the tabular statements on the two preceding pages.

In the upper extremities 11.6 per cent. of the total fractures were treated by excision; in the lower extremities only 3.0 per cent. There is little difference in the relative percentage of amputation in the upper and lower extremities (in the first 47.7, in the second 49.1 per cent.); the proportion of cases of conservative treatment in the lower extremities exceeded that in the upper 7.2 per cent., being 47.9 in the former and 40.7 per cent. in the latter. It is difficult to account for this larger percentage in the attempts at conservation in shot fracture of the lower extremities, unless it be due to the instructions given during the progress of the war by medical directors of the armies that amputations in the thigh should not be performed on the battle-field, and that by the time such patients reached general hospitals the favorable time for operative interference had passed.

It is a curious anomaly that in the upper extremity conservatism was more extensively employed in the part most distant from the trunk, while in the lower extremity the reverse was the case. Of eight thousand two hundred and forty-five (8,245) shot fractures of the humerus, two thousand nine hundred and sixty (2,960), or 35.9 per cent., and of five thousand one hundred and ninety-four (5,194) shot fractures of the bones of the forearm, two thousand nine hundred and seventy-one (2,971), or 57.2 per cent., were treated by conservative measures throughout. In the lower extremities the percentage of cases of fracture

of the femur treated conservatively exceeded that of the fractures of the bones of the leg; in the former three thousand six hundred and twenty (3,620) out of six thousand seven hundred and thirty-eight (6,738), or 53.7 per cent., being treated without operative interference, in the latter four thousand one hundred and sixteen (4,116) out of nine thousand one hundred and seventy-one (9,171), or 44.8 per cent.[1]

One hundred and thirteen thousand nine hundred and forty (113,940) shot flesh wounds of the extremities, including cases of injuries of arteries and nerves in which no lesions of bone were reported, gave four thousand five hundred and sixty (4,560) fatal results, a mortality rate of 4.0 per cent., of which fifty-four thousand eight hundred and one (54,801) of the upper extremities, with one thousand six hundred and forty (1,640) deaths, gave a mortality rate of 2.9 per cent., and fifty-nine thousand one hundred and thirty-nine (59,139) of the lower extremities, with two thousand nine hundred and twenty (2,920) deaths, a fatality rate of 4.9 per cent. Of the former in eighty-two (82), and of the latter in two hundred and one (201) cases, amputation was resorted to, generally on account of hæmorrhage, aneurisms, or extended sloughing or suppuration; less frequently on account of pyæmia, gangrene, and erysipelas, and, in a few instances, on account of lacerations of nerves.

Sixty thousand two hundred and sixty-six (60,266) of the one hundred and seventy-four thousand two hundred and six (174,206) shot wounds of the extremities were complicated by injuries of the bony structure. Forty-four thousand three hundred and seventy-five (44,375) recovered, twelve thousand eight hundred and sixty-one (12,861) proved fatal, and the result in three thousand and thirty (3,030) cases was not recorded, a mortality rate of 22.4 per cent. Thirty-two thousand nine hundred and ninety-two (32,992) were fractures in the upper, and twenty-seven thousand two hundred and seventy-four (27,274) in the lower extremities:

TABLE CLXV.

Summary of Sixty Thousand Two Hundred and Sixty-six Shot Fractures of the Extremities, showing Treatment and Results.

MODE OF TREATMENT.	Cases.	Recovery.	Fatal.	Undetermined.	Percentage of Fatality.	Upper Extremities.				Lower Extremities.			
						Recovery.	Fatal.	Undetermined.	Percent. of Fatality.	Recovery.	Fatal.	Undetermined.	Percent. of Fatality.
Conservation	26,467	20,854	4,562	1,051	17.9	11,646	1,288	480	9.9	9,208	3,274	571	26.2
Excision	4,656	3,183	1,213	260	27.5	2,744	858	239	23.8	439	355	21	44.7
Amputation	29,143	20,338	7,086	1,719	25.8	12,539	1,822	1,376	12.6	7,799	5,264	343	40.2
Aggregates	60,266	44,375	12,861	3,030	22.4	26,929	3,968	2,095	12.8	17,446	8,893	935	33.7

Twenty-six thousand four hundred and sixty-seven (26,467), or 43.9 per cent., were treated conservatively; four thousand six hundred and fifty-six (4,656), or 7.7 per cent., were followed by excision; and twenty-nine thousand one hundred and forty-three (29,143), or 48.4 per cent., were followed by amputation. Of the conservatively treated cases, 17.9 per cent. proved fatal; of those followed by excision 27.5 per cent., and of those by ampu-

[1] It might be claimed, in a comparison of this nature, that the cases of excision would be more fairly classed with the cases treated by conservation in contradistinction to the cases treated by amputation. While this would somewhat change the relative percentages in the two groups of the upper and lower extremities, the conclusion arrived at above would remain the same, thus: Fractures of humerus, 8,245; treated by conservation or excision, 3,907, or 47.4 per cent.; fractures of bones of the forearm, 5,194; treated by conservation or excision, 3,956, or 76.8 per cent.; in the lower extremities, fractures of the femur, 6,738; treated by conservation or excision, 3,806, or 56.4 per cent.; and fractures of the tibia and fibula, 9,171; treated by conservation or excision, 4,326, or 49.1 per cent.

tation 25.8 per cent., showing that the fatality after excision exceeds that after amputation in the whole series of cases 1.7 per cent., although over three-fourths of the excisions were operations performed in the upper extremities, where the results of operative interference are less serious than in the lower extremities.

The greatest fatality after shot injuries of the extremities with lesion of bone was observed in shot injuries of the hip joint, where the fatality reached 84.7 per cent. Next came the injuries of the knee joint, with a mortality of 53.7 per cent.; then those of the thigh, of which 52.4 per cent. perished. Then come the injuries of the shoulder joint with 34.2 per cent. mortality, of the leg with 27.0, of the ankle joint with 26.9, of the arm with 20.7, elbow with 19.4, wrist 12.9, forearm 9.4, foot 8.3, and finally the shot injuries of the bony structure of the hand with 3.1 per cent. fatality.

A reference to TABLES CLXIII and CLXIV, *ante*, shows a percentage highly flattering to the efforts of conservation; but it must be borne in mind that the cases reported as treated conservatively were cases selected as specially adapted to this mode of treatment, and probably were the least serious. Moreover, there were many cases in which conservative treatment was abandoned and intermediary or secondary excisions and amputations were resorted to—cases which helped to increase the mortality rate of these operations, but which should properly be charged to the attempts at conservation. On the other hand, many operations were performed in the field, where the appliances and necessary rest of conservative surgery could not be had, and where frequent transportation for considerable distances was unavoidable, in which in general hospitals an attempt might have been made to save the limb.

The disposition towards conservation developed itself rapidly as medical officers became familiar with serious cases of shot injuries, and it is safe to say that in the later stages of the war many limbs were saved which at an earlier period would have been sacrificed. Especially was this the case in the upper extremities, where the preservation of the hand, or even of portions of the same, was considered most important for the well being of the individual. An examination of the many cases thus treated, as described in previous sections of the history, will show the formidable risks taken to attain this end.

There was a decided growth in the disposition to save in shot injuries of the lower extremities, especially in those of the femur, and the many favorable results leave beyond doubt the wisdom of the course. Still there was a wide difference of opinion on this point, particularly between field surgeons and those in charge of general hospitals at the rear—a difference that can only be reconciled by viewing the subject from the standpoint of each.

Probably the least satisfactory ultimate results of conservative treatment were those in the foot and ankle, which, while successful in saving life, render it doubtful, in the light of their ultimate condition, whether conservation was the wisest course.

EXCISIONS.—The consideration of this operation at this point is restricted to the excisions in the bones of the extremities; the three hundred and fifty cases of excisions in the bones of the head, face, and trunk, including two hundred and twenty instances of trephining, have been considered in the *First Surgical Volume*.

Of four thousand six hundred and fifty-six excisions, three thousand eight hundred and forty-one, or over four-fifths, were in the upper extremities, and eight hundred and fifteen in the lower extremities.

The excisions at the hip joint lead with the largest mortality, 90.9 per cent.; next come the excisions at the knee joint with 81.4 per cent.; the excisions in the shaft of the

femur have a fatality of 69.4 per cent.; the excisions at the shoulder of 36.6 per cent.; at the ankle joint of 29.0 per cent.; in the shaft of the humerus of 28.6 per cent.; in the tibia and fibula of 28.2 per cent.; in the bones of the foot of 19.3 per cent.; at the wrist joint of 13.8 per cent.; in the bones of the forearm of 11.3 per cent.; and in the bones of the hand of 9.6 per cent. With the exception of the elbow the excisions in the joints show

TABLE CLXVI.

Numerical Statement of Four Thousand Six Hundred and Fifty-six Excisions in the Extremities.

SEAT OF OPERATION.	CASES.					PRIMARY.				INTERMEDIARY.				SECONDARY.				PERIOD OF OPERATION UNKNOWN.			
	Total.	Recoveries.	Fatal.	Unknown.	Percentage of Fatality.	Recoveries.	Fatal.	Unknown.	Percentage of Fatality.	Recoveries.	Fatal.	Unknown.	Percentage of Fatality.	Recoveries.	Fatal.	Unknown.	Percentage of Fatality.	Recoveries.	Fatal.	Unknown.	Percentage of Fatality.
Clavicle and Scapula	84	60	19	5	24.1	27	9	3	25.0	12	6	..	33.3	8	....	....	.....	13	4	2	23.5
Shoulder Joint	1,086	603	348	135	36.6	376	185	91	32.9	124	113	15	47.6	69	29	4	29.5	34	21	25	38.1
Shaft of Humerus	696	477	191	28	28.6	326	145	16	30.7	64	29	....	31.1	36	5	....	12.1	51	12	12	19.0
Elbow Joint	764	551	165	48	23.0	288	75	33	20.6	152	74	5	32.7	57	8	..	12.3	54	8	10	12.9
Radius and Ulna	986	856	109	21	11.3	589	71	5	10.7	120	29	....	19.4	36	4	...	10.0	111	5	16	4.3
Wrist Joint	109	94	15	....	13.8	55	7	...	11.2	18	6	....	25.0	15	2	....	11.7	6	...	...	.....
Bones of Hand	116	103	11	2	9.6	58	6	...	9.3	15	2	...	11.7	6	....	....	.....	24	3	2	11.1
Hip Joint	66	6	60	....	90.9	1	32	....	96.9	2	20	..	90.9	3	8	....	72.7	....	....	....	.....
Shaft of Femur	175	51	116	8	69.4	20	65	6	76.4	9	39	....	81.2	15	3	1	16.6	7	9	1	56.2
Knee Joint	57	10	44	3	81.4	4	26	2	86.6	1	12	....	92.3	4	3	....	42.8	1	3	1	75.0
Tibia and Fibula	387	275	108	4	28.2	148	67	....	31.1	58	29	..	33.3	42	8	....	16.0	27	4	4	12.9
Ankle Joint	33	22	9	2	29.0	8	2	1	20.0	5	3	....	37.5	5	4	...	44.4	4	....	1	.....
Bones of Foot	97	75	18	4	19.3	40	11	2	21.5	15	5	..	25.0	16	1	....	5.8	4	1	2	20.0
Aggregates	4,656	3,183	1,213	260	27.6	1,940	701	159	27.0	595	367	20	38.1	312	75	5	19.3	336	70	76	17.2
						2,800				982				392				482			

larger mortality rates than those in the osseous structures immediately above the joint; the fatality of the operations in the knee joint exceeds that in the shaft of the femur 12.0 per cent.; in the ankle joint the fatality is 0.8 per cent. greater than in the leg, and in the wrist joint 2.5 per cent. greater than in the bones of the forearm; the excisions at the elbow joint, on the contrary, show more favorable results than those in the arm, the death-rate being 5.6 per cent. less in the former than in the latter.

The percentage of fatality in the entire series of excisions in the extremities is disappointing, especially when it is considered that over four-fifths of the excisions were performed in the upper extremities, where the chances for success must be considered the brightest. It disproves the opinion held by the advocates of this operation that excision involves less loss of life than amputation. That it might be possible to obtain better results in well-appointed and less crowded hospitals is not denied; and the many excellent results obtained in civil practice should encourage the military surgeon to persevere in his efforts in this direction in suitable cases and under favorable circumstances. As to whether the effort made to secure a useful limb by excision compensates for the formidable risk which must be encountered in military practice, can be best determined by the reader by an examination of the analyses of the cases in the various sections of the extremities, as given previously under their appropriate headings. In brief, it may be stated that the results after excisions in the long bones and in the knee and ankle joints were little less than disastrous, and the ultimate conditions of many of these cases, although considered successful shortly after the operation, proved to be deplorable.

The results in excisions of the shoulder and elbow joints and, to some extent, in the wrist joint have been more encouraging, as useful limbs were preserved after many of these operations. In the excision at the wrist the patient generally recovered with anchylosis and extreme deformity of the hand and stiffness of the fingers; but such is the adaptability of the hand to all pursuits in life, that even with these disadvantages it remained a useful member to the patient.

In three hundred and five cases the excision was followed by amputation of the limb, in two hundred and twenty-six in the upper, in seventy-nine in the lower extremities.

The operations have been grouped into primary, intermediary, and secondary. The primary operations contain the excisions performed within the first three days; the intermediary those from the fourth to the thirtieth day, inclusive; and the secondary those performed more than thirty days after the date of injury. As indicated in TABLE CLXVI, the ratio of fatality after primary operations was 27.0 per cent., after intermediary 38.1, and after secondary 19.3 per cent. The results of the secondary operations were the most favorable; but it must always be remembered that this group embraces the cases only which had successfully resisted the attacks of the inflammatory period.

It will be noticed in the detailed histories of cases of excisions that the period of treatment extended over a long time, even months and years, and that these cases appeared to be particularly prone to consecutive hæmorrhage, gangrene, and pyæmia (see pages 808, 810, 825, and 857, *ante*).

Towards the latter part of the war the most thoughtful surgeons found it necessary to exercise a careful discrimination in the selection of cases for excision, and to refuse to operate in many instances in which, early in the contest, this operation would have been favored.

A table indicating the different months in which the operations were performed is here appended. The highest rate of mortality it will be noticed occurred in June, the lowest in November; but as regards the influence of season on the operations seemingly no points of value can be deduced from the tabular statement:

TABLE CLXVII.

Tabular Statement of Excisions, indicating the Months in which the Operations were performed.

SEAT OF INJURY.	JAN.		FEB.		MAR.		APRIL.		MAY.		JUNE.		JULY.		AUGUST.		SEPT.		OCT.		NOV.		DEC.	
	Recoveries.	Fatal.	Recoveries.	Fatal.	Recoveries.	Fatal.	Recoveries.	Fatal.	Recoveries.	Fatal.	Recoveries.	Fatal.	Recoveries.	Fatal.	Recoveries.	Fatal.	Recoveries.	Fatal.	Recoveries.	Fatal.	Recoveries.	Fatal.	Recoveries.	Fatal.
Shoulder Joint	10	5	16	7	11	7	26	21	109	81	94	73	82	44	46	22	54	25	45	20	43	14	32	14
Humerus	12	3	8	2	18	3	26	7	113	43	70	42	66	34	23	15	47	12	27	10	33	8	30	6
Elbow Joint	12	3	6	2	17	3	15	9	143	43	74	37	67	19	33	5	37	13	53	17	25	3	26	6
Forearm	7	1	12	2	22	5	30	3	195	31	161	24	114	16	47	4	37	7	43	2	34	6	41	3
Wrist Joint	2	1	1	1	4	.	2	....	24	1	12	5	14	3	5	1	7	....	6	1	4	....	6	1
Hand	2	1	5	....	2	1	3	....	32	1	15	2	5	2	1	....	10	1	5	1	1	....	7	....
Hip Joint	....	2	....	2	1	4	.	6	2	12	....	5	.....	5	.....	10	1	7	.....	5	2	1	....	1
Femur	..	1	.	1	2	8	4	6	7	28	5	21	9	11	4	5	2	9	2	8	3	2	4	6
Knee Joint	.....	.....	.....	.....	1	2	1	2	2	15	....	3	....	2	....	1	....	4	3	4	.....	2	1	6
Leg	10	6	4	1	10	2	13	8	56	22	30	32	31	11	12	4	26	1	24	3	16	5	16	9
Ankle Joint	.....	.....	1	..	1	..	2	....	2	....	4	5	3	4	1	....	1	....	2	.	.....	.....	1	....
Foot	5	....	3	....	.....	.....	4	1	14	5	8	3	7	2	3	2	7	....	4	1	10	....	5	3
Aggregates	60	23	56	18	89	35	126	63	699	282	473	252	398	153	175	69	229	79	214	72	171	41	169	55
Per ct. of Fatality	27.7%		24.3%		28.2%		33.3%		28.7%		34.7%		27.7%		28.2%		25.6%		25.1%		19.3%		24.5%	

AMPUTATIONS.—The total number of amputations reported on the records in this Office is twenty-nine thousand nine hundred and eighty (29,980); but the whole number of amputations performed for injuries received during the war would undoubtedly exceed that number. During the first eighteen months of the strife few or no reports were made of the wounded in the various engagements, and the hospital reports for this period were found to be very meagre. Furthermore, a number of amputations performed on officers treated in private quarters, and sometimes by their own family physicians, is unavoidably omitted in this summary, as no reports of these operations were ever sent to this Office. Another class of operations only partially included in this summary are late amputations, performed after the soldiers were discharged from service for wounds received during the war.

Of the twenty-nine thousand nine hundred and eighty (29,980) amputations the results were ascertained in all but one thousand seven hundred and nineteen (1,719), as shown in the following tabular statement:

TABLE CLXVIII.

Tabular Statement of Twenty-nine Thousand Nine Hundred and Eighty Amputations, indicating Seat of Operation and Results.

AMPUTATIONS.		CASES.				
		Totals.	Recoveries.	Deaths.	Results Unknown.	Percentage of Fatality.
Upper Extremities	Amputations of the Hand or Fingers	7,902	6,551	198	1,153	2.9
	Amputations of the Wrist Joint	68	60	7	1	10.4
	Amputations in the Forearm	1,761	1,503	245	13	14.0
	Amputations at the Elbow Joint	40	36	3	1	7.6
	Amputations in the Upper Arm	5,510	4,054	1,273	183	23.8
	Amputations at the Shoulder Joint	866	596	245	25	29.1
Lower Extremities	Amputations of the Foot or Toes	1,519	1,317	81	121	5.7
	Amputations at the Ankle Joint	161	119	40	2	25.1
	Amputations in the Leg	5,523	3,595	1,790	138	33.2
	Amputations at the Knee Joint	195	82	111	2	57.5
	Amputations in the Thigh	6,369	2,878	3,411	80	54.2
	Amputations at the Hip Joint	66	11	55	....	83.3
Aggregates		29,980	20,802	7,459	1,719	26.3

Of the one thousand seven hundred and nineteen (1,719) undetermined cases, one thousand one hundred and fifty-three (1,153) were amputations of the hand or fingers, and but for the want of time and sufficient clerical assistance the results in nearly all these cases could have been ascertained. As it is, the number of cases in which the ultimate results are known is sufficiently large to determine the ratio of mortality attending the amputations in the various sections of the extremities. As in the excisions the operations at the hip gave the largest ratio of mortality, 83.3 per cent.; next come the amputations through the knee joint with 57.5 per cent., those of the thigh with 54.2 per cent., of the leg with 33.2 per cent., of the shoulder joint with 29.1 per cent., of the ankle joint with 25.1 per cent., of the arm with 23.8 per cent., of the forearm with 14.0 per cent., of the wrist with 10.4 per cent., of the elbow with 7.6 per cent., of the foot with 5.7 per cent., and of the hand with 2.9 per cent.

It will be noted that with the exception of the amputations at the elbow and those at the knee joint the ratio of mortality in the upper extremities as well as in the lower decreases with the increasing distance of the point of ablation from the trunk. No sufficient reason can be assigned for the exceptionally favorable results in amputations at the elbow; while the gravity of injuries as well as of operations in the knee has been repeatedly pointed out in this volume.

Comparing the mortality rate after amputations with that of excisions in the same portion of the extremities, we find the following results:

TABLE CLXIX.

Table indicating the Rate of Mortality after Amputations and Excisions in the Extremities.

UPPER EXTREMITIES—SEAT OF OPERATION.	RATIO OF MORT. AFTER—		LOWER EXTREMITIES—SEAT OF OPERATION.	RATIO OF MORT. AFTER—	
	Amputation.	Excision.		Amputation.	Excision.
Hand and Fingers	2.9	9.6	Foot and Toes	5.7	19.3
Wrist Joint	10.4	13.8	Ankle Joint	25.1	29.0
Forearm	14.0	11.3	Leg	33.2	28.2
Elbow	7.6	23.0	Knee Joint	57.5	81.4
Arm	23.8	28.6	Thigh	54.2	69.4
Shoulder	29.1	36.6	Hip Joint	83.3	90.9

With the exception of the operations in the bones of the forearm and those in the bones of the leg, the excisions are uniformly followed by larger percentages of fatality than the amputations, the excisions of the knee joint especially showing an exceedingly large excess in the mortality rate over the amputations at the knee. The favorable results after excisions in the bones of the forearm and leg are due to the fact that in many of these cases only portions of one or the other of the two bones comprising them were excised, thus lowering considerably the percentage of fatality of the operation. For instance, as shown on page 445, *ante*, the fatality after excisions in the fibula was 27.2, after those in the tibia 25.6, and after those in both bones was 61.1 per cent., while the average fatality of all the excisions in the bones of the leg is only 28.2 per cent. Similar results were obtained in the excisions of the bones of the forearm, the mortality after excisions of both radius and ulna exceeding those of the radius or ulna alone.

The necessity for a uniform system of classification of the amputations in order that the results of operations performed at different periods could be compared is self evident. All operations performed within forty-eight hours after the injury have here been grouped as primary, as the commencement of inflammatory symptoms rarely falls within this period. In the amputations at the hip joint alone the primary period has been restricted to twenty-four hours, as it is believed that in those cases the inflammatory period is hastened by the gravity of the injury. In the second or intermediary group have been placed the cases in which the operation was performed in the interval from the third to the thirtieth day (both inclusive) after the injury; this class consists mainly of the operations performed during the inflammatory stage. The third group comprises the operations performed after the thirtieth day from the date of the injury, or at a period when the inflammation had abated or entirely subsided.

Of the twenty-nine thousand nine hundred and eighty (29,980) amputations, the date after the injury on which the operations were performed was recorded in twenty-three thousand nine hundred and ninety-three (23,993) cases. Of these the results were not ascer-

tained in two hundred and thirty-one (231), leaving twenty-three thousand seven hundred and sixty-two (23,762) cases in which the results as well as the dates of operation and injury were recorded.

Sixteen thousand two hundred and thirty-eight (16,238) amputations belong in the group of primary operations performed within the first forty-eight hours; of these, three thousand nine hundred and ninety-two (3,992), or 23.9 per cent., terminated in death; five thousand five hundred and one (5,501) were intermediary operations; of these, one thousand nine hundred and eighteen (1,918), or 34.8 per cent., proved fatal; and two thousand and twenty-three (2,023) were secondary operations, performed after a lapse of thirty days from the date of injury, of which five hundred and eighty-four (584), or 28.8 per cent., had fatal terminations. The primary operations gave the best chance for life. The operations performed during the intermediary or inflammatory period were the most unfavorable in their results:

TABLE CLXX.

Summary of Twenty-three Thousand Seven Hundred and Sixty-two Amputations, indicating the period of the Operation.

	SEAT.	Cases.			Primary.			Intermediary.			Secondary.		
		Total.	Recoveries.	Fatal.	Recoveries.	Fatal.	Percentage of Fatality.	Recoveries.	Fatal.	Percentage of Fatality.	Recoveries.	Fatal.	Percentage of Fatality.
Upper Extremities.	Amputations of Hand or Fingers	4,501	4,412	89	3,179	48	1.4	1,059	41	3.7	174	.....	.....
	Amputations at Wrist Joint	67	60	7	50	5	9.0	6	1	14.2	4	1	20.0
	Amputations in Forearm	1,655	1,420	235	911	97	10.6	350	109	23.7	159	29	15.4
	Amputations at Elbow	35	33	2	27	1	3.5	5	.....	....	1	1	50.0
	Amputations in Arm	4,626	3,581	1,045	2,659	603	18.4	615	320	34.2	307	122	28.4
	Amputations at Shoulder	722	505	217	369	117	24.0	86	78	47.5	50	22	30.5
Lower Extremities.	Amputations of Foot or Toes	1,045	987	58	651	36	5.2	243	20	7.6	93	2	2.1
	Amputations at Ankle Joint	153	115	38	78	23	22.7	25	14	35.8	12	1	7.6
	Amputations in Leg	4,900	3,350	1,550	2,309	1,032	30.8	690	382	35.6	351	136	27.9
	Amputations at Knee Joint	189	79	110	50	57	53.2	16	37	69.8	13	16	55.1
	Amputations in Thigh	5,803	2,715	3,088	1,960	1,951	49.8	488	893	64.6	267	244	47.7
	Amputations at Hip Joint	66	11	55	3	22	88.0	.....	23	100.0	8	10	55.5
	Total	23,762	17,268	6,494	12,246	3,992	23.9	3,583	1,918	34.8	1,439	584	28.8
	Aggregates	.....	.....	.....	16,238			5,501			2,023		

Primary operations were the rule, over two-thirds of all the amputations belonging to this group. In the field, where few of the appliances of conservative surgery can be had, and where, moreover, the chances of properly applying them are uncertain, where, furthermore, transportation for considerable distances is unavoidable, frequently amputations are necessary where at least an attempt at conservation might be made in a general hospital. Nearly all the surgeons of the war agreed that the decision in regard to amputation should be made at the time of the injury and should be followed by immediate operation. In this connection Surgeon H. S. Hewit, U. S. V., observed that shock to the extent of forbidding surgical interference, even in cases of considerable gravity, is much less common than generally thought.

The experience with intermediary operations was so discouraging that when the time for primary operation had passed the operation, if possible, was deferred until the inflammation had subsided and the lesions had become local and analogous to chronic disease.

Of the different modes of operation each method had its advocates; but the flap operations were more frequently used, especially in amputations in and near the joints. Of eleven thousand and fifty-three (11,053) cases of major amputations in which the method is specified, six thousand two hundred and forty (6,240) were flaps, and four thousand eight hundred and thirteen (4,813) circular operations. A multitude of varieties of the flap operation were recorded; instances have been cited of the use of the anterior, posterior, antero-posterior, lateral, bilateral, external, internal, oval, circular, U-shaped, rectangular, and skin or muscular flap. In regard to the last two modifications it seems to have made little difference whether a thick covering of muscular tissue was used or a skin flap, for, as a rule, the stumps became conical sooner or later; short stumps sometimes remained well-rounded, long stumps rarely; but when they remained full it was often due to osteophytes, which in time became troublesome. The advocates of the circular operation claimed for this mode that it required little time and care in dressing, was easily handled, that it seldom sloughed, that its discharges were less, and that it was less frequently followed by hæmorrhage than the flap operation, while the latter mode would not stand transportation unless very carefully supported, and was considered, altogether, too nice an operation for the flurry of a battle-field. As far as the stumps are concerned, handsome rounded stumps were achieved by either method, as has been illustrated in PLATE LXXIII, opposite page 356, and conical stumps were noted after the circular as well as after the flap operation.

The side upon which the operation was performed was recorded in eighteen thousand seven hundred and eighteen (18,718) cases. The amputations on the left side exceeded those on the right by 3.4 per cent.—the operations on the left side being nine thousand six hundred and eighty-three (9,683), or 51.7 per cent., on the right nine thousand and thirty-five (9,035), or 48.3 per cent. of the cases in which this point was recorded. This is in accordance with the facts pointed out throughout the preceding volumes, that, with a few exceptions, the shot injuries of the left side were more numerous than those of the right.

TABLE CLXXI.

EXTREMITY.	Total Cases.	RIGHT SIDE.				LEFT SIDE.			
		Total.	Recoveries.	Fatal.	Percentage of Fatality.	Total.	Recoveries.	Fatal.	Percentage of Fatality.
Amputations in the Upper Extremities	7,628	3,655	2,845	810	22.1	3,973	3,127	846	21.2
Amputations in the Lower Extremities	11,090	5,380	3,138	2,242	41.6	5,710	3,326	2,384	41.7
Aggregates	18,718	9,035	5,983	3.052	33.7	9,683	6,453	3,230	33.3

Whether the seat of the injury was on the right or the left side seems to have had no influence on the ratio of mortality. In the upper extremities the fatality is slightly larger in the amputations on the left side; in the lower, in those of the right; but the difference in the rate of mortality of the two sides in the whole number is only 0.4 per cent.

The number of double amputations performed on account of shot injuries was one hundred and seventy-two; of these, both upper extremities were amputated in forty-seven, one upper and one lower in forty-three, and both lower in eighty-two, as follows:

TABLE CLXXII.

Numerical Statement of One Hundred and Seventy-two Cases of Double Amputations for Shot Injuries.

EXTREMITY.	TOTAL CASES.	RECOVERIES.	FATAL.	UNDETERMINED.	PERCENT. OF FATALITY.
Both Amputations in the Upper Extremities	47	31	16	.....	34.0
One Amputation in Upper, one in Lower Extremities	43	21	21	1	50.0
Both Amputations in the Lower Extremities	82	31	50	1	61.7
Aggregates	172	83	87	2	51.1

The mortality rate of the cases in which both the upper members were removed is 34.0 per cent., of those in which one of the upper and one of the lower extremities were amputated, 50.0 per cent., and of those in which the two operations were performed in the lower members, 61.7 per cent. Brief accounts of these cases will be found in the following table:

TABLE CLXXIII.

Condensed Summary of One Hundred and Seventy-two Double Amputations after Shot Injury.

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATE OF INJURY.	NATURE OF THE INJURY.	DATE OF OPERATION.	OPERATION AND OPERATOR.	RESULT AND REMARKS.
1	Warner, G. W., Pt., B, 20th Connecticut, age 32.	July 3, 1863.	Right arm severed from body 4 inches below shoulder, and left forearm fractured and lacerated by shell.	July 3, 1863.	Amputation of right arm at shoulder and left arm in lower third.	Discharged October 7, 1863.
2	Fuller, D., Pt., G, 53d Pennsylvania.	Sept. 17, 1862.	Shell wound, both arms	Sept. 17, Oct. 5, 1862.	Amputation at right shoulder joint and in upper third of left forearm.	Discharged Dec. 17, 1862; both stumps healthy and healed.
3	Mark, F., Pt., A, 2d Missouri Light Artillery, age 26.	May 26, 1861.	Both arms torn off by accidental discharge of a cannon.	May 26, 1861.	Amp. at left shoulder joint and in right forearm 3 ins. below elbow. Dr. Schmidt.	Discharged August 12, 1861; stumps in good condition.
4	Hodgdon, J. F., Pt., I, 1st Mass. Heavy Artillery.	June 14, 1863.	Both arms torn off to elbow and humeri fractured in several places from premature explosion of cannon; great laceration.	June 14, 1863.	Circular amputation of both arms in upper third. Surgeons M. F. Bowes, 12th Pennsylvania Cavalry, and T. C. Smith, 116th Ohio.	Discharged August 5, 1863.
5	Sergeant, W., Pt., E, 53d Pennsylvania, age 18.	June 1, 1862.	Shot fracture of both arms and wound of nose.	June 1, July —, 1862.	Circular amputation left arm in middle and right arm in upper thirds.	Disch'd November 19, 1864; sound stump.
6	Stratton, A., Pt., C, 147th New York, age 17.	June 18, 1864.	Solid-shot fractures of both elbow joints; laceration.	June 18, 1864.	Flap amputation both arms through middle. Surgeon A. S. Coe, 147th New York.	Discharged October 3, 1864; good stump. Died June 3, 1874; consumption.
7	Bacon, B. W., Capt., G, 74th Illinois, age 40.	June 27, 1864.	Shot fracture of right radius and ulna, and of left radius	July 14, 19, 1864.	Flap amp. middle third right arm. Surg. J. E. Herbst, U. S. V. In lower third l't arm. A. A. Surgeon J. H. Green.	Died July 21, 1864, of pyæmia.
8	Bawn, W., Pt., G, 16th Me., age 26.	Dec. 13, 1862.	Fracture of right arm by shell, and left arm by conoidal ball.	Dec. 14, 1862.	Amputation of both arms at junction of upper and middle thirds.	Died February 22, 1863.
9	Clarke, R., Pt., E, 13th Colored Troops, age 18.	Dec. 16, 1864.	Shot wounds of both arms, lower thirds; great destruction.	Dec. 16, 1864.	Right, upper third, flap; left, middle third, flap. A. A. Surgeon J. S. Giltner.	Died December 19, 1864.
10	Haltzee, F., Pt., F, 16th N. Y. H. A., age 21.	Sept. 1, 1864.	Both forearms carried away by a cannon ball.	Sept. 1, 1864.	Amputation in middle third of both arms. Surgeon M. S. Kittinger, 100th N. Y.	Died October 9, 1864; exhaustion.
11	Lacbine, L., Pt., D, 1st N. York Artillery.	June 18, 1864.	Hands blown off, eyes destroyed, humerus and forearm fractured; premature discharge of cannon.	June 18, 1864.	Amputation of both arms ...	Died June 20, 1864.
12	McHugh, O., Pt., D, 37th New York.	Dec. 13, 1862.	Shot fracture of both arms ..	Dec. 13, 1862.	Amputation of both arms ...	Died.
13	*Ruth, J.*, Pt., H, 6th Arkansas.	Nov. 30, 1864.	Shell fracture of both elbow joints.	Dec. 1, 1864, Jan. 2, 1865.	Right, ant. post. flap, lower third; left, antero-posterior flap, upper third. Surgeon Cooper, C. S. A.	Gangrene. Died March 26, 1865.
14	Savage, G., Pt., A, 2d Connecticut Artillery.	June 1, 1864.	Shot fracture of both arms by bullet.	On field.	Amputation of both arms ..	Died June 4, 1864
15	Tanner, T. B., Pt., B, 3d Rhode Island Artillery.	July 10, 1863.	Wound of both arms by premature explosion.	July 10, 1863.	Amputation of both arms ..	Aug. 5, hæmorrhage. Died August 9, 1863.
16	Vanatta, L., Pt., A, 23d Wisconsin.	Jan. 11, 1863.	Wound of both arms	Jan. 11, 1863.	Amp. of both arms. Surg. J. W. F. Gerrish, 67th Ind.	Died March 6, 1863.

No.	Name, Military Description, and Age.	Date of Injury.	Nature of the Injury.	Date of Operation.	Operation and Operator.	Result and Remarks.
17	Beatty, J. H., Pt., K, 5th Artillery.	July 3, 1863.	Right forearm and left arm at lower third carried away by premature discharge of cannon; fracture of jaw.	July 3, 1863.	Flap amputation of left arm at upper third and right forearm at middle third.	Discharged May 26, 1864; sound stumps.
18	Conner, J., Pt., F, 3d Delaware, age 15.	Feb. 2, 1863.	Compound fracture of right forearm, wound of left arm, and wounds of breast; accidental discharge of gun.	Feb. 2, May 26, 1863.	Amputation right forearm; dissecting aneurism of left brachial artery; amp. left arm, upper third. Surg. E. Wolfe and Asst. Surg. J. M. Houston, 3d Delaware.	Disch'd November 12, 1863; healthy stumps.
19	Duey, M., Pt., K, 97th Pennsylvania, age 21.	Jan. 15, 1865.	Shell fracture of right arm, middle third, and left forearm by conoidal ball.	Jan. 16, 1865.	Cir. amp. of right arm, upper third; left forearm at junct. upper and middle thirds.	Disch'd October 21, 1865; good stumps.
20	Hill, W., Sergt., A, 76th Colored Troops, age 29.	Apr. 4, 1865.	Fracture of right elbow and left forearm by a shell fragment.	Apr. 4, 1865.	Flap amputation right arm, lower third. Surgeon N. N. Horton, 47th C. T. Flap amputation left forearm, upper third. Asst. Surg. B. F. Lyford, 68th C. T.	Discharged July 22, 1865.
21	Maher, M., Corp'l, Detachment of Ordnance.	Sept 19, 1863.	Injured by explosion of a shell.	Sept. 19, 1863.	Amp. right arm, upper third; flap at middle third of left forearm. Surg. E. H. Abadie and Asst. Surg. H. L. Sheldon, U. S. A.	Discharged February 8, 1864; sound stumps.
22	Plunket, T., Serg't, E, 21st Massachusetts.	Dec. 13, 1862.	Shell wounds of both arms ..	Dec. 13, 1862.	Flap amputation right arm near shoulder, and left forearm in middle third.	Discharged, March 9, 1864.
23	Price, I., Corp'l, F, 15th West Virginia, age 34.	Oct. 13, 1864.	Shell fractures of both arms and flesh wound of thigh.	Oct. 14, 1864.	Amputation of right arm, lower third, and left forearm, upper third. Surg. W. S. Walsh, 15th W. Va.	Discharged June 9, 1865.
24	Shippen, S. C., Pt., D, 3d Rhode Island Heavy Artillery.	July 10, 1863.	Both arms mangled by premature discharge of gun; loss of right eye.	July 10, 1863.	Amputation right arm near shoulder, and left forearm near wrist. Asst. Surg. H. S. Lamson, 3d R. I. Art.	Discharged October 19, 1863.
25	Young, A. H., Pt., A, 6th Wisconsin.	Sept. 17, 1862.	Shot wounds of both arms .	Sept. 17, 1862.	Amp. in upper third of left arm, and flap amp. in upper third right forearm. Surg. J. McNulty, U. S. V.	Disch'd November 16, 1863.
26	Chatfield, J., Pt., E, 6th Ohio Cavalry, age 32.	June 21, 1863.	Shot compound fracture of left radius and right carpal and metacarpal bones	July 14, 1863.	Amputation at lower third of left arm and lower third of right forearm.	Died July 14, 1863.
27	Colwell, A. N., Pt., E, 1st Rhode Island Artillery.	Nov. 7, 1863.	Fracture of both forearms by premature discharge of cannon.	Nov. 7, 1863.	Amp. in lower third left arm and upper third right forearm. Asst. Surgeon H. G. Taylor, 8th N. Jersey.	Died November 7, 1863.
28	Ferris, G. W., Corp'l, A, 36th Wisconsin, age 34.	May 27, 1864.	Shell wounds of left arm, right hand, and left thigh.	May 27, June 12, 1864.	Circular amp. left arm, middle third; circ. amp. right forearm, upper third. A. A. Surg. W. B. Dick.	Died June 17, 1864, of pyæmia.
29	Walker, P., Pt., I, 104th New York, age 40.	June 18, 1864.	Shot fracture right humerus and left forearm by cannon ball.	June 18, 1864.	Musc. flap amp. at surg. neck right humerus, and circ. of left forearm in upper third.	Died July 9, 1864, of exhaustion.
30	McDonald, J., Pt., G, 85th Pennsylvania.	July 29, 1862.	Shell wounds of right arm and left hand.	July 29, 1862.	Amp. right arm near shoulder, and amp. at left wrist joint. Surg. S. A. Green, 34th Mass.	Discharged March 7, 1864; sound stumps.
31	Stanford, V. B., Pt., A, 1st Ohio L. A.	May 15, 1864.	Mutilation of hands by premature discharge of gun.	May 15, 1864.	Amp. at mid. third right arm and left wrist joint. Surg. E. B. Glick, 40th Indiana.	Died June 4, 1864.
32	Cassidy, J. E., Pt., K, 4th Artillery, age 33.	Mar. 31, 1865.	Left hand blown off and right wrist joint comm. by explosion of cannon; face and breast burned.	Mar. 31, 1865.	Oval flap amp. right forearm at mid. th'd and left forearm in upper third. Surg. W. S. Thompson, U. S. V.	Discharged July 21, 1865; both stumps perfectly healed.
33	Decker, S. H., Pt., I, 4th Artillery.	Oct. 8, 1862.	Wounds of both forearms by premature discharge of cannon.	Oct. 8, 1862.	Amputation both forearms six inches from elbow.	Discharged Nov. 3, 1862; good stumps.
34	Latham, E. P., Pt., 9th Battery Ohio Light Artillery.	June 19, 1862.	Both hands blown off by premature discharge of cannon.	June 19, 1862.	Amp. right and left forearms in upper third. Surgs. J. C. McPheeters, 33d Ind., and C. W. Millen, 2d Tenn.	Discharged Nov. 20, 1862; left stump sound, right withered.
35	Lewis, W. H., Pt., C, 5th Artillery, age 22.	June 7, 1864.	Compound fracture both forearms by explosion of a shell.	June 7, 1864.	Flap amp. upper third right forearm and lower third left forearm.	Discharged April 29, 1865; stumps healed.
36	Minor, E., Pt., F, Ind. Batt Minnesota Cavalry.	Sept. 28, 1864.	Injured by premature explosion of a cannon.	Sept. 28, 1864.	Ant. post. flap amp. low. th'd both forearms. Drs. Seward and Murphy.	Recovered. Stumps healed.
37	Shelby, T., Pt., E, 1st Ohio Heavy Artillery.	Apr. 10, 1865.	Comminution of both forearms, premature discharge of cannon.	Apr. 10, 1865.	Circ. amp. left, and flap amp. right forearm. A. A. Surgs. C. F. Thomas and W. Tibbetts.	Discharged June 22, 1865.
38	Tucker, J. B., Serg't, B, Green River Batt'n Kentucky State Militia.	July 4, 1865.	Severe injury both forearms and hands by ramrod from cannon.	July 4, 1865.	Circ. amp. right forearm near elbow and left near wrist. Asst. Surg. C. F. Ulrich, Kentucky State Militia	July 11, reamp. left forearm 4 inches below elbow. Discharged August 23, 1865; stumps healed.
39	Wallace, R., Pt., F, 33d Missouri.	May 18, 1864.	Shell wounds of both hands; great mutilation.	May 18, 1864.	Amp. right forearm in middle and left in lower third. Asst. Surg. C. H. Andrus, 128th New York.	Died on hospital steamer.
40	Magoonaugh, B., Pt., Ordnance Corps, age 23.	May 4, 1865.	Wounded while firing a salute.	May 4, 1865.	Circ. amp. mid. third right forearm, and flap amp. at left wrist. A. A. Surgs. E. S. Snow and D. O. Farrand.	Duty October 16, 1865.
41	Thompson, T. M., Pt, 1st Maine Battery.	Jan. 14, 1863.	Left hand torn off above, and right below, wrist; premature discharge of cannon.	Jan. 14, 1863.	Amp. left forearm 3 inches below elbow and at right wrist joint. Surg. M. D. Benedict, 75th N. Y.	Discharged May 10, 1863; stumps partially healed, but painful.

No.	Name, Military Description, and Age.	Date of Injury.	Nature of the Injury.	Date of Operation.	Operation and Operator.	Result and Remarks.
42	Colvin, R. J., Pt., 3d New York Ind. Batt., age 22.	Oct. 1, 1864.	Compound fracture lower end right forearm, involving wrist joint, and of fifth metatarsal bone left hand.	Oct. 2, 1864.	Flap amp. lower third right forearm and left little finger with part of metacarpal bone. A. A. Surg. E. Ohlenschlager.	Discharged Feb. 20, 1865.
43	Edwards, M., Pt., M, 3d New York Art., age 20.	July 13, 1864.	Right and left hands blown off at wrist joint by explosion of shell; flesh wound of side.	July 13, 1864.	Flap amp. low third left forearm and of right thumb, index and mid. fingers with metacarpal bones.	Discharged April 13, 1865.
44	Harris, M., Pt., G, 12th New York Cavalry, age 19.	Apr. 17, 1864.	Shot wounds of both hands..	Apr. 25, May 3, 1864.	Oval amp. right 3d finger, low. third met. bone. A. A. Surg. P. C. Porter. Circ. skin flap amp. up. third left forearm. Surg. C. A. Cowgill, U. S. V.	Returned to duty Dec. 17, 1864.
45	Warren, M. C., Mus., A, 20th Maine.	May 3, 1863.	Injured by the bursting of a musket in his own hands.	May 3, 1863.	Amputation of both hands at wrist joints.	Discharged Jan. 26, 1865.
46	Carrice, A., Pt., H, 39th Ohio, age 31.	Apr. 5, 1864.	Accidental shot wounds of both hands.	Apr. 5, 1864.	Amp. right and left index fingers with met. bones.	Discharged Jan. 13, 1865; healed.
47	Dardinger, J. S., Pt., A, 11th West Virginia.	July 11, 1863.	Both hands partially blown off firing a salute.	———	Amp. index, mid., ring, and little fingers through met. bones and port. thumb left hand, and r't hand through met. bones except thumb.	Discharged Nov. 26, 1863.
48	[1]Rand, W. J., Pt., K, 45th Massachusetts, age 25.	Dec. 14, 1862.	Left arm near shoulder and lower third right femur crushed by solid shot.	Dec. 14, 1862.	Amp. at left shoulder j't and mid. third r't thigh. Surg. I. F. Galloupe, 17th Mass.	Died January 24, 1863, of pyæmia.
49	Marquis, W. H., Pt., E, 83d Pennsylvania, age 20.	Aug. 27, 1863.	Shell compound fracture right arm and left leg.	Aug. 27, 1863.	Amputation at right shoulder joint and at lower third left leg.	Sept. 12, hæm. from brachial art.; lig. of axillary. Died Sept. 12, 1863.
50	Gallagher, L., Pt., A, 69th Ohio, age 18.	Sept. 1, 1864. Jan. 31, 1865.	Shot fracture left humerus and wound right forearm. Wound of right leg by railroad accident.	Sept. 1, 1864. Jan. 31, 1865.	Circ. amp. upper third left arm. Surg. L. Slusser, 69th Ohio. Flap amp. low. third right thigh. Surg. C. McDermott, U. S. V.	Discharged March 2, 1866; stump perfectly healed.
51	Kircher, H., Capt., E, 12th Missouri.	Nov. 27, 1863.	Shot wound left leg and right arm.	Nov. 27, 1863.	Flap amp. right arm at mid. third and of left thigh four inches above knee. Surg. J. Spiegelhalter, 12th Mo.	Mustered out Nov. 14, 1864.
52	Kreig, P., Pt., C, 46th New York, age 28.	Aug. 21, 1864.	Compound comminuted shell fractures left arm and thigh.	Aug. 21, 1864.	Flap amp. left arm, up. third, and left thigh at mid. third. Surg. W. B. Fox, 8th Mich.	Discharged April 27, 1865.
53	Lovely, C., Pt., I, 11th Vermont, age 38.	June 1, 1864.	Shot fractures left elbow and right knee joint.	June 1, 1864.	Double flap amp. at mid. th'd left humerus and mid. third right thigh.	Union of both stumps by first intention. Disch'd Feb. 6, 1865.
54	Rose, F., Pt., D, 57th New York, age 20.	Oct. 14, 1863.	Shell compound comminuted fractures left humerus and right knee joint.	Oct. 14, 1863.	Circ. amp. left arm 1 inch from shoulder and of right thigh at lower third. Surg. W. H. Potter, 57th N. Y.	Aug. 9, 1864, rem. of sequestrum. Discharged Oct. 13, 1864. *Spec.* 3104, A. M. M.
55	Schmidt, H., Pt., G, 57th Illinois.	Oct. 3, 1862.	Shot wounds right leg and right arm.	Oct. 4, 28, 1862.	Amp. in upper right arm. Confed. surg'n. Flap amp. upper right thigh. Surg. J. R. Zearing, 57th Ill.	Discharged December 18, 1863.
56	[2]Weeks, J. D., Pt., G, 3d Colored Troops, age 20.	Nov. 14, 1863.	Comminuted fracture left femur, middle third, and left elbow; lacerated wound of side; explosion of shell.	Nov. 14, 1863.	Ant.-post. flap amp. middle third left arm; oblique flap amp. of upper left thigh. Surg. S. W. Gross, U. S. V.	Discharged July 27, 1865.
57	Winn, J. J., Quartermaster, U. S. S. Oneida, age 33.	Apr. 22, 1862.	Shell wounds left arm and thigh.	Apr. 22, 1862.	Amp. left arm, upper third, and left thigh at junction of upper and middle thirds.	Discharged November 17, 1862; thigh stump unhealthy.
58	Arms, A. J., Pt., H, 71st New York.	July 2, 1863.	Shot fracture right arm and middle third femur.	July 2, 1863.	Amputation of right arm and of thigh.	Died July 3, 1863.
59	Cramer, S., Pt., B, 142d Pennsylvania.	July 1, 1863.	Shot wounds left arm and thigh.	July 1, 1863.	Amputation left arm and thigh.	Died July 9, 1863.
60	Jackson, H., Pt., E, 4th Colored Troops, age 23.	Sept. 20, 1864.	Shot wounds left arm, lower third, and left thigh, middle third.	Sept. 20, 1864.	Amputation lower third left arm and middle third left thigh.	Died October 11, 1864, of exhaustion.
61	*Nickinson, A.*, Pt., G, 52d North Carolina.	July 3, 1863.	Comminuted fracture middle third humerus and lower third tibia and fibia; conoidal ball.	July 3, 1863.	Amp. arm at junction upper and middle thirds; thigh at lower third. Surg. C. S. Wood, 66th New York.	Died July 19, 1863.
62	Reed, F., Pt., A, 53d Ill...	July 12, 1863.	Shot injury of left arm and knee joint.	.....	Amputation left arm and thigh.	Died August 12, 1863.
63	*Thorn, T.*, Lieut., D, 16th North Carolina, age 30.	July 3, 1863.	Shot wounds of right thigh and right arm.	July 4, 1863.	Amputation of right arm and right thigh.	Died July 30, 1863, of pyæmia.
64	Wilson, J., Pt., 21st N. Y. Battery.	Mar. 27, 1865.	Shot fracture left femur and left humerus.	Primary.	Amputation left arm and left thigh. Surg. C. Winne, 77th Illinois.	Died March 27, 1865.
65	Bierce, P., Pt., A, 1st Ohio Artillery, age 20.	Nov. 13, 1863.	Shell wounds left elbow joint and left leg; also wounds right leg and left thigh.	Nov. 13, 1863.	Flap amputation left arm at middle third and left leg at upper third. Surg. G. H. Bane, 115th Illinois.	Discharged August 29, 1864; good stump in 1870.
66	Martin, L., Pt., E, 29th Colored Troops.	July 30, 1864.	Shot fractures left leg, right arm, left shoulder, and face, by conoidal balls.	July 31, 1864.	Flap amp. at upper third of right arm, and circ. at low'r third of left leg. Surg. D. MacKay, 29th C. T.	Disch'd December 6, 1865; sound stumps.
67	*Partian, J.*, Pt., D, Philip's Georgia Legion.	May 6, 1864.	Shot fracture right arm and right leg.	May 6, 1864.	Amp. middle third right arm and lower third right leg.	Recovered.
68	Smith, H., Pt., E, 11 Vermont, age 19.	Sept. 13, 1864.	Shell fracture left elbow joint and left leg; both limbs almost shot off.	Sept. 13, 1864.	Flap amputation left arm at lower third and left leg at upper third. Surg. C. B. Park, 11th Vermont.	Sept. 26, secondary haem.; ant. tib. art. lig. Disch'd September 14, 1865; good stumps.

[1] Galloupe (T. F.), *Army Medical Intelligence*, in *Boston Medical and Surgical Journal*, 1863, Volume xviii, p. 205.

[2] Gross (S. W.), *Original communications* in *American Medical Times*, 1864, Volume VIII, p. 122.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Operation.	Operation, Operator.	Result and Remarks.
69	*Thornton, M. L.*, Pt., E, 31st Georgia, age 22.	Oct. 19, 1864.	Shot comminution right elbow and right ankle joints.	Oct. 19, 1864.	Amp. at middle third right arm, and circular amp. at lower third leg. Surg. G. G. Button, 31st Georgia.	Transferred to Provost Marshal April 8, 1865.
70	Bryan, M. W., Pt., G, 11th Michigan.	Aug. 7, 1864.	Shot fracture right foot and arm.	Aug. 7, 1864.	Amputation of right leg and arm.	Died September 6, 1864.
71	Crowningshields, L. C., Pt., G, 142d New York.	Dec. 25, 1864.	Shot fracture left arm and right leg.	On field.	Amputation left arm and right leg.	Died January 11, 1865.
72	Grossman, W., Pt., C, 11th Pennsylvania, age 23.	May 8, 1864.	Shell wounds right arm and right leg.	Primary.	Amp. right arm and right leg. Surg. W. Lyons, 11th Pa. Res., and B. Rohrer, 10th Pa. Res.	Died August 3, 1864.
73	Jullivett, N., Pt., D, 98th New York, age 18.	Sept. 29, 1864.	Shell wounds left arm and right leg.	Sept. 30, 1864.	Amputation left arm near shoulder and right leg in middle third. Asst. Surg. J. A. Bigelow, 8th Conn.	Died October 9, 1864, of exhaustion.
74	Pinney, A. N., Capt., H, 27th Colored Troops.	July 30, 1864.	Shot fracture of right humerus and right leg.	July 30, 1864.	Circular amputation of arm in middle third and leg. Surg. G. J. Potts, 23d C. T.	Died August 8, 1864.
75	*Pool, J.*, Pt., B, 16th Ga...	July —, 1863.	Shot wounds of leg and arm.	.....	Amputation of leg and arm.	Died July 6, 1863.
76	Ray, S., Sergt, D, 84th Illinois.	Sept. 2, 1864.	Shot fracture leg and arm	Sept. 2, 1864.	Amp. of leg and arm. Surg. T. M. Cook, 101st Ohio.	Died September 6, 1864.
77	*Taylor, S. J.*, Pt., E, 30th Alabama, age 22.	Dec. 16, 1864.	Shot fracture right humerus and elbow joint and left tarsus.	Dec. 17; 1864, Jan. 20, 1865.	Ant.-post. flap amp. at lower th'd of arm. A. A. Surg. E. Woodruff. Circ. amp. at lower third of leg. A. A. Surg. W. M. Rodman.	Died April 8, 1865, of chronic diarrhœa.
78	*Brown, P. W.*, Pt., I, 15th Virginia.	Sept.—, 1862.	Shot wounds left leg and arm.	.....	Amputation of left leg and arm.	
79	Schoneckles, F., Pt., G, 2d Delaware.	Dec. 13, 1862.	Comminuted fracture upper third right humerus and bones right foot by cannon ball.	Dec. 19, 1862.	Amp. in upper th'd ri't arm, and Pirogoff's amp. at ri't ankle joint. Surgs. C. S. Wood, 66th New York, and C. Gray, 7th New York.	Died.
80	Fuller, H. D., Pt., F, 28th Iowa, age 16.	Oct. 19, 1864.	Shell wounds left forearm, upper third left foot, and right tibia, middle third.	Oct. 20, 1864.	Flap amp. at lower third left arm, and Chopart's amp. of left foot. Surg. J. W. H. Vest, 28th Iowa.	Discharged June 21, 1865. *Spec.* 4226, A. M. M.
81	Wimpfler, S., Pt., C, 9th Ohio.	Nov. 25, 1863.	Shot wounds left forearm and left foot.	Primary.	Amp. at left elbow joint and at lower third of left leg.	Died December 9, 1863.
82	Clark, G. W., Pt., E, 12th New Hampshire, age 25.	May 9, 1864.	Fragment of shell comminuted right forearm and lower third right femur.	May 9, 1864.	Amputation in right forearm and in middle third of right thigh.	Discharged June 2, 1865.
83	Costello, P., Corp'l, E, 83d Indiana.	June 10, 1864.	Shot wounds right thigh and right forearm.	June 12, 1864.	Amputation right forearm 1½ inch above wrist and of right thigh 4 inches above knee. Confederate surgeon.	Mustered out Aug. 10, 1865.
84	Fay, J. S., Pt., F, 13th Massachusetts.	Apr. 30, 1863.	Shell fractures right forearm and right knee.	Apr. 30, 1863.	Amputation mid. th'd right forearm and low. th'd right thigh. Surg. A. W. Whitney, 13th Massachusetts.	Disch'd September 9, 1863; stumps sound in 1866.
85	Kretzler, A., Corp'l, D, 162d New York.	June 14, 1863.	Shell fractures right forearm, right knee, and lower jaw.	June 14, 1863.	Flap amp. low. 3d right forearm and ant. post. flap low. th'd right thigh. Surg. W. B. Eager, 162d New York.	Disch'd Aug. 29, 1863. Died July 8, 1876, of phthisis.
86	Lawrence, C., Corp'l, E, 90th New York.	June 10, 1863.	Shell wounds, fracture left ulna and fifth metacarpal bone and opening left knee joint.	June 10, 1863.	Circular amp. mid. third left forearm and lower th'd left thigh. Surg. E. S. Hoffman, 90th New York.	Discharged Nov. 21, 1863.
87	Jecko, P., Serg't, D, 15th Missouri, age 29.	Nov. 29, 1864.	Shot fractures right wrist joint and lower third right leg.	Nov. 29, 1864.	Circ. amp. lower third right forearm, and flap amp. mid. third r't leg. Surg. Graves, 6th Arkansas, C. S. A.	Discharged July 31, 1865.
88	*Bendall, B. F.*, Pt., F, 53d Virginia.	July —, 1863	Shot wounds left forearm and right leg.	....	Amputation in left forearm and right leg.	Died August 6, 1863.
89	Price, R., Pt., B, 1st New Jersey Artillery, age 25.	July 3, 1863.	Shot fractures right forearm and right leg.	July 4, 1863.	Amputation in upper third right forearm and lower third right leg.	Colliquative diarrhœa. Died August 23, 1863, of exhaustion.
90	Kearney, J., Serg't, I, 76th New York, age 30.	July 2, 1863.	Shell shattered lower th'd ri't thigh and carried away r't thumb, fracturing metacarpal bone.	July 2, 1863.	Circular amp. junc. mid. and lower third r't thigh and 1st metacarpal bone at middle. Surg. G. W. Metcalf, 76th New York.	September 25, gangrene in stump. Discharged July 6, 1864. *Spec.* 4366, A. M. M.
91	Waters, W., Pt., K, 123d New York.	May 15, 1864.	Large fragment of shell carried away left thigh and fractured right leg.	May 15, 1864.	Amputation at left hip joint and in middle third right leg. Surgeon J. W. Brock, 66th Ohio.	Survived but a short time. Died May 15, 1864. (See Case 286, p. 135, *ante.*)
92	Allen, S., Pt., G, 59th Massachusetts, age 19.	June 17, 1864.	Conoidal ball comminuted both knee joints.	June 17, 1864.	Amputation in lower third both thighs.	Flabby granulation; profuse suppu'n. Died June 27, '64.
93	Bagley, S., Pt., B, 5th New Hampshire, age 21.	Apr. 7, 1865.	Conoidal ball comminuted both condyles femur and head left tibia.	April 8, June 3, 1865.	Circular amp. mid. th'd right thigh. Sur. W. O'Meagher, 69th N. Y. Ant.-post. flap amp. left thigh, junc. lower and middle thirds. Surg. O. A. Judson, U. S. V.	July 5, pus burrowing about both thighs Died July 10, 1 65, of exhaustion. *Spec.* 4232, A. M. M.
94	Dowd, T., Serg't, C, 2d Michigan.	July 30, 1864.	Shot wound both thighs...	July 30, 1864.	Amputation mid. third both thighs. Surg. W. B. Fox, 8th Michigan.	Died July 31, 1864.
95	Goodwell, S., Pt., G, 29th Illinois.	Mar. 30, 1865.	Shot fracture both thighs..	Mar. 30, 1865.	Ampnt'n both thighs. Surg. W. D. Murray, 161st N. Y., and J. W. Angel, 23d Wis.	Died March 31, 1865.
96	*Kenner, H.*, Pt., 4th Virginia.	July—, 1863.	Wounds of both thighs	.....	Amputation of both thighs..	Died July 6, 1863.
97	Michael, R. S., Pt., A, 105th Pennsylvania.	July 3, 1863.	Shot wounds of both legs ..	July 3, 1863.	Amputation in lower third both thighs.	Died July 16, 1863.

No.	Name, Age, and Military Description.	Date of Injury.	Nature of Injury.	Date of Operation.	Operation, Operator.	Result and Remarks.
98	Mills, W. F., Pt., E, 8th New York Heavy Artillery, age 42.	June 16, 1864.	Shot fracture of right femur and left knee joint.	June 16, 1864.	Amp. both thighs, lower third. Surg. S. H. Plumb, 82d N. Y.	Died June 23, 1864.
99	Moore, J., Pt., E, 46th Pennsylvania.	Aug. 9, 1862.	Fract. int. condyle right femur, and right leg below joint; also wou'ds l't thigh.	Aug. 15, 1862.	Double flap amputation low. third both thighs. Surg. J. E. Summers, U. S. A.	August 26, nervous shock from fright. Died 1 hour afterward, August 26, 1862.
100	Myer, C., Pt., F, 30th Missouri.	June 4, 1863.	Conoidal ball fractures both thighs.	June 4, 1863.	Double flap amputation both thighs. Surg. M. W. Robbins, 4th Iowa.	Died June 5, 1863.
101	Nicholson, D., Pt., H, 22d Massachusetts, age 23.	May 10, 1864.	Shot wounds of both thighs by conoidal ball.	May 10, 1864.	Ant. post. flap amput'n both thighs at low. third. Surg. J. Thomas, 118th Penn.	Stumps unhealthy, tendency to slough. Died May 28, 1864. *Spec.* 2966, A. M. M.
102	*Nunenger, G.*, Pt., A, 58th Virginia.	.....	Shot fracture both thighs....	. .....	Amputation of both thighs..	Died August 17, 1862.
103	Rabbitt, E. C., Serg't. B, 10th Missouri.	Nov. 24, 1863.	Shot wounds of both knee joints.	Nov. 25, 1863.	Amputation lower third both thighs. Surg. E. J. Buck, 18th Wisconsin.	Died December 26, 1863.
104	Stewart, J., Pt., D, 77th New York, age 38.	Mar. 25, 1865.	Shell fracture both legs	Mar. 25, 1865.	Amputation in lower third both thighs.	Died April, 1865; pyæmic intoxication.
105	Tieman, H., Pt., C, 119th New York.	June 21, 1864.	Shot wounds of both thighs..	June 21, 1864.	Amputation of both thighs. Surgs. G. P. Oliver, 111th Penn., and J. V. Kendall, 149th New York.	Died July 3, 1864.
106	Wallace, D, Pt., I, 5th Artillery.	July 1, 1863.	Conoidal ball shattered patella of right and condyles of left knee joint.	July 4, 1863.	Circular amputation lower third both thighs.	Died August 2, 1863. *Specs.* 1383, 1384, A. M. M.
107	Whelpley, J., Lieut., D, 1st Maine.	Mar. 25, 1865.	Solid shot carried off both legs.	Mar. 25, 1865.	Amputation in lower third both thighs.	Died March 25, 1865.
108	Woodworth, J. W., Corp'l, H, 11th Infantry.	Nov. 7, 1863.	Shot compound fracture mid. third both thighs.	Nov. 7, 1863.	Amputation at middle third both thighs.	Died November 8, 1863.
109	Dunn, M., Corp'l, H, 46th Pennsylvania, age 21.	May 25, 1864.	Grape shot passed through both legs just below knee joint.	May 26, 27, 1864.	Amputation both thighs, low. third. A. A. Surg. S. Teats.	August, 1864, re-amp. right thigh, mid. third. Disch'd Aug. 17, 1865. Died Oct. 23, 1877. *Spec.* 3193, A. M. M.
110	*Parker, J. A.*, Pt., L, Cobb's Georgia Legion.	June 24, 1864.	Shot wounds of both thighs..	.....	Amputation of both thighs..	Furloughed August 2, 1864.
111	*Rush, C. G.*, Pt., G, 21 Georgia, age 22.	Mar. 25, 1865.	Shell comminution left knee joint and right leg.	Mar. 25, 1865.	Ant. post. flap amp. low. th'd both thighs. Surg. L. W. Bliss, 51st New York.	Released Aug. 2, 1865. *Spec.* 3998, A. M. M.
112	Lapham, C. N., Corp'l, K, 1st Vermont Cav., age 23.	July 8, 1863.	Both legs carried away by solid shot; extensive comminution.	July 10, 1863.	Ant. post. flap amp. middle third right thigh and at left knee joint. Surgeon L. P. Woods, 5th New York Cav.	Discharged August 25, 1864.
113	Barker, J., Pt., I, 58th Massachusetts, age 42.	June 17, 1864.	Conoidal ball wounded right knee joint and left leg.	June 17, 1864.	Oval flap amp. lower third rig't thigh and l't knee j'nt.	Died June 27, 1864.
114	Smith, H., Pt., I, 14th New Jersey, age 24.	June 7, 1864.	Shot wounds right thigh and left leg.	June 7, 1864.	Flap amputations at lower third right thigh and at left knee joint.	Died June 17, 1864.
115	Brown, H., Pt., K, 22d Colored Troops, age 19.	July 30, 1864.	Shell fracture both legs . ..	July 30, 1864, Mar. 19, 1865.	Amputation right leg in upper third; double flap amputation left thigh, lower th'd A. A. Surg. O. Shittler.	Discharged March 20, 1865. Died July 14, 1872.
116	Housley, H., Cook, F, 33d Wisconsin, age 20.	Apr. 2, 1865.	Shell fracture right knee joint and left leg, mid. th'd.	Apr. 11, 1865.	Amp. right thigh, lower th'd, and left leg in upper third; antero-post. skin flaps and circ. sect. muse. Surg. F. E. Piquette, 86th C. T.	Sent home July 23, 1865; not a pensioner.
117	Banks, S., Pt., C, 43d C. T.	July 30, 1864.	Conoidal ball fractured left leg and right thigh.	July 30, 1864.	Amp. mid. th'd r't thigh and of left leg, lower th'd. Surg. D. MacKay, 29th C. T.	Died July 31, 1864.
118	Bradley, P., Serg't, C, 16th Michigan.	Aug. 21, 1864.	Shell fracture left knee joint and right leg.	Aug. 21, 1864.	Amp. lower third left thigh and upper third right leg.	Died September 16, 1864.
119	Foss, J., Serg't, C, 59th N. York.	Sept. 17, 1862.	Shot wounds both legs and left arm.	Sept. 17, 1862.	Amputation of thigh and leg.	Died September 21, 1862.
120	*Hess, T. W.*, Pt., K, 8th North Carolina.	Sept. 30, 1864.	Shot fractures left leg and right thigh.	.....	Amputation of left leg and of right thigh.	Died October 7, 1864, of irritative fever.
121	Johnson, C. L., Pt., B, 1st Tennessee.	Aug. 6, 1864.	Compound shot fracture left leg, inv. knee joint, and right leg, lower third.	Aug. 6, 1864.	Amputation in low. third left thigh and upper third right leg.	Died August 21, 1864.
122	Lamphere, L. O., Pt., G, 21st Connecticut.	June 30, 1864.	Shell comminution lower end left femur and right foot and ankle.	June 30, 1864.	Amp. lower third left thigh and lower third right leg.	Died July 22, 1864, of tetanus.
123	*Lewis, J. R.*, Pt., H, 53d Georgia, age 32.	July —, 1863.	Shot wound left knee joint and fracture right leg.	July —, 1863.	Amp. left thigh, lower third; ri't leg at point of election. Surg. J. J. Knott, P. A. C. S.	Died July 10, 1863.
124	Birmingham, A., Lt., A, 69th New York.	Dec. 13, 1862.	Shot wounds right knee and left foot.	Dec. 13, 1862.	Amp. right thigh, and Pirogoff's amp. left ankle joint.	Died December 17, 1862.
125	*Alexander, J. W.*, Corp'l, K, 13th Mississippi.	Dec. 11, 1862.	Shot fracture both legs	Dec. 11, 1862.	Amputation of both legs. Surgeon Gilmore, C. S. A.	Recovered.
126	*Bartram, W. R.*, Pt., F, 1st North Carolina.	Sept. 17, 1862.	Shot fracture both legs	.... ..	Amputation of both legs ..	Furloughed Sept. 23, 1864.
127	Fisher, E. H., Lieut., A, 21st Indiana.	Oct. 20, 1862.	Wound of both legs by explosion of a shell	Oct. 20, 1862.	Amp. both legs. Surg. E. Read, 21st Indiana.	Discharged November 20, 1863.
128	Gordon, J., Teamster, Q. M. D., age 38.	Aug. 30, 1862.	Shell wounds both legs, low. third.	Sept. 1, 1862.	Amp. both legs, lower third. A. A. Surg. M. J. Davis.	Recovered.
129	*Higginbotham, E. B.*, Pt., F, 38th Georgia.	May 12, 1864.	Shot fracture of both legs...	May 13, 1864.	Amp. mid. third, both legs. Surgeon Arrington, C. S. A.	Recovered.
130	Kopp, E., Pt., K, 12th New Jersey, age 32.	Mar. 25, 1865.	Shot fracture of both tibiæ and left ankle joint.	Mar. 26, 27, 1865.	Flap amp. low. third right and mid. third left leg. Surgeons A. Satterthwaite, 12th N. J., and W. J. Burr.	April 16, protruding bones removed from stumps. Discharged Oct. 3, 1865.
131	[1] Lorence, J., Corp'l, K, 9th New Jersey, age 35.	Feb. 8, 1862.	Shot wounds of both legs by cannon ball.	Feb. 8, 1862.	Flap amputation both legs, up. third. Surgeons J. H. Thompson, U. S. V., and H. W. Rivers, 4th R. I.	Discharged September 30, 1862; 1875, knee joints without motion, stumps very tender.

[1] THOMPSON (J. H.), *Report of cases occurring at the battle of Roanoke Island, Va.*; in *Am. Med. Times*, 1862, Volume IV, p. 199.

No.	Name, Military Description, and Age.	Date of Injury.	Nature of Injury.	Date of Operation.	Operation and Operator.	Result and Remarks.
132	Lee, D., Pt., G, 2d N. Y. H. A., age 20.	June 16, 1864.	Shell injury of both legs ...	June 16, 1864.	Circ. amp. lower third, both legs. Ass't Surgeon O. S. Paine, 2d N. Y. Art.	Disch'd May 31, 1865; died September 25, 1874.
133	Page, F., Pt., K, 3d Mich ..	Apr. 16, 1862.	Shell wounds of both legs.	Apr. 16, 1862.	Circular amp. at lower third, both legs.	Discharged August 16, 1862.
134	Scott, J. G., Pt., D, 77th New York, age 23.	May 6, 1864.	Shell fracture of both legs...	May 6, 1864.	Flap amp. both legs. Snr. E. B. P. Kelly, 95th Pa.	Disch'd Nov. 3, '64; '79, rig't leg reamputated. *Spec.* 513.
135	Smith, A. A., Pt., A, 3d R. Island Art., age 23.	Apr. 8, 1863.	Fracture of both legs by explosion of magazine stmr. G. Washington.	Apr. 9, July 31, 1863.	Flap amp. upper th'd left leg. Surgeon F. L. Dibble, 6th Conn. Circ. of right leg. A. A. Surg. J. W. Cushing.	Discharged August 25, 1864. *Spec.* 1163, A. M. M.
136	*Snellings, E. A.*, Pt., Nottaway's Artillery.	June 22, 1864.	Shot fracture both legs.....	June 22, 1864.	Amp. mid. th'd left, and low. th'd right leg. Confed. surg.	Recovered.
137	Starin, F., Pt., C, 43d Wisconsin, age 19.	Nov. 5, 1864.	Shell wounds mid. th'd right and low. third left leg.	Nov. 5, 1864.	Flap amp. upper third right and lower th'd left leg.	Discharged July 2, 1865.
138	Stewart, T. B., Pt., C, 2d Conn. H. A., age 31.	Sept 19, 1864.	Shell wounds both feet, comminut'g all the tarsal bones.	Sept. 23, 24, 1864.	Circular amputation lower th'd both legs. Ass't Surg. J. G. Thompson, 77th N. Y.	Discharged August 17, 1865.
139	Tanner, J., Corp'l, C, 87th New York, age 18.	Aug. 30, 1862.	Shell wounds both legs.....	Aug. 30, 1862.	Flap amputation upper th'd both legs.	Discharged Oct. 15, 1862.
140	*Trim, S. H.*, Pt., B, 41st Alabama, age 19.	May 21, 1864.	Both legs torn off near ankle by explosion of shell.	May 21, 1864.	Circ. amp. both legs. Surg. D. Jackson, 44th Tenn.	July 13, 1864, recovered; furloughed.
141	Troy, B. F., Pt., G, 10th Iowa.	May 16, 1863.	Shot wounds both legs	May 16, 1863.	Amp. right leg 4 inches, and left leg 8½ ins. below knee.	Discharged Sept. 3, 1863; sound stumps in 1870.
142	Willson, S. L., Pt., D, 72d New York, age 18.	July 2, 1863.	Shot fracture both legs, lower third, by conoidal ball.	July 3, 1863.	Flap amp. up. third both legs. Surg. C. K. Irwin, 72d N. Y.	Discharged May 31, 1865.
143	Albert, J., Pt., F, 91st New York, age 19.	Oct. 12, 1864.	Shot wounds of lower third both legs.	Oct. 19, 1864.	Amputation in upper third both legs.	Died November 4, 1864, of pyæmia.
144	Anderson, D., Corp'l, H, 7th Maryland, age 41.	Aug. 21, 1864.	Shell wounds both legs.....	Aug. 21, 1864.	Amp. both legs. Surg. W. C. Shurlock, 51st Penn.	Died October 1, 1864.
145	Arkerson, A., Pt., D, 11th Infantry.	June 17, 1864.	Shot fracture both legs.....	June 18, 1864.	Amputation of both legs....	Died June 19, 1864.
146	Brinkmann, A., Pt., G, 79th Pennsylvania.	Aug. 11, 1864.	Shot fracture both legs.....	Aug. 11, 1864.	Amputation of both legs ...	Died August 12, 1864.
147	*Cooksey, A. J.*, Pt., D, 3d Mississippi, age 35.	Dec. 15, 1864.	Shot wounds of both legs ..	Dec. 16, 1864.	Circular amputation in middle third both legs.	Died January 2, 1865, from exhaustion.
148	*Daniel, J. P.*, Corp'l, H, 11th Virginia.	....	Shot wounds of both ankles.	Secondary.	Amputation of both legs .	Died September 30, 1863.
149	Flemming, C., Pt., A, 35th New York.	Dec. 13, 1862.	Shell fracture both legs	Dec. 13, 1862.	Amputation of both legs .	Died December 21, 1862.
150	Lualllen, J., Pt., D, 13th Indiana.	Jan. 15, 1865.	Shot fracture of both legs...	Jan. 15, 1865.	Amp. of both legs. Surg. L. Barnes, 6th C. T., and Assistant Surg. H. C. Merryweather, 5th C. T.	Died January 23, 1865.
151	McCurdle, J., Pt., E, 2d Penn. Artillery, age 23.	July 2, 1864.	Shell injury both legs	July 2, 1864.	Amp. left leg near knee and right leg near ankle.	Died July 3, 1864.
152	Manson, J. P., Pt., A, 121st Pennsylvania.	Dec. 13, 1862.	Shot fracture of both legs...	Dec. 13, 1862.	Flap amputation both legs below knee.	Died December 25, 1862.
153	Nason, H., Pt., C, 1st Rhode Island Artillery, age 38.	Nov. 30, 1863.	Cannon ball took off both legs just above ankles.	Dec. 2, 1863.	Circular amp. lower right 3d; flap at middle 3d left leg.	Died December 21, 1863, of pyæmia.
154	Nock, P., Pt., E, 1st La., att'ch'd to 1st Me. Batt'y.	May 27, 1863.	Both feet carried away by cannon ball.	May 27, 1863.	Both legs amputated	Died May 27, 1863.
155	Paine, A., Pt., 42d New York.	July 2, 1863.	Fracture of both feet by solid shot.	July 3, 1863.	Amp. low. 3d both legs. S'g. H. M. McAbee, 4th Ohio.	Died July 23, 1863.
156	Randell, A., Pt., C, 35th New York.	Dec. 13, 1862.	Shell fracture both legs	Dec. 13, 1862.	Amputation of both legs ...	Died December 15, 1862.
157	*Rash, R. A.*, Pt., F, 52d North Carolina.	... ...	Shot wounds both legs.....	.....	Amputation of both legs....	Died January 8, 1863.
158	S——, B., Corp'l, 3d Md. Battery, age 37.	.....	Shot fracture upper third left femur; mortification.	Feb. 16, 1865.	Amp. through middle third of both legs.	Died March 12, 1865.
159	Shearer, F., Pt., A, 35th Indiana.	Dec. 15, 1864.	Shot fracture both legs	Dec. 15, 1864.	Amputation of both legs....	Died December 16, 1864.
160	Smith, P., Serg't, K, 69th New York, age 30.	Aug. 16, 1864.	Shot wounds of both feet by conoidal ball.	Sept. 6, 1864.	Circ. amp. both legs, lo'r 3d. A. A. Surg J. A. Hutchinson.	Died Oct. 10, 1864, of exhaustion. *Spec.* 3044, A. M. M.
161	York, M., Pt., E, 120th New York, age 20.	July 2, 1863.	Conoidal ball fractured both ankles.	July 27, 28, 1863.	Amp. both legs. A. A. Surg. F. Hinkle.	Died August 8, 1863. *Spec's* 1605, 1609, A. M. M.
162	*Carpenter, P. J.*, Pt., D, 13th Virginia.	....	Shot wounds both legs	.....	Amputation of both legs ...	....
163	Johnson, J. M., Pt., C, 3d Delaware, age 31.	June 3, 1861.	Shell wounds right leg and left foot.	June 3, 1864.	Amp. mid. th'd right leg, and Syme's amp. l ft ankle j't. Surg. D. E. Wolfe, 3d Del.	Discharged June 8, 1865.
164	[1] *Unknown*, C. S. A	....	Shot wounds of both legs ...	Primary	Lenoir's am. in leg, and Pirogoff's amp. in other ankle j't. Surg. J. T. Gilmore, C. S. A.	Flaps of ankle joint; stump sloughed. Died.
165	Baumgardner, S., Serg't, F, 14th W. Virginia, age 35	Sept. 22, 1864.	Shot wounds of both feet ...	Sept. 23, 1864.	Amp. left leg, mid. third, and r't f't by Chopart's method.	Disch'd November 4, 1865; tender stumps.
166	Martin, J., Pt., L, 2d N. Y. H. A., age 21.	June 16, 1864.	Shell wounds right leg and left foot.	June 16, 1864.	Circ. amp. mid 3d r't leg and four toes of left foot.	Disch'd November 11, 1864. May, 1865, reamputation right leg.
167	*Sadley, A. D.*, Serg't, G, 21st Mississippi.	Dec. 11, 1862.	Shot fracture right leg and left foot.	Dec. 11, 1862.	Amp. of right leg and left foot. Surg. Hill, C. S. A.	Recovered.
168	Williams, H., Pt., K, 198th Pennsylvania, age 22.	Apr. 9, 1865.	Shell wounds left leg and right foot.	Apr. 9, 1865.	Circ. amp. low. third left leg, and Lisfranc's amp. r't foot. Surg. H. A. Grim, 198th Pa.	Discharged October 6, 1865; parts entirely healed.
169	Hicks, H. F., Pt., A, 1st R. Island Artillery.	Dec. 13, 1862.	Shot wounds of both feet ...	Dec. 14, 1862.	Syme's amp. at r't and Pirogoff's at left ankle joint.	Disch'd September 24, 1863.
170	[2] Clark, H. W., Pt., H, 100th New York, age 30.	May 13, 1864.	Solid shot fractured both feet.	May 13, 1864.	Syme's amp. left ankle, Chopart's amp. r't foot. Surg. M. S. Kittinger, 100th N. Y.	Disch'd December 13, 1864. *Spec.* 2857, A. M. M.
171	Carpenter, J. W., Serg't, I, 10th Vermont.	June 3, 1864.	Conoidal ball injured both feet.	June 3, 1864.	Hey's amp. left foot, and 1st toe and met. bone r't foot.	Died June 15, 1864.
172	Rowland, S., Serg't, A, 48th New York.	May 3, 1863.	Shot wounds of both feet ...	.....	Amputation of both feet	Died June 6, 1863.

[1] Holloway (J. M.), *Comparative Advantages of* Pirogoff's, Syme's, *and* Chopart's *Amputations, etc.*, in *Am. Jour. Med. Sci.*, 1865, Volume LI, pp. 85, 86.

[2] Smith (S.), *Amputations at the Ankle Joint in Military Surgery*, in *U. S. San. Com. Memoirs*, 1871, Surg. Vol. II, pp. 110, 140.

CHAPTER XIII.

UNIVERSITY OF CALIFORNIA

ANÆSTHETICS.

It was impracticable to determine the total number of cases in which anæsthetics were employed during the war, but as near as can be ascertained they were used in no less than eighty thousand (80,000) instances. Time and clerical assistance did not allow of the examination of this enormous number of cases in detail, and in treating of this subject we must confine our remarks to the number of major operations in which the agents used were definitely ascertained. Of eight thousand nine hundred cases chloroform was used in six thousand seven hundred and eighty-four, or 76.2 per cent., ether in one thousand three hundred and five, or 14.7 per cent., a mixture of chloroform and ether in eight hundred and eleven, or 9.1 per cent. These percentages differ somewhat from the percentages given in the preliminary report,[1] where it was stated that chloroform was used in 60 per cent., ether in 30 per cent., and ether and chloroform in 10 per cent.; but at that time the percentage of the different agents had been principally derived from the reports of general hospitals, and in which ether was frequently used. When, afterwards, the operations performed in the field hospitals were examined, where chloroform was almost uniformly used, the percentage of the cases in which the latter agent was employed increased to 76.2 per cent., as above indicated, while the number of cases in which ether or the mixture of ether and chloroform was used was proportionally decreased.

The inestimable value of the use of anæsthetics in military surgery will hardly be denied at this date, although it has been claimed that the effect of anæsthetics in the treatment of shot injuries are deleterious, inasmuch as they add to the depression caused by the shock, and retard union by first intention, and predispose to hæmorrhages and pyæmia. It is possible that in two hundred and fifty-four cases in which it was asserted that no anæsthetic was given the surgeons were actuated by such objections, as no reasons have been assigned why anæsthetics were not administered. How far the use of anæsthetics has contributed to the saving of life during the late war it is impossible to say, as we have no statistics to make this comparison. It may be stated, however, that their use has undoubtedly influenced the favorable percentages of mortality after major operations pointed out in different sections of this and the preceding volumes.

From the rapidity of its effects, and from the small quantity required—qualities which can only be appreciated at their proper values by the field surgeon when surrounded by hundreds of wounded anxiously awaiting speedy relief—chloroform was preferred by nearly

[1] *Circular* No. 6, War Department, Surgeon General's Office, Washington, November 1, 1865.

all the field surgeons, and their testimony as to its value and efficacy is almost unanimous, although all recommend the greatest care in its administration. It is, perhaps, best to allow the different medical officers to speak for themselves on this subject: Surgeon C. J. Walton, 21st Kentucky, administered "chloroform in every painful operation, but did not keep the patients under its influence longer than was absolutely necessary, withdrawing it as soon as the cutting was completed. * * * While I could not dispense with chloroform, I must protest against the extravagant and indiscreet use of it. It is a most potent agent, and should be used with the utmost caution. *In no case were we displeased with its effect.*" Surgeon B. B. Breed, U. S. V.: "Chloroform was almost universally employed as an anæsthetic, and without bad effect in any case. Whenever practicable, I employed ether in preference to chloroform, preferring, both from personal experience and observation, the delay and discomfort in its administration to the possible danger from the use of the latter. On the field of battle, however, chloroform is the safe and preferable agent." Assistant Surgeon C. Bacon, jr.: "The anæsthetic I have seen used has invariably been chloroform. Among the great number of cases in which I have witnessed its administration I have seen but one death resulting from its use. I have, however, frequently seen cases in which its use required extreme care, and, at times, have been obliged to desist in its administration in cases of great exhaustion consequent upon long-established injuries. I have frequently seen the use of chloroform attended with bad results when improperly administered. As an anæsthetic I think chloroform should be given in prompt and efficient dose. The desired effect being attained, its administration should be discontinued; in this manner less chloroform is required, thereby avoiding to a great extent its toxical effect." Surgeon D. P. Smith, U. S. V.: "I have in every instance but one, in the army, employed chloroform, and in but one case have I had reason to believe its use disastrous. In this instance it was given too profusely by an entirely incompetent person (since then dismissed from the medical corps) while I was amputating at the knee joint. The patient never reacted from the shock, but died about twelve hours subsequently." Assistant Surgeon J. T. Calhoun, U. S. A.: "I have always used chloroform as an anæsthetic, have given it, and have seen it given under my direction, and in the practice of other surgeons in an immense number of cases, and never saw a death from it, or, in army practice, even an alarming symptom. I am inclined to believe that in general practice the chief danger of choloform is that in its administration care is not taken to let the patient inhale sufficient air with it (a fact often due to the desire to be economical in its use), and the patients die, not from the chloroform, but from the want of oxygen." Surgeon H. S. Hewit, U. S. V.: "Chloroform was used freely without any fatal accident. But I conceived that those cases did not finally do so well who were kept under its influence for a length of time; and I am of the opinion that when used the patient should be kept under its influence merely long enough to last through the severest part of the operation. I believe that when a patient is kept under its influence for a long time his chances of recovery are thereby lessened." The serious results following the use of chloroform, when "improperly" or "too long" administered, or when administered by "incompetent persons," referred to by several of the operators, will hardly be charged to the agent itself. In the reports of the surgeons in charge of base hospitals, sometimes the use of ether, sometimes of chloroform alone, or a mixture of both, is advocated.

The most convenient and common form of administering anæsthetics was a cloth or paper folded in the shape of a cone, with a sponge in the apex. It was placed at some distance

over the nose and mouth of the patient to allow the first inhalations to become diluted with air, and then gradually advanced to the nose until anæsthesia was produced, when the inhalation was suspended. The method of Marshall Hall, by placing a double fold of muslin over the mouth and nose of the patient and simply dropping the chloroform on it drop by drop, was found to be tedious, and inoperative in the open air, where many of the operations were performed, owing to rapid evaporation. In the southern armies, where chloroform was scarce, Surgeon J. J. Chisolm, finding that much chloroform was wasted by these methods, employed a flattened cylinder two and a half inches long and one inch wide in its broadest diameter, having in one of its broadest surfaces a perforated plate. Attached to the cover are two nose pieces. When the instrument is not in use these projections can be pressed into the cylinder, thus diminishing the size of the instrument. In the interior of the cylinder is found a piece of sponge, or what is much better, a bent wire, over which is folded a piece of cotton cloth. The chloroform when dropped through the perforated plate is received upon the sponge or folded cloth, which offers an extended surface for evaporation.

FIG. 424.—CHISOLM'S Inhaler. *Spec.* 4910.

In reference to the propriety of giving alcoholic stimulants prior to the administration of ether and chloroform, the records of the war supply little definite information. They give simply the number of cases in which anæsthesia was induced, and frequently not even the name of the anæsthetic employed. In cases in which the effect of the anæsthetic was believed to have led to a fatal result special reports were made. These special reports throw little light on the question, since they include, in almost equal proportion, cases in which stimulants had, or had not, been administered prior to the inhalation of the anæsthetic. Some surgeons advise the use of stimulants prior to anæsthesia uniformly; others deprecate the practice except in rare cases, and others again discard it altogether. When there is extreme depression, alcoholic stimuli will of course be employed, in conjunction with other restoratives, to bring about reaction. But when the patient is in a fit state to undergo a major operation, a stimulant should not be given with especial reference to the anæsthesia about to be induced, as it would seem that in the practice of surgeons who habitually employed the stimulants the patients were less readily anæsthetized. It would be better to reserve the stimulant as a restorative in the course or on the completion of the operation, that it may aid in reducing reaction instead of retarding the induction of anæsthesia.

It has been stated that the nature of the anæsthetic employed was indicated in eight thousand nine hundred cases, viz: chloroform in six thousand seven hundred and eighty-four, ether in one thousand three hundred and five, and chloroform and ether in eight hundred and eleven cases. Of the six thousand seven hundred and eighty-four cases in which chloroform was used, death was ascribed to this agent in thirty-seven, or 5.4 per thousand;[1] of the one thousand three hundred and five cases in which the anæsthesia was induced by ether, four deaths, or 3.0 per thousand; and of the eight hundred and eleven cases in

[1] CHISOLM (J. J.), (*A Manual of Military Surgery for the use of Surgeons in the Confederate States Army*, Columbia, 1864, pp. 429–30): "Of the many thousand instances of its administration since the war between the Confederate States and United States began, but two fatal cases from chloroform inhalation have been reported. In one, the patient died in a few minutes after inhalation was commenced. In the other, the patient did not die for several hours. The case was that of a healthy young soldier who had a minié ball embedded under the scapula, and who, while *en route* to rejoin his command, stopped at a hospital and desired its removal. The operation was very tedious, and he was kept under the influence of chloroform for one and a half hours. Although he regained his consciousness when the administration was stopped, his pulse never reacted, notwithstanding the liberal use of brandy. A few hours after the operation was completed there appeared an increasing disposition to sleep, which gradually ended in coma, the pulse becoming more and more feeble. He died thirty-two hours after the inhalation. As the operation affected no vital part, and as the health of the patient was good, his death could be attributed to no other cause than the inhalation of the chloroform."

which a mixture of chloroform and ether had been employed, two deaths, or 2.4 per thousand, were charged to the anæsthetic. Brief abstracts of the fatal cases are given.

Deaths from Chloroform.—Thirty-seven cases were reported:

CASE 1233.—Surgeon M. K. Hogan, U. S. V., reports that Private Sylvester Anninger, Co. F, 147th New York, aged 27 years, received a shot fracture of the left leg, at Spottsylvania, May 12, 1864. He was at once carried to the field hospital of the 3d division, Ninth Corps. He died May —, 1864, "under chloroform."

CASE 1234.—Corporal ——— Ballou, Co. E, 14th Pennsylvania Cavalry, fracture of bones of right hand, April, 1863. Operation for removal of fingers October 12, 1863. Chloroform inhaled without unpleasant symptoms; upon removing index finger pain was evinced; small additional portion given and operation recommenced, when patient struggled violently; arterial hæmorrhage ceased to flow; tongue found to not have fallen back upon rima glottidis; usual means of exciting respiration applied; good current of fresh air; patient rolled from side to side; artificial respiration resorted to; spirit of ammonia applied to nostrils and cold water dashed on chest and face, without effect. In the opinion of Surgeon W. B. Wynne, 14th Pennsylvania Cavalry, the operator, the patient was not under the effects of the anæsthetic five minutes before life was extinct. At the autopsy the lungs were found to be perfectly healthy; the heart presented some appearance of slight ossification.

CASE 1235.—Private *J. Bradley*, Co. D, 25th North Carolina; slight wound of patella; admitted into Chimborazo Hospital, Richmond, June 25th; necrosis and gangrene. July 18th, amputation at junction of upper and middle thirds of thigh. There was but little blood lost, but the patient sank under the operation and expired a few minutes after its completion. It is remarked, upon an unsigned case-book, that "the chloroform may have, by its depressing effect, contributed to this unfavorable result, for it caused him to vomit freely, and he was unable to retain any stimulants in the stomach."

CASE 1236.—Private G. Budlinger, 76th Ohio, aged 30 years, admitted into hospital of 1st division, Fifteenth Corps, with a shot wound of hand; placed upon operation table and about a drachm of chloroform sprinkled upon four folds of patent lint applied to face, space being given for the free admission of air. After breathing it for a few moments quietly without any apparent effect, more chloroform was added and reapplied by a nurse in attendance (the surgeon having stepped aside for a moment), when, after six or seven respirations, the patient drew up his legs and arms convulsively, and heavy stertorous breathing came on. Chloroform removed immediately, and a few moments given him to resume his regular breathing, but the difficulty increased; frothy exudation from mouth not caused by excess of saliva; respiration became more and more incomplete, pulse small and imperceptible, veins of neck and face prominently distended; heart action ceased before respiration had entirely stopped. Friction to extremities, cold water dashed in face, jugular vein opened, artificial respiration, without relief. The surgeons of the hospital reported, as the result of an autopsy, that "being unable to discover any other abnormal condition, and in the absence of further evidence, it may be proper to conclude that this is a case of apoplexy induced by chloroform."

CASE 1237.—Private J. G. Clarkson, Co. A, 35th Massachusetts, age 40 years, is reported by Surgeon F. M. Lincoln, 35th Massachusetts, to have died in hospital at Falmouth, Virginia, "from the inhalation of chloroform administered for the performance of an amputation," January 20, 1863.

CASE 1238.—Private J. Conley, Co. A, 90th Illinois, aged 18 years; shot fracture left ankle joint, Mission Ridge, November 25, 1863; ball lodged; admitted into hospital No. 1, Nashville, February 4, 1863. Surgeon R. L. Stanford, U. S. V., reports that the patient "died from the effects of the chloroform at the time of the operation of extraction of the ball," and forwarded the specimen of the lower portions of the left leg, the astralagus, and calcaneum; they constitute *Spec.* 3360 of the *Surgical Section.*

CASE 1239.—Private P. Conlin, Co. G, 11th New Jersey; shot perforation knee joint, popliteal artery cut; Ream's Station, September 17, 1864; considerable hæmorrhage; patient in a very nervous state and having great fears of the result. Stimulants were given, and after he had rallied a little he was placed upon the table and chloroform administered. Plenty of fresh air was allowed during the administration and he passed through the usual stages necessary to insensibility, but died before the contemplated operation was commenced, having just reached the point of insensibility. The only observable symptoms which were unusual were the high state of nervous excitement while the chloroform was being administered and the very small quantity required to render him insensible. Methods for resuscitation freely used for half an hour without effect. A *post-mortem* examination revealed nothing abnormal in the size or appearance of the organs.

CASE 1240.—Sergeant *S. Crumbaker*, Co. A, 35th Virginia Cavalry, aged 44 years, was admitted into the Confederate hospital at Charlottesville in May, 1864, with a pistol ball perforation of the head of the humerus, received at the Wilderness, May 6th. On May 11th chloroform was administered and the head of the humerus was excised. He is reported to have died May 16, 1864, "from the effects of the chloroform."

CASE 1241.—Private T. Donaldson, Co. E, 13th Ohio Cavalry, aged 19 years; shot injury left humerus, Poplar Springs, Virginia, October 8, 1864; admitted into hospital at Beverly, New Jersey. Necrosis of humerus. October 29, 1864, amputation of left arm at shoulder by antero-posterior flaps by Acting Assistant Surgeon J. C. Morton; chloroform used. Patient "died from the effects of the chloroform and nervous shock to the general system." The upper part of the humerus was forwarded to the Museum by Assistant Surgeon C. Wagner, U. S. A., and is numbered *Specimen* 3706 of the *Surgical Section.*

CASE 1242.—Private D. Flynn, Co. A, 18th Infantry, admitted into hospital No. 19, Nashville, January 5, 1863, with a compound fracture of fingers of right hand, received December 31, 1862. January 8th, chloroform administered with a due proportion of atmospheric air; patient was rather troublesome, struggled, etc. A relaxation of the muscles testifying to anæsthesia, the chloroform was suspended and the operation commenced; just after the formation of the anterior flap the patient commenced to breathe stertorously, and at that instant the brachial pulse suddenly ceased; there was an up and down movement of the thyroid cartilage, a swelling out almost to bursting of the external jugular veins, blue lips, a pupil insensible to light, and an ashy paleness. Cold water dashed in face, aqua ammonia to nostrils and upon thorax, tongue drawn forward with tenaculum.

artificial respiration kept up, and the principles of Marshall Hall's method of respiration put into requisition, but without effect; patient expired after one or two long-drawn sighs. Amount of chloroform expended was about two drachms. No autopsy possible.

CASE 1243.—Private R. Gormley, Co. I, 7th New York Artillery, admitted into McClellan Hospital, Philadelphia, June 13, 1864, with a shot wound of the lower third of the right leg; ball lodged. On November 29th chloroform was administered with a view of removing the ball. The anæsthetic was given with great caution, and inhaled with perfect facility until the operation was nearly completed. Acting Assistant Surgeon W. E. Ely stated that "the patient's pulse continued good, and nothing of unusual interest presented itself until the incision had been made, when I was suddenly deterred from proceeding in search of the ball by a spasmodic rigidity of the muscles, such as generally occurs immediately before the point of complete anæsthesia is attained. The patient, who had up to this time appeared perfectly sensible of external objects, suddenly threw his head back and almost immediately expired. Cold water was dashed into his face, ammonia was applied to his nostrils, his mouth was kept open, and his tongue drawn forward, while Hall's ready method of artificial respiration was kept up for nearly an hour, but only with the effect of producing three or four long inspiratory efforts, when life became entirely extinct." Dr. Ely was assisted by Acting Assistant Surgeon A. S. Uhler.

CASE 1244.—Private Thomas Hamilton, Co. A, 1st Maryland Infantry, aged 31 years, admitted into Patterson Park Hospital, Baltimore, June 25, 1864, with a gunshot wound of the hand. September 3, 1864, patient placed on table to undergo an operation for necrosis of the carpal bones. A sponge wet with chloroform was carefully held at first some three or four inches from the face, and at no time less than two or three inches. The patient inhaled for about five minutes and still remained conscious, frequently making some remark. He soon, however, commenced muscular efforts, such as are quite common with patients inhaling chloroform, except that the muscular contractions were more violent than usual. Before the contractions ceased the pulse grew feeble and the chloroform was withdrawn for two or three minutes; the breathing continued regular, only that the patient occasionally took a deep inspiration and expired forcibly, then the muscles became relaxed; the operation was commenced; but the respiration soon commenced to fail and the pulse became imperceptible; the operation was stopped. All known means for resuscitation were resorted to, but life had fled. The friends of the deceased could only be persuaded to allow an examination of the heart. The organ was found of normal size and appearance; both auricles were distended with venous blood, but the ventricles were empty. A clot of white fibrin, streaked in some places with coagula of blood, was found in each auricle.

CASE 1245.—Private Robert Harris, Co. G, 132d New York, was admitted into Ward Hospital, Newark, New Jersey, May 4, 1864. Surgeon George Taylor, U. S. A., reported that the patient died on May 20, 1864, while under the influence of chloroform administered for the purpose of amputating the leg.

CASE 1246.—Private John Johnson, Co. B, 2d Pennsylvania Heavy Artillery, a patient in Mower General Hospital, near Philadelphia, expired suddenly on May 13, 1865, while inhaling chloroform preparatory to undergoing a surgical operation. The case is reported by Surgeon J. Hopkinson, U. S. V.

CASE 1247.—Private John Kroft, Co. D, 7th New York, shot fracture leg, Petersburg, September 16, 1864. Admitted into hospital at Beverly, New Jersey, September 28th. Amputation of leg October 8th. On November 16th a second amputation was found necessary; at the previous operation sufficient chloroform was administered to produce complete anæsthesia without unpleasant effect. On the latter date chloroform was administered on a sponge, from one drachm to a drachm and a half—in all not over an ounce was given. He had been upon the table about fifteen minutes when fatal symptoms were manifested, and he died in from five to six minutes. An autopsy revealed no pathological lesions sufficient to account for death. Assistant Surgeon C. Wagner, U. S. A., reported the case.

CASE 1248.—*William Laws*, Co. E, 23d North Carolina, aged 24 years, shot wound of groin, fracturing tuber ischii; admitted into hospital No. 1, Frederick. October 28th, chloroform was administered to remove the fragments of the ischium. The chloroform was administered on a pocket handkerchief which was pressed firmly against the mouth of the bottle which was then inverted. Plenty of air was given, and the handkerchief was wet with chloroform but once. About a minute after the administration was begun almost complete relaxation was produced, and two stertorous respirations were observed, when the handkerchief was immediately removed. The pulse up to this time was undisturbed; the patient then took some ten or twelve deep and rather rapid inspirations, with quickened pulse, when respiration suddenly ceased; the pulse continued for six or eight beats, which were slower and feeble, and then suddenly ceased. Artificial respiration was immediately resorted to by Marshall Hall's ready method, which produced distinct respiration, but no pulsation. Having kept it up for about twenty minutes without result, the case was given up as hopeless. An account of the *post-mortem* appearances, together with other details of the case, will be found in CASE 703, page 242, *Second Surgical Volume*.

CASE 1249.—Colonel McGilvray, Chief of Artillery of the Tenth Corps, was slightly wounded in the forefinger of the left hand, at Flussus Mills, August 17, 1864. Excision of the joint was advised, and, on September 4th, chloroform was administered; about a drachm of the anæsthetic was poured on a sponge enclosed in a towel folded funnel-shaped. The patient came very kindly under its influence, about two drachms of chloroform in all being used. The period of excitement did not last over a minute and a half. The operation was commenced; the pulse was then beating steady and firm at about 65, respiration slow and regular; at the time the inhalation of the chloroform had been discontinued for at least two minutes; at the moment of the first incision the pulse and respiration at the same moment ceased without the slightest warning. The face flushed for a moment, and then became pallid; the eyes were fixed and not suffused. About half a minute after the cessation of respiration the patient made one or two spasmodic attempts at respiration and then was still. Artificial respiration was commenced and kept up for an hour, but in vain. The heart and lungs were examined on the next day, but did not indicate the cause of death. The particulars of the case were communicated by Surgeon A. M. Clark, U. S. V.

CASE 1250.—Sergeant George S. Moss, Co. C, 125th New York, received a shell wound of the penis, scrotum, and thigh, at Gettysburg, July 3, 1863; the missile lodged among the muscles of the back of the thigh. The patient desired to have the

missile removed, but positively refused to be touched without the administration of chloroform. On August 8th a stimulant was given and the anæsthetic was administered; in one minute the patient came under its influence, the shell fragment was removed in less than half a minute, and additional stimulant administered; pulse became suddenly weak, and the patient died almost instantly. It was the opinion of surgeons present that the patient died from valvular affection of the heart.

CASE 1251.—Private Patrick Murphy, Co. B, 111th Pennsylvania, aged 22 years, admitted into hospital at Murfreesboro', Tennessee, October 28, 1863, with shot wounds of right knee joint and in centre of forehead, received at Brown's Ferry, Tennessee, on the same day. On admission patient was wild, delirious, and unruly, but a few hours afterwards seemed partially to recover his senses. On October 30th amputation of the thigh was performed. On loosening the tourniquet no blood escaped from the vessels, and the patient was observed to be in a state of collapse. Stimulants were freely given, but without avail. He died on the table soon after the operation, probably from the effects of chloroform. A section of the anterior portion of the cranium, showing a partial fracture and depression of the centre of the frontal bone, was forwarded to the Museum by Assistant Surgeon John C. Norton, U. S. V., and is numbered 2139 of the *Surgical Section*.

CASE 1252.—Private C. M. Odell, Co. I, 36th Wisconsin, received a shot fracture of the head and shaft of the humerus, at Cold Harbor, June 3, 1864. Amputation was deemed necessary; his pulse was good, and he walked to the operating table unassisted. Chloroform was given until complete relaxation of the voluntary muscles was produced; the amputation was performed, the arteries ligated, and the flaps were about to be closed, when respiration suddenly and quietly ceased. Artificial respiration was set up, but without success. The autopsy showed the heart much enlarged, without thinning of the walls, and distended on both sides with a grumous fluid and tough grayish clot, which extended into the great vessels.

CASE 1253.—Surgeon J. F. Patterson, 131st New York, states that "on June 11, 1863, the 114th New York was ordered to take a position in front of our line, and while advancing to execute the order one of the privates shot himself in the foot and was carried to the field hospital for treatment. An amputation being deemed necessary, chloroform was administered by the assistant surgeon of the 1st Louisiana in such a manner that death almost immediately ensued. The surgeon of the 114th, whose name I believe was Wagoner, opened the chest of the cadaver about fifteen minutes after death, and finding the lungs lying on the back of the chest announced that death was occasioned by collapse of the lungs." The case of William Rathbone, Co. K, 114th New York, who received a gunshot wound of toe of left foot at Port Hudson, Louisiana, and who died, is reported by Surgeon L. P. Wagner, 114th New York, but no details of the case are furnished.

CASE 1254.—Surgeon S. A. Richardson, 13th New Hampshire, in a special report of the surgical operations performed at Flying Hospital, Twenty-fourth Corps, March 30th to April 9, 1865, remarks: "Manuel Silver, Private, Co. F, 10th Connecticut, gunshot comminuted fracture of the left humerus by conoidal ball. Flap amputation left arm in middle third by Surgeon H. C. Levensaler, 8th Maine, April 2, 1865 (primary operation). Died during the operation, from effects of chloroform given by Surgeon De Landre, 158th New York. Was brought under the influence of chloroform with difficulty."

CASE 1255.—Sergeant Major Adolphus Spaeth, 9th Ohio, was admitted into Cumberland Hospital, Nashville, September 24, 1863, with a shot fracture of the right wrist. The ball passed upward on the palmar aspect of the forearm nearly to the bend of the elbow, but so deeply embedded as not to be found. He had violent erysipelas of arm and great constitutional disturbance. Three or four days afterwards the ball was removed from the deep layer of muscles opposite the upper third of the radius, palmar aspect. His general condition continued bad. On October 17th he was placed upon the table for amputation at the middle third of humerus. During the administration of chloroform death took place with scarcely a premonitory symptom. The *post-mortem* exhibited venous congestion of both lungs, evidently produced by the chloroform, the lungs being otherwise perfectly healthy. The quantity of chloroform inhaled did not exceed two drachms.

CASE 1256.—Private George E. Stannard, Co. G, 14th Connecticut, admitted into Finley Hospital, Washington, with a shot fracture of left ulna, received at Fredericksburg December 31, 1862. Patient was a perfectly healthy, robust man, of lively temperament, rather pale in color. On January 28, 1863, chloroform was administered for the purpose of removing the loose pieces of bone. About two drachms of the anæsthetic were sprinkled on a towel and placed to the nose; in about five or six minutes he came under its influence; the usual struggle came on just preceding complete anæsthesia, when he suddenly ceased to breathe and his pulse failed. Every effort to resuscitate him failed. The history of the case, together with the specimen of the lower extremity of the left ulna, was contributed by Surgeon I. Moses, U. S. V.; the *Specimen* is numbered 859 of the *Surgical Section* of the Museum.

CASE 1257.—Corporal C. F. Tarbell, Co. D, 21st Maine, aged 19 years, shot wound of left thigh, at Port Hudson, May 27, 1863. He was removed to the regimental hospital, where it was found necessary to amputate the thigh in the middle third. Surgeon G. E. Brickett, 21st Maine, reports that the patient died May 27, 1863, from the effects of the chloroform.

CASE 1258.—Private G. N. Titus, Co. G, 8th Vermont, was admitted into regimental hospital at Algiers, Louisiana, August 21, 1862, with a wound of one of his toes. Chloroform was administered by Surgeon H. H. Gillett and Assistant Surgeon S. H. Currier, 8th Vermont, for the purpose of amputating the injured toe. The patient expired suddenly, before the operation was commenced. Assistant Surgeon L. C. Herrick, 4th U. S. Colored Cavalry, reports the case.

CASE 1259.—Surgeon Edwin Bentley, U. S. V., reports that a Confederate soldier, a large, robust, muscular North Carolinian, after the battle of Hanover Court House, May 29, 1862, underwent amputation of the thigh. The operation was performed in the open air and very little blood was lost. A large amount of chloroform had been administered without the patient becoming at all unconscious, when the surgeon forced him to large and free inspirations and he became immediately under its influence. Just after the completion of the operation the pulse sank rapidly, and he appeared to cease to breathe simultaneously with the effects of the anæsthetic.

CASE 1260.—Surgeon John A. Lidell, U. S. V., in his report of the operations of the medical staff of General Sedgwick's division of the Second Corps, at Fair Oaks, states: "A soldier of General Richardson's division was placed on the table and

chloroform administered for the purpose of amputation of the thigh for gunshot comminuted fracture of the femur in the neighborhood of the knee joint. While inhaling the chloroform he suddenly became pale, pulseless, and ceased to breathe, dying on the operating table while the amputation was going on."

CASE 1261.—Private J. W. Whitlock, Co. K, 111th Illinois, gunshot wound of left elbow joint, Dallas, Ga., May 31, 1864. Admitted into hospital of 2d division, Fifteenth Corps, same day; chloroform administered for the purpose of operating, but he died from its effects. An autopsy revealed extensive adhesions of the pericardium and hepatization of the right lung. The case is reported by Surgeon J. B. Potter, 30th Ohio.

CASE 1262.—Unknown soldier, with a shot injury necessitating amputation at the knee joint; chloroform was administered, and the patient died while the operation was being performed. Surgeon D. P. Smith, U. S. V., the operating surgeon, states that the anæsthetic was administered too profusely by an entirely incompetent person, who was subsequently dismissed from the service.

CASE 1263.—Corporal A. Wilde, Co. H, 61st New York, wounded at Deep Bottom, August 19, 1864; distal phalanx of thumb shattered; admitted into hospital of 1st division, Second Corps. Assistant Surgeon C. Smart, U. S. A., reports that chloroform was given, and after about three drachms had been taken the patient became much excited and passed into a violent convulsion, in the midst of which he died. At the autopsy the heart was found small and firmly contracted, its walls being in contact and the cavities obliterated.

CASE 1264.—Private Lewis Winters, Co. I, 11th Michigan, aged 40 years, Atlanta, August 7, 1864; conoidal ball in upper third right thigh. Admitted into hospital No. 8, Nashville, August 20th; gangrene. October 27th, preparatory to cleaning and burning the wound Acting Assistant Surgeon R. W. Forrest commenced to administer chloroform from a sponge surrounded with a napkin, plenty of atmospheric air being admitted. Not more than half an ounce of chloroform was poured upon the sponge. His pulse was good, and he was judged to be a healthy man. After inhaling the chloroform for about three minutes a very severe spasm came on; his head was thrown violently back, his body arched, resting on top of head and feet, the arms were drawn up, and the hands violently clenched. The chloroform was withdrawn; the spasm relaxed in a few seconds; his head and face became very much congested. Cold water was instantly dashed over his face and chest and ammonia applied to the nostrils, and every means that could be devised to resuscitate kept up for more than an hour without effect. Autopsy: Five points of cicatrization from scarification for cupping; considerable serous effusion under arachnoid and filling sulci; vessels on surface of brain much congested; pleuritic adhesions very firm on both sides; left lung deeply engorged with dark blood, frothy serum exuding from cut surface, and numerous small chalk-like deposits found near the surface; heart normal in size and appearance.

CASE 1265.—*D. Zebriske*, Co. I, 12th Alabama, admitted into hospital No. 5, Frederick, October 18, 1862, with a shot flesh wound left hip, traversing deep portion of gluteal muscles; Antietam, September 17, 1862; ball lodged. October 19th, chloroform administered with a view of removing missile. No unusual symptom was observed; but while the operation was in progress and the patient not in the act of inhaling the vapor, it was discovered that he had ceased to breathe. The autopsy threw no light on the cause of death. The subject was anæmic, and exhausted by hardship and depleted by suppuration. The report of the case was made by Surgeon H. S. Hewit, U. S. V.

CASE 1266.—Private G. G. Allison, Co. A, 6th New York Artillery, aged 43 years, admitted into hospital at Beverly, New Jersey, July 7, 1864. On February 7, 1865, he was placed upon the table to be operated on for fistula in ano. Chloroform was administered in the ordinary manner; room was well ventilated and the vapor of the chloroform freely diluted with atmospheric air; full anæsthesia was produced, when the pulse rapidly failed, and in a very brief period death took place. The quantity of chloroform inhaled did not exceed two drachms. Every effort was made to restore life by artificial respiration, ammonia, stimulants, etc. An autopsy was made twelve hours after death; the brain, thoracic and abdominal viscera were very carefully examined, but nothing detected sufficient to account for death; the brain was very slightly congested. Assistant Surgeon C. Wagner, U. S. A., reported the case.

CASE 1267.—Private Francis Heward, Co. F, 1st New Jersey, was admitted into Fairfax Seminary Hospital, April 5, 1862, with a dislocation of left humerus forward and inward of a few hours' standing. Surgeon Henry A. Armstrong, 2d New York Artillery, reduced the bone without assistance. On May 6th Acting Assistant Surgeon H. W. Ducachet discovered that the bone was again out of place in the same direction. The patient was chloroformed and reduction attempted with the heel in the axilla, but without success. On the 9th pulleys and counter-extending bands were obtained and adjusted. Chloroform was again administered, a drachm being poured upon a piece of lint about two inches square and held about three inches from his face, a towel being thrown over the head of the patient and hand of the operator, and which was removed from time to time to admit air. Some time elapsed before the muscles became relaxed, when the chloroform was removed. There was no stertorous breathing, choking, or struggling, nor was there occasion to use force to keep him down, as at the previous administration. There was, as there always is, congestion of the conjunctiva and vessels of the neck, but not as much, *certainly not more*, than when the chloroform was administered on the 6th. Reduction was being attempted when symptoms of asphyxia were noticed; the pulleys were instantly relaxed, the tongue drawn forward, and artificial respiration resorted to, but everything failed. No autopsy was made. The report of the case is signed by Surgeon H. A. Armstrong and Acting Ass't Surgeon H. W. Ducachet.

CASE 1268.—T. A. Leaning, Co. H, 76th New York, a patient in Eckington Hospital, was troubled with stricture of the urethra. An attempted examination by the catheter was so painful that chloroform was administered on a handkerchief, pains being taken that the patient had plenty of air by holding the handkerchief far enough away from the face. In a few minutes the rigidity of the muscles yielded, but only partly, and two or three stertorous respirations were taken. The chloroform was immediately suspended and the examination by the catheter commenced. The instrument had only been introduced to about the membranous urethra when an involuntary evacuation of both bladder and bowels took place; the patient at that moment ceased to breathe and his face grew purplish. The action of the heart could not be observed at this time, since the administrator

had not his finger on the pulse. On being immediately observed, no pulsation could be felt at the wrist nor observed on auscultation over the heart. The tongue was immediately pulled forward with a tenaculum, but as no respiration succeeded, Marshall Hall's ready method of artificial respiration was immediately commenced. The temporal artery was also instantly cut, but only a few drops of blood escaped. Respiration incomplete and obstructed by eructation; passive vomiting, with friction of the surface by the hand and by a stiff brush, and stimulating injections of ammonia and turpentine were kept up for over two hours with no favorable result, and the attempt at resuscitation was then given up. Acting Assistant Surgeon W. W. Keen, jr., who reports the case, remarks of the autopsy that "almost the only things strictly abnormal were the enormous congestion—probably passive—of the heart, fluidity of the blood, and the absence of rigor mortis."

CASE 1269.—Surgeon J. R. Weist, 1st Colored Troops, reports: "A death from chloroform occurred in hospital No. 12, Nashville, in 1862. The hospital was then under the charge of Surgeon Frederick Seymour, U. S. V. I supposed that he had reported the case. I cannot now obtain the name of the soldier, but there can be no mistake about it, as I administered the chloroform myself. The patient was a United States soldier (Irish), suffering from anal fistula, and the chloroform was carefully administered from a towel folded in the shape of a cone preparatory to an operation. The patient was in a well-ventilated room. About two drachms of the anæsthetic had been used, when death suddenly occurred without any warning. Autopsy revealed fatty degeneration of the heart. Nothing else abnormal found."

Considering the great number of cases in which chloroform was applied, principally during and after the exciting circumstances of a battle, when expedition was a matter of necessity, it is remarkable that not more cases of death from this agent have been recorded. With what justice the fatal issues in the cases here cited are chargeable to the anæsthetic the reader must judge for himself.

Deaths from Chloroform and Ether.—Two cases were reported. In one case, although the patient's condition would appear to have been favorable, no efforts at resuscitation seem to have been made; in the other case it is doubtful whether death was due to the severity of the injury or the anæsthetic:

CASE 1270.—Private Henry Jefferson, Co. E, 19th Colored Troops, aged 20 years; shot fracture of femur two inches below trochanter major, August 14, 1865; doing well until October 16th, when the pus became rusty. November 17th, Acting Assistant Surgeon H. Raphael, at the post hospital at Brownsville, Texas, administered an anæsthetic of two parts of ether and one part of chloroform with the intention of excising the ends of the bone; but after inhaling two minutes the patient began to sink pulse failed, spasms occurred, the head was drawn back and hands and feet were in a tremor; the sponge was removed, and the patient rallied; but upon re-administration spasms immediately returned, the pulse stopped, and the patient was dead.

CASE 1271.—Lieutenant Colonel J. C. Hodges, 44th Indiana, was injured on the railroad, September 27, 1864. The right femur was fractured and the soft parts lacerated; the left os calcis was also fractured; considerable hæmorrhage. At the patient's urgent request a mixture of chloroform and ether was administered. The pulse improved slightly, and amputation of the thigh was decided upon. Five minutes before the conclusion of the operation the breathing was noticed to be stertorous and soon intermitting, with flagging pulse. Artificial respiration was immediately resorted to by posture and by compression of chest at intervals, while the tongue was drawn forward by an assistant. This procedure gave much encouragement for a long time—indeed, for two hours the indications of returning vitality and consciousness seemed to depend entirely upon the vigorousness of the efforts at artificial respiration, but every effort failed to restore life.

Deaths from Ether.—Four cases were reported. In three cases death was probably due to the shock and the effects of the ether combined; in one an overdose was administered:

CASE 1272.—Captain *John Brennan*, Co. A, 16th Virginia, shot wound, right thigh, lower third, Weldon Railroad, October 27, 1864. Admitted into Harewood Hospital October 31st. The condition of the wound was good, but hæmorrhage occurred November 10th, from the popliteal artery, by which ten ounces of blood were lost. The artery was ligated in popliteal space, and the patient did well until November 21st, when the limb became œdematous. November 25th, hæmorrhage recurred to the amount of twelve ounces; it could not be controlled, and the limb was amputated; the patient died on the operating table from the shock and effects of ether. At the *post-mortem* no abnormities could be discovered, with the exception of slight venous congestion of the right lung and old adhesions of the left. The case is reported by Surgeon R. B. Bontecou, U. S. V.

CASE 1273.—An unknown soldier received, in 1862, a shot fracture of the condyle of the femur. The patient was stout and exhibited no symptom of exhaustion or severe shock; his heart acted with uniformity and strength; amputation was decided on and ether was administered, which produced insensibility in about ten minutes. As soon as the operation was begun the patient seemed to be regaining consciousness; but it required only a few seconds to restore complete anæsthesia. The assistant then removed the ether from the patient's face, but was ordered by the operating surgeon to renew the application. After one or two inspirations the patient ceased to breathe. The saw had not been applied nor the use of the knife been finished when death occurred. The case is reported by Dr. Walter Burnham.[1]

CASE 1274.—Private John Maxwell, Co. E, 159th New York, was wounded before Port Hudson, May 27, 1863, just below the knee, implicating the joint. He lay on the field of battle until midday of the 28th. His pulse was small and feeble and his

[1] BURNHAM (W.), (*Death from the Effects of Sulphuric Ether* [in an overdose.—ED.], in *The Boston Med. and Surg. Jour.*, 1870, Vol. VI, p. 377.

nervous system much prostrated. He was fed on beef tea and stimulants. He was brought to the field hospital, and three hours later ether was administered to him with a view of amputating the wounded leg. After being partially anæsthetized he was removed from where he had been lying and placed upon the operating table. More ether was then administered, and as soon as the patient appeared to be sufficiently narcotized a circular incision was made just above the knee joint. The assistant holding the pulse remarked that the circulation was failing, and efforts were immediately made to induce restoration of the vital energies by drawing out the tongue, throwing back the head, artificial respiration, and dashing of cold water. All was in vain, and the patient died May 28, 1863. The case is reported by Surgeon C. A. Robertson, 159th New York.

CASE 1275.—Private Henry S. Ware, Co. K, 38th New York, aged 23 years, was struck by a shell in the upper part of the right leg, at the battle of Williamsburg, May 5, 1862, for which injury the limb was removed on the field, at the middle third of the thigh. He was admitted into the general hospital at David's Island, New York Harbor, on June 15th, and came under the care of Acting Assistant Surgeon E. B. Root on June 26th, at which time his general condition was bad. He was suffering from diarrhœa and a very large bed-sore. The wound had nearly united but the bone was denuded. The constant discharge from the stump necessitated the removal of the necrosed bone. On October 9th the patient was placed under the influence of ether and an inch of bone removed with the chain saw, and then two inches of the bone with its involucrum. During the operation the femoral artery was divided, but not much blood was lost. Although it was found that more of the shaft was involved, further operative interference was deemed unnecessary. The patient was removed to his bed, when severe vomiting commenced which continued to the time of his death, seventy-two hours subsequently. The *post-mortem* examination showed all the viscera healthy. Surgeon S. W. Gross, U. S. V., ascribes the death to the effects of the ether superadded to the previous exhausted condition of the system. The constant vomiting and retching could not be arrested.

A few instances are recorded in which suspended animation was restored by energetic and prompt interference. The following two may serve as examples:

CASE 1276.—Private *A. Boyd*, Co. C, 38th Georgia, received a shot fracture of the right elbow joint, at Gettysburg, July 1, 1863, and was admitted to hospital at Frederick five days afterwards. Water dressings were applied until July 18th, when considerable œdema of the limb having become apparent, with redness about the joint, a resection of the injured parts was decided upon. The patient having been brought to the operating room, ether was administered by a Medical Cadet for fifteen or twenty minutes without producing anæsthesia, when from one and a half to two drachms of chloroform was added to the sponge and closely placed over the patient's mouth and nose. In the course of thirty or forty seconds stertorous breathing was produced, whereupon Assistant Surgeon R. F. Weir, U. S. A., in charge of the hospital, proceeded to operate and commenced the incisions. About this time, however, pulsation in the brachial artery was noticed to be running down rapidly, and the respiratory movements of the chest and abdomen were observed to have ceased, when one of the attending surgeons was instructed to examine the patient's tongue, and finding it had not fallen back, "Marshall Hall's" ready method was proposed and instantly applied. After this had been kept up for about half a minute and no respiratory effort had been observed, the operator immediately proceeded to open the larynx, when, after artificial respiration by means of compressing and relaxing the chest and abdominal walls for the period of about two minutes, natural breathing was re-established and pulsation of the radial artery could be felt. There was scarcely any hæmorrhage from the incision, and none, perhaps, entered the trachea. The edges of the wound were drawn together by adhesive straps. It not being thought proper to proceed with the operation of excision, the patient was returned to his ward and stimulants ordered to be given freely, also generous diet. He rested fairly and took broth very freely the next morning; pulse 130 and quite feeble; respiration quite easy. During the next night and for several days afterwards the patient had a daily chill, and there was considerable cough, with well marked capillary bronchitis throughout the whole extent of the left lung; tongue coated and brown; wound of elbow but little disposed to suppurate. These symptoms continued to grow worse, and subsequently there were several slight hæmorrhages from the incision over the olecranon process. During the last few days the patient's swallowing became very difficult, and beef tea and whiskey were administered by means of clysters. Death supervened on July 28, 1863. The *post-mortem* examination disclosed a small abscess on each side of the sternum, just beneath the pleura-costalis and about one and a half inches below the clavicles, and confirmed the existence of capillary bronchitis. The history of the case was furnished by Acting Assistant Surgeon W. S. Adams. The lower third of the injured humerus and a wet preparation of the upper portion of the trachea, the cricoid cartilage, and larnyx, showing the incision made, were contributed to the Museum by the operator, and constitute *Specimens* 3901 and 4080, respectively, of the *Surgical Section*.

CASE 1277.—Private S. R. Green, Co. A, 5th New Hampshire, was wounded in the leg, at Gettysburg, July 2, 1863, by a minié ball, which fractured the tibia and fibula. Amputation at the middle third of the leg was performed at a field hospital by Surgeon C. S. Wood, 66th New York, who made the following report: "Out of the hundreds of cases in which I have administered chloroform this is the only one accompanied by any unpleasant symptoms; here the patient sunk under its use, was apparently dead, and respiration and circulation both ceased. But by the continual use for some ten or fifteen minutes of Marshall Hall's ready method he was restored and the operation was proceeded with. The cause was evidently inattention on the part of the administrator." The patient subsequently died at the Seminary Hospital at Gettysburg on July 30, 1863.

The reports of the surgical operations of the war are very deficient in regard to the quantities of the anæsthetic used, the manner in which it was administered, the time required to produce insensibility, the period during which it was maintained, or the unfavorable symptoms following its application; the reports of the medical officers of the army after the war were somewhat fuller on these points; but to make them as complete as possible, the following order was issued in 1876 from the Surgeon General's Office:

WAR DEPARTMENT, SURGEON GENERAL'S OFFICE,
WASHINGTON, *October* 2, 1876.

CIRCULAR ORDERS. No. 2.

With a view of collecting precise data relative to the effects of chloroform and ether, Medical Officers are instructed to record, during the year 1877, the cases in which recourse is had to anæsthetics, noting the following particulars: Name and age of subject; nature of the anæsthetic; the quantity used in maintaining anæsthesia; the time required to induce complete insensibility; the time the anæsthetic influence was maintained; the mode of administration; whether vomiting, excitement, or great prostration was observed during or after the administration. These memoranda will be transcribed and returned on the Quarterly Reports of Wounded for March, June, September, and December, 1877.

BY ORDER OF THE SURGEON GENERAL:

C. H. CRANE,
Assistant Surgeon General, U. S. Army.

As the number of cases in which anæsthesia was employed during the year 1877 was limited, the order was continued in force by the following:

WAR DEPARTMENT, SURGEON GENERAL'S OFFICE,
WASHINGTON, *May* 20, 1878.

CIRCULAR ORDERS, No. 1.

Circular Orders No. 2, of October 2, 1876, from this Office, will be hereby continued in force until further orders. Medical Officers will render reports accordingly.

BY ORDER OF THE SURGEON GENERAL:

C. H. CRANE,
Assistant Surgeon General, U. S. Army.

The information thus obtained is here briefly given: The total number of cases since the close of the war, in 1865, in which anæsthesia was produced, is one thousand two hundred and ten (1,210). Of these chloroform was used in three hundred and fifty-five (355), ether in five hundred and eighty-seven (587), and ether and chloroform in two hundred and sixty-eight (268) cases. In the cases reported previous to the issue of *Circular Orders* No. 2, Surgeon General's Office, 1876, the data are, like those of the war, very incomplete, and we will therefore confine ourselves to the consideration of the cases reported since the issue of that order. They number five hundred and ninety-seven (597); in one hundred and fifty-seven (157), or 26.3 per cent. of these, chloroform; in one hundred and eight (108), or 18.1 per cent., chloroform and ether; and in three hundred and thirty-two (332), or 55.6 per cent., ether was administered. In three of the cases death was ascribed to the anæsthetic—to chloroform in one, to chloroform and ether in one, and to ether in the third.

The smallest quantity of chloroform used to induce anæsthesia was three-fourths of one drachm, of chloroform and ether one drachm, and of ether two drachms; the largest quantity of chloroform ninety-six drachms, of chloroform and ether one hundred and thirty drachms, and of ether two hundred and fifty-six drachms; the average amount of the agents used was chloroform eleven, chloroform and ether thirty-two, and ether fifty-one drachms. The average time in which insensibility was induced by chloroform was nine minutes, by ether and chloroform seventeen minutes, and by ether sixteen minutes, as shown in the following table:

TABLE CLXXIV.

Statement of Five Hundred and Ninety-seven Cases of the Employment of Anæsthetics, showing Quantities used, Time to induce Anæsthesia, and Period during which it was maintained.

ANÆSTHETIC AGENTS EMPLOYED.	CASES.	QUANTITIES USED.			TIME TO INDUCE ANÆSTHESIA.			ANÆSTHESIA SUSTAINED.		
		Small Quant.	Large Quant.	Average Quant.	Shortest Time.	Longest Time.	Average Time.	Shortest Time.	Longest Time.	Average Time.
		Drachm.	*Drachm.*	*Drachm.*	*Minutes.*	*Minutes.*	*Minutes.*	*Minutes.*	*Minutes.*	*Minutes.*
Chloroform	157	¾	96	11	½	35	9	1	180	22
Chloroform and Ether	108	1	130	32	1	60	17	1	130	26
Ether	332	2	256	51	1	55	16	1	235	26

The rapidity of the effects and the saving in quantity in the use of chloroform, so important to the field surgeon, especially after large battles, is at once apparent. There is hardly any difference in the average time required to produce anæsthesia by ether or by chloroform and ether.

Vomiting was recorded in twenty-three (23), or 14.6 per cent., of the one hundred and fifty-seven (157) cases of chloroform; in thirty-two (32), or 29.6 per cent., of the one hundred and eight (108) cases of chloroform and ether; and in ninety-eight (98), or 29.5 per cent., of the three hundred and thirty-two (332) cases of ether,—the relative frequency being nearly the same in the cases in which ether or ether and chloroform was used, and less in the cases of chloroform, as well as less copious:

TABLE CLXXV.

Statement showing the Frequency of Vomiting, Excitement, and Prostration in Five Hundred and Ninety-seven Cases of Anæsthesia.

ANÆSTHETIC AGENT EMPLOYED.	CASES.	VOMITING.			EXCITEMENT.				PROSTRATION.		
		None.	Slight.	Copious.	None.	Slight.	Marked.	Violent.	None.	Slight.	Marked.
Chloroform	157	134	20	3	113	23	9	12	136	11	10
Chloroform and Ether	108	76	25	7	68	24	10	6	95	11	2
Ether	332	234	83	15	202	85	31	14	295	24	13

Excitement was likewise reported less frequently in cases in which chloroform was administered than in those in which chloroform and ether or ether was used, the percentages being 28.0 in chloroform, 37.0 in chloroform and ether, and 39.1 in ether; but, as the figures in the table indicate, it seems to have been somewhat more violent in the cases of chloroform narcosis, although in one case in which ether was employed the excitement was so intense that the use of the anæsthetic was abandoned and the operation completed without anæsthesia. Prostration was reported in twenty-one, or 13.3 per cent., of the cases of chloroform; in thirteen, or 12.0 per cent., of the cases of chloroform and ether; and in thirty-seven, or 11.1 per cent., of the cases of ether.

In four of the one hundred and fifty-seven cases in which chloroform was used slight disturbance of respiration was noted, and in two cases respiration ceased and the pulse stopped, but life was restored after prolonged efforts. Pulse and respiration were likewise suspended in two instances in which ether and chloroform, and in one in which ether alone, had been used; they also were brought back to consciousness. In three cases death was ascribed to the anæsthetic. A case of death from chloroform is reported by Assistant Surgeon R. Barrett, U. S. A.:

CASE 1278.—Private A. L. Bruce, Co. G, 13th Infantry, aged 26 years, suffered from bleeding internal piles, and deriving no benefit from a palliative treatment it was decided to relieve him by operation. After abstaining from solid food for sixteen hours the patient was, on August 28, 1877, placed on the operating table and the administration of chloroform was commenced. The inhaler used was a towel folded cone-shaped, with an inch aperture at the apex. Fearing that this opening was not sufficiently large to admit of the free access of atmospheric air, the inhalation was discontinued and the opening enlarged to twice its former size. The inhalation was then resumed, the patient at this time lying on the table and quietly observing the operations going on around him. I am thus minute as I wish to show that the patient was perfectly conscious when the second inhalation began. He took the anæsthetic kindly for about a minute, when he suddenly sat upright and asked if his piles were out. I replied "No, lie down;" he said "All right doctor, I have the utmost confidence in you." His head had hardly touched the table when his radial pulse ceased and his face became intensely congested; his breathing was stertorous and a large quantity of froth appeared on his lips. I directed the attendants to seize his heels and hold him up, head down, at the same time

applying aqua ammonia to the nostrils. His respiration was now reduced to an occasional gasp, and finding the Nélaton position of no benefit I had him laid on the table, and drawing forward his tongue with a forceps introduced a large gum catheter into the trachea and gently blew air into the lungs; this was repeated several times, the air being forced out after each inflation by pressing on the thorax. While attempting artificial respiration I ordered an enema of whiskey, which was retained, but was immediately followed by a copious discharge of urine. This was the last act of the patient's life, for he was now dead, and I reluctantly discontinued my efforts to revive him. I have estimated the quantity of chloroform used as about two drachms. Death no doubt occurred from paralysis of the heart, as there was no evidence of a pulse after it first ceased at the wrist. After the patient's death I learned that he had stated that he had heart disease and expected to die under the operation.

Assistant Surgeon C. E. Price reports a case of death from the administration of ether; the case was hopeless before the operation was begun:

Case 1279.—A. J. Moore, aged 50 years, suffered for about six years from the results of a contusion of the knee. The joint became swollen and painful, and an examination in May, 1878, showed that the bone had become diseased. Amputation or resection was advised, but the patient refused to be operated upon, and gradually became worse until July 11th, when he finally consented to an amputation. He was then put on a generous diet with stimulants. However, he grew rapidly worse. The urine had only a trace of albumen, but there was œdema of the lungs with evidence of great effusion in the pleural cavity. His breath began to be labored, and there were large, coarse, moist rales in both lungs, while the effusion almost destroyed all movement in the left lung and impaired that of the right. He became greatly alarmed, as in two or three coughing spells he was nearly strangled to death. He now begged me to operate, and said he was sure to die very soon if I did not. When I explained the dangers of the operation he said he knew it all, but that it gave him a possibility of life. Having no assistant of any kind, I called upon Lieut. Halloran, 12th Infantry, who had on several occasions attended to the administration of an anæsthetic for me. I read to Lieutenant Halloran and gave him to study the instructions as given in Ashhurst's and Erichsen's Surgery, and explained to him the importance of closely watching the effects of the anæsthetic. I had but six ounces of ether (Squibb's), so I took the bottle of chloroform for use in case the ether should prove insufficient. With Lieutenant Halloran to attend to the anæsthetic and two soldiers for assistants I began. At first I attended to the anæsthetic myself. After a few breaths of the ether I said: "Moore, do you feel it?" He said: "A little." A few more breaths and he said: "Wait a minute and give me a rest;" I replied "all right," but kept along with the ether. After a few moments more I gave the sponge to Lieutenant Halloran and began applying an Esmarch's bandage. I had wrapped it up to the lower part of the swelling about the knee when I looked up and said to Lieutenant Halloran "take away the sponge," and noticed that his breath had stopped. Lieutenant Halloran replied: "His pulse is good," but by the time I felt it it had disappeared. I instituted artificial respiration at once, applied nitrite of amyl to his nostril, and injected ammonia into a vein of the arm. I kept up artificial respiration after Sylvester's method for three-quarters of an hour, but it was of no avail. In the chest a large effusion was found in the pleural cavity, with stringy pus and bands of adhesion in many places. The upper and middle portions of the left lung were thickly filled with points of caseous deposit, and in many of these spots were deposits which were as hard as and seemed to be solid limestones. The right side of the heart was dilated and nearly full of clotted blood; the left side was nearly empty.

The details of a case in which first ether and subsequently chloroform were administered are given by Assistant Surgeon P. J. A. Cleary, U. S. A.:[1]

Case 1280.—Private H. D. Bradfield, Co. H, 19th Infantry, aged about 33 years, large and robust, addicted to liquor, was admitted to hospital December 3, 1878, suffering with an injury of the middle finger, right hand, resulting in gangrene of the second and third phalanges, and in consequence it was decided to amputate at the metacarpal articulation. For this purpose a mixture of equal parts of ether fortior and chloroform was administered. About ten minutes previously two ounces of whiskey were given. I examined his heart and found it normal in every respect. The anæsthetic was administered on a piece of lint, covered with a small towel, held square in contradistinction to cone-shaped. I personally administered the mixture while the steward observed his pulse. The cloth was held so as to allow a free admixture of air. He inhaled freely. About two drachms were first poured on the cloth, but had no apparent effect. Shortly after about the same quantity was poured on; he observed that "he did not feel it." After a time about the same quantity was again poured on, and, as I turned to look at some instruments, he requested me not to begin yet to cut him. A further quantity was now poured on the cloth, when he began to laugh; this was followed by attempts to articulate, then, as is common, by strong gesticulations of his arms, to stop which the steward forcibly pressed down one arm, holding him by the wrist, while an attendant did likewise with the other. He was now passing to a state of unconsciousness, and in reply to my inquiry the steward said he could not feel the pulse, but added that his arm was somewhat twisted, which prevented his perceiving the pulse. I therefore felt for the pulse at the other wrist, but could not perceive it. Just as I felt, the muscles of his arm and neck, which had been strongly in action, suddenly relaxed; his breathing, however, was very good and such as would in no wise have attracted attention. At once I removed the anæsthetic and dashed some cold water in his face. The pulse did not return. He continued to breathe freely for a little time longer, then his breathing became labored, and then suddenly stopped. The action of the heart had previously stopped, and the man was dead. I will add that everything I ever heard of, saw, or read, appropriate for such cases, was done, but to no effect. The mixture consisted of chloroform and ether fortior; amount used exactly one ounce; time in using it, fifteen minutes. Cause of death, paralysis of the heart. Of the entire amount used one-half only was chloroform, *i. e.*, half an ounce. Of this amount a large proportion was wasted over the cloth and which he never inhaled: the inhalation of the remainder occupied fully fifteen minutes.

[1] The case has been reported in the *Philadelphia Medical Times*, 1879, Volume IX, page 280.

CHAPTER XIV.

THE MEDICAL STAFF AND MATERIA CHIRURGICA.

Previous to the outbreak of the rebellion the regular army numbered one thousand one hundred and seventeen (1,117) commissioned officers and eleven thousand nine hundred and seven (11,907) enlisted men. The Medical Department was composed of one Surgeon General with the rank of Colonel; thirty Surgeons with the rank of Major, and eighty-four Assistant Surgeons holding for the first five years the rank of 1st Lieutenant, and subsequent to that period, until promotion to Surgeon, the rank of Captain. The officers of the Medical Department formed a portion of the General Staff of the army; were not permanently attached to any regiment or command, but were subject to duty wherever their services were needed. Experience had demonstrated this system to be the best for the necessities of an army widely scattered over an immense area of territory, serving in commands of less than regimental strength, while it possessed the advantage of increasing the efficiency and value of the medical force in a professional point of view.

At the beginning of hostilities, in 1861, large forces of State troops, or militia, responded to the several proclamations of the President calling for aid in suppressing the rebellion. Each regiment was provided with a Surgeon and an Assistant Surgeon commissioned by the States in which the troops had been enlisted. These officers were borne on the muster-rolls and permanently attached to the regimental organization, being seldom detached except for urgent reasons.

During the early military operations the administrative duties pertaining to the Medical Department were performed by officers of the regular medical staff, detailed for the purpose, or by volunteer Surgeons appointed as Medical Directors of Divisions, as allowed by the President's proclamation of May 3, 1861.

On the 22d of July, 1861, Congress passed an act authorizing the President to raise a force of volunteers, not exceeding 500,000, and prescribing the organization of this levy into divisions of three or more brigades, and that "each brigade shall be composed of five or more regiments, and shall have one Brigadier General, two Aids-de-Camp, one Assistant Adjutant General with the rank of Captain; *one Surgeon;* one Assistant Quartermaster, and one Commissary of Subsistence." The Surgeons authorized by this act were known as Brigade Surgeons, and were borne as such on the official army registers of September, 1861, and January, 1862; they held the rank of Major.

The duties, prerogatives, and responsibilities of Brigade Surgeons being somewhat vaguely defined, the following bill was passed by Congress on July 2, 1862: "From and after the passage of this act Brigade Surgeons shall be known and designated as Surgeons

of Volunteers, and shall be attached to the general medical staff under the direction of the Surgeon General; and hereafter such appointments for the medical service of the army shall be appointed Surgeons of Volunteers."

The Brigade Surgeons, or Surgeons of Volunteers as they were henceforth called, were assimilated to those of the regular staff, holding equal rank with the latter under commissions conferred by the President and confirmed by the Senate. They became eligible to all the duties and prerogatives pertaining to the medical officers of the army, whether in the field as Directors of Armies, Corps, or Departments, or in charge of hospitals, etc. From time to time, by acts of Congress, additions were made to the regular and volunteer corps, and such changes effected as were necessarily demanded. The act of April 16, 1862, was one of the most important of these acts, wherein the rank of Brigadier General was conferred upon the Surgeon General. Provisions were also made in this act for an Assistant Surgeon General and a Medical Inspector General, both with the rank, pay, and emoluments of Colonel of Cavalry, and for eight Medical Inspectors with the rank, pay, and emoluments of Lieutenant Colonel of Cavalry, also for Medical Purveyors and Medical Cadets. The text of the act is here inserted:

"AN ACT TO REORGANIZE AND INCREASE THE EFFICIENCY OF THE MEDICAL DEPARTMENT OF THE ARMY.

"*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That there shall be added to the present medical corps of the army ten Surgeons and ten Assistant Surgeons, to be promoted and appointed under existing laws; twenty medical cadets, and as many hospital stewards as the Surgeon General may consider necessary for the public service, and that their pay and that of all hospital stewards in the volunteer, as well as the regular service, shall be thirty dollars per month, to be computed from the passage of this act. And all medical cadets in the service shall, in addition to their pay, receive one ration per day, either in kind or commutation.

"SEC. 2. *And be it further enacted*, That the Surgeon General to be appointed under this act shall have the rank, pay, and emoluments of a Brigadier General. There shall be one Assistant Surgeon General and one Medical Inspector General of Hospitals, each with the rank, pay, and emoluments of a Colonel of Cavalry, and the Medical Inspector General shall have, under the direction of the Surgeon General, the supervision of all that relates to the sanitary condition of the army, whether in transports, quarters, or camps, and of the hygiene, police, discipline, and efficiency of field and general hospitals, under such regulations as may hereafter be established.

"SEC. 3. *And be it further enacted*, That there shall be eight Medical Inspectors, with the rank, pay, and emoluments each of a Lieutenant Colonel of Cavalry, and who shall be charged with the duty of inspecting the sanitary condition of transports, quarters, and camps, of field and general hospitals, and who shall report to the Medical Inspector General, under such regulations as may be hereafter established, all circumstances relating to the sanitary condition and wants of troops and of hospitals, and to the skill, efficiency, and good conduct of the officers and attendants connected with the medical department.

"SEC. 4. *And be it further enacted*, That the Surgeon General, the Assistant Surgeon General, Medical Inspector General, and medical inspectors, shall, immediately after the passage of this act, be appointed by the President, by and with the advice and consent of the Senate, by selection from the medical corps of the army, or from the surgeons in the volunteer service, without regard to their rank when so selected, but with sole regard to qualifications.

"SEC. 5. *And be it further enacted*, That medical purveyors shall be charged, under the direction of the Surgeon General, with the selection and purchase of all medical supplies, including new standard preparations, and of all books, instruments, hospital stores, furniture, and other articles required for the sick and wounded of the army. In all cases of emergency they may provide such additional accommodations for the sick and wounded of the army, and may transport such medical supplies as circumstances may render necessary, under such regulations as may hereafter be established, and shall make prompt and immediate issues upon all special requisitions

made upon them under such circumstances by medical officers; and the special requisitions shall consist simply of a list of the articles required, the qualities required, dated, and signed by the medical officers requiring them.

"SEC. 6. *And be it further enacted*, That whenever the Inspector General, or any of the medical inspectors, shall report an officer of the medical corps as disqualified, by age or otherwise, for promotion to a higher grade, or unfitted for the performance of his professional duties, he shall be reported by the Surgeon General for examination, to a medical board, as provided by the seventeenth section of the act approved August third, eighteen hundred and sixty-one.

"SEC. 7. *And be it further enacted*, That the provisions of this act shall continue and be in force during the existence of the present rebellion and no longer: *Provided*, however, that, when this act shall expire, all officers who shall have been promoted from the medical staff of the army under this act shall retain their respective rank in the army, with such promotion as they would have been entitled to."

Approved April 16, 1862.

Beside the medical officers of the regular and volunteer staff, and the medical officers of regiments, there was a class designated as Acting Assistant Surgeons, who were private physicians, uncommissioned, serving under contract to do duty with the forces in the field or in general hospitals. This class was very large and embraced in its number some of the most eminent surgeons and physicians of the country. The Medical Cadets were generally young men, students of medicine, who were assigned to duty in general hospitals as dressers and assistants. The Medical Department was still further increased by a number of Hospital Stewards, who were enlisted as needed, and who performed the duties of druggists, clerks, and storekeepers.

During the years of the war the organization of the Regular Staff had been increased so as to number one Surgeon General, one Assistant Surgeon General, one Medical Inspector General, sixteen Medical Inspectors, and one hundred and seventy Surgeons and Assistant Surgeons; there had been appointed five hundred and forty-seven (547) Surgeons and Assistant Surgeons of Volunteers; there were mustered into service between April, 1861, and the close of the war, two thousand one hundred and nine (2,109) regimental Surgeons, three thousand eight hundred and eighty-two (3,882) regimental Assistant Surgeons. During the same period there were employed eighty-five (85) Acting Staff Surgeons and five thousand five hundred and thirty-two Acting Assistant Surgeons.[1]

To the fidelity and efficiency of this vast body of professional men the Surgeon General, in his annual report of 1865, bears the following well-deserved tribute: "I desire to bear testimony to the ability, courage, and zeal manifested throughout the war by the officers of the Medical Department under all circumstances and upon all occasions. With hardly an exception they have been actuated by the highest motives of national and professional pride, and the number who have been killed or wounded bear honorable testimony to their devotion and duty on the field of battle."

The following record of casualties of the Regular and Volunteer Staff during the war shows well for the honor of those who are erroneously supposed to escape the dangers and chances of war: "Thirty-two (32) were killed in battle, or by guerillas or partizans, and nine (9) by accidents; eighty-three (83) were wounded in action, of whom ten (10) died; four (4) died in rebel prisons, seven (7) of yellow fever, three (3) of cholera, and two hundred and seventy-one (271) of other diseases, most of which were incidental to camp life or the result of exposure in the field."[2]

[1] BROWN (H. E.), *The Medical Department of the United States Army from* 1775 *to* 1873, Washington, Surgeon General's Office, 1873, p. 245.
[2] BROWN (H. E.), (*loc. cit.*), p. 246.

Of the amount of labor performed by the Medical Staff during the war some idea may be obtained when it is stated that 5,825,480 cases of wounds and disease occurred among the white troops and 629,354 cases among the colored troops.[1]

"The cost of maintaining the Medical Department formed no small portion of the total expenses of the war, and it is a matter of just pride that it can be said that the medical disbursing officers performed their duties faithfully and honestly, and that the immense quantities of medical supplies distributed all over the country were almost without exception properly accounted for. The expenditures on behalf of the Medical Department to the close of each fiscal year, on the 30th of June, from 1861 to 1866, were as follows:

1861	$194,126.77
1862	2,371,113.19
1863	11,594,650.35
1864	11,025,791.33
1865	19,328,499.23
1866	2,837,801.37

making a total of $47,351,982.24 expended during the war (exclusive of salaries of commissioned officers) for the benefit of the sick and wounded soldiers of the nation."[2]

After the organization of the forces raised for the suppression of the rebellion was perfected, the medical service in the field was based upon an independent hospital and ambulance establishment for each division of three brigades. The *personnel* of the division hospital consisted of a Surgeon in charge, with an Assistant Surgeon as executive officer and a second Assistant Surgeon as recorder, an operating staff of three Surgeons aided by three Assistant Surgeons, and the requisite number of nurses and attendants.

The division ambulance train was commanded by a First Lieutenant of the line, assisted by a Second Lieutenant for each brigade. The enlisted men detailed for ambulance duty were a sergeant for each regiment, three privates for each ambulance, and one private for each wagon. The ambulance train consisted of from one to three ambulances for each regiment, squadron, or battery, a medicine wagon for each brigade, and two or more supply wagons. The hospital and ambulance train were under the control of the Surgeon-in-Chief of the Division. The division hospitals were usually located just out of range of artillery fire. Sometimes three or more division hospitals were consolidated under the orders of a Corps Medical Director, who was assisted by his Medical Inspector, Quartermaster, Commissary, and chief ambulance officer.

The medical officers not employed at field hospitals accompanied their regiments and established temporary depots as near as practicable to the line of battle.

As soon as possible after every engagement the wounded were transferred from the division or corps hospitals to the base or general hospitals, which at one time numbered 205; these were under the charge and command of the Regular or Volunteer Staff, assisted by Acting Assistant Surgeons, Medical Cadets, and officers of the 2d Battalion of the Veteran Reserve Corps.

The following extracts of reports are presented to show the system of the medical organization in one of the corps of the Army of the Potomac. The reports, which give in detail the specific duties of each class of officers, were made in accordance with the following circular letter of Surgeon T. A. McParlin, Medical Director of the Army of the Potomac:

[1] BROWN (H. E.), *The Medical Department of the United States Army from 1775 to 1873*, Washington, Surgeon General's Office, 1873, p. 246.
[2] BROWN (H. E.), *(loc. cit.)*, p. 246.

"HEADQUARTERS ARMY OF THE POTOMAC,
"MEDICAL DIRECTOR'S OFFICE,
"*September* 28, 1864.

"Surgeon J. J. MILHAU, U. S. Army,
"*Medical Director Fifth Army Corps.*

"DOCTOR: You will require from one of each of the following named officers a detailed written report of their duties, both sedentary and active, the reports they make and receive, their duties and positions before and after engagements and on the march:

1. Medical Director of Corps.
2. Medical Inspector of Corps.
3. Surgeon-in-Chief of Division.
4. Surgeon-in-Chief of Brigade.
5. Surgeon in charge of Division Hospital.
6. Recorder of Division Hospital.
7. Attending or Prescribing Surgeon of Division.
8. Operating Surgeon.
9. Surgeon of Regiment.
10. Assistant Surgeon of Regiment.
11. Division Hospital Commissary.
12. Chief Ambulance Officer of Corps.
13. Chief Ambulance Officer of Division.
14. Ambulance Officer of Brigade, who will also specify the duties of the non-commissioned officers and privates under him. The reports when rendered you will forward to this office.

"Very respectfully, your obedient servant,
(Signed) "THOMAS A. McPARLIN,
"*Surgeon U. S. Army and Medical Director Army of Potomac.*"

The responses to this circular were collected by Surgeon J. J. Milhau, U. S. A., and by him transmitted to the Medical Director, T. A. McParlin. Omitting the official verbiage and forms the substance of the reports is here given:

"*Duties of the Medical Director of a Corps:* The Medical Director of a Corps is the head of the Medical and Ambulance Departments of the corps, and he is held responsible by the Corps Commander that they be properly and effectively managed under all circumstances. It is therefore impossible to specify definitely his duties in every case. He should possess the confidence of his Commander and ask for instruction in all cases of doubt. He should have an office and at least two clerks, of whom one should be a Hospital Steward. The following books should be kept, viz: 1st, a Register of all Medical Officers and regular Hospital Stewards belonging to the Corps; 2d, an Endorsement Book; 3d, a Record of Certificates of Death, and action thereon; 4th, a Letter and Order Book; 5th, a Blotter, in which are checked off the regular requisitions and Monthly Reports of Sick and Wounded as received; 6th, a Manifold Writer. The following regular reports are received: 1st, Daily Report of the Medical Inspector of the Corps; 2d, the Weekly Report of Sick and Wounded; 3d, the Weekly Report of the Ambulance Corps (in duplicate); 4th, the Weekly Report of Brandy and Whiskey received, issued, etc., from each Brigade and from each Hospital; 5th, the Monthly Returns of Medical Officers from Divisions and Brigades; 6th, the Monthly Returns of Hospital Stewards, U. S. A.; 7th, the Monthly Returns of Ambulance Officers (in duplicate); 8th, Statement of Hospital Fund from each Hospital. After engagements are to be transmitted to the Medical Director of the Army: 1st, Nominal Lists of Wounded, for transmittal; 2d, Classified Returns of Injuries and Wounds (in duplicate); 3d, Aggregate Mean Strength of Command (per regiment); a Report of the Operations of the Ambulance Corps. The following Consolidated Reports for the Corps are made at stated periods to the Medical Director of the Army: 1, Weekly Report of Sick and Wounded; 2d, Monthly Return of Medical Officers; 3d, Monthly Return of Hospital Stewards, U. S. A.; 4th, Statement of Balance due Hospital Fund; 5th, Record of Certificates of Disability, and action thereon. All other reports are simply transmitted without consolidation, including certificates of death. The following papers are referred, by order of the Corps Com-

mander, to the Medical Director for approval, recommendation, expression of opinion or disapproval, viz: All tenders of resignations on account of disability; all applications for leaves of absence; all certificates of disability for discharge, and invalid rolls when doubtful; all recommendations and complaints referring to the Medical and Ambulance Departments or affecting the health and well being of the troops; all applications for leave of absence or resignation of Medical or Ambulance Officers—in fact, all papers relating to the Medical Department are referred to the Medical Director prior to the action of the General Commanding. The following papers require to be examined and acted upon by the Medical Director: All requisitions for Medical and Hospital Supplies, and all requisitions and estimates for supplies for the Ambulance Corps. Written circulars and instructions from the Medical Director of the Army and from the Surgeon General should either in whole or part be promptly published to the Surgeons-in-Chief of Divisions and Surgeons-in-Chief of separate commands. The health and welfare of the troops, as well as the comfort and proper care of the sick and wounded, should receive the unceasing attention of the Medical Director. It therefore becomes his duty to ascertain, through the Medical Inspector, the Surgeons-in-Chief of Divisions, and, from his own observation, the existence of irregularities and of deficiencies in the hospitals or in the command, and he must issue the necessary instructions to have the one corrected and the other supplied. In matters of defective police, bad drainage, unhealthy camp grounds, insufficient shelter, improper or damaged food, etc., etc., he should first call the attention of the Medical Officers to the fact and suggest remedies; but if these suggestions be not promptly attended to, a written report with recommendations should be made without delay to the Corps Commander. Special attention must be given to the keeping up of supplies, both medical and hospital. Circulars should be issued from time to time, giving information to the medical officers as to what articles can be obtained, specifying the manner of obtaining them. The Ambulance Corps being under the direction of the Medical Director, the ambulances and everything connected with them claim a full share of his attention. In conjunction with the Chief Ambulance Officer he must therefore see that nothing is neglected to render them efficient in every respect and the intention of the law be carried out. The Surgeons-in-Chief of Divisions look to the Medical Director for orders, instructions, and suggestions in reference to the fitting up of the different hospitals; he should therefore instruct them as to the number of tents to be pitched, and as to whether it is desirable to construct fire-places, erect bunks, dig wells, etc., etc. As a general rule, verbal orders will be sufficient. When a movement is ordered, the Medical Director should ask for instructions in reference to the sending off of sick and wounded, the breaking up of the hospitals, the number of ambulances and wagons allowed to march with the troops, and the number to be sent to the rear, and on receiving them will give the necessary orders in writing, specifying the number of tents and flies to be carried, as well as the amount of hospital supplies, medical stores, clothing, and rations, and directing the Surgeons-in-Chief of Divisions to see that the "hard bread" is put up in the ambulance boxes, and the field companions and hospital knapsacks are filled. Orders should be given to the Chief Ambulance Officer in reference to the position of the stretcher bearers; as a general rule they should all march with their commands, with stretchers. When only a limited number of ambulances accompany the troops, all the stretchers should go to the front strapped on the ambulances. Orders should be given to have the water-kegs filled. On the march the Medical Director accompanies the Staff, acquainting himself as far as practicable with the nature of the country passed over, the general direction and condition of the roads, the position of the houses, streams, woods, etc., etc. This knowledge will materially assist him in the selection of hospital sites. When an engagement commences the Medical Director should ascertain the position of the troops, and should immediately communicate with the Surgeons-in-Chief of Divisions, directing the establishment of field depots for the wounded at such points as will be most convenient for collecting them and where the ambulances can come up. In locating these depots special care must be taken to have them as near the line of troops as possible, so as to diminish the distance of stretcher transportation. Ravines and woods should be taken advantage of as a protection against the enemy's fire; if necessary, a breastwork can be thrown up by the attendants. An occasional bullet or an occasional shell is not sufficient to warrant Medical Officers in leaving their posts. If practicable, the Medical Director should himself visit and inspect these depots, and give orders that will insure the object of their establishment; he should also consult with the Chief Ambulance Officer as to the best roads, everything considered, to be taken by the ambulances. Should the enemy fall back these depots should be removed

farther to the front; should our own troops yield the ground, the depots must be moved farther to the rear. The moment the number of wounded warrants the establishment of Division Hospitals the Corps Commander should be consulted as to the locality of these hospitals, in a military point of view. The Medical Director then selects the site himself, or designates some one to do it in his name. Orders should be immediately given to the Surgeons-in-Chief of Divisions and to the Chief Ambulance Officer, designating the locality chosen. Should a lull occur in the firing or the enemy be driven back, orders must be immediately given to advance the field depots and to take all the available ambulances to the front to pick up the wounded as rapidly as possible, and to convey them to the hospitals. During an engagement the duty devolving upon the Medical Director of a Corps to select a site for the different hospitals of the Corps is not always an easy one. As a general rule they should be placed near the most practicable roads, in rear of the centre of the troops, and sufficiently to the rear to be out of the ordinary range of the enemy's guns; suitable ground, good water, and plenty of fuel must of course decide the choice of locality. During the action the Medical Director must keep himself thoroughly acquainted with the movements of the troops and act accordingly. The Corps may take up a new position with a different front; sometimes a part or even the whole of a Corps may meet a superior force and be repulsed; under such circumstances the Medical Director should be ready to act promptly, and to transfer his wounded to a safer locality. Should the Corps Commander be present he will advise his Medical Director of the state of affairs and give orders in reference to the removal of the hospitals. There are times, however, in which the Director is called upon to act upon his own responsibility. Should it become necessary to leave the wounded in hospitals in the hands of the enemy, the Medical Director will see that they are properly sheltered, that a sufficient number of Medical Officers, Hospital Stewards, and attendants remain with them, and that an ample supply of medical and hospital stores, dressings, and provisions be left for their comfort. After an engagement, the Medical Director of the Army should be communicated with as to the means of transportation for the wounded to General Hospital; he should be informed of the number and of the time at which they will be ready for such transit; on receiving instructions the necessary orders are given. The Medical Inspector generally attends to the shipment of wounded. During action the duties of a Medical Director require his presence at Corps Headquarters, where he can be found, and where he can obtain the earliest information and receive orders and reports. As a general rule, therefore, he cannot stop to operate during an engagement; he should remember that he is responsible for all the wounded, and that there are occasions in which the delay of half an hour will result in the loss of his hospitals. The Corps Commander should be kept informed of the operations of the Department both during and after engagements, and should always be consulted in matters of importance. As it is necessary for the Medical Director to visit his hospitals and field depots from time to time, he should always leave a competent Medical Officer at headquarters to represent him. When practicable, the hospitals of the different Divisions should be located near together—each one, however, to be kept perfectly independent and distinct in its management. This will much facilitate the operations of the Ambulance and Medical Departments, enabling the divisions to assist each other in taking care of the wounded. For instance, should one Division suffer more than another, an operating staff, or more if necessary, with the Autenrieth wagon, can be ordered to the suffering Division; again, should one Division be deficient in shelter or supplies, they can be obtained from the other Divisions; another advantage is the facility given for inspection, and for giving instruction, and in distributing the wounded as they come in; for instance, all available ambulances are used when wanted, without reference to their Divisions. An ambulance reaches the hospital containing wounded of different Divisions, no difficulty is experienced in distributing them, each to his own Division Hospital, thus enabling them to be treated by their own Medical Officers and to be registered in their own Divisions. Again, in sending off the wounded to General Hospital, the loading of the wagons will be much facilitated and a corps train readily found. When avoidable, the wounded should not be sent off from the field Division Hospital until they have been operated upon, properly dressed, fed, and have obtained some rest, and have somewhat recovered from the shock. In sending sick and wounded off to General Hospital the Corps Director gives the necessary orders to have the wagons or cars properly bedded with brush or hay, specifies the number of rations to be taken, and the number of Medical Officers, Stewards, and attendants that should accompany the train, giving any instructions that he may deem important in reference to the roads, camping, etc. When the troops

remain in camp some time, it will be found convenient to have near each Division a few ambulances, with horses hitched up ready to convey a patient to the hospital. These are known in the Corps as picket ambulances, and are relieved every twelve hours. At this post there should be a medicine wagon, under the charge of a Steward, to issue medicines to the regimental Surgeons. The post should be marked by an ambulance guidon; this wagon to be relieved as often as emptied. As a large number of stretchers and lanterns are always broken or lost during an engagement, orders should be given after an action to have the deficiencies supplied as early as possible.

"*Duties of the Medical Inspector of a Corps:* A Medical Inspector of a Corps has but few specific duties assigned to him, and these, with one exception, are such as the Medical Director may direct to facilitate the management of the Medical Department and keep him informed of the deficiencies which need correcting and errors that should be rectified; as his relative position to the Medical Director is analogous to that occupied by an Assistant Adjutant General to his Commanding General, any authority he may exercise in the discharge of duty is entirely delegated power. The only reports made to him are the daily morning reports of each hospital from which the Corps report is made. A monthly report of the inspection of troops has been used, but since that has been abandoned reports, not in tabular form, have been made of the condition of the troops only to the Medical Director, calling his attention to any violation of sanitary rules that may have been observed. Previous to an engagement, or march, he sees that the direction of his superior officers relative to the proper disposition of the flying hospital and medicine wagons are obeyed, and that they are in readiness to accompany the troops. The principal duty devolved upon him during an engagement has been to represent the Medical Director at the hospitals, to see that the men are properly provided for, and when instructed to send wounded to the rear to assist the Chief Ambulance Officer in the proper apportioning of the means of transportation, to make the detail of Medical Officers and attendants to accompany the train, and ascertain that they are provided with stimulants and other essentials to render the patients confided to them as comfortable as possible.

"*Duties of the Surgeon-in-Chief of a Division:* 1. The Surgeon-in-Chief of a Division promulgates to Surgeons-in-Chief of Brigades all orders, circulars, and communications that are received from the Medical Director of the Corps, also all orders, circulars, and communications pertaining to the Medical Department that emanate from Division Headquarters. 2. He receives all reports that are made by the Surgeons-in-Chief of Brigades and consolidates them before forwarding them to the Medical Director of the Corps, except the 'Monthly Report of Sick and Wounded' furnished by the regimental Surgeons, and the weekly report of 'Brandy and Whiskey' furnished by the Surgeons-in-Chief of Brigades: these are forwarded without any action from him. The only reports made directly by him are the 'Monthly Return of Medical Officers' of the Division, which he forwards to the Medical Director of the Corps, and the Personal Report to the Surgeon General from the post at which he is serving. 3. All requisitions for medicines and hospital supplies, made by the Surgeons-in-Chief of Brigades, are received by him and forwarded to the Medical Director of the Corps, without any action from him except 'Special Requisitions,' which are either approved or disapproved before being forwarded. 4. All applications for leave of absence and resignation on Surgeon's certificate, and all Certificates of Disability for discharge of enlisted men, are forwarded from their regiments through the regular military channel and referred to the Surgeon-in-Chief of the Division by the Assistant Adjutant General of the Division; each case is personally examined by the Surgeon-in-Chief and the action indorsed on the official paper. Applications for leave of absence of Medical Officers are referred to the Surgeon-in-Chief by the Assistant Adjutant General for his action. 5. All details of Medical Officers and enlisted men for duty at Division Hospitals are made by the Assistant Adjutant General, to whom the names, rank, regiment, and company are furnished by the Surgeon-in-Chief. 6. The Surgeon-in-Chief of a Division has no official relation with any Staff Officers except the Assistant Adjutant General. 7. A detail of one Medical Officer as 'Officer of the Day' is made each day by the Surgeon-in-Chief, with instructions to visit each regiment of the Division and inspect carefully its hygienic and sanitary conditions, also to visit the Division Hospital and see that proper attention is given to cleanliness and to the comfort of the patients; examine the cooking and whether the attendants perform their duties faithfully. A written report to be furnished of these investigations. 8. Before an engagement the detail for the 'Field Hospital' is announced by the Surgeon-in-Chief of the Division: the Surgeon in charge of the Division Hospital remains in charge and has control of all the shelter; the officer detailed

as Hospital Commissary provides the food; the records are kept by a Hospital Steward, U. S. A. Three (3) Surgeons are detailed as operators, and three (3) Medical Officers are assigned to each operator as Assistants. One Cook, two Nurses, and one Hospital Steward are taken from each regiment for the 'Field Hospital.' 9. The Medical Officers who remain on the field at the time of and after an engagement are instructed to form their depots and locate them by Brigades, and are to select their positions in compliance with instructions of 'Circular' from Headquarters, Army of the Potomac, Medical Director's Office, dated October 30, 1862, and to examine each man before he is put in an ambulance. 10. The position of a Surgeon-in-Chief of a Division during an engagement is, first to locate the 'Field Hospital' and see that the details are properly filled, then to visit the front and confer with the Ambulance Officer of the Division, ascertain that the depots are properly located and that the Ambulance Sergeants have been notified of their positions, then to report to the General Commanding and receive any instructions he may have; afterwards to return to the hospital and assist in making the wounded comfortable. 11. On the march the Surgeon-in-Chief of a Division remains with the General Commanding.

"*Duties of a Surgeon-in-Chief of a Brigade:* 1. The Surgeon-in-Chief of a Brigade has under his charge all the medical supplies allowed to his command. He draws once a month from the Medical Purveyor of the Army all needed to bring what he has on hand up to the requirements of the supply table, and in case of emergency can, during the month, make special requisitions for necessary articles. He issues to Medical Officers in charge of regiments only what they want for immediate use. By this excellent arrangement the Army has been relieved from the encumbrance of the large supplies formerly allowed to regiments and the transportation of the Medical Department is greatly reduced. Under two orders from Surgeon Letterman, Medical Director of the Army of the Potomac, Brigade Surgeons were forbidden, for more than a year, to take receipts from regimental Surgeons for supplies issued to them, and the Brigade Surgeon was ordered to expend them on his annual returns. This proving unsatisfactory to the Treasury Department, a circular from the Surgeon General directed a return to the requirements of Army Regulations in the transfer of all property. As medicines and other expendable articles are issued continuously, and in very small quantities, it is unavoidable for the Surgeon-in-Chief of a Brigade to be forced to expend, on his returns, much property really issued to regimental Surgeons. The transportation granted to each Brigade for its entire medical supplies, including the desks and medicine chests of regimental Surgeons, consists of one Army and one Autenrieth or Perot medicine wagon. In addition, however, to the articles carried in the wagons, the boxes of the ambulances are filled with the material necessary to establish a temporary field hospital in case the supply train during a movement is inaccessible. This arrangement is one of the greatest advances made during the past two years in providing for the wounded—as the conveyances bringing them in have all that is absolutely required to feed them, and the hospital tent and fly generally carried in the ambulance gives sufficient shelter. In the construction of new ambulances it would be desirable to increase the width and depth of the box so that larger camp kettles could be carried, the present only admitting the smallest sized kettle. The Surgeon-in-Chief of a Brigade furnishes the material carried in the ambulance boxes, and assures himself by weekly inspections of them that each box contains all required by the supply table and other orders. He also draws from the Medical Purveyor and is responsible for the stretchers carried on the ambulances. 2. The Surgeon-in-Chief of a Brigade is the Medical adviser of a Brigade Commander in all professional questions affecting the command. Applications for leave of absence, discharge, and invalid rolls, grounded on the certificates of regimental Surgeons, are submitted to him for his opinion of their propriety, to be based on an examination of the applicant. It is the duty of the Surgeon-in-Chief of a Brigade also to keep careful watch over the health of the Brigade, pointing out and endeavoring to correct all infractions of hygienic laws. He receives every Saturday, from each Medical Officer in charge of the regiments constituting the Brigade, a weekly Report of Sick and Wounded of his regiment and of the anti-scorbutics issued to it. Whenever a regimental Medical Officer leaves or returns to his command he should furnish the Surgeon-in-Chief of the Brigade with a copy of the order under which he acts. The Surgeon-in-Chief consolidates the regimental weekly reports of sick and wounded and of anti-scorbutics, and forwards them to the Surgeon-in-Chief of his Division. He sends, at the same time, a report of the liquors drawn and issued by him during the week. He makes also, to the Surgeon-in-Chief of the Division, a monthly return of the Medi-

cal Officers of the Brigade. After a battle he sends to the Surgeon-in-Chief of the Division a report of the aggregate strength for duty and names of Medical Officers present for duty, and the killed, wounded, and missing in action, according to the reports received from regimental Surgeons. The losses in skirmishing in the intervals between the battles have been reported weekly.

"*Duties of the Surgeon-in-Charge of a Division Hospital:* The duties of a Surgeon-in-Charge of a Division Hospital are somewhat varied, depending upon the season of the year and the state of military operations, whether the Army is in winter-quarters or engaged in an active campaign. In one case more permanent arrangements are made with a view of remaining undisturbed for several months; in the other all the appliances of a Division Hospital are arranged and managed to meet certain conditions, definite transportation, general mobility, and despatch in its construction and removal. Procuring all the necessary supplies for the sick and wounded, superintending the care and treatment which they should receive, organizing the hospital attendants, keeping the necessary and suitable records, causing reports to be made, and receiving orders from his superior officers and complying with them, are briefly in the aggregate the duties of the Surgeon-in-Charge of a Division Hospital. On the march the sick and wounded on hand are placed in ambulances, and a Medical Officer connected with the hospital is assigned the duty of keeping with the ambulance train and rendering such assistance on the journey as the wants of the sick, etc., may demand. In the evening, or at the close of the day's march, the Surgeon-in-Charge will make the necessary arrangements for sheltering and furnishing the sick, etc., present, with food and medical attendance. This is often accomplished in this manner: The Medical Director of the Corps indicates to the Ambulance Officer the place he desires the ambulances to park. The Surgeon-in-Charge then proceeds to pitch a sufficient number of tents, directs the cooks to provide beef tea, hot coffee, etc., orders sinks to be dug, sees that the sick and wounded are unloaded and taken care of, thus affording them attentions and comfort consistent with the nature of circumstances. On the following morning, after food has been served to all, a 'Sick Call' is held, and all that require medicine receive it. Soon after, a morning report is made, signed by the Surgeon-in-Charge, and sent to the Surgeon-in-Chief of the Division. Thereafter, if it is intended to resume the march, the sick and wounded are reloaded, the tents are struck, and everything packed. Thus the routine continues from day to day as long as the march may last. In the event of an engagement, the Surgeon-in-Chief of the Division indicates to the Surgeon in charge of the hospital the place selected for the location of the Division Hospital. The latter then directs the pioneers or fatigue party to police the ground and pitch the tents, establishes the kitchen, appoints a chief cook and a cook for special diet, organizes the nurses and other attendants, unloads the ambulances of the sick, provides operating tables and all necessary appliances for surgical operations, such as chloroform, stimulants, dressings, etc., orders sinks dug, sees that a sufficient supply of water is near, either by opening springs or by digging wells, etc. Thus accommodations are made for the sick on hand as well as for the wounded that may be brought in from the battle-field. The Surgeon-in-Charge selects a Medical Officer to superintend unloading and disposing of the wounded as they come in. Such as require operations are taken to the tables and receive the attention of the Surgeons. Very often comfortable and convenient beds are made by filling sacks with hay or straw, raising them from the ground on crutches or cross-pieces. The Recorder's attention is then called to the wounded, and he takes down their names, rank, regiment, and character of injury, and, in order to prevent confusion, often finds it necessary to attach a small piece of bandage to the button-hole of the wounded man that he may be assured afterwards that his name, etc., has been registered. It is the duty of the Surgeon-in-Charge to see that the records are at the amputating tables and properly kept, specimens preserved and labelled, etc. He selects either a Medical Officer or a Hospital Steward to have immediate supervision of the kitchen, diet, and feeding of the men. He sees also that the wounds of all the wounded men are examined and dressed, and in order to secure this a sufficient number of Medical Officers are assigned to wards as dressers, and a Medical Officer, Surgeon, or Assistant Surgeon appointed each day to act as officer of the day. He is required to be on duty at night, also to attend to any emergency that may arise—sudden hæmorrhage, prostration, etc. The dead likewise require the duties of the Surgeon-in-Charge. He selects a suitable location for a cemetery and here inters the dead, giving them a Christian burial by the presence of a Chaplain to officiate and attend to the funeral obsequies. The graves are marked by a head-board, written or inscribed on it the name, rank, company, and regiment of the deceased. His effects are preserved and at a

convenient time disposed of according to the requirements of the Army Regulations. His duties consist, likewise, in making out provision returns and drawing from the Commissary of Subsistence a sufficient number of rations for the sick and wounded, as well as for the hospital attendants present. He should see to it that an abundant supply of chloroform, stimulants, beef-stock, blankets, bed-sacks, bandages, dressings, shirts, drawers, and socks is on hand to meet almost any emergency that may occur. When the sick and wounded are ordered to be sent to the 'Depot Hospital' a list of them will be made out complete, which, when approved by the Medical Director of the Corps, will be sent with the Medical Officer who accompanies them. A proper entry of the disposition of these will be made in the register. The supervision of the Hospital Fund made from the savings devolves upon the Surgeon-in-Charge. He will keep a correct account of it, and authorize the purchase from it of such delicacies as are needed for the comfort of the more serious cases in the hospital. The Surgeon in charge of the hospital is immediately subject to the orders of the Surgeon-in-Chief of the Division, and such other orders as may come through him from higher authority—Medical Director of Corps and Army. His reports should be made through the same channel, also the requisitions for Medical Supplies, requests for details, etc., and in fact all official communications whatever, except property returns, which go directly to the Department of the Surgeon-General. The following is a list of reports, requisitions, etc., made by the Surgeon in charge of the hospital: A Weekly Report, Monthly Report, Report of Sick and Wounded, Certificates of Death, Requisitions for Medical and Hospital Stores, Morning Reports, etc. The following is a list of the books and registers kept on hand: Morning Report Book, Register, Prescription Book, Case Book, Letter and Order Book.

"*Duties of the Medical Recorder of a Division Hospital:* 1. During a battle the names of all wounded admitted to the hospital are carefully entered in the prescribed forms: Lists of Wounded, giving Rank, Company, Regiment, and Corps; also the nature of the missile or weapon causing the injury, when wounded, its nature (slight or severe) and the treatment pursued in each case. On this form are also entered all amputations and operations and deaths. After the engagement is over a Classified Return of Wounds and Injuries is prepared from this list. 2. At the operating table an assistant prepares all specimens of interest for preservation in a specimen jar. Here, likewise, the name and designation of the patient is noted down, with a full detail of the injury and the operation performed, with the name and rank of the operator. When the specimen is ready to be deposited in the jar it is labelled and the number on the label written opposite the patient's name. As soon as possible afterwards, a complete list is made of all the operations during the engagement, giving, as it were, a history of each case, the number opposite the patient's name corresponding with the number of the specimen in the jar. After a battle a report of aggregate strength of men and names of Medical Officers present for duty is also made out.

"*Duties of the Attending or Prescribing Surgeon of a Division Hospital:* 1. To visit his ward regularly twice each day, or as often as the condition of his patients may require. 2. To examine and make proper diagnosis of patients as they may be reported to him, either for wounds or disease; to make and keep a correct register of all patients, with their treatment, and daily to report them to the Surgeon in charge of the hospital. 3. To prescribe suitable remedies and to see that they are regularly administered by the attendants. 4. To inspect the diet of the men and see that proper food is given them. 5. To attend strictly to the sanitary condition of his ward and surroundings, and compel those whose duty it may be to remove everything offensive or detrimental to health. 6. To assist in all surgical operations, or operate, as he may be required by the Surgeon assigned to that duty. 7. To see that the men under his care are as comfortable as circumstances will admit.

"*Duties of the Operating Surgeon:* 1. The Operating Surgeon shall select steady and reliable attendants, give them clear and explicit instructions relative to their respective duties, and assign to each his proper place. 2. He shall see that all the necessary appliances be at hand required in performing operative surgery, that the instruments are in good order and in their proper places, and that a good and sufficient supply of lint, bandages, ligatures, sponges, plaster, etc., be conveniently placed and ready for use. 3. He should take charge of all patients that in the opinion of the Prescribing Surgeon require surgical attention, make a minute and thorough examination of each case and determine whether surgical aid is necessary; judge of the best manner of benefiting the patient, taking into consideration the relation of important organs, vessels, and nerves in

proximity to the wound, what bearing they may have in the preservation or loss of the patient's life, and to use every preservative means within the reach of surgical science to save the life of the patient with as little impairment of all his functions as possible. 4. An operation being determined upon, he should have the patient properly placed upon the table and should judge of the practicability of administering anæsthetics, and if their use is found necessary should superintend the administration. 5. The patient being etherized, the Surgeon proceeds with the operation that the case requires in the most expeditious and scientific manner compatible with the nature of the injury, endeavoring to preserve the usefulness of the parts operated upon to the greatest extent—in operations on the extremities preserving as great a length of bone as possible and securing sufficient integument to give a liberal covering to the stump.

"*Duties of the Regimental Surgeon:* The first duty of the day is that of the Morning 'Sick Call,' when the sick and disabled, as well as those who are neither sick nor disabled, present themselves for treatment. The Surgeon is called upon to exercise his judgment in determining the character and gravity of their ailments. If he had none to deal with but those who were really sick, his task would be plain, simple, and easy; but, unfortunately, many of the cases are feigned, and he is required to discover and overcome the means brought into requisition by a skulker's ingenuity to carry out his deception. Presuming that the Surgeon is fortified by skill and experience sufficient to detect these, and has a just sense of responsibility to the United States Government (for he really regulates the strength of the command), his examinations will be made without partiality and regardless of position or prejudice, and in his report he will assign to duty those who are fit for duty, the sick to quarters for treatment, or send them to hospital, and recommend the permanently disabled for discharge or the Veteran Reserve Corps. It may be added that in cases having slight symptoms of diseased action, insufficient to indicate position and unmistakable disease, humanity would dictate, and authority sanctions, that they be placed off duty, and that they may have the benefit of the doubt and time for development of disease. Having concluded his work thus far, the Surgeon will see that a copy of his report is forwarded to the Adjutant, who deducts all excused from duty from the mean strength present in the regiment; and the available strength of the command is obtained, which forms the basis for all details and assignments that may be made in the regiment. Should the regiment be filled up by conscripts, substitutes, or enlisted men, the Surgeon is required to examine each one carefully and report on their fitness for service, rejecting all those who, by reason of infirmity, are unfit, and recommending for reception such as he thinks will be able to discharge the duties of a soldier. That the duties imposed upon the Surgeon are important is obvious to any one, and should be particularly so to an officer who has recorded his obligation to subserve the interest of the United States. If the Surgeon indulges the men and reports them off duty when they are not sick, he imposes additional labor on the faithful men who bear the heat and burden of the day, and virtually offers a reward to the faithless; or in examining recruits admits any who are physically disqualified, he acts in bad faith to all and in the end unwarrantably weakens the command, defrauds the Government, and may be the cause of rendering an important engagement abortive. If he conducts his examinations carelessly, the men will soon avail themselves of the chance to escape duty, and in great numbers report themselves sick; the Surgeon loses his influence for good, and he sinks into disrepute and merited disgrace, which does not terminate with his service in the Army, but will follow him throughout all time. After 'Sick Call' the Surgeon should visit the sick in quarters, prescribe for them, and see that suitable food is provided and their quarters made as comfortable as possible, inspect the camp daily, see that it is well drained by proper ditching through which all superfluous or surface water may be carried off, that all filth or anything likely to produce disease is removed or corrected, that the quarters of the men are swept and aired and their bedding exposed to the sun whenever practicable, that the sinks are covered with dirt or ashes (the latter preferable), that the food of the men is of good quality and sufficient quantity (reporting any error in either), and that the cooking is judiciously done. These duties are essential and should receive daily attention, as the neglect thereof will decidedly increase the sickness of the regiment and consequently impair its efficiency. Should a soldier die in camp or regimental hospital, the Surgeon should notify his Commanding Officer and forward to him an inventory of his effects, with the disease from which he died and the date of death, select a place for burial and see that he is decently buried and his grave carefully marked. The duties thus far pointed out are obligatory, and no excuse can be made for their non-perform-

ance in camp. There are many other acts of kindness, more correctly denominated 'favors,' that can be extended by a Surgeon without detriment to himself, that will have a good effect upon the soldier in leading him to believe that his life and comfort command the Surgeon's consideration; these being done willingly will have the effect of improving the morale of the command and usefulness of the Surgeon. When a march is likely to be made the Surgeon is directed to send his sick to General or Division Hospital. Again he is called upon to make a careful and rigid examination to avoid imposition; for the terrifying effect of a prospective battle will cause men to limp who never limped before, and many hitherto good soldiers will make an effort to escape it. The Surgeon completes his list and forwards a copy by name, rank, and company, regiment, and disease, with descriptive lists of each man; when he loads his men, providing sufficient food for the time required to reach the hospital. Having provided the requisite quantity of medicines, etc., to fill the 'hospital knapsack' or 'field companion,' he gives them to his hospital attendants, and when the regiment moves the Surgeon, Hospital Steward, and attendants take their position in the rear. If any of the command take sick or are wounded on the march, the Surgeon is notified and is prepared to prescribe medicines or suitable dressings, and furnishes a pass for ambulance transportation (a duplicate of which he retains), or directs them to walk leisurely in the road, being governed by the severity of the diseases or wounds, and being careful that no deception is practised by men that are not sick, recording each case in his 'Field Register,' with character of disease or wound. Having thus carefully discharged his duties during the day, and though the march has been a long and laborious one, he should, after arriving in camp, visit and prescribe for the sick, and endeavor to make them as comfortable for the night as the means at hand will permit, before his day's work is done. Again, in the morning, before the regiment moves, he should see them and prescribe medicines for the day, select such cases as require wagon transportation, see that they are loaded, and those able to march started before he leaves the camp. From day to day these duties should be performed. Although trying on the strength of the Surgeon he should not fail to do them, as, sooner or later, a day of rest will come and he will be able to recuperate. During an engagement the Surgeon, if not detailed on the operating staff at the hospital, should report with his assistants and attendants to a point selected in the rear of his command, either by brigade or regiment, and notify the sergeant in charge of the stretcher bearers thereof, that the wounded may be carried to said point, to whom he should give such medicines and apply such dressings as their wounds may require, to afford comparatively comfortable transportation to the hospital of their Division, where each case receives minute examination and further attention. Should the Surgeon be placed on the operating staff, his duty, in connection with other members, is to examine carefully every wounded man and determine the extent of his wound, the parts involved, and the necessity for and kind of operation his case may demand. Should he be selected to perform the operation he should endeavor to do it as scientifically and with as much despatch as the nature of the case and safety of the patient will admit, and in all cases apply appropriate dressings in such a manner that they will not become detached in transportation to General Hospital. He may be thus employed for an indefinite length of time; he should therefore feel it incumbent on him to labor as long as there are any cases requiring attention, until all have had the advantage of primary operations and are relieved from the excessive pain of undressed wounds and increased mortality attending secondary operations. The duties of the Surgeon in every position may be summed up in one sentence: He does not rest until everything is done that can contribute to the comfort of the wounded. After a battle the Surgeon will report to his regiment, unless otherwise ordered, and resume the charge thereof, and will perform such duties as are mentioned in describing those in camp, etc., previously procuring the names of the men killed in the action, and of the wounded, the nature of their wounds and character of the missile inflicting them, together with all statistics required in reports he may have to make. The reports required of a Surgeon of a regiment are the 'Morning Report' to the Adjutant, the 'Weekly' to the Surgeon-in-Chief of the Brigade, and the 'Monthly.' It is altogether necessary that a medical officer should so conduct his department that he may secure the confidence of the officer in command of the regiment to which he is attached, that said officer may receive his reports and rely on their correctness. If both military and medical officers are sincerely interested in the health of the regiment and act in concert, much can be done to promote order and discipline. The necessity for this can be discovered when the opposite is experienced. The Surgeon cannot have an order issued or carried into effect without

great difficulty, and if the variance should continue the intercourse will be so unpleasant that the command eventually suffers in consequence. The officers are mutually responsible and should be mutually respectful.

"*Duties of the Assistant Regimental Surgeon:* The duties of an Assistant Surgeon when in charge of a regiment or hospital are identical with those of a Surgeon in the same position. If he be acting under a Surgeon in charge he will perform such share of the Surgeon's duties in the case of the sick as the Surgeon may assign to him. The sick in the ambulances on the march are usually put in charge of an Assistant Surgeon, one or more, whose duty it is to accompany the ambulances and see that such medicines are administered as the patients may require; usually he both prescribes and dispenses. He decides also what patients must be carried, and when they are well enough to walk or to rejoin their companies. Beef stock, tea, and sugar are carried in each ambulance for the use of the sick, subject to the order of the Assistant Surgeon in charge, and to be prepared by the ambulance men belonging to each ambulance. When an action is about to take place the Surgeons with the regiments are usually ordered to the Division Hospital, while the Assistant Surgeons are left to establish regimental field hospitals or depots, where the wounded come or are brought by the stretcher bearers to be dressed. Sometimes a Surgeon is left in charge of the Assistant Surgeons of a Division with orders to select the places for the field hospitals. A depot of this kind should be in some comparatively safe place, but not too far from the regiment, and where the ambulances can have a good chance to come without being in great danger from the enemy's fire; it should also be convenient to good water, which will be needed for dressing the wounded. If the place is too much exposed the stretcher men will not be likely to bring the wounded, nor will wounded men wish to be left where they may get more wounds while being dressed or waiting their turn to be attended to; but will prefer to go farther to the rear. If the ambulances cannot come to the depots where the men are brought to be dressed, a sudden change in the lines may cause some men to be left on the field who were waiting to be attended to, and who might have been carried off in a very few moments if necessary, even though they were not dressed, were the ambulances there. Still, although perfectly safe places can seldom be found near where the fighting is going on, especially where the ground is comparatively even, the Assistant Surgeon should not allow his fears to induce him to remain too far away from his men, and they should be kept advised of his whereabouts; hence, when a regimental field hospital has been established it should not be moved unless it is absolutely necessary to do so. . Assistant Surgeons on the battle-field should be furnished with the ordinary Surgeons' dressing case of instruments —operations requiring other instruments than these are usually of too severe a character to be attempted on the field. He should be accompanied by one or two nurses with plenty of lint, bandages, isinglass plaster, water, sponges, and a few of the most frequently required medicines. After dressing the men the Surgeon should see that they are properly placed in the ambulances, and give the direction for their care until they reach the Division Hospital—duties often of great importance to the patient. When it can be done conveniently it is better that the Assistant Surgeons of several regiments or of a Brigade be together on the field, as they will often be enabled to assist and advise each other. An Assistant Surgeon in the field has very little opportunity for observing severe surgical cases; after the first dressing he very rarely sees or hears anything of their further treatment or termination. So far as practicable the Assistant Surgeon in the field should keep a memorandum of the names of the men he dresses, their companies and regiments, also the character and severity of their wounds; this will be of much service in making the required reports and in answering the inquiries of anxious friends. Of the relative position of an Assistant Surgeon very little is to be said. He seems to be subject to the orders of the commander of his regiment, brigade, etc., whether he be colonel or corporal, and to those of the Surgeon of his regiment, brigade, division, etc., and has command only over those of inferior rank in his own department. So far, however, observation leads to the belief that regimental commanders seldom interfere with the duties of their Assistant Surgeons.

"*Duties of the Commissary of Subsistence of a Division Hospital:* The Division Hospital Commissary is under the immediate direction of the Surgeon in charge of the hospital; he makes reports to him and receives his orders. His duties while in camp are to draw at stated intervals from the commissary officer, authorized to issue to the hospital, such stores as are required for the use of the sick and wounded, stewards, and authorized attendants, on provision returns approved

by the Surgeon in-Charge. He is required by existing orders to keep on hand at least one thousand rations of bread, sugar, coffee, tea, pork, and from six to ten head of beef-cattle. He makes a daily inspection of the stores on hand in order to keep up the necessary amount of supplies, so as to be ready at all times for a rapid movement or an engagement. It is also his duty to make out the provision returns, having them agree with the morning report of sick and wounded; the names of all the hospital attendants to be written on the back of each return. He superintends the purchase of such articles as are not furnished by the Government, and which the Surgeon-in-Charge considers necessary for the use of the sick and wounded. He also keeps an account of the savings of the hospital, and makes a monthly report of the state of the hospital fund to the Surgeon-in-Charge. He has, in conjunction with a medical officer, charge of the cooking and preparation of the food, seeing that there is no unnecessary waste, and that the place in which the stores are kept and food prepared is properly policed daily. When orders to move are received he attends to the packing of the supplies in the wagons assigned for that purpose. He also sees that there is a sufficient number of cooking utensils on hand, and that they are kept clean and in good condition. On the march he is required to keep his wagons with the hospital department, or wherever they may be ordered, also to have the beef-cattle up with the wagons, so that if necessary they can be slaughtered and prepared for food in the evening, or whenever a halt is ordered. He selects a proper place for cooking purposes, unloads such stores as are required for the occasion, and, if within reach of the supply train, gets his stock replenished. On the approach of an engagement it is his duty to have hot coffee, tea, beef-soup, and other necessary articles of diet ready for the wounded as soon as they may be brought in from the field. When the wounded are being sent to the depot hospital he furnishes each man with sufficient rations to last him until he reaches his place of destination. When men are returned to duty from the hospital he also furnishes them with rations.

"*Duties of the Chief Ambulance Officer of a Corps:* In addition to the regular monthly returns of Quartermaster's property the Chief Ambulance Officer of the Corps receives and makes the following reports: 1, Daily Wagon and Forage Report; 2, Weekly Ambulance Report; 3, Monthly Report of Transportation; 4, Monthly Report of Officers in Quartermaster's Department of the Ambulance Train and the time to which they have made their property returns; 5, Monthly Report of all Quartermaster's property received and issued during the month; 6, Monthly Report of Officers serving in the Ambulance Train. When not on the march the Chief Ambulance Officer of the Corps inspects the ambulance train every Sunday morning with the object of correcting all abuses and of promoting the efficiency of the train. Before a move he should give timely notice to the Division Ambulance Officers, so that they may have everything packed up and ready to start at the appointed hour. It is his duty to regulate the order of march of his train, select suitable camping grounds, and see that his train is at all times ready for active service. Before an engagement he informs himself as well as possible about the country, roads, etc., sees that his train is well up and together, so that as soon as the lines of battle are established he can park his whole train in some central position from which to send picket ambulances as near the lines of each Division as possible. An officer is always placed in charge of the main park of ambulances, one in charge of the picket ambulances of each Division, and the remainder of the officers are instructed to take charge of the stretchers, men, and sergeants. It is also necessary to leave an officer in charge of the hospital train of the corps. The Chief Ambulance Officer must personally superintend the working of his train so as to see that every one does his duty, that the drivers do not become stampeded, and that the wounded are transferred to the hospital as quickly and easily as possible. It is also his duty to see that the stretcher men do not carry the wounded farther than is necessary. When in camp, and it is necessary to send off sick or wounded, the chief Ambulance Officer orders the proper number of ambulances and details an officer to take charge of the train; one ambulance officer from each Division superintends the loading of the ambulances at his Division Hospital. When in camp, the stretcher men are used in the hospital when needed. It is also necessary that the Chief Ambulance Officer should see that the ambulances are not improperly used. It being desirable to receive orders as early as possible, the Chief Ambulance Officer finds it best to have his quarters at Corps Headquarters.

"*Duties of the Chief Ambulance Officer of a Division:* He should be the receipting officer for all Quartermaster's property belonging to his Division, and be responsible for all deficiencies. He should make all necessary returns required by the Quartermaster's Department, Commissary

Department, and Ordnance Department, viz: Monthly returns of property to the Quartermaster's Department, Quarterly return of Ordnance, usual Ration return to Commissary Department, also the daily Forage Report, the Weekly report of Ambulance Department, Monthly report to Quartermaster's Department, and Monthly report of Officers. When on the march he should attend to the running of his train, see that forage is drawn from the nearest post, and a sufficient quantity kept constantly on hand; properly park his train at night according to orders from the Chief Ambulance Officer of the Corps; necessary sentries posted so that horses may not stray away or be stolen, and be ready to move at short notice. Before an engagement it is his duty to see that the Brigade Officers are with their Brigades, and that they have the sergeants and stretcher bearers well up with their regiments, have his train so parked that it will be easy of access, and so near that the stretcher men will not have any farther than actually necessary to carry the wounded, and at the same time protect his horses from unnecessary exposure; and after an engagement to assure himself that all the wounded of the Division have been removed from the field; also to assist the Surgeons when a train of sick and wounded is to be sent to Base or General Hospital.

"*Duties of the Chief Ambulance Officer of a Brigade:* 1. While in camp one Brigade Officer of each Division train is constantly with the troops, and in case of any movement reports the fact at once to the Chief Ambulance Officer of his Division. He should see that the drivers and stretcher men are at the established posts, and that all orders from Surgeons for ambulances or stretchers for the transportation of sick or wounded men are promptly attended to. 2. When not on duty with the troops he will see that the ambulances are properly parked, and that the drivers attend faithfully to the feeding and grooming of their horses, the cleaning of the harness and ambulances, and to the policing of the stables and grounds of the park; also that the kegs are kept constantly filled with fresh water. Stretcher men will assist in the policing when not on duty at the Division Hospital. 3. A suitable non-commissioned officer will be selected to have the direct supervision of the ambulances of the Brigade, and another of the stretcher men. The rest of the non commissioned officers will have charge of the stretcher men of their respective regiments under the one in charge of the stretcher men of the Brigade. 4. On the march (unless otherwise directed) Brigade Officers remain with the headquarters of their Brigades, and in case of an engagement select a spot as near the line as possible, with a reasonable degree of safety to the horses, and as central to the lines of the Brigade as possible. 5. The Brigade Officer will cause a small number of ambulances to be brought to the spot selected, and others to be sent to fill their places; and as fast as they are filled to send to the place selected for the hospital. The stretcher men will be informed of the position of the ambulances, and will bring to them as fast as possible any man that may be wounded and unable to walk, until all the wounded men are carried from the field. 6. The Brigade Officer should inform himself of the shortest and best roads to the Division Hospital, and see that the drivers take them, driving carefully, and avoiding the bad places as much as possible on an uneven road. A good non-commissioned officer should remain constantly with the advanced ambulances to see that the wounded men are loaded carefully and speedily and the drivers do not get demoralized. 7. No written reports are made by Brigade Officers. They report verbally to the Division Officer any breach of discipline or neglect of duty that may require his attention. 8. He receives only such orders as come through the Chief Ambulance Officer of the Corps or his Division, or some medical officer."

It is only necessary to point to the manifold functions required of the medical officers in the foregoing reports to see that their duties were arduous and responsible, calling, aside from professional ability, for the exercise of firmness combined with tact and moderation to do justice to the sick and wounded entrusted to their immediate care, and at the same time to avoid complications with clashing interests.

MATERIA CHIRURGICA.

At the beginning of the war each regimental Surgeon was furnished with a suitable equipment for his regiment for field service, consisting of medicines, stores, instruments, and dressings, in quantities regulated by the Standard Supply Table.[1] In action he was

[1] See *Standard Supply Table for Field Service*, in *Revised Regulations for the Army of the United States*, 1861, p. 304.

accompanied by a hospital orderly, who carried a knapsack containing a limited supply of anæsthetics, styptics, stimulants, and anodynes, and material for primary dressings. This hospital knapsack had been recommended for adoption by an army board in 1859; it was made of light wood, 18 inches in height, 15 inches wide, and 7½ inches deep, but subsequently

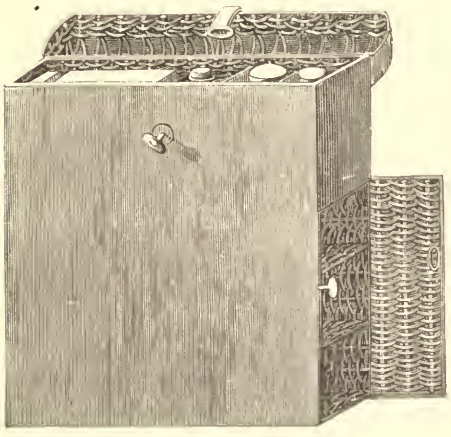

FIG. 425.—Hospital knapsack of wicker-work, covered with enamelled cloth.

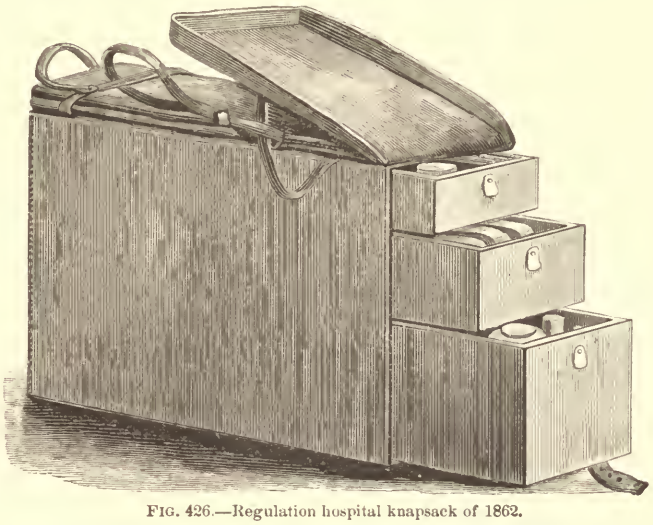

FIG. 426.—Regulation hospital knapsack of 1862.

wicker-work, covered with canvas or enamelled cloth, was substituted for the wood; its weight when filled was 18 pounds. This knapsack (FIG. 425) was in general use in the first year of the war and served an excellent purpose. In 1862 it was changed for what was known as the new regulation knapsack, in which the arrangement and character of the supplies were modified. The new pattern was 16 inches high, 12½ inches wide, and 6 inches deep; the contents were packed in drawers, which were more accessible than in the old style and less liable to become disarranged or broken.[1] The weight when packed was nearly 20 pounds (FIG. 426). Notwithstanding its convenience and general adaptability it was too heavy and cumbrous to be carried by the Surgeon himself, and, when entrusted to other hands, was liable, in the vicissitudes of battle, to be lost. In the early part of 1863 Medical Inspector R. H. Coolidge, U. S. A., arranged a field case or companion[2] (FIG. 427) to take the place of the knapsack. It was something after the plan of the one used in the British service, and was intended to be carried by the Surgeon himself, if necessary. The "companion" is a leather case 13 inches long, 6 inches wide, and 7½ inches deep; it is supported by a strap passing over the shoulder, and is provided with a waist strap to steady it when carried.

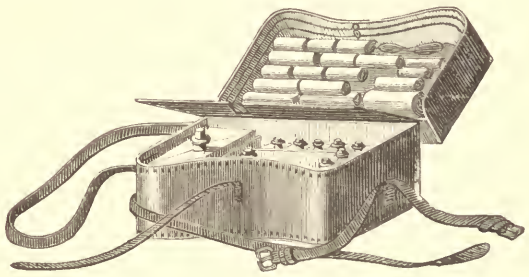

FIG. 427.—Surgeon's Field Companion.

The hospital medicine chest, mess-chest, and bulky hospital supplies were transported in wagons of the supply train and were often inaccessible when required. To obviate this

[1] The contents of the knapsack were: One piece of white wax, 8 oz. simple cerate, 12 oz. chloroform, 5 yds. adhesive plaster, 2 yds. isinglass plaster, 1 oz. persulphate of iron, 100 compound cathartic pills, 150 blue mass pills, 150 opium pills, 100 opium and camphor pills, 150 quinine pills, 8 oz. aromatic spirit of ammonia, 16 oz. brandy, 4 oz. laudanum, 10 bandages, 10 binder's boards, 4 oz. charpie, 2 medicine glasses, 1 (spirit) lamp, 12 oz. lint, 1 box matches, 1 paper of pins, 1 spool of surgeons' silk, 4 pieces of sponge, 4 (Dunton's) field tourniquets, 2 spiral tourniquets, 1 piece of tape, 1 spool of lead wire, 1 spool of silver wire, and 1 spatula.

[2] The contents of the Surgeon's Companion were: 6½ oz. chloroform, 2 oz. fluid extract of ipecacuanha, 2 oz. fluid extract of ginger, 2 oz. solution of persulphate of iron, 24 oz. of whiskey, 2 oz. tincture of opium, 144 compound cathartic pills, 144 colocynth and ipecacuanha pills, 144 sulphate of quinine pills, 144 opium pills, 1 yard isinglass plaster, a medicine cup, scissors, teaspoon, pins, thread, 4 oz. lint, a towel, 2 doz. bandages, muslin, and corks.

inconvenience panniers were provided containing the most necessary medicines, dressings, and appliances; they were designed to be carried on the backs of pack-animals, but were found to be inconveniently heavy to be transported in this manner, and were more generally carried in one of the ambulance wagons and filled from the medicine chest as required. Figs. 428, 429 represent the pannier arranged for army use by Dr. Squibb, of Brooklyn, N. Y.; it consists of a wooden box strongly bound with iron, 21⅛ inches in length, 11⅝ inches in breadth, and 11⅜ inches in depth; it weighs, when filled, 88 pounds. The medicines are well packed in japanned tin bottles and boxes, and room is left for an adequate supply of dressing material. The pannier had two compartments.[1]

Fig. 428.—Medicine pannier.

In the early part of the war medical supplies and instruments had been carried in heavy army wagons. In March, 1862, a medicine wagon was constructed by E. Hayes & Co., of Wheeling, Virginia, in accordance with plans and instructions of Surgeon Jonathan Letterman, U. S. A. Details of the internal arrangement of this wagon could not be obtained. A Board, consisting of Brigade Surgeon William Hayes and Assistant Surgeons Hammond and Dunster, U. S. A., on April 17, 1862, examined the wagon and reported as follows: "The merits of this dispensary wagon are so apparent, when compared with the old method of packing medicines and instruments in unwieldy boxes and transporting them in the heavy army wagons, that the Board unanimously approves of the same, and recommend that it at once be sent into the field where it can be practically tested. The adoption of a vehicle of this or some similar construction for the transporting of medicines, etc., in the field would be an actual saving in transportation over the present plan, as a three months' regimental supply can be carried with ease in a single wagon dispensary. The advantage accruing from the prevention of loss by wastage and breakage, the convenience of having the whole together and unencumbered by other baggage, and the readiness of access to medicines, instruments, and dressings in case of an emergency, are so palpable that it is only a matter of surprise that some such plan has not been previously adopted."

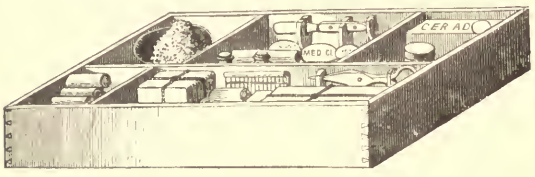

Fig. 429.—Upper tray of medicine pannier.

In November, 1862, Mr. J. Dunton proposed a medicine wagon, a drawing of which is shown in Fig. 430. It was examined by Medical Inspectors T. F. Perley and J. M. Cuyler and Surgeons J. Simpson and J. H. Brinton, who reported, on November 3, 1862, that it was questionable whether it would answer the purpose for which it was designed, as it was faulty in construction, and its capacity insufficient to accommodate the entire hos-

[1] The upper compartment contained 24 roller bandages, 1 yd. of isinglass plaster, 1 paper of pins, 2 yds. bleached muslin, and 1 pair of scissors. In the lower compartment were 6½ oz. purified chloroform, 2 oz. fluid extract of ipecacuanha, 2 oz. fluid extract of ginger, 2 oz. liquor of persulphate of iron, 12 doz. compound cathartic pills, 12 doz. quinine pills (3 grs. each), 12 doz. opium pills, 12 doz. pills of compound extract colocynth (3 grains) and ipecacuanha (½ grain), 24 oz. whiskey, 2 oz. tincture of opium, ¼ lb. patent lint, 1 medicine glass, 1 tinned iron teaspoon, 1 small piece fine sponge, ¼ oz. silk for ligatures, 1 towel, and 6 corks.

pital supplies for a regiment for three months." The wagon could be elongated at both ends, or closed, as was desired, and was arranged so as to be opened on the side.[1]

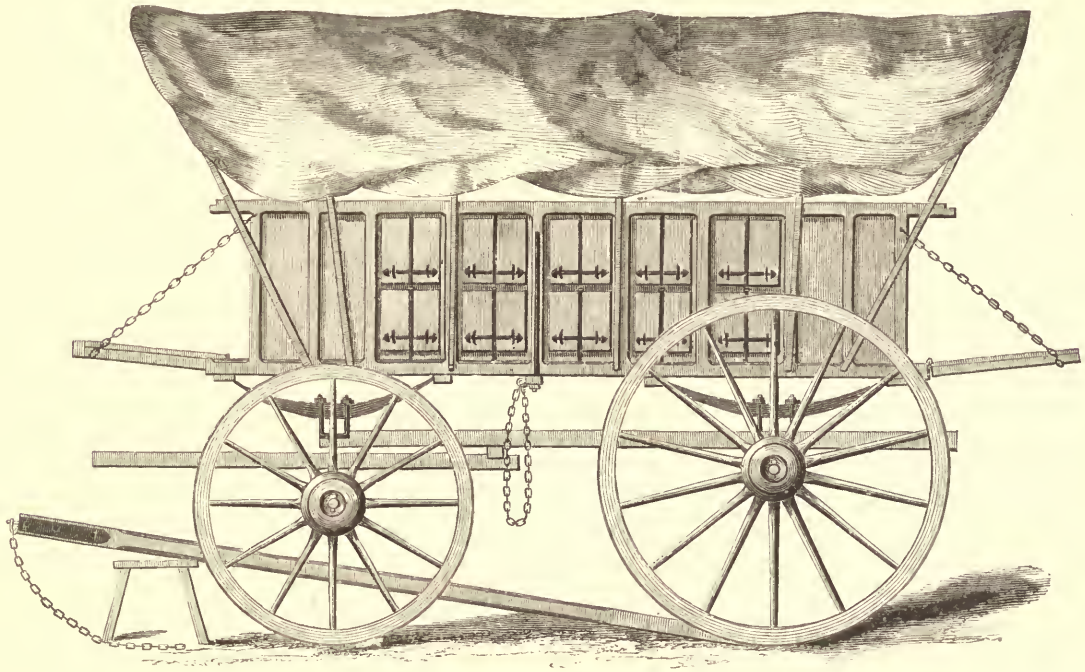

FIG. 430.—DUNTON'S regimental medicine wagon.

As the organization of the medical staff was perfected, the cumbrous regimental supplies were curtailed and the brigade supplies augmented. Each brigade was provided with a "medicine wagon," which was furnished not only with drugs but with ample provision of stores, dressings, furniture and appliances, an amputating table, and a limited amount of bedding. The contents of the medicine wagon were constantly replenished from the stores of the medical purveyors who accompanied each army. FIGURE 431 represents the medicine wagon of Perot.[2] While the internal fixtures and arrangements for transporting supplies in this wagon were excellent and convenient, the cost of furnishing it was very great, and on the recommendation of a Medical Board consisting of Surgeons C. H. Crane, R. O.

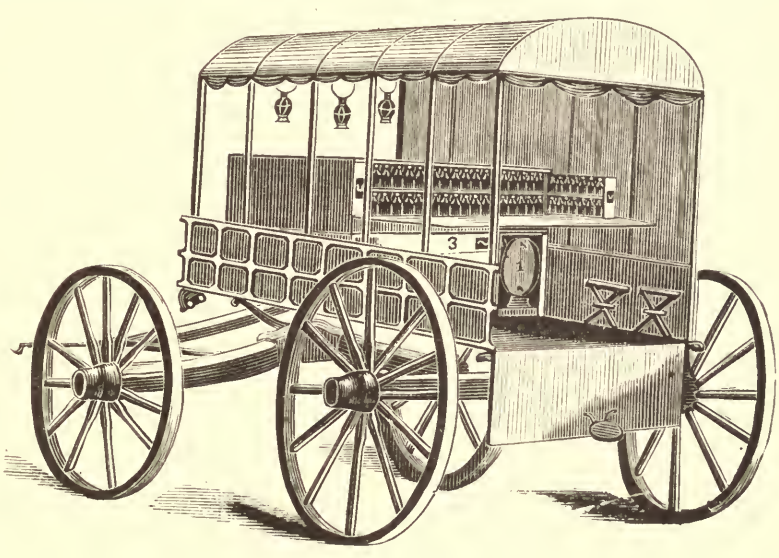

FIG. 431.—PEROT'S medicine wagon.

[1] This medicine wagon is erroneously designated by Professor T. LONGMORE (*A Treatise on the Transport of Sick and Wounded Troops*, London, 1869, page 386) as a United States Sick Transport Wagon with side and end openings.

[2] CONTENTS OF PEROT'S MEDICINE WAGON.—*Drawer* 1 contained an oval keg for 6 galls. of whiskey, with a cock on top and bottom, one to let in air, the other to draw from. This keg is on a skid and can be drawn out and filled at the bung. *Drawer* 2: Stronger ether for anæsthesia, 32 oz.; sweet spirit of nitre, 32 oz.; solution of ammonia, 32 oz.; turpentine, 1 qt.; castor oil, 4 qts.; brandy, 6 qts.; olive oil, 2 qts.; purified chloroform, 32 oz.; copaiba, 32 oz.; sulphate of quinia, 10 oz.; syrup of squill, 4 lbs. (part in *Drawer* 9). *Drawer* 3: 1 sponge-holder for throat, 12 probangs, 1 hinged tongue depres-

Abbott, and Charles Sutherland, U. S. A., in June, 1864, the Autenrieth pattern[1] (FIGS. 432, 433) was furnished to the army. An improved wagon, recommended by the Medical Department and constructed at the Government shops, was adopted during the last year of the war.

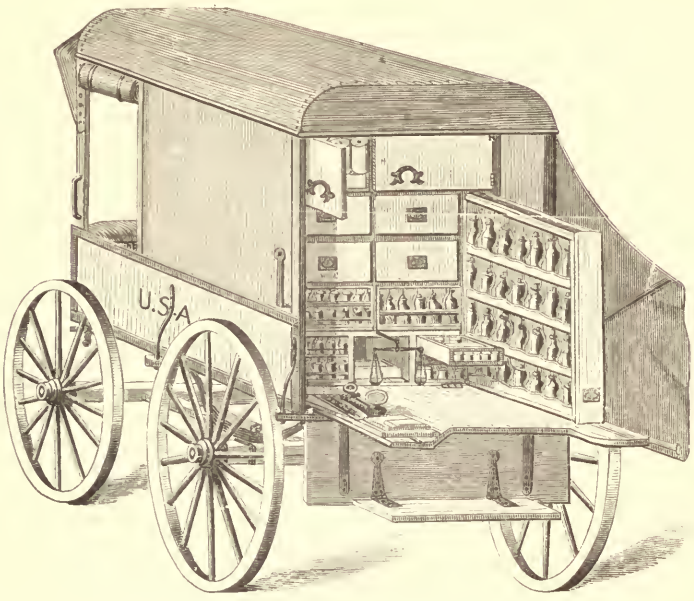

FIG. 432.—AUTENRIETH medicine wagon.

Surgical instruments were furnished by the Government, each medical officer making requisition for his equipment, receipting for it, and becoming responsible for its condition while in his possession; no transfers were allowed, and an annual return was required to be made to the Surgeon General. On leaving the service it was turned in to the nearest medical purveyor, who receipted for the same. The instruments intended for surgeons and assistant surgeons of the regular and volunteer staff were comprised in three cases—one for capital operations, containing amputating, trephining, and

sor, 4 single trusses, 2 bottles ink, 1 bottle mucilage, 1 U. S. Dispensatory, 1 portfolio (cap size), 2 quarto blank books, 1 order and letter book, 4 quires writing paper, 1 register of patients, 1 Gray's Anatomy, 1 Erichsen's Surgery, 1 Packard's Minor Surgery, 1 Longmore on Gunshot Wounds, 1 tooth-extracting case (army pattern), 1 8-oz. hard-rubber syringe, 1 self-injecting rubber syringe, 2 thumb lancets, 12 hair pencils, 2 scarificators. *Drawer* 4: Closet for 3-gall. can of alcohol, and a vacant drawer for any articles desired. *Drawer* 5: 1 set splints (6 forearm, 4 leg, 6 large coaptation, 4 small coaptation), 2 papers pill boxes (turned wood), 1 pair pliers, 1 gimlet, 1 tape measure, 8 pieces binder's board (4 x 17 inches), 8 pieces binder's board (2½ x 12 inches), razor strop in case, 1 file, 6 glass penis syringes, 1 corkscrew, 1 set Aiken's tool pad, 8 oz twine (½ coarse), 1 hone, 1 razor. *Drawer* 6: 2 quires wrapping paper (white and blue), 2 oz. ligature silk, 1 oz. linen thread (unbleached), 2 papers pins, 4 pieces cotton tape, case containing 25 needles, 1 spool cotton and thimble, 1 yard gray silk for shades, 8 field tourniquets, 2 screw tourniquets with pad, 12 cupping tins, 2 scissors (large and small), 1 pocket case, 1 box for sundries, 100 printed envelopes, 1 traveller's inkstand, 24 steel pens, 2 pen-holders, 6 lead-pencils No. 2, 1 stick sealing wax, 1 sheep-skin (dressed). *Drawer* 7, *Dispensing Case:* 1 Wedgewood mortar, 2 doz. vials (6 6-oz., 12 4-oz., 3 2-oz., 3 1-oz.), 1 pill tile (6 x 8 inches), 8 oz. fine sponge (small pieces), 1 tin funnel (pint), 5 yds. adhesive plaster, 4 lbs. patent lint, pestle for mortar, 4 yds. red flannel (all wool), 2 medicine measuring glasses, 2 yds. gutta-percha cloth, 5 yds. isinglass plaster, 8 doz. assorted corks, 1 glass graduated measure (4 oz.), 1 minim measure, 10 yds. bleached muslin, 2 cotton bats, 1 sheet cotton wadding, 1 set prescription scales and weights, 2 spatulas (3 and 6-inch), 2 glass urinals, 8 suspensory bandages, 2 lbs. scraped or picked lint, 2¼ yds. oiled silk, 2¼ yds. oiled muslin, 16 doz. roller bandages, assorted (2 doz. 1 inch by 1 yd., 4 doz. 2 ins. by 3 yds., 4 doz. 2½ ins. by 3 yds.. 2 doz. 3 ins. by 4 yds., 2 doz. 3½ ins. by 5 yds., 1 doz. 4 ins by 6 yds., 1 doz. 4 ins. by 8 yds.), 10 lbs. pressed tow, 1 doz. towels, aromatic sulphuric acid, tannic acid, spirit of nitrous ether, stronger ether (for anæsthesia), strong alcohol, alum, aromatic spirit of ammonia, purified chloroform, Dover's powder, sulphate of morphia, olive oil, castor oil, laudanum, paregoric, acetate of lead, bicarbonate of potassa, creasote, fluid extract of colchicum seed, fluid extract of aconite root, fluid extract of ipecac, fluid extract of seneka, tincture of chloride of iron, solution subsulphate of iron, pure glycerin, chlorate of potassa, iodide of potassium, bicarbonate of soda, whiskey, syrup of squill, blue mass, citrine ointment, powdered squill, Hoffman's anodyne, carbonate of ammonia, solution of ammonia, camphor, collodion, copaiba, sulphate of copper, alcoholic extract of belladonna, fluid extract cinchona (aromatic), fluid extract ginger, mercury with chalk, oil of turpentine, eroton oil, permanganate of potassa, Fowler's solution, chlorinated solution soda, solution chloride zinc, resin cerate, simple cerate, powdered gum arabic, nitrate of silver (crystals), fused nitrate silver, sulphate cinchona, citrate iron and quinia, powdered subsulphate iron, iodide of iron, powdered ipecac, powdered opium, pills of camphor (2 grains) and opium (1 grain), compound cathartic pills, opium pills, pills of sulphate of quinia (3 grains), sulphate of quinia, powdered Rochelle salts, sulphate zinc, blistering cerate, powdered compound extract colocynth. *Drawer* 8: 8 oz. Fowler's solution, 8 oz. aromatic sulphuric acid, 8 oz. fluid extract ipecac, 8 oz. fluid extract seneka, 8 oz. tincture chloride of iron, 8 oz. pure glycerin, blue mass, empty bottles, 8 lbs. sulphate magnesia, 8 lbs. flaxseed meal, 10 lbs. farina, 12 lbs. white crushed sugar. *Drawer* 9: 16 oz. Hoffman's anodyne, 16 oz. fluid extract ginger, 16 oz. laudanum, 16 oz. paregoric, 16 oz. chlorinated solution of soda, 16 oz. solution chloride zinc, 4 lbs. syrup of squill (part in *Drawer* No. 2), 8 oz. powdered tartaric acid, 16 oz. subnitrate bismuth, 8 oz. ground cayenne pepper. 16 oz. powdered Rochelle salt, 8 oz. alum, 8 oz. mercury with chalk, 8 oz. powdered ipecac, 8 oz. Dover's powder, 8 oz. acetate lead, 8 oz. bicarbonate potassa, 8 oz. chlorate potassa, 8 oz. iodide potassium, 8 oz. bicarbonate soda. 8 oz. nutmegs, 8 oz. powdered gum arabic, 8 oz. carbonate ammonia, 8 oz. camphor, 8 oz. powdered opium, empty bottles, 8 lbs. castile soap. *Drawer* 10: 2 tin basins (small, for dressers), 3 wash-hand basins, 2 vacant boxes for sundries, 1 metal bed-pan. *Drawer* 11: 3 lbs. simple cerate, 24 oz. sulphate cinchona, 16 oz. mercurial ointment, 1 smoothing plane, 1 saw, 1 hatchet, 1 nutmeg grater, 4 oz. white wax, 6 lbs. ground black mustard seed, 5 lbs. black tea, 1 box for sundries, 2 lbs. candles (half length). *Drawer* 12: 2 doz. planed splints, 20 gray blankets, 2 blanket cases (canvas), 8 gutta-percha bed-covers, 15 bed sacks, 15 pillow cases (white), 2 leather buckets, 1 coffee mill. The wagon also contained an amputating table, 3 box lanterns, and 2 camp stools, and four hand litters were attached outside.

[1] CONTENTS OF THE AUTENRIETH MEDICINE WAGON.—*First Case:* Tannic acid, 1 oz.; aromatic sulphuric acid, 8 oz.; powdered gum arabic, 8 oz.; stronger ether, 2 lbs.; Hoffman's anodyne, 1 lb.; alcohol, 64 oz.; alum, 8 oz.; solution of ammonia, 32 oz.; carbonate of ammonia, 8 oz.; aromatic spirit of ammonia, 4 oz.; tartar emetic, 1 oz.; nitrate of silver, 1 oz.; fused nitrate of silver, 1 oz.; subcarbonate of bismuth, 4 oz.; camphor, 8 oz.; simple cerate, 2 lbs.; cerate of cantharides, 8 oz.; resin cerate, 1 lb.; pure chloroform, 32 oz.; collodion, 4 oz.; copaiba, 16 oz.; creasote, 4 oz.; sulphate of copper, 2 oz.; fluid extract of aconite root, 4 oz.; extract of belladonna, 1 oz.; fluid extract of cinchona, aromatic, 16 oz.; fluid extract of colchicum seed, 4 oz.; compound extract of colocynth, 8 oz.; fluid extract of ipecac, 8 oz.; fluid extract of ginger, 8 oz.; tincture of chloride of iron, 8 oz.; citrate of iron and quinine, 2 oz.; solution of persulphate of iron, 4 oz.; powdered subsulphate of iron, 2 oz.; glycerin, 8 oz.; calomel, 8 oz.; blue mass, 8 oz.; mercurial ointment, 16 oz.; citrine

resecting instruments;[1] one for general and minor operations,[2] composed of knives, forceps, catheters, etc.; and a pocket case.[3] For regimental surgeons and assistant surgeons the field case[4] was issued; this contained much the same assortment of instruments as those already mentioned, but were somewhat more closely packed and more easily transported. Teeth-extracting instruments and dissecting cases were also furnished to regimental and general hospitals. Great liberality was shown in providing special instruments and appliances, and every effort was made to render the surgical equipment as perfect as possible.

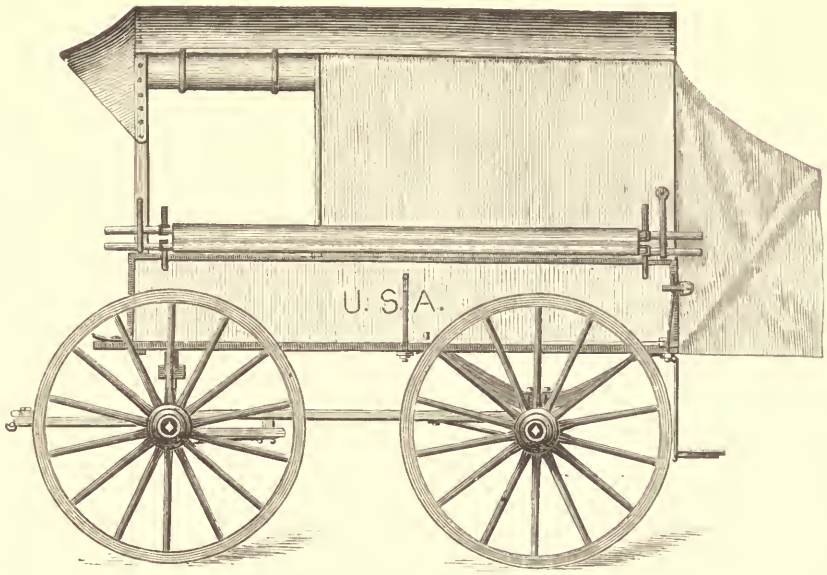

FIG. 433.—AUTENRIETH medicine wagon—side view.

At the beginning of the war it was the general custom to secure possession of buildings, such as churches, mills, and dwelling houses, for hospital accommodations; but the hygienic evils growing out of such occupancy soon led to the use of tent hospitals for the wounded, and finally, under the excellent organization of the field hospitals, tents were almost universally used by our armies in campaigns as well as in periods of inactivity. The principal tents used were the Hospital and the Sibley tent.

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ointment, 4 oz.; Dover's powder, 8 oz.; flaxseed, 6 lbs.; flaxseed meal, 12 lbs.; morphia, ¼ oz.; olive oil, 2 qts.; castor oil, 4 qts.; oil of turpentine, 1 qt.; croton oil, 1 oz.; powdered opium, 8 oz.; tincture of opium, 16 oz.; paregoric, 16 oz.; pills of camphor (2 gr.) and opium (1 gr.), 12 doz.; compound cathartic pills, 16 doz.; pills of compound extract of colocynth (3 gr.) and ipecac (½ gr.), 16 doz.; opium pills, 10 doz.; sulphate of quinine (3 gr.) pills, 12 doz.; chlorate of potassa, 8 oz.; acetate of lead, 8 oz.; bicarbonate of potassa, 8 oz.; permanganate of potassa, 32 oz.; iodide of potassium, 8 oz.; sulphate of quinine, 8 oz.; soap, 8 lbs.; syrup of squill, 3 lbs.; powdered black mustard, 9 lbs.; bicarbonate of soda, 8 oz.; solution of chlorinate of soda, 32 oz.; Rochelle salt, 16 oz.; sweet spirit of nitre, 2 lbs.; solution of chloride of zinc, 1 lb.; sulphate zinc, 1 oz.; sulphate cinchona, 2 oz.; arrow root, 10 lbs.; extract of beef, 16 lbs.; brandy, 6 qts.; farina, 10 lbs.; nutmegs, 4 oz.; sugar (white, crushed), 15 lbs.; extract of coffee; black tea, 10 lbs.; whiskey, 6 qts.; patent lint, 6 lbs.; scraped lint, 2 lbs.; roller bandages (assorted), 32 doz.; suspensory bandages, 8. The wagon also contained surgical instruments, books, and stationery, prescription furniture and utensils, bed-pans, urinals, tow, coffee mill, rubber buckets, tin basins, wash-hand basins, blankets, gutta percha bed-covers, lanterns, and a hatchet. The medicines were arranged in slides; the hospital stores, dressings, furniture, utensils, etc., were arranged in drawers or on shelves.

[1] The *Capital Operating Case* contained: 2 amputating knives (one long, one medium), 2 catlings (one long, one medium), 4 scalpels, 1 cartilage knife, 1 capital saw (long, bow, two blades), 1 metacarpal saw, 1 chain saw, 1 Hey's saw, 1 trephine (conical), 1 trephine (small crown), 1 bone forceps (Liston's long, sharp, spring handle), 1 bone forceps (broad edged, slightly curved, spring handle), 1 bone forceps (gnawing, spring handle), 1 bone forceps (sequestrum, spring handle), 1 artery forceps, 1 artery needle, 1 artery needle key, 12 surgeon's needles, 1 tourniquet screw with pad, 1 tenaculum, 1 scissors, 1 chisel, 1 gouge, 1 mallet, 4 drills (with one handle), 2 retractors, 1 raspatory, 1 elevator, 1 brush, 12 yards suture wire (iron), ¼ oz. ligature silk, ½ oz. wax, 1 mahogany case (brass bound, slide catch), 1 leather pouch.

[2] The *Minor Operating Case* contained: 1 amputating knife, 3 scalpels, 2 bistouries, 1 hernia knife, 1 finger knife, 1 artery forceps, 1 ball forceps, 1 gullet forceps, 1 dressing forceps, 1 dissection forceps, 1 artery needle, 1 artery needle key, 12 surgeon's needles, 1 tenaculum, 2 scissors, 1 trocar and canula, 1 Belloc's canula, 1 bullet probe, 1 director, 1 cutting pliers (small), 6 steel bougies (silvered, double curve, Nos. 1 and 2, 3 and 4, 5 and 6, 7 and 8, 9 and 10, 11 and 12), 3 silver catheters (Nos. 3, 6, and 9), 6 gum-elastic catheters (Nos. 1, 3, 5, 7, 9, and 11), 24 suture pins (silvered), 6 yards suture wire (iron), ¼ oz. ligature silk, ½ oz. wax, 1 mahogany case (brass bound, slide catch), 1 leather pouch.

[3] The *Pocket Case* contained: 1 scalpel, 3 bistouries, 1 tenotome, 1 gum lancet, 2 thumb lancets, 1 razor (small), 1 artery forceps, 1 dressing forceps, 1 artery needle, 6 surgeon's needles, 1 exploring needle, 1 tenaculum, 1 scissors, 1 director, 3 probes, 1 caustic holder, 1 silver catheter (compound), 6 yards suture wire (iron), ¼ oz. ligature silk, ½ oz. wax, 1 Russia leather case.

[4] The *Field Case* contained: 2 amputating knives (one long, one medium), 2 catlings (one long, one medium), 3 scalpels, 2 bistouries, 1 hernia knife, 1 finger knife, 1 capital saw (long, bow, two blades), 1 metacarpal saw, 1 Hey's saw, 1 trephine (conical), 1 bone forceps (broad edged, slightly curved, spring handle), 1 bone forceps (sequestrum, spring handle), 1 artery forceps, 1 ball forceps, 1 dressing forceps, 1 dissection forceps, 1 artery needle, 1 artery needle key, 12 surgeon's needles, 1 tourniquet screw with pad, 1 tenaculum, 2 scissors, 2 retractors, 1 trocar and canula, 1 raspatory, 1 elevator, 1 brush, 1 bullet probe, 1 director, 6 steel bougies, silvered, double curve (Nos. 1 and 2, 3 and 4, 5 and 6, 7 and 8, 9 and 10, 11 and 12), 3 silver catheters (Nos. 3, 6, and 9), 6 gum-elastic catheters (Nos. 1, 3, 5, 7, 9, 11), 12 yards suture wire (iron), ¼ oz. ligature silk, ½ oz. wax, 1 mahogany case (brass bound, slide catch), 1 leather pouch; pocket case the same as allowed to staff surgeons.

The hospital tent[1] in use previous to the war was 24 feet in length, 14 feet 6 inches in breadth, and 11 feet 6 inches high; it was bulky, heavy, and difficult to pitch in windy weather. By the action of an army board in 1860 its size was reduced, the general form being retained. Its general appearance will be seen in FIG. 434, and its dimensions were: length 14 feet, breadth 14 feet 6 inches, height 11 feet (centre), with a wall 4½ feet, the whole covered with a "fly" 21 feet 6 inches by 14 feet. The weight of this tent, including its poles and pins, was 217 pounds. Each tent had at one end a lapel to admit of two or more tents being joined and thrown into one ward. Each hospital tent was designed to accommodate comfortably eight patients. This tent has been found in practice to answer every necessary purpose. By the Army Regulations three hospital tents were assigned to each regiment, also one Sibley tent and one common wedge tent. The Sibley tent (FIG. 435) is conical in shape, 18 feet in diameter at base and 12 feet high, with an opening at the apex, to which is fitted a hood which may be closely fitted or removed at pleasure. The absence of any wall renders it inconvenient and illy adopted to hospital purposes, and the want of a fly renders it almost intolerable on account of heat in midsummer, while the centre pole curtails the available space and interferes with the free movements of the medical officers and attendants. It was not used to any very great extent for hospital purposes. The wedge tent was still less adapted to hospital purposes though found convenient as an adjunct to field hospitals. The hospital tent "fly" alone was found to answer an admirable purpose in sheltering the wounded in mild weather or when it was inconvenient or impracticable to pitch the entire tent.

FIG. 434.—Regulation hospital tent.

FIG. 435.—Sibley tent.

Surgeon A. P. Meylert, U. S. V., treated about eighteen hundred (1,800) patients in a field hospital of the Army of the Ohio constructed of tarpauling, such as was used by the Quartermaster's Department for covering stores and forage, and remarks: "The chief cause of success in this hospital, I believe, was in the mode of shelter adopted. The difficulty in obtaining quarters for the sick and wounded, which in the outset I regarded as the greatest possible calamity, was no doubt of the utmost advantage, since it led to the adoption of those cool, clean, and airy wards, in which I am satisfied the patients improved more rapidly and surely than in either wall or hospital tent or in ordinary buildings. Whenever it was practicable, board floors were placed in the tents, resting on sleepers placed directly on the ground. A trench from 6 to 8 inches in depth, dug around the base, and loose earth thrown around the lower edge of the tent wall in cold weather, completed the arrangement."

[1] In October, 1859, a board of medical officers, consisting of Surgeons C. A. Finley, R. S. Satterlee, C. S. Tripler, J. M. Cuyler, and Assistant Surgeon R. H. Coolidge, had recommended for the army the following allowance of tents for the sick and wounded and their attendants: For one company, 1 Sibley tent and 1 common tent; for three companies, 1 hospital tent, 1 Sibley tent, and 1 common tent; for five companies, 2 hospital tents, 1 Sibley tent, and 1 common tent; for ten companies, 3 hospital tents, 1 Sibley tent, and 1 common tent.

The bedsteads used in the hospital tents were cots of a light frame-work of stout wood, provided with four folding legs and furnished with a jointed support near the head. The whole frame-work was covered with sacking, and throughout the war proved a most useful and satisfactory hospital cot. It was light, strong, easily transported, and was comfortable to the patient.

Various modes were employed for heating hospital tents in the field. Wood-burning stoves were largely used, their chief objection being the difficulty of transportation. The plan which was most generally in vogue, particularly in the Army of the Potomac, and which gave the utmost satisfaction, was that known as the California plan. A pit was dug about two-and-a-half feet deep outside the door of the hospital tent; from this a trench passed longitudinally through the tent, terminating outside its farther or closed extremity. At this point a chimney was formed by barrels placed one upon the other, or by some other simple plan. The joints and crevices of this chimney were cemented with clay. The trench in the interior of the tent was roofed over with plates of sheet-iron issued for that purpose by the Quartermaster's Department. A fire was built in the pit, and the resulting heat, radiating from the sheet-iron plates, kept the interior of the tent warm and comfortable even in the coldest weather. In the western armies, in the trench in the interior of the tent, railroad iron was placed in regular layers and covered with iron plates when possible to procure them, or with stone slabs. Occasionally funnel-shaped stoves, open at the bottom, resting upon the ground, and provided with a short pipe, were used. These were, however, objectionable. The wood fire burned out rapidly, and although an intense heat was created while it lasted, after its extinguishment the atmosphere soon chilled, exposing the men to rapid and uncomfortable changes of temperature.

From an examination of the records and reports in this office it would appear that the first regular tent field hospital was organized during the battle of Shiloh, April, 1862, by Dr. B. J. D. Irwin, U. S. A., Medical Inspector of the 4th Division, Army of the Ohio. His interesting description is here given: "During the military movements of troops during the battle of Shiloh," Dr. Irwin says, "one of the operating hospitals was moved forward to a deserted farm-house situated on an open level piece of unbroken ground. The presence of a spring of cool potable water and the nearness of the building to a branch of the creek were advantages that were promptly recognized, and but a short time elapsed ere these valuable desiderata were utilized in providing shelter and other comforts for the large number of wounded of our own division and those disabled on that part of the field in the preceding day's conflict, pertaining to both of the contending parties, left on the field without assistance some twenty-four to thirty-six hours. The proximity of this field hospital to the recaptured camp of a division of our troops defeated and made prisoners the preceding day, suggested the utilization of the abandoned tents for the benefit of the wounded; and as soon as the battle ceased the hospital tents, commissary tents, and wall tents pertaining thereto were accordingly taken possession of, and in a short space of time were removed to and pitched in regular order on the level ground by which the house was surrounded. The building afforded an operating room, dispensary, office, kitchen, and dining-room. Long into the night the ambulances continued to bring in the wounded, who, after receiving the necessary professional attendance, were made as comfortable as possible by being supplied with an abundance of warm food, good bedding, and shelter from the inclement weather. Next day the hospital camp was enlarged so as to accommodate some 300 patients, and the tents were systematically arranged; all bedsteads, cots, bedding, cooking and messing utensils, hay and

straw found in the abandoned camp were taken possession of, and on the evening of the 8th the Division Medical Purveyor reached us with our medical supplies and hospital stores. By this time the hospital had assumed the proportions and discipline of a well regulated army camp, arranged with a view to meet the special wants of those for whom it had been established. Some mattresses were secured, and the bed-sacks, filled with hay and straw, were placed on cots, bedsteads, or improvised bunks, so that almost every patient was provided with comfortable sleeping accommodations. A suitable number of attendants of each class was detailed for duty in the establishment, which was placed under the charge of Surgeon Menzies, 1st Kentucky Volunteer Infantry, so that the invalids were promptly and regularly supplied with abundance of properly prepared nutritious food, and even a fair supply of extra diet and delicacies were served to the inmates requiring special attention. It soon became manifest that the wounded in this improvised field hospital were better provided for and more comfortable in every way than those who were moved aboard the hospital transports. * * * In illustration of how the efforts made to ameliorate the condition of the wounded were appreciated the following official communication was published, viz:

"'HEADQUARTERS FOURTH DIVISION, ARMY OF THE OHIO,
FIELD OF SHILOH, *April* 12, 1862.

"Col. J. B. FRY,
Assistant Adjutant General, Chief of Staff.

"'SIR: I desire to call the especial attention of the General commanding this Army to the admirable hospital accommodations adopted by Dr. Irwin, U. S. A., Medical Inspector of the Division, during the battle of the 7th inst. They will be found as nearly perfect as the circumstances would allow. The wounded in the Division did not suffer from the inclement weather; they were all promptly sheltered and cared for. I beg to recommend Dr. Irwin to the favorable consideration of his superiors.

"'Very respectfully,
(Signed) "'W. NELSON,
"'*Brigadier General.*'

"Thus was established the *first* tent field hospital of any magnitude for the reception and treatment of the wounded on the field of battle. In the movements of the army following Shiloh and culminating in the siege of Corinth, Miss., the utility of large field hospitals was recognized, and soon developed into a system which became general in the combined armies engaged in the investment of that place. * * * Further experience in the treatment of the sick and wounded under canvas demonstrated the many great advantages possessed by such hospitals over those established in churches, houses, and other structures temporarily used as hospitals, such as the wooden and iron huts used by the allied armies in the Crimea, or those established in large buildings, especially when not constructed in accordance with modern sanitary science. Numerous tent hospitals of much greater capacity were established and kept in successful operation during the last two years of the war, it having been satisfactorily shown that the wounded who were treated under canvas did better in every way, and recovered sooner than those treated in the large permanent hospitals."

The consideration of the construction, organization, and administration of permanent or general hospitals is deferred to the Third Medical Volume of the Medical and Surgical History of the War.

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CHAPTER XV.

TRANSPORTATION OF THE WOUNDED.

The first removal of the wounded from the battle-field was generally effected by means of hand litters. The number of litters issued during the war exceeded fifty thousand[1] (50,000). From the Purveyor's Office at New York, Brigadier General R. S. Satterlee reports that from April 1, 1861, to August, 1865, sixteen thousand eight hundred and seven (16,807) hand litters were issued. At the Medical Purveyor's Depot at Louisville, from November, 1863, to August, 1865, seven thousand and ninety-eight (7,098) hand stretchers were issued, and Surgeon D. L. Magruder, U. S. A., estimated that four thousand seven hundred and thirty-two (4,732) had been given out before November, 1863. The Medical Purveyor's Office at Philadelphia issued, from January, 1863, to August, 1865, five thousand five hundred and forty-eight (5,548), and the Office at New Orleans, from September, 1864, to the end of the war, eight hundred and thirty-five (835) stretchers.[2]

In the beginning of the war the Satterlee, or U. S. Regulation litter (FIG. 436), was supplied to the regiments. It weighed twenty-four and one-half pounds and was twenty-seven inches wide. The canvas consisted of two pieces, five feet ten inches long, sewed in the centre with a flat seam, and with a hem on either side seven and one-half inches wide, through which the poles were passed; there was an inch and a half hem on each end; on one end were three tarred rope loops to put over the pins on the cross-bar,

FIG. 436.—SATTERLEE or Regulation hand litter.

[1] The Records of the Property Division of the Surgeon-General's Office show that from 1861 to 1865 fifty-two thousand four hundred and eighty-nine (52,489) litters of various manufacture were purchased and issued to the troops.

[2] Extemporaneous modes of conveying wounded from the field of battle can only be briefly alluded to. Stout sticks or muskets may be passed through the sleeves of a coat or rolled into the edges of blankets and a litter thus be formed. Hurdles, gates, or ladders, with blankets or straw thrown over them, have made useful stretchers. Poles interlaced with ropes or telegraph wire have been found to answer the purpose of a litter. The editor was once obliged to transport a soldier, wounded in the abdomen, a distance of twelve miles along the narrow bed of a creek filled with boulders and obstructions: "I was fortunate enough to find two ash saplings which, with a blanket stretched across, made an improvised litter, on which my patient was borne by relays of men with comparative ease and comfort. At another time a man belonging to a small detachment sent out from a scouting party was wounded in the leg by the accidental discharge of a musket. Finding it impossible to place the man on horseback, and unsafe to detach a small party to seek the main command, his comrades carried him a distance of about three miles by forming a seat with their hands and arms similar to the chairs made by children in their games (Fig. 437). During the late war I saw a soldier who had been wounded at some distance from his command conveyed to a place of safety by laying him prone across a saddle, the stirrup of one side being sufficiently lengthened to afford support for one foot. The horse with his burden was then led quite a distance. I am familiar with another instance where a man, badly wounded, was conveyed about a three-days' journey in a cot or hammock formed by securing a blanket to two lariat-ropes; the ends of the ropes were gathered and carried by his comrades on horseback. All military surgeons know of instances where wounded men have been carried from the battle-field on muskets with an overcoat laid upon them for a bed. Under the urgent demands of necessity the fruits of ingenuity are sure to come to the rescue." (See *Circular* No. 9, *On the Transport of Sick and Wounded by Pack-Animals*, Washington, 1877, p. 27.)

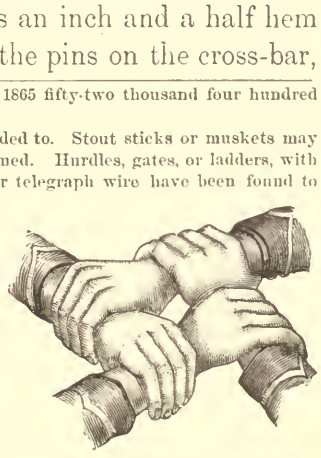

FIG. 437.—Seat made by clasping hands.

and two five-inch drilling loops for pulling the canvas over the poles; at the other end were three eyelet-holes, with a piece of rope three feet long and spliced into one of the holes for fastening the canvas to the pins on the other cross-bar. The poles were made of seasoned red ash, were one and one-half inches in diameter and eight feet nine inches long. Sixteen inches from either end of the poles were wrought-iron bands three-sixteenths of an inch thick and three-fourths of an inch wide, and riveted to the poles as shoulders for the cross-bars to strike against. The cross-bars weighed six and one-fourth pounds; they were made of seasoned white ash, one and one-half inches thick by twenty-four inches long. A piece of wrought-iron, six feet long by one inch wide and one-fourth of an inch thick, was so curved as to form the legs[1] and sockets on either end of the wooden cross-bar for the poles to pass through, and was fastened by two rivets, one at each end; the pin in the centre, on which the canvas was looped, was used as a third. The three pins in each cross-bar were made of half-inch iron, and projected one inch, with heads to keep the loops from slipping off. The shoulder straps weighed one and one-half pounds, were made of leather two inches wide, five feet eight inches long, with a three and one-half inches loop at one end and a buckle at the other end for adjustment on the handles of the stretcher. One objection to the Satterlee litter was its bulk, which seriously interfered with its conveyance in large numbers.

The Halstead[2] litter, a stretcher of lighter and more compact pattern (FIG. 438), soon superseded the Satterlee. It weighed twenty-three and three-fourths pounds and was twenty-three and one-half inches wide; the length of the canvas (unbleached) was five feet eleven inches, being fastened on the outer side of the rave with six-ounce tacks. The poles were made of seasoned white ash, eight feet long and one and five-sixths inches square, with thirteen inches at one end and twelve inches at the other, extending beyond the canvas, and rounded off for handles. The legs, which were also made of seasoned white ash, were fourteen and one-half inches long, one inch thick, one and seven-eighths inches wide at the top, and tapering to one and three-eighths inches at the bottom. They were fastened to the poles with screw bolts, washers under the heads of the bolts, and rivets through the upper end of the legs to prevent them from splitting. The braces to hold the stretcher open, one (on the under side) at either end, consisted of two pieces of wrought-iron one inch wide by three-eighths of an inch thick; one piece was fifteen inches and the other twelve inches in length, hinged in the centre of the stretcher, the longer one overlapping the shorter three and one-half inches, and, when open, shutting on a bolt or pin, forming a stiff shoulder for the hinge and preventing the stretcher from accidentally closing. The braces were fastened on with heavy screws, with pieces of common hoop iron underneath the braces to prevent them from wearing the wood. The shoulder straps weighed eight ounces, and were made of striped cotton webbing two and one-half inches wide by fifty inches long, with a five-inch loop at one end and a leather strap twenty-two and one-half inches long by one and one-sixth inches wide, with buckle, at the other end to loop around the handles of the stretcher at any length desired. A hair pillow covered with canvas accompanied this stretcher, which

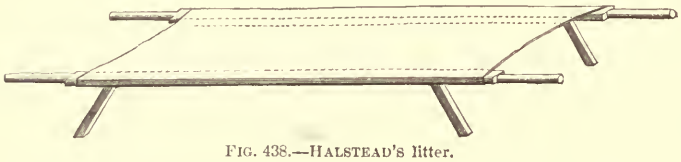

FIG. 438.—HALSTEAD'S litter.

[1] Professor LONGMORE in his *Treatise on the Transport of Sick and Wounded Troops*, London, 1869, p. 129, has probably mistaken the iron feet for yoke pieces, as he speaks of the absence of feet in the litter.

[2] In the preliminary report, *Circular* No. 6, S. G. O., 1865, p. 81, this litter is erroneously called the Smith hand litter; the litter there designated as the Halstead litter was a stretcher issued by the Sanitary Commission. It is to be regretted that these errors have misled Professor LONGMORE, who in his excellent *Treatise on the Transport of Sick and Wounded Troops*, p. 141, reproduced the wood-cuts from *Circular* No. 6.

gave great satisfaction, and out of the litters (16,807) issued by the New York Purveying Depot twelve thousand eight hundred and sixty-seven (12,867) were of this pattern.

Of the litter shown in FIG. 439 and known in New York as the Sanitary Commission litter, few were issued; it was too fragile for the hard usage of actual warfare.

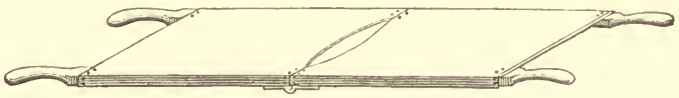

FIG. 439.—Sanitary Commission litter.

A drawing of the litter used in the Confederate armies is shown in FIG. 440, and has been copied from Chisolm.[1] Its construction was very simple and, with the exception of the mode of securing the duck cloth, or sacking, to the frame, needs no explanation: "A groove three-quarters of an inch wide and five-eighths of an inch deep is cut out in the length of the frame. The cloth is tacked in this and secured by a lath which fits accurately the groove and which is nailed in, covering the cloth. The tension upon the cloth is not borne by the tacks, but is uniformly supported by the entire lath, and therefore never rips off."

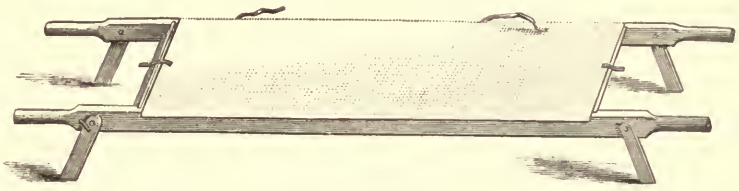

FIG. 440.—Confederate litter.

A litter to be used as a bedstead was proposed by Assistant Surgeon Henry S. Schell, in 1862, in a letter to Medical Inspector Vollum, U. S. A.: "I beg leave to suggest that the hand litter at present in use be somewhat modified, so that it may be arranged as a bedstead in the hospital tent when it is desirable to have a large number of beds quickly made up. It generally takes a day, perhaps more, to prepare bedsteads, or rather to build them, so that they may be elevated from the damp and uneven surface of the ground. The present stretcher cannot be used to make two rows of beds, with a passage from door to door between them in the usual manner, because of its length. The litter (FIGS. 441, 442) which I would propose is constructed of two parallel bars, each six feet two inches long, connected by a strong canvas, and separated by a jointed iron rod about six or eight inches from each end, somewhat similar to those on the litter now in use. To the ends of each of the parallel wooden bars a shorter one, ten inches long, is joined by a strong hinge placed underneath. This latter bar constitutes the handle when used as a stretcher, or the leg when used as a camp bedstead. It is retained in the upright position by a short iron stay, as seen in the figure. I have long felt the want of such an arrangement when arriving in camp and wishing to pitch the hospital tent immediately. The hinge will be found to last much longer than the canvas. As each ambulance carries two stretchers, a hospital may be improvised from these very readily."

FIG. 441.—SCHELL'S litter.

FIG. 442.—SCHELL'S litter used as a cot.

[1] CHISOLM (J. JULIAN), *A Manual of Military Surgery for the Use of Surgeons in the Confederate States Army*, Columbia, 1864, 3d edition, page 530, and PLATE I.

In the last year of the war an order was issued for the construction of a form of litter[1] on wheels (FIG. 443), similar to one used advantageously in the Danish war of 1864, but there are no reports that indicate its practical utility.

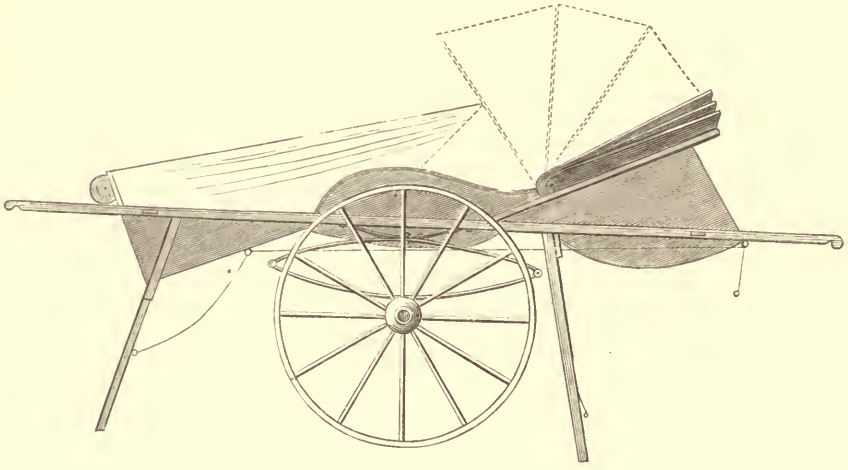

FIG. 443.—Hand-litter carriage—scale ½ inch to the foot.

The modes of carrying wounded men on horse or mule litters during the war have been fully described in *Circular* No. 9, Surgeon General's Office, March 1, 1877, and we cannot do better than to reproduce, with a few additional remarks, the account given there by the author, the late Surgeon George A. Otis, U. S. Army:

"In the Revised Regulations for the Army of the United States for 1861, Paragraph 1298 reads: 'Horse litters may be prepared and furnished to posts whence they may be required for service on ground not admitting the employment of two-wheeled carriages; said litters to be composed of a canvas bed similar to the present stretcher, and of two poles, each sixteen feet long, to be made in sections, with head and foot pieces constructed to act as stretchers to keep the poles apart.' There is no record that these litters were used during the war.[2]

"During the progress of the late war in this country a number of persons, actuated by motives of patriotism, humanity, or interest, devised and brought to the notice of the War Department forms of conveyance for the sick and wounded in localities impracticable for wheeled vehicles, that were represented as improvements upon existing patterns. Several of these were apparently suggested by the descriptions of Delafield[3] and McClellan[4] of the horse litters and cacolets they had observed in the Crimea. In October, 1861, W. C. H. Waddell forwarded to Secretary Cameron a proposal to construct cacolets and litters for army use, accompanied by drawings (FIGS.

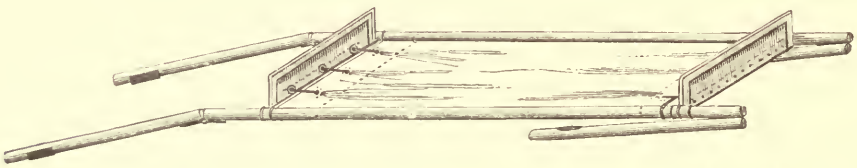

FIG. 444.—United States Army regulation two-horse litter. [From a sample in the Army Medical Museum.]

[1] GURLT (E.), *Militär-chirurgische Fragmente*, Berlin, 1864, p. 6. NEUDÖRFER (J.), *Handbuch der Kriegschirurgie, etc.*, Leipzig, 1864.

[2] Professor T. LONGMORE, in his excellent *Treatise on the Transport of Sick and Wounded Troops*, London, 1869, p. 292, thus refers to this form of litter: "It is necessary to notice another form of sick-transport litter issued for use in the early part of the late war in the United States, in which, instead of two litters being suspended across one horse or mule, one litter was suspended between two horses. This is a very ancient form of litter in Europe. Frequent notices of it occur, showing its common use on occasions of state and ceremony, as well as its employment for the carriage of sick persons, in the records of our own country prior to the introduction of coaches. It seems curious that its use should have been revived in modern times in America." In a note it is added: "This form of litter is referred to as late as the reign of Charles II. A quotation introduced into the first volume of Knight's London, pp. 24 and 25, mentions that 'Major General Skipton, coming in a horse-litter to London when wounded, as he passed by the brew house near St. John street, a fierce mastiff flew at one of the horses and held him so fast that the horse grew mad as a mad dog: the soldiers were so amazed that none had the wit to shoot the mastiff; but the horse-litter, borne between the two horses, tossed the major-general like a dog in a blanket.'"

[3] *Report on the Art of War in Europe in* 1854, 1855, *and* 1856, *by Major* RICHARD DELAFIELD, *Corps of Engineers, from his Notes and Observations made as a member of a "Military Commission to the Theatre of War in Europe,"* Washington, 1860.

[4] *Report of the Secretary of War, communicating the Report of Captain* GEORGE B. MCCLELLAN *(First Regiment United States Cavalry), one of the officers sent to the Seat of War in Europe in* 1855 *and* 1856, Washington, 1857.

446, 447) copied from Delafield's report, and suggested some trivial modifications. In November, 1861, Mr. G. Kohler offered to furnish mule litters and chairs of patterns imitated from those used in the Crimea. In July, 1862, three hundred of these litters were purchased. In April, 1862, Surgeon Glover Perin, U. S. A., and Assistant Surgeon Benjamin Howard, U. S. A., reported to Surgeon General C. A. Finley the results of their inspection of cacolets and litters devised by Mr. Charles Proal, of Louisville.[1] Newspaper descriptions, almost textually quoted from Delafield's report, with figures of these appliances, were transmitted. Mr. Proal claimed to have improved upon the French patterns by diminishing the weight and cost of construction. Messrs. Lawrence, Bradley & Pardee, of New Haven, Connecticut, in 1861, applied for a patent for a cacolet of cumbrous pattern, weighing 131 pounds. The chairs could not be detached from the saddle. A sample, figured in the adjoining wood-cut (FIG. 445), was sent, in 1867, to the Army Medical Museum, and is numbered 824 in Section VI. It combines, in an unusual degree, the undesirable qualities of weight, weakness, and inconvenience. On September 25, 1862, a board of officers of the Quartermaster's Department examined cacolets submitted by Dr. Slade Davis, and reported[2] that, as compared with others that had been purchased for the service, the only advantage of this form of cacolet was its lightness. It was thought that those already on hand were as light as was consistent with the requisite degree of strength. Mr. E. P. Woodcock,[3] of New York, in November, 1863, patented a pack-saddle with wooden outriggers from the pommel and cantle for the suspension of litters. By securing litters to the projecting parts by straps, and protecting the sides of the animal by pads, it was designed to carry two patients in the recumbent position. This contrivance was exhibited by the United States Sanitary Commission at the Exposition in Paris in 1867, but met with no more approval abroad than at home. Mr. J. Jones,[4] of New York, in December, 1862, proposed to the Surgeon General of the Army a mule litter for carrying two persons either in a sitting or recumbent position, the litters being designed to serve also as efficient hand stretchers or hospital-beds. The 'exceeding lightness, strength, and simplicity' of these conveyances were insisted on. The saddle with

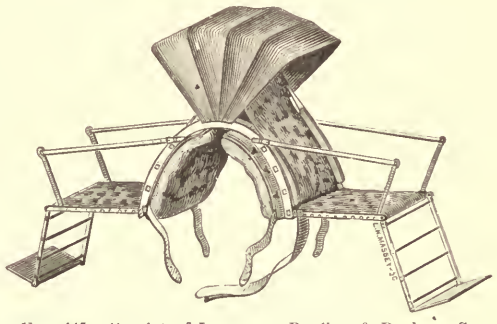

FIG. 445.—Cacolet of Lawrence, Bradley & Pardee. *Spec.* 824, SECT. VI, A. M. M.

[1] Extract from a communication to Surgeon General C. A. FINLEY, by Surgeon G. PERIN and Assistant Surgeon B. HOWARD, dated Louisville, April 2, 1862: "The undersigned would respectfully state that Mr. CHARLES PROAL, of this city, has submitted to our inspection a saddle ambulance, which has been fairly tested by us in the open field. Its chief excellences, compared with other saddle ambulances, are that it is lighter, is more easily adjusted, and combines both the litter and the chair, both of which can be packed away in a very small compass when the pack-saddle to which they belong is required for other purposes. The weight of the entire ambulance, with saddle, etc., is about seventy-four pounds, that of the French being about one hundred and forty-two pounds. The mode of adjustment is such that two litters, two chairs, or one chair and one litter, can be used at the same time, at discretion, each of which may be affixed to or detached from the saddle, while the patient remains undisturbed. The harness appears to be very complete, the breeching and breast-band preventing motion backward or forward, while the surcingle, by being attached to the bottom of each chair or litter, prevents either undue oscillation or shifting, which would be otherwise consequent upon any inequality in the weight of the two patients being carried . . . The price of the ambulance and appurtenances completed is about $50."

[2] A board of officers, consisting of Colonel D. H. RUCKER, Quartermaster, Captain J. J. DANA, A. Q. M., and Captain E. E. CAMP, A. Q. M., was convened at Washington, September 25, 1862, to "examine a cacolet to be presented for inspection by Dr. SLADE DAVIS, and to report its opinion of the cacolet, as compared with other patterns which have been purchased for the service. The board reported that "in their opinion the cacolet presented by Dr. SLADE DAVIS possessed an advantage over those furnished by Mr. KOHLER (three hundred in number, all of which are now on hand) in lightness only. Those made by Mr. KOHLER are constructed in a strong and desirable manner, and are as light as is consistent with the requisite degree of strength. No call has yet been made, either for those first purchased or for those furnished by Mr. KOHLER, which cost $21,000. We would not recommend the purchase of an additional number from any source."

[3] Compare LONGMORE (*Treatise on the Transport of Sick and Wounded, etc., op. cit.*, p. 290): Subject-matter, *Index of Patents for Inventions*, Washington, 1874, Volume III, p. 1232; and SÉRURIER (*Conférences Internationale des Sociétés aux Blessés Militaires des Armées de Terre et de Mer, tenues à Paris*, en 1867, T. I, p. 47).

[4] Manuscript Records of War Department for 1862.

two litters, girths, bridle, and other appurtenances weighed only 62 pounds, and could, probably, be reduced to 60 pounds. In September, 1863, a board of medical officers was convened in Washington to examine into the merits of an adjustable ambulance and pack-saddle, 'submitted by Spencer, Nichols & Co.' Lightness, strength, simplicity, efficiency, adjustability, and cheapness were the merits claimed for this contrivance.[1] Shortly afterward (December 1, 1863) another medical board assembled in Washington to inspect and report on a mule litter submitted by Messrs. Pomeroy & Co., which was found to possess some good and some objectionable features.[2] In addition to these essays in invention, cacolets and litters were submitted to the Quartermaster's Department that purported to be constructed simply in accordance with drawings in General Delafield's report.[3] August 20, 1861, Messrs. Lutz & Bridget, harness-makers, furnished twenty such sets, with pack-saddles and harness. These drawings, which are copied, of a reduced size, in FIGS. 446 and 447, though prepared by so distinguished an artist as Professor Weir, do not accurately represent the mechanical details of either the French or British Crimean litters and cacolets, and the ambulance equipments made in imitation of them did not prove to be of utility. Early in the war, however, probably as early as May, 1861, the Quartermaster's Department had purchased a number of cacolets and mule litters of the pattern used in the French army, and in July, 1861, engaged Tiffany & Co., of New York, to construct others, and employed a French agent to give instruction in the

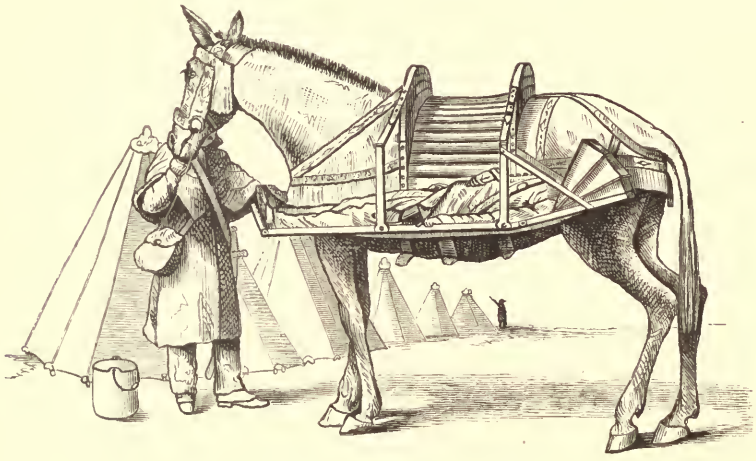

FIG. 446.—British Crimean mule litter. [After WEIR.]

[1] The board, consisting of Surgeon T. H. BACHE, U. S. V., Surgeon C. ALLEN, U. S. V., and Assistant Surgeon W. MOSS, U. S. V., reported, September 16, 1863: 1. That the cacolets weighed 55½ pounds, and the saddle-girths and other equipment 38 pounds; 2. The saddle-tree was jointed so that by turning screws it could be adapted to animals of different sizes; 3. As to simplicity, the saddle was provided with projecting crane-like supports of hickory, covered with raw-hide, which were connected either with a flat framework of hickory for packs, or with litters for patients; 4. As to strength, the saddle easily sustained two barrels of flour; but when two soldiers, one of them a heavy man, mounted on the litters there was a "slight yielding;" but the board considered the litters "strong enough to bear any load that a horse or mule could carry." Finally, the board considered the pattern submitted as "comfortable as such a conveyance can be made."

[2] The board consisted of Medical Inspector J. M. CUYLER, U. S. A., Surgeon O. A. JUDSON, U. S. V., and Assistant Surgeon C. A. MCCALL, U. S. A. The report is unaccompanied by a description or drawing of the conveyance, but states that it was simple in construction, with unusual capacity for providing for the comfortable carriage of two wounded men. Some modifications were suggested, such as strengthening the attachments of the litters by substituting chains for straps; of supplying means for rendering their framework rigid, so that they might be used temporarily as stretchers; of arranging that they might be detached from the saddle; of having rings and hooks for attaching necessary articles to the pack-saddle, and particularly a vessel for water. The board was unwilling to decisively approve of the conveyance until these alterations had been effected and a trial in actual service had been successfully made.

[3] DELAFIELD (R.) (*Report on the Art of War in Europe*, 4-to, Washington, 1860, p. 73) makes the following observations on mule litters and cacolets: "The requisites for an ambulance should be such as to adapt it to the battle-field, among the dead, wounded, and dying; in plowed fields, on hill-tops, mountain slopes, in siege batteries and trenches, and a variety of places inaccessible to wheel carriages, of which woods, thick brush, and rocky ground are frequently the localities most obstinately defended, and where most soldiers are left for the care of the surgeons. These difficulties were felt in a great degree by all the armies allied against Russia in the siege of Sebastopol, and the consequence was that the English, French, and Sardinian armies adopted finally, in part or altogether, *pack-mules carrying litters or chairs*. The careful and sure-footed mule can wind its way over any road or trail, among the dead, dying, and wounded on any battle-field, as well as in the trench and siege battery. It required but suitable arrangements to support the wounded from the mule's or horse's back to attain the desired object, and this the allied armies finally accomplished and put in practice. The merit of the plan renders it worthy our consideration, particularly so in our Rocky Mountain and other distant expeditions." Further on he remarks: " . . . I witnessed the transport of one hundred and ninety-six sick and wounded French soldiers, with their arms, accoutrements, and knapsacks, on the route from the Tchernaya to Kamiesch Bay, on these litters and chairs. Fifty-two of them were on twenty-six mules in the horizontal litters, and one hundred and forty-four seated in chairs on seventy-two other mules. A driver was provided for every two mules or four wounded men. The appearances, with such an examination as I gave the whole equipment, were so favorable as to recommend it for trial in our service. To make the system better understood I annex two additional figures (FIGS. 446 and 447), showing the animal, the equipment, and position of the soldier, for which compilation and drawing I am indebted to Professor WEIR."

use of these cacolets and litters, and purchased animals specially adapted for their transport. The Quartermaster General has remarked that these horses and mules were gradually appropriated as draft animals, and that the litters and cacolets were, for the most part, condemned as unserviceable. The French litters and cacolets were what is known as the old pattern, such as the French used in Algeria and the Crimea. They are figured in the surgical report in *Circular* 6, S. G. O., 1865, at page 82. Surgeon General Longmore correctly observes (*op. cit.*, p. 291) that 'the same drawings may also be seen in Chapter XX of M. Legouest's *Traité de Chirurgie d'Armée*, Paris, 1863, pp. 968–9.' I ventured to copy the drawings because they well represented the identical cacolets and litters issued in our army, and through an inadvertence, which must be conceded to be unusual in me, I neglected to acknowledge my indebtedness to my honored friend and master. I trust this explanation will convince him and every one that I had no surreptitious design in using the cuts. In the mule litters and cacolets now issued in the French army there are improvements providing for making the sections of the litter rigid, so that it can be used temporarily as a hand-stretcher, for reduction in weight, and for greater compactness in packing.[1] The mule chairs and litters now issued by the British Royal Carriage Department are lighter and more convenient than those used in the Crimea. I take the liberty of copying Surgeon General Longmore's drawings of the cacolet (FIG. 448) and litter (FIG. 449) now employed in the British service.[2] The only reference I find of the actual employment in battle, during the late war in this country, of horse litters or cacolets, is made by Professor F. H. Hamilton. He mentions that, at the battle of Fair Oaks, May 31, 1862, when he was Medical Director of the Fourth Army Corps, eight pack-saddles, pro-

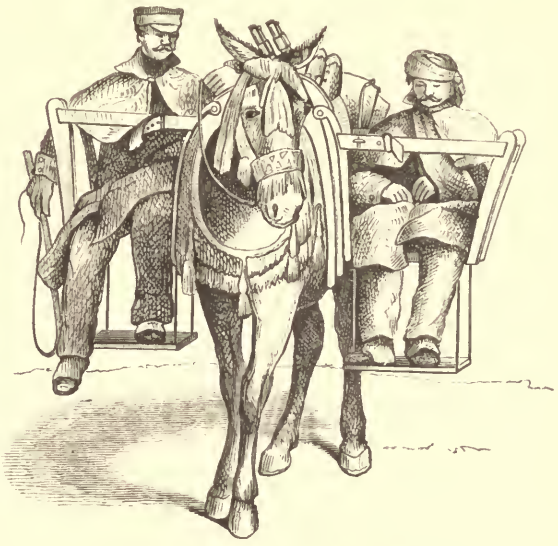

FIG. 447.—British Crimean cacolet. [After WEIR.]

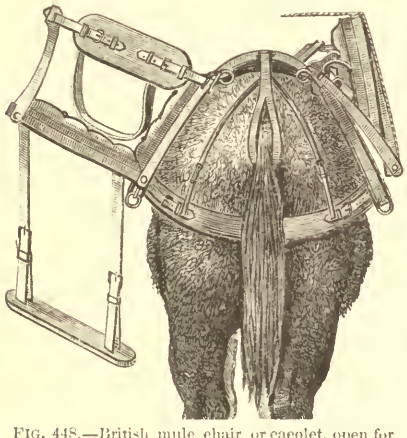

FIG. 448.—British mule chair or cacolet, open for use and packed for traveling. [After LONGMORE.]

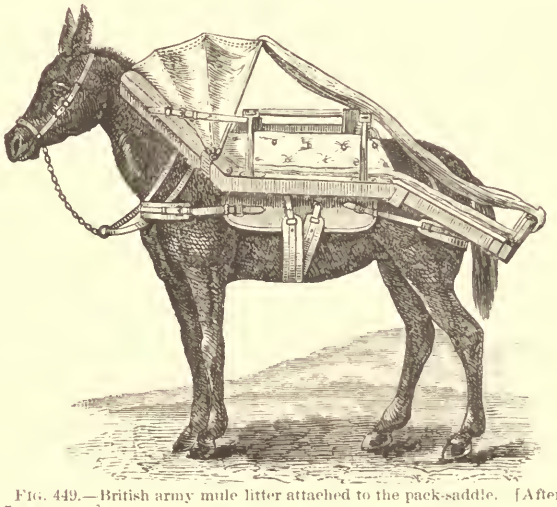

FIG. 449.—British army mule litter attached to the pack-saddle. [After LONGMORE.]

[1] M. BOUDIN states (*Système d'ambulances des armées Française et Anglaise*, 1855, p. 35) that the cacolet weighed something over 19 kilogrammes the pair. The pair in the Army Medical Museum weighs 40 pounds. Including the pack-saddle, Professor LONGMORE says a pair weighed in the Crimea was found to be 89 pounds and 12 ounces.

[2] The weight of a pair of English litters used in the Crimea was 138 pounds 12 ounces without the pack-saddle. The present pattern weighs 84 pounds without bedding or pack-saddle. With palliasses and pack-saddle the weight is 167 pounds.

vided with a litter on one side and a cacolet on the other, were provided as a part of the ambulance outfit of that corps, and were used only on the first day of the battle, proving utterly unserviceable.[1] Notes are found in the War Department of the transmission, August 26, 1861, of twelve of the mule litters and cacolets made by Tiffany & Co., to the army in the Shenandoah Valley, commanded by General Banks. A supply of litters and cacolets was provided for the advance of the Army of the Potomac from Yorktown toward Richmond, in May, 1862. There were forty, at least, in store at White House,[2] but there were no trained animals to bear them. Moreover, the subordinate quartermasters and medical officers appear generally to have regarded the experiment with little favor. Medical Director Tripler, who, in 1859, in a report on the needs of the ambulance service, had urged the importance of supplying horse litters to troops serving in regions impracticable for wheeled carriages, made several efforts to secure suitable equipment and proper animals[3] for this purpose, but without much success. His successor also, Medical Director Letterman, entertained similar views, in correspondence with the opinions of European authorities; and persevering, though ill-arranged, efforts were made to give the system a fair trial. In July, 1862, the Surgeon General requested the Quartermaster's Department to provide three hundred litters, and this number was purchased of Mr. G. Kohler.[4] Prior to the battle of Antietam Medical Director Letterman asked for a supply of mules equipped with cacolets and litters.[5] The Quartermaster's Department had an ample supply of the French patterns, which were beyond all question the best that had been devised at that time. But there were no trained animals to bear them, and few, if any, available skilled packers. September 1, 1862, the Surgeon General requested that a hundred mule litters should be sent to Medical Inspector R. H. Coolidge. A few weeks after the battle of Antietam a hundred and fifty mules were sent to the Army of the Potomac for ambulance service, but they were so unruly that it was thought unwise to pack them with their equipment, and the litters and cacolets were sent along in wagons, and, as far as can be learned, never found their way to the backs of the mules.[6] Little could be anticipated from such essays. In November, 1862, the Sur-

[1] HAMILTON (F. H.) (*A Treatise on Military Surgery and Hygiene*, 1865, p. 162): "Just before the battle of Fair Oaks, eight were sent to us for the use of the 4th corps. They were only employed, however, on the first day of the battle. The horses were found to be impatient and restless under them, and six of the eight were soon broken and rendered unfit for use. Mules are better than horses for this purpose; they are not so high, and are less restive under the pressure of heavy weights upon their backs; but even mules require to be trained especially to this kind of service before they can be rendered useful or safe."

[2] From a telegraphic order of May 27, 1862, recorded on the files of the War Department, and addressed from the Headquarters of the Army of the Potomac, by Lieutenant Colonel J. A. HARDIE, to Colonel S. VAN VLIET, Quartermaster, at White House on the Pamunkey, it appears that a certain number of cacolets were at that depot prior to the battle of Fair Oaks. The dispatch reads: "The Commanding General directs that you furnish the forty cacolets at the White House, belonging to the Medical Department, with horses, and report to the Medical Director here the moment they are ready." Doubtless the eight cacolets sent to the Fourth Corps were supplied from this source.

[3] March 13, 1862, on receiving the papers regarding Mr. KOHLER'S request for an examination of his litters and cacolets, Medical Director TRIPLER makes the indorsement that: "there are sufficient horse litters for this army in the possession of the Quartermaster's Department. All we want now is horses or mules properly trained to carry them. On April 25, 1862, Dr. TRIPLER stated that there were some 200 or more cacolets furnished by the Quartermaster's Department, and that he made every effort to have horses trained to carry them with their loads; that orders to that effect were issued by General McClellan, but were not executed.

[4] June 17, 1862, Colonel RUCKER advises the Quartermaster General that he has advertised for proposals for mule litters, and that the only proposal received is from Mr. G. KOHLER, and that the litter he proposes to furnish seems to be very high priced: "It is intricate and cumbersome in construction, and, in my opinion, inferior to those now in Captain DANA'S store-house" [the French cacolet and litière]. July 26, 1862, Surgeon General HAMMOND states, in reply to a letter from the Quartermaster General concurring in Colonel Rucker's opinion: . . . "The litter presented by Mr. KOHLER has been examined by myself and a board of officers, who agree that it possesses sufficient merit to entitle it to trial in the field. I therefore request that *three hundred* of the mule litters presented by Mr. KOHLER be purchased for the use of the army." Quartermaster General MEIGS replies, July 29, 1862, that . . . "inasmuch as the Surgeon General adopts and requests that these litters be constructed, though in the opinion of the Quartermaster's Department they are not as good as those already on hand, they will be contracted for under the proposal of Mr. KOHLER. The price bid is understood, as in other cases, to include the whole set, namely: head-stall, harness, saddle, and two litters for each mule." As early as December 9, 1861, this pattern of mule litter had been reported on by a board convened by General MCCLELLAN, consisting of Colonel D. H. RUCKER, Surgeon C. H. LAUB, and Surgeon J. R. SMITH, it is presumed unfavorably, as further action was not had at the time.

[5] The records of the Property Division of the Surgeon General's Office show that during the period from 1861 to 1865, nine hundred and eighteen horse or mule litters were purchased and distributed by the Medical Department. Of these, 417 were manufactured in the depot at New York, and the rest were purchased from Tiffany & Co., of New York, Wyeth & Brother, of Philadelphia, A. F. Coldeway, Louisville, Ky., and Suire & Eckstein, of Cincinnati, Ohio.

[6] In October, 1862, the Surgeon General again made requisition on the Quartermaster's Department for one hundred and fifty mules provided with mule litters, to be sent to Dr. JONATHAN LETTERMAN, Medical Director of the Army of the Potomac. In reference to delay in compliance with this

geon General made another requisition for a hundred and fifty mules with drivers, with a view of having them drilled with cacolets in the field by Dr. Slade Davis; but this, like previous experiments in this direction, proved abortive; and the ambulance material for transport by pack-animals, accumulated at no inconsiderable cost, was never really tested in the field.[1] There seems to have been a widespread distrust of the system on the part of officers of the Quartermaster's and the Medical Departments.

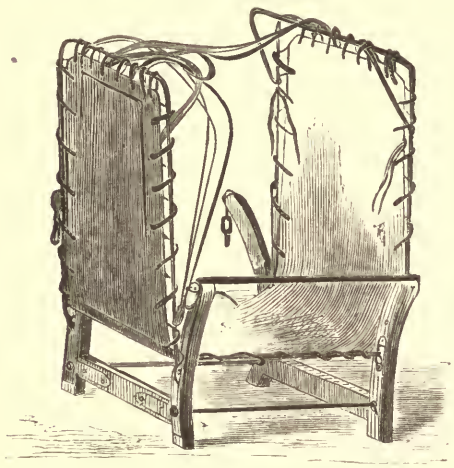

FIG. 450.—French litière folded. [After LEGOUEST.]

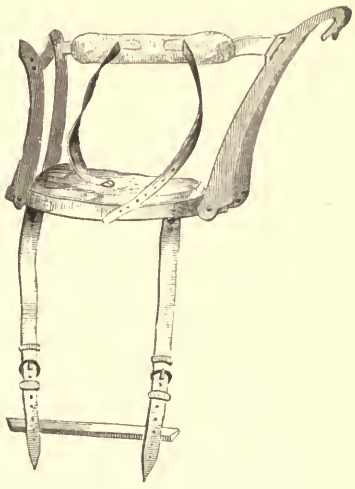

FIG. 451.—French cacolet unfolded. [After LEGOUEST.]

"In a letter of March 20, 1863, Surgeon George Suckley, U. S. V., Medical Director of the Eleventh Corps, wrote from the Army of the Potomac, near Fredericksburg, to Surgeon J. H. Brinton, U. S. V., at Washington: 'There are no cacolets in this corps, and I want none. Three hundred and fifty pounds weight is too much for a mule's back over rough ground, encumbered by bushes, stones, logs, and ditches. Among trees, cacolets will not answer at all; although used in European services and in Algeria, they have there been employed under some favorable circumstances, either on plains or on open rolling country. Here they would prove, I sincerely believe, only a troublesome and barbarous encumbrance, cruel alike to the wounded and the pack-animals.'"

AMBULANCE CORPS.

The necessity for a drilled and instructed corps for the transportation of wounded from the field is apparent to every one who will consider the subject. The importance of having the wounded rapidly removed from the scene of strife must be conceded, not only on the score of humanity, but also as a military necessity. Without a detachment whose service

requisition Captain J. J. DANA, A. Q. M., reported October 17, 1862, as follows: "The order was given by me October 3d, immediately on its receipt, for one hundred and fifty mules and litters to be made ready for service. At that time we had no mules sufficiently well broken for the purpose. I directed fifty of the best to be taken from the ambulance train, the litters to be fitted upon them, and the mules drilled daily until they were fit to go into the field. On the 9th of October fifty mules, with litters upon them, were started for Dr. LETTERMAN. Much difficulty was experienced in getting the mules forward, as they were, many of them, inclined to lie down, and were otherwise unruly. Among a lot of mules received on the 10th instant we found one hundred which were, to some extent, suitable for the purpose, and were sent forward on the 11th instant, the litters being sent by wagons in order to expedite the matter." October 3, 1862, Quartermaster General MEIGS, in transmitting this report to Surgeon General HAMMOND, stated: "I desire respectfully to call your attention to the fact mentioned in the report: that there are a large number of cacolets now in the possession of the Government which appear to have been overlooked by the officers of your Department, and to suggest the expediency of directing their availing themselves of them as occasion may arise. General MCCLELLAN issued orders, a year ago, for drill and practice of ambulance men, including, as I understand, the use of the mule litters, of which, of French and American manufacture, there were then a considerable number provided by the Quartermaster's Department. Those lately purchased from Mr. KOHLER, on the requisition of the Surgeon General, cost $21,060 and are still in store."

[1] "From the papers laid before the Quartermaster General to-day, there appears an expenditure for purchase of cacolets and litters in 1861 and 1862 for the army, partly upon requisitions from the Surgeon General, partly from orders originating in this office, of over $20,000. To this, if the cost of animals and use of men, of forage, etc., supplied by this Department for the experiment of introducing these litters and cacolets, it would be found that not less than $100,000, and probably more, has been expended in an experiment which was, so far as information in this office goes, entirely unsuccessful. There never was, to the knowledge of the Quartermaster General, a requisition from any military commander. All the requisitions came from the Surgeon General's Office. It is not known to this office that these mule litters ever were used in service, and the Quartermaster General believes that no wounded man was ever placed upon one of them. While the wheeled ambulances and hand litters provided for the hospital equipments were in constant and useful use, the litters burdened the trains, and the mules were, by the ordinary accidents of service, taken for the ambulances and wagons. He believes that no better cacolets or mule litter will be constructed than the French cacolet and litter, ordered at the beginning of the rebellion; and these, which though in his judgment inferior, were, at a later period, bought at the urgent requisition of the then Surgeon General. He is, therefore, of opinion that any further expenditure by this Department in this line of experiment will be a waste of public money, and he will not, therefore, unless under order of higher authority, expend money or make reports upon any models thus far submitted to him.—*Mem. of* QUARTERMASTER GENERAL, December 23, 1863.

it is to attend to this duty, the natural impulse of sympathy will draw men from the ranks to assist their fallen comrades, while the pretext is a temptation to the faint-hearted to shirk the perils of their position. Moreover, the courage of troops under fire would be sustained if they were assured that reliable men would be ready to bear them rapidly from the vicissitudes of a conflict and to tender them early assistance.

No organized ambulance corps[1] existed in the army at the beginning of the war, but the necessity of such an organization under the control of the Medical Department was

[1] Propositions were made by citizens early in the war to aid in the establishment of an ambulance corps. In May, 1861, Dr. J. O. BRONSON, of New York, urged upon General Winfield Scott the formation of an organization to consist of a surgeon-in-chief, with aids, nurses, and an efficient body of men to attend upon the ambulance and litters. The letter was referred by General Scott to the Surgeon General, but no further action seems to have been taken. On September 19, 1861, the Surgeon General of Pennsylvania, Dr. H. H. SMITH, wrote to Surg. C. S. TRIPLER, U. S. A., Medical Director of the Army of the Potomac: "I shall have at Camp Curtin, near Harrisburg, in a few days, fifteen of your ambulances, thirty of those of Coolidge, and fifteen transport carts, with harness complete, ready to send to the Pennsylvania Reserve Corps. I should like to enlist, if authorized, and drill for one week at this camp, teamsters as drivers, with non-commissioned and commissioned officers, at the same pay as similar grades in the Army. The corps would consist as follows: One driver to each carriage—60 drivers; one corporal, mounted, to fifteen carriages—4 corporals; one sergeant, mounted, to a division (20 carriages)—3 sergeants; two second lieutenants—2 officers; 67 men. This company would have its motions in transportation directed by the lieutenants, who would be commanded by the surgeon of brigade, etc.; the officers and drivers dismounting to lift wounded men, and, whilst carriages went to a hospital and back, could ride round and give temporary assistance with tourniquets, canteens, etc. This may suffice to show my general ideas, which can readily be made to conform to Army Regulations when I am authorized to do so. Not knowing who to apply to, I place the matter in your hands, asking a prompt reply, that no time may be lost, especially if wanted. Such a corps would serve to drill and form others. When not acting with ambulances the corps could attend to general police of sinks, stables, water, fuel, etc., aided by guard-house prisoners, and relieving guard of such duties, or act as extra nurses, cooks, wardmasters, etc., of regimental hospitals. Many volunteer regiments are deficient in these men—those having them could organize an ambulance corps readily." Surgeon TRIPLER forwarded this letter to the honorable Secretary of War with the following endorsement: "The plan suggested by Dr. SMITH, if authorized to be carried out, would meet a pressing want—that of having properly instructed men to handle the wounded. The only difficulty in the way is that medical officers are not *now* authorized to command lieutenants. The necessity for that authority, however, becoming daily more apparent, it is hoped it may be granted, at the next session of Congress, to the same extent as in the other staff departments. The whole plan of Dr. SMITH is, therefore, earnestly recommended to the favorable consideration of the honorable Secretary of War." No action was had on this recommendation. In the early spring of 1862 a plan was submitted to the Secretary of War by Mr. CHARLES PFIRSCHING: "To every division of the army a company shall be attached which will follow it immediately into action on the day of battle for the purpose of taking up all its wounded and carrying them back to the ambulances, or to the points where the regimental surgeons have taken position. Each man of this company should be armed and equipped in the following manner: Two navy revolvers, carried in the cartridge-box belt; a hatchet, carried on the left side of the cartridge-box belt; a cartridge-box on a leather belt; a knapsack half filled with his own things, while the other half is appropriated to a stock of bandages, linen, lint, etc., as they may be necessary for a bandage to prevent the death of the wounded before he obtains the assistance of the surgeon. Besides some prepared sticking plasters, etc., and some bottles with stimulating essences to recall the spirits of the wounded, or to enable him to bear the pains of his wound and of the transportation, a large canteen with water, to which some vinegar or pure brandy may be added for the use of the wounded; a tin tumbler with it; a small canteen for the man's own use; a small box on the cartridge-box belt, with lint, bandages, a small bottle of vinegar for immediate use, so that he has not to take off his knapsack; the half of a litter of my own invention. Two men of this company always keep together, and by means of their two halves they form a litter on which they carry the wounded from the battle-field to the ambulances, or to the places where the regimental surgeons have established themselves. Every man has a broad bandoleer of black leather from the left shoulder to the right hip, and one from the right shoulder to the left hip, with a sling to each to put the ends of the litter through, so that the weight of the load rests on it, and that the men may have one or both hands free if they should be obliged to make use of their weapons. Each man should have a small whistle to give signals to other members of his company. Each company should have one first and one second lieutenant, and as many non-commissioned officers as there are regiments in the division. If brigades or regiments should be detached from the division, a corresponding number of platoons would be detached from the ambulance companies with them. All ambulance companies of the army should be under the command of a colonel. The men would be instructed in a particular drill for their particular duties on the battle-field. The two or four wheeled ambulances would then be stationed on a convenient place in the rear of the different regiments, and with them might be stationed the regimental surgeons to give the wounded the first regular assistance before they are sent farther back. By this arrangement not only a great deal of pain and suffering might be spared to the wounded, but a great many lives might be saved also. In an economical point of view a saving would also be made, for the ambulances would last a good deal longer than at present. All the confusion with the wounded at present on the battle-fields would be avoided; the ranks would not be broken by men who want to assist their wounded comrades, or who use this excuse to cover their cowardice. The men of the ambulance companies would be detached from the different regiments of every division, say one man from every company. I am willing to undertake the formation and instruction of these companies, and to take the command of them. (Signed) CHARLES PFIRSCHING." The Secretary of War directed, on March 3, 1862, Surgeon-General C. A. FINLEY to examine, or cause to be examined, this plan, and report. Surgeon General FINLEY sent the paper to Surgeon CHARLES S. TRIPLER, U. S. A., Medical Director of the Army of the Potomac, requesting his views with regard to its adaptability to the service and with regard to the question whether the proper organization of the bands in the field would not obviate the necessity for the proposed organization. The report of Surgeon TRIPLER is appended: "Headquarters Army of the Potomac, Medical Director's Office, Washington, March 6, 1862. Sir: I have the honor to report that, in obedience to your instructions, I have examined the plan of organization of an ambulance corps submitted by CHARLES PFIRSCHING. However desirable a regularly organized ambulance corps may be for an army, it is too late now to raise, drill, and equip so elaborate an establishment as this for our service. There is nothing new in this plan, nothing that has not been thought of and well weighed years ago in connection with our own organization, unless it be the arsenal of pistols and hatchets with which the men are to be loaded. As we have no ambulance corps proper, an attempt has been made to instruct a certain number of men in each regiment in the duties appertaining to such a corps. An order providing for the drilling of ten men and the band of each regiment to the ambulance service was issued from these headquarters on the 3d of October, 1861. This has been generally faithfully done, and we now have a tolerably well instructed body of men for this duty. Instructions for the distribution and employment of these men during an action have been prepared by me and even submitted to General Williams, Adjutant General of the Army of the Potomac, for the action of General McClellan, some ten days ago. I hope they will soon be printed and circulated. When that is done all necessary and practicable arrangements for the transportation of our wounded will have been made. I am, therefore, of opinion that the plan of Mr. PFIRSCHING is neither needed nor available for our service at the present time. Very respectfully, your obedient servant. (Signed) CHAS. S. TRIPLER, Surgeon and Medical Director, Army of the Potomac." The report of Surgeon TRIPLER was returned, on March 7th, to the Secretary of War by the Surgeon General, who fully endorsed the views of Surgeon TRIPLER.

early recognized by the medical officers, and already in April, 1862, Medical Director Tripler, of the Army of the Potomac, called attention to the absolute necessity of having an experienced quartermaster and assistant commissary of subsistence attached to the command of the Chief Medical Officer of an army in the field: "I find it impossible to secure either transportation or subsistence for the men thrown upon my hands without tedious delays and much unnecessary suffering. Time, which is so valuable to me now, is taken up and wasted in endeavors, too often unsuccessful, to get together ambulances and wagons[1] to have these trains properly and economically conducted, to have boats prepared and in position, to procure buildings for hospitals, to get subsistence for the sick and wounded, and, in short, doing the duty assigned to quartermasters and subsistence officers. It seems to me that to bring this evil to the notice of the Secretary of War will be sufficient to cause its instant remedy; at all events, I protest beforehand against the Medical Department being held responsible for evils they have no possible means of obviating. My experience in this campaign has taught me that without an executive officer of these two important departments under my command, more time is lost in negotiating through second and third parties, with an even chance of not getting at all what is wanted, and a certainty of not getting it in time, than would be required in procuring what is necessary and having it in the right place if these officers were placed at my disposal."

On August 21, 1862, Surgeon General W. A. Hammond, U. S. Army, in a letter to the Secretary of War, urged the necessity for such a corps:

"SURGEON GENERAL'S OFFICE,
"WASHINGTON, *August* 21, 1862.

"Honorable EDWIN M. STANTON,
Secretary of War.

"SIR: In accordance with your verbal permission, I have the honor to submit to you the inclosed project for an Hospital Corps, and to ask your favorable consideration for the same. The plan is merely submitted as a basis on which the corps can be organized; much will remain to be done by regulations, and I propose, should you approve the inclosed outline, to ask for a board of medical officers to perfect the organization. I have not considered it necessary to enter into details; the first thing essential is to obtain your sanction to the organization of such a corps. The need for it is most urgent. In no battle yet have the wounded been properly looked after; men under pretence of carrying them off the field leave the ranks and seldom return to their proper duties. The adoption of this plan would do away with the necessity of taking men from the line of the army to perform the duties of nurses, cooks, and attendants, and thus return sixteen thousand men to duty in the ranks. In view of these facts, and many others which could be adduced, I respectfully ask your approval of the inclosed project.

'I am, sir, very respectfully,
"Your obedient servant,
(Signed) "WILLIAM A. HAMMOND,
"*Surgeon General.*"

To this the following answer was received:

"WAR DEPARTMENT,
"WASHINGTON CITY, D. C., *August* 29, 1862.

"SIR: The Secretary of War directs me to acknowledge the receipt of your communication of the 21st instant, submitting a project for a Hospital Corps, and to inform you that the subject was referred to the General-in-Chief, whose views, adverse to the project, are expressed in the following words: 'Our army trains are already much too large and very seriously impede the movements of our troops in the field. The enemy have great advantages over us in this respect. To

[1] It will be shown hereafter that the importance of having the ambulance wagons under the control of the Medical Department had, before the war, been pointed out by a board of medical officers consisting of Surgeons R. S. SATTERLEE, C. H. LAUB, and Assistant Surgeon C. H. CRANE, U. S. A., who, in March, 1858, had been appointed a board to examine and report upon the Moses' ambulance wagon.

organize such a medical force as is here proposed would, besides involving enormous expenses, greatly increase this evil. Moreover, the presence of non-combatants on, or near the field of battle, is always detrimental, as most panics and stampedes originate with them. Medical soldiers would not obviate the necessity of sending fighting soldiers from their ranks with their wounded, for the former would seldom be near enough to the enemy to perform that duty. The soldier can be very much relieved by hiring cooks, nurses, and attendants in hospitals, whenever the circumstances will permit; but I can see no advantage in having them enlisted for that special purpose. All persons so employed are, by law, subject to Army Regulations. I regard this project as one calculated to increase the expenses and immobility of our army by adding to it a large corps of non-combatants, without any corresponding advantages. I therefore report against its adoption.'

"Very respectfully, your obedient servant,

"SURGEON GENERAL, (Signed) "P. H. WATSON,
Washington, D. C." "*Assistant Secretary of War.*

A second appeal was made to the Secretary of War on September 7, 1862:

"SURGEON GENERAL'S OFFICE,
"WASHINGTON CITY, D. C., *September* 7, 1862.

"SIR: I have the honor to ask your attention to the frightful state of disorder existing in the arrangements for removing the wounded from the field of battle. The scarcity of ambulances, the want of organization, the drunkenness and incompetency of the drivers, the total absence of ambulance attendants, are now working their legitimate results, results which I feel I have no right to keep from the knowledge of the Department. The whole system should be under the charge of the Medical Department; an ambulance corps should be organized and set in instant operation. I have already laid before you a plan for such an organization, which I think covers the whole ground, but which I am sorry to find does not meet with the approval of the General-in-Chief. I am not wedded to it. I only ask that *some* system may be adopted by which the removal of the sick from the field of battle may be speedily accomplished, and the suffering to which they are now subjected be, in future, as far as possible avoided. Up to this date six hundred wounded still remain on the battle-field in consequence of an insufficiency of ambulances and a want of a proper system for regulating their removal in the Army of Virginia. Many have died of starvation, many more will die in consequence of exhaustion, and all have endured torments which might have been avoided. I ask, sir, that you will give me your aid in this matter; that you will interpose to prevent a recurrence of such consequences as have followed the recent battle, consequences which will inevitably ensue on the next important engagement, if something is not done to obviate them.

"I am, sir, very respectfully,
"Your obedient servant,

"Hon. E. M. STANTON, (Signed) "WILLIAM A. HAMMOND,
Secretary of War." "*Surgeon General, U. S. A.*

This also was referred to the General-in-Chief and returned endorsed as follows:

"HEADQUARTERS OF THE ARMY,
"WASHINGTON, *September* 15, 1862.

"I am informed by the Quartermaster General that every effort is being made to supply a large number of ambulances. It is proper to remark, however, that the enemy have provided for their wounded on every battle-field with not one-half the ambulances and other facilities provided for our armies. I do not perceive how the drunkenness and incompetency of drivers are likely to be prevented any more by putting the ambulances exclusively under the direction of the Medical Department. It is the duty of all officers to furnish fatigue parties, properly officered, on the requisition of medical officers, for the care and removal of the wounded, and it is the duty of all medical officers to make such requisitions, and if not filled, to report the neglect. No such neglect has been reported by medical officers on the recent battle-fields. My objection to the proposed organization of a separate non-combatant corps to be attached to the Medical Department were set forth in my endorsement upon a former letter of the Surgeon General.

(Signed) "H. W. HALLECK,
"*General-in-Chief.*"

Owing to the opposition of the General-in-Chief, no further steps were taken in this direction at this time. In the meantime the medical officers in the field had been compelled to devise the best means they could for the immediate care of the wounded after battles. At the suggestion of Medical Director Tripler, the following order was issued in the Army of the Potomac on October 3, 1861:

"HEADQUARTERS ARMY OF THE POTOMAC,
"WASHINGTON, *October* 3, 1861.

"GENERAL ORDERS No. 20.

* * * * * * * *

"VI.—The hospital attendants, to the number of 10 men to a regiment, and the regimental bands, will be assembled under the supervision of the brigade surgeons, and will be drilled one hour each day, except Sunday, by the regimental medical officers, in setting up and dismantling the hand-stretchers, litters, and ambulances; in handling men carefully; placing them upon the litters and ambulance beds; putting them into the ambulances, taking them out, etc.; carrying men upon the hand-stretchers (observing that the leading bearer steps off with the *left* foot and the rear bearer with the *right*); in short, in everything that can render this service effective and the most comfortable for the wounded who are to be transported.

* * * * * * * *

"BY COMMAND OF MAJOR GENERAL MCCLELLAN:
(Signed) "S. WILLIAMS,
"*Assistant Adjutant General.*"

Similar plans were adopted in other armies, but the first and most complete ambulance system[1] was that established in August, 1862, at the instance of Surgeon Jonathan Letterman, U. S. A., Medical Director of the Army of the Potomac. The plan is clearly set forth in the accompanying order:

"HEADQUARTERS ARMY OF THE POTOMAC,
"CAMP NEAR HARRISON'S LANDING, VA., *August* 2, 1862.

"GENERAL ORDERS No. 147.

"The following regulations for the organization of the Ambulance Corps and the management of ambulance trains are published for the information and government of all concerned. Commanders of Army Corps will see that they are carried into effect without delay:

"1. The Ambulance Corps will be organized on the basis of a captain to each Army Corps as

[1] A crude draft of a plan for the establishment of an ambulance corps had, on July 15, 1862, been submitted to the Surgeon General by Surgeon B. A. VANDERKIEFT, U. S. V., as follows: "Each division shall be provided with a special corps under the name of 'Division Ambulance Corps.' This corps will be under the immediate orders of the Division Medical Director. This corps will be composed of one hundred private soldiers and four non-commissioned officers, under the orders of a medical officer with the rank of surgeon, who will be aided in his duties by an assistant surgeon; both being detailed from respective regiments, and being exempt from all duties save those connected with the above mentioned corps. The non-commissioned officers attached to this corps will have the rank and pay of hospital stewards, and the privates will receive the additional pay of hospital attendants. Among the privates four will be detailed to act as cooks. One blacksmith shall be attached to the corps. The four non-commissioned officers to be mounted. The men composing the Division Ambulance Corps will be selected from the different regiments forming the division; and preference will be given to hospital attendants recommended by their respective surgeons as being competent, intelligent, and of unimpaired physique. As means of transportation there will be required: 12 four-wheeled four-horse ambulances; 12 two-wheeled one-horse ambulances for transportation of sick and wounded; 1 four-wheeled two-horse ambulance, containing the medical stores on hand and serving as an ambulating surgery; 2 four-wheeled four-horse transport wagons, for transporting medical stores and provisions. The corps, having no permanent place of settlement, should always be provided with a few days' rations for attendants and patients. Rations and forage should be drawn by the medical officer in charge from the division commissary. Every man belonging to this corps shall be instructed, if possible, four hours each day in the following exercises: Transportation of sick and wounded; removing sick and wounded in ambulances from the field of battle; attendance of the wounded on the field before the arrival of the surgeon, such as applying tourniquets and bandages to prevent fatal bleeding, etc. The building of provisional hospitals *(abris)*, where no other means offer, and the construction of *impromptu* bunks and litters will also form part of the instruction of attendants, to make them more thoroughly efficient for their position. Each man shall be provided with a bag containing a tourniquet, lint, linen, bandages, and a few hæmostatic and stimulant medicines, the use of each having been explained. During and after a battle or engagement, the surgeon in charge shall always superintend the transportation of the wounded, not only by his own corps, but even by the different regimental ambulance corps. In cases where it may be absolutely required, operations on the field should even be performed by the surgeon in charge or his assistant surgeon, but only in the absence of the proper regimental surgeon, such privilege belonging properly to him. After an engagement the division ambulances shall be used for transporting the sick and wounded to the central hospitals; and when the division is only moving they shall assist the different regiments in the transportation of the sick, thus preventing the numerous stragglers arising from insufficient means of regimental transportation. When the corps has attained a certain degree of proficiency, the men composing it may be gradually returned to the departments from which they have been taken, and new ones detailed who shall be instructed in the same exercises. The division ambulance corps is thus not only intended for the transportation of sick and wounded, but to be a school of instruction to form well-disciplined hospital attendants."

the Commandant of the Ambulance Corps, a 1st lieutenant for a Division, 2d lieutenant for a brigade, and a sergeant for each regiment.

"2. The allowance of ambulances and transport carts will be: One transport cart, one 4-horse and two 2-horse ambulances for a regiment; one 2-horse ambulance for each battery of artillery, and two 2-horse ambulances for the Headquarters of each Army Corps. Each ambulance will be provided with two stretchers.

"3. The privates of the Ambulance Corps will consist of two men and a driver to each ambulance, and one driver to each transport cart.

"4. The captain is the commander of all the ambulances and transport carts in the Army Corps, under the direction of the Medical Director. He will pay special attention to the condition of the ambulances, horses, harness, etc., requiring daily inspections to be made by the commanders of Division ambulances, and reports thereof to be made to him by these officers. He will make a personal inspection once a week of all the ambulances, transport carts, horses, harness, etc., whether they have been used for any other purpose than the transportation of the sick or wounded, and medical supplies; reports of which will be transmitted through the Medical Director of the Army Corps to the Medical Director of the Army every Sunday morning. He will institute a drill in his corps, instructing his men in the most easy and expeditious method of putting men in and taking them out of the ambulances, taking men from the ground and placing and carrying them on stretchers, observing that the front man steps off with the left foot and the rear man with the right, etc. He will be especially careful that the ambulances and transport carts are at all times in order, provided with attendants, drivers, horses, etc., and the keg daily rinsed and filled with fresh water, that he may be able to move at any moment. Previous to and in time of action he will receive from the Medical Director of the Army Corps his orders for the distribution of the ambulances and the points to which he will carry the wounded, using the light two horse-ambulances for bringing men from the field, and the four-horse ones for carrying those already attended to farther to the rear, if the Medical Director considers it necessary. He will give his personal attention to the removal of the sick and wounded from the field and to and from the hospitals, going from point to point to ascertain what may be wanted, and to see that his subordinates (for whose conduct he will be responsible) attend to their duties in taking care of the wounded, treating them with gentleness and care, and removing them as quickly as possible to the places pointed out; and that the ambulances reach their destination. He will make a full and detailed report after every action and march of the operations of the Ambulance Corps.

"5. The 1st lieutenant assigned to the Ambulance Corps of a Divison will have complete control, under the Commander of the whole Corps and the Medical Director, of all the ambulances, transport carts, ambulance horses, etc., in the Division. He will be the Acting Assistant Quartermaster for the Division Ambulance Corps, and will receipt and be responsible for the property belonging to it, and be held responsible for any deficiencies in ambulances, transport carts, horses, harness, etc., pertaining to the Ambulance Corps of the Division. He will have a travelling cavalry forge, a blacksmith, and a saddler, who will be under his orders, to enable him to keep his train in order. He will receive a daily inspection report of all the ambulances, horses, etc., under his charge from the officer in charge of Brigade Ambulance Corps, will see that the subordinates attend strictly to their duties at all times, and will inspect the corps under his charge once a week; a report of which inspection he will transmit to the Commander of the Ambulance Corps.

"6. The 2d lieutenant in command of the ambulances of a brigade will be under the immediate orders of the commander of the Ambulance Corps for the Division, and have superintendence of the Ambulance Corps for the brigade.

"7. The sergeant in charge of the Ambulance Corps for a regiment will conduct the drills, inspections, etc., under the orders of the Commander of the Brigade Ambulance Corps, and will be particular in enforcing rigidly all orders he may receive from his superior officers. The officers and non-commissioned officers of this corps will be mounted.

"8. The detail for this corps will be made with care by Commanders of Army Corps, and no officer or man will be selected for this duty except those known to be active and efficient; and no man will be relieved except by orders from these Headquarters. Should any officer or man detailed for this duty be found not fitted for it, representations of the fact will be made by the Medical Director of the Army Corps to the Medical Director of this Army.

"9. Two medical officers from the reserve corps of surgeons of each Division, and a hospital steward who will be with the medicine wagon, will be detailed by the Medical Director of the Army Corps to accompany the ambulance train when on the march, the train of each Division being kept together, and will see that the sick and wounded are properly attended to. A medicine wagon will accompany each train.

"10. The officers connected with the corps must be with the trains on the march, observing that no one rides in the ambulances without the authority of the medical officers, except in urgent cases; but men must not be allowed to suffer, and the officers will, when the medical officers cannot be found, use a sound discretion in this matter, and be especially careful that the men and drivers are in their proper places. The place for the ambulances is in front of all the wagon trains.

"11. When in camp the ambulances, transport carts, and Ambulance Corps will be parked with the brigade, under the supervision of the commander of the corps for the brigade. They will be used on the requisition of the regimental medical officers, transmitted to the Commander of the Brigade Ambulance Corps, for transporting the sick to various points and procuring medical supplies, and *for nothing else.* The non-commissioned officer in charge will always accompany the ambulances or transport carts when on this or any other duty, and he will be held responsible that they are used for none other than their legitimate purposes. Should any officer infringe upon this order regarding the uses of ambulances, etc., he will be reported by the officer or non-commissioned officer in charge to the commander of the train, all the particulars being given.

"12. The officer in charge of a train will at once remove anything not legitimate, and if there be not room for it in the baggage wagons of the regiment, will leave it on the road. Any attempt by a superior officer to prevent him from doing his duty in this or any other instance he will promptly report to the Medical Director of the Army Corps, who will lay the matter before the commander of that corps. The latter will, at the earliest possible moment, place the officer offending in arrest for trial for disobedience of orders.

"13. Good, serviceable horses will be used for the ambulances and transport carts, and will not be taken for any other purpose, except by orders from these Headquarters.

"14. The uniform of this corps is: For privates, a green band two inches broad around the cap, a green half chevron two inches broad on each arm above the elbow, and to be armed with revolvers. Non-commissioned officers to wear the same band around the cap as a private, chevrons two inches broad, and green, with the point toward the shoulder, on each arm above the elbow.

"15. No person will be allowed to carry from the field any wounded or sick, except this corps.

"16. The Commanders of the Ambulance Corps, on being detailed, will report without delay to the Medical Director at these Headquarters for instructions. All Division, Brigade, or Regimental Quartermasters having any ambulances, transport carts, ambulance horses or harness, etc., in their possession, will turn them in at once to the Commander of the Division Ambulance Corps.

"By command of Major General McClellan:

(Signed) "S. WILLIAMS,
"*Assistant Adjutant-General.*"

The advantages accruing from this organization became speedily manifest. At the battle of Antietam, in September, 1862, by the active and energetic exertions of the members of this corps the disabled of the right wing of the army (there was no ambulance system on the left) were rapidly conveyed from the scene of conflict to the hospitals in the rear. The train of ambulances plied incessantly between the battle-ground and the field hospital. During the night of the battle all of our wounded in the widely extended field were removed to shelter and received the necessary surgical attention. Different members of the corps behaved with the utmost gallantry, passing freely under fire in their search of the fallen, and advancing at times to the extreme verge of the enemy's pickets. All of our wounded having thus been collected at the temporary depots, such as were deemed best able to undergo further transportation were carefully selected. These, during the following two or three days, were then conveyed by the ambulance train to Frederick City, Md.,—the nearest point of railway connections. At the first battle of Fredericksburg the results

of the persevering endeavors of the Ambulance Corps were not less happy. During the night following the battle all of the wounded remaining on the ground not absolutely in the hands of the enemy were safely conveyed to the city of Fredericksburg and its neighborhood. When it subsequently became necessary to evacuate the city of Fredericksburg for military reasons, the wounded were again placed upon the train and safely reached the opposite bank of the river. These fortunate results were, however, obtained at the expense of the Ambulance Corps, which experienced a loss of one officer and several privates killed, besides others who were captured during their humane efforts to remove their fallen countrymen.

In the Army of the Tennessee, with the exception of General Sherman's Corps, no system for the formation of an ambulance train, for confining ambulances to their proper use, or for the ready removal of wounded had existed prior to March, 1863, when Medical Inspector E. P. Vollum, U. S. A., urged upon General Grant the necessity of establishing an ambulance corps. The proposition was cheerfully entertained, and on March 30, 1863, the following order was issued from the Headquarters of the Department of the Tennessee:

"HEADQUARTERS DEPARTMENT OF THE TENNESSEE,
"YOUNG'S POINT, LOUISIANA, *March* 30, 1863.

"GENERAL ORDERS No. 22.

"Army Corps Commanders will at once enforce the following regulations:

"1. All ambulances with the Army in the field will be turned in to Division Quartermasters, each Division retaining all the ambulances it now has.

"2. Division ambulance trains will be formed in charge of one commissioned officer for each Division, one non-commissioned officer for each brigade, and one driver and two enlisted men for each ambulance, to be detailed for that purpose, who will be subject to the direction of the Chief Surgeon of the Division.

"3. The officers in charge of Division ambulance trains will have direct military control over all the non-commissioned officers and privates of their respective trains, and will see that the ambulances are only used for conveying sick or wounded, carrying provisions for hospitals when necessary, and other purposes connected with the relief of sick and wounded.

"4. In removing sick and wounded the enlisted men detailed to attend ambulances, as above directed, will alone be permitted to accompany them, and that they may be recognized as having been appointed for this purpose, each of them will wear a white badge on the left arm above the elbow, the same to be provided by the Medical Department.

"5. Division Quartermasters will be responsible for all public property connected with said Division ambulance trains, and will exercise authority over all matters pertaining to the parking and preservation of the same.

"6. Army Corps commanders and Medical Directors of Army Corps will make such regulations for the removal of wounded and sick as will, in their judgment, best secure the end desired to be attained under this order.

"By order of Major-General U. S. GRANT.

(Signed) "JNO. A. RAWLINS,
"*Assistant Adjutant General.*"

Actual experience in the field suggested various changes in the original plan adopted in the Army of the Potomac, and on August 22, 1863, Surgeon Letterman laid before the General Commanding revised regulations, which were published in General Orders No. 85, Headquarters of the Army of the Potomac, August 24, 1863:

"The following revised regulations for the organization of the Ambulance Corps and the management of the ambulance trains are published in lieu of Special Orders No. 147, Headquarters Army of the Potomac, August 2, 1862, for the information and government of all concerned. Commanders of Army Corps will see that they are carried into effect.

"1. The Army Corps is the unit of organization for the Ambulance Corps, and the latter will be organized upon the basis of Captain as the Commandant of the Corps, one 1st Lieutenant for each Division, one 2d Lieutenant for each brigade, one sergeant for each regiment.

"2. The privates of this corps will consist of two men and one driver to each ambulance and one driver to each medicine wagon.

"3. The two-horse ambulances only will be used, and the allowance until further orders to each corps will be upon the basis of three to each regiment of infantry, two to each regiment of cavalry, one to each battery of artillery, to which it will be permanently attached, and two to the Headquarters of each Army Corps; and two army wagons to each Division. Each ambulance will be provided with two stretchers.

"4. The captain is the commander of all the ambulances, medicine, and other wagons in the corps, under the immediate direction of the Medical Director of the Army Corps to which the Ambulance Corps belongs. He will pay special attention to the condition of the ambulances, wagons, horses, harness, etc., and see that they are at all times in readiness for service, that the officers and men are properly instructed in their duties, and that these duties are performed, and that the regulations of the corps are strictly adhered to by those under his command. He will institute a drill in his corps, instructing his men in the most easy and expeditious method of putting men in and taking them out of the ambulances, lifting them from the ground, and placing and carrying them on stretchers, in the latter case observing that the front man steps off with the left foot and the rear man with the right, etc.; that in all cases his men treat the sick and wounded with gentleness and care; that the ambulances and wagons are at all times provided with attendants, drivers, horses, etc.; that the vessels for carrying water are constantly kept clean and filled with fresh water; that the ambulances are not used for any other purpose than that for which they are designed and ordered. Previous to a march he will receive from the Medical Director of the Army Corps his orders for the distribution of the ambulances for gathering up the sick, and previous to and in time of action he will receive orders from the same officer where to send his ambulances, and to what points the wounded are to be carried. He will give his personal attention to the removal of the sick and wounded from the field in time of action, going from place to place to ascertain what may be wanted, to see that his subordinates (for whose conduct he will be responsible) attend faithfully to their duties in taking care of the wounded and removing them as quickly as may be found consistent with their safety to the field hospitals, and see that the ambulances reach their destination. After every battle he will make a report, in detail, of the operations of his corps to the Medical Director of the Army Corps to which he belongs, who will transmit a copy with such remarks as he may deem proper to the Medical Director of this Army. He will give his personal attention to the removal of sick when they are required to be sent to general hospitals, or to other points as may be ordered. He will make a personal inspection at least once a month of everything pertaining to the Ambulance Corps, a report of which will be made to the Medical Director of the Corps, who will transmit a copy to the Medical Director of this Army. This inspection will be minute and made with care, and will not supersede the constant supervision which he must at all times exercise over his corps. He will also make a weekly report according to the prescribed form to the same officer, who will forward a copy to the Medical Director of this Army.

"5. The 1st lieutenant assigned to the Ambulance Corps for a Division will have complete control, under the captain of his corps and the Medical Director of the Army Corps, of all the ambulances, medical and other wagons, horses, etc., and men in that portion of the Ambulance Corps. He will be the Acting-Assistant Quartermaster for that portion of the corps, and will receipt for and be responsible for all the property belonging to it, and be held responsible for any deficiency in anything appertaining thereto. He will have a travelling cavalry forge, a blacksmith, and a saddler, who will be under his orders, to enable him to keep his train in order. His supplies will be drawn from the Depot Quartermaster upon requisitions approved by the captain of his corps and the Commander of the Army Corps to which he is attached. He will exercise a constant supervision over his train in every particular, and keep it at all times ready for service. Especially before a battle will he be careful that everything be in order. The responsible duties devolving upon him in time of action render it necessary that he be active and vigilant, and spare no labor in their execution. He will make reports to the captain of the corps upon the form prescribed every Saturday morning.

"6. The 2d lieutenant will have command of the portion of the Ambulance Corps for a brigade, and will be under the immediate orders of the commander of the ambulances for a Division, and the injunctions in regard to care and attention and supervision prescribed for the Commander of the Division he will exercise in that portion under his command.

"7. The sergeant will conduct the drills, inspections, etc., under the orders and supervision of the commander of the ambulances for a brigade, be particular in enforcing all orders he may receive from his superior officers, and that the men are attentive to their duties. The officers and non-commissioned officers will be mounted. The non-commissioned officers will be armed with revolvers.

"8. Two medical officers and two hospital stewards will be detailed daily by roster by the Surgeon-in-Chief of the Division, to accompany the ambulances for the Division when on the march, whose duties will be to attend to the sick and wounded with the ambulances and see that they are properly cared for. No man will be permitted by any line officer to fall to the rear to ride in the ambulances unless he has written permission from the senior medical officer of his regiment to do so. These passes will be carefully preserved, and at the close of march be transmitted by the senior medical officer with the train, with such remarks as he may deem proper, to the Surgeon-in-Chief of his Division. A man who is sick or wounded, who requires to be carried in an ambulance, will not be rejected; should he not have the permission required, the Surgeon of the regiment who has neglected to give it will be reported at the close of the march by the senior Surgeon with the train, to the Surgeon-in-Chief of his Division. When on the march, one-half the privates of the Ambulance Corps will accompany on foot the ambulances to which they belong, to render such assistance as may be required. The remainder will march in the rear of their respective commands to conduct, under the orders of the medical officers, such men as may be unable to proceed to the ambulances, or who may be incapable of taking proper care of themselves, until the ambulances come up. When the case is of so serious a nature as to require it, the Surgeon of the regiment or his assistant will remain and deliver the man to one of the medical officers with the ambulances. At all other times the privates will be with their respective trains. The medicine wagons will on the march be in their proper places in the rear of the ambulances for each brigade. Upon ordinary marches the ambulances and wagons belonging to the train will follow immediately in the rear of the Division to which it is attached. Officers connected with the corps must be with the trains when on the march, observing that no one rides in any of the ambulances except by authority of medical officers. Every necessary facility for taking care of the sick and wounded upon the march will be afforded the medical officers by the officers of the Ambulance Corps.

"9. When in camp the ambulances will be parked by division. The regular roll-calls, reveille, retreat, and tattoo will be held, at which at least one commissioned officer will be present and receive the reports. Stable duty will be at hours fixed by the captain of the corps, and at this time, while the drivers are in attendance upon their animals, the privates will be employed in keeping the ambulances to which they belong in order, keeping the vessels for carrying water filled with fresh water, and in general police duties. Should it become necessary for a regimental medical officer to use one or more ambulances for transporting sick and wounded, he will make a requisition upon the Commander of the Ambulances for a Division, who will comply with the requisition. In all cases when ambulances are used the officers, non-commissioned officers, and men belonging to them will accompany them; should one ambulance only be required, a non-commissioned officer as well as the men belonging to it will accompany it. The officers of the Ambulance Corps will see that ambulances are not used for any other purpose than that for which they are designed, viz: the transportation of sick and wounded, and in urgent cases only, of medical supplies. All officers are expressly forbidden to use them, or to require for them to be used for any other purpose. When ambulances are required for the transportation of sick or wounded at Division or Brigade Headquarters they will be obtained as they are needed for this purpose from the Division train, but no ambulances belonging to this corps will be retained at such headquarters.

"10. Good, serviceable horses will be used for the ambulances and medicine wagons, and will not be taken for any other purpose except by orders from these Headquarters.

"11. The corps will be designated, for sergeants, by a green band 1¼ inches broad around the cap, and chevrons of the same material, with the point toward the shoulder, on each arm above the elbow. For privates, by a band the same as for sergeants around the cap, and a half chevron of the same material on each arm above the elbow.

"12. No person except the proper medical officers or the officers and non-commissioned officers and privates of this corps will be permitted to take or accompany sick or wounded to the rear either on the march or upon the field of battle.

"13. No officer or man will be selected for this service except those who are active and efficient, and they will be detailed and relieved by Corps Commanders only.

"14. Corps Commanders will see that the foregoing regulations are carried into effect.

"BY COMMAND OF MAJOR GENERAL MEADE:

(Signed) "S. WILLIAMS,
"*Assistant Adjutant General.*"

The establishment of a uniform system of ambulance corps in the armies of the United States was not accomplished until the spring of 1864, when Congress[1] passed the following act, which was approved by the President on March 11, 1864, and promulgated by the Secretary of War in General Orders No. 106, War Department, A. G. O., Washington, D. C., March 16, 1864:

"*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the medical director, or chief medical officer of each army corps, shall, under the control of the medical director of the army to which such army corps belongs, have the direction and supervision of all ambulances, medicine and other wagons, horses, mules, harness, and other fixtures appertaining thereto, and of all officers and men who may be detailed or employed to assist him in the management thereof, in the army in which he may be serving.

"SEC. 2. *And be it further enacted*, That the commanding officer of each army corps shall detail officers and enlisted men for service in the ambulance corps of such army corps, upon the

[1] A copy of the bill as originally introduced in Congress in the winter of 1863 to 1864, was submitted by the Committee on Military Affairs of the Senate to Surgeon LETTERMAN for recommendations and suggestions, and was returned by him with the following letter:

"HEADQUARTERS ARMY OF THE POTOMAC,
"MEDICAL DIRECTOR'S OFFICE, *January* 2, 1864.

"DEAR SIR: As desired by the clerk of the Committee on Military Affairs in the Senate, from whom, since I took the liberty of addressing you on the 31st ult., I received a copy of the bill in reference to an Ambulance System, I have the honor to submit for your consideration the following suggestions, viz: In SECTION 1, line 2, after the word 'shall' insert the words 'under the control of the Medical Director of the Army to which such Army Corps belongs.' This suggestion is made because it is considered necessary that there should be *one* officer who shall have the control and supervision of the Ambulance Corps throughout an army, and as the Medical Director of an army is held responsible for the care (in the widest meaning of the word) of the wounded and sick in that army, it is necessary that he should control the subordinate officers in his department, and his authority be commensurate with his responsibility. SECTION 1, line 4, after the word 'medicine' insert the words 'and other.' This will make the provisions of the bill harmonize. SECTION 2, line 2, after the word 'detail' insert the words 'officers and enlisted men.' SECTION 2, line 2, after the words 'Army Corps' insert the words 'upon the following basis, viz.' These alterations will, I think, clearly show that the officers and men are detached from their regiments, brigades, etc., and the Ambulance Corps in each Army Corps considered a unit, and as belonging not to any particular regiment, brigade, etc., but to the Army Corps at large, a feature very essential to the proper working of the system. SECTION 3. Strike out all after the word 'furnished,' in line 1, to the word 'and,' in line 7, and insert the words 'to each Army Corps two-horse ambulances upon the following basis, viz: three to each Regiment of Infantry; two to each Regiment of Cavalry; one to each Battery of Artillery; to which it shall be permanently attached.' The ground-work of the organization is to take from regiments the *direct* control of the ambulances and form them into trains under proper officers and men. Unless they are so they cannot be wielded with facility, kept in order, or be properly supervised by the superior medical officers. It has been found when ambulances are attached to regiments that they are of very little use, especially upon a march or in time of action—the regimental medical officers under such circumstances cannot, from the nature and pressure of their duties at such time, control them. The proposed alteration will harmonize with the provisions of SECTION 8. It is proposed to attach the ambulance to each battery, as the latter has no fixed position and is liable to constant change. I regard the last three suggestions as of vital importance to the successful working of the system. SECTION 3, line 8, after the word 'division' insert the words 'train of ambulances.' SECTION 5. Strike out all after the words 'Army Corps,' in line 15, to the words 'and it shall,' in line 18, and insert 'previous to a march, and previous to and in time of action, or whenever it may be necessary to use the ambulances, to issue the proper orders to the captain for the distribution and management of the same; for collecting the sick and wounded and conveying them to their destination.' SECTION 5, line 21, strike out all after the words 'Surgeon General' to the end of the section, and insert instead 'or the Medical Director of the Army; and all reports to higher authority than the Commanding Officer of the Army Corps shall be transmitted through the Medical Director of the Army to which such Army Corps belongs.' The Medical Director of an Army having, under the Commanding General, the control of the Ambulance Corps in all Army Corps, military subordination and discipline require all correspondence and reports to pass through him. The words that are proposed to be stricken out are not necessary, as the Commanding Officer of an Army Corps has all in his Corps under his supervision. SECTION 6. Strike out in line 7 the words 'of their respective regiments' and insert the words 'under his orders.' This is suggested that the different sections may be in harmony, and to reject the idea of the ambulances being attached to regiments. SECTION 8, line 3, strike out the word 'officers' and instead of it insert the word 'persons.' I have made the above suggestions freely and without reserve, as I believe you desire, and it is in accordance with my own wishes that my views be plainly given on the subject. The manner in which the ambulance trains are now established and conducted in this army permits the formation either of Corps, Division, or Regimental Hospitals, or the change from one to the other as the exigencies of the service may require at any time, without delay or inconvenience, and to the great advantage of the sick and wounded, and I am fully convinced from my experience that when properly carried into effect this system can be managed without trouble, and the sick and wounded, by their own officers, be promptly, carefully, and efficiently cared for, and thus, in no small degree, contributing to the efficiency of the army in which it is properly administered.

"I am, sir, very respectfully, your obedient servant,

(Signed) "JONATHAN LETTERMAN,
"*Medical Director.*

"Hon. HENRY WILSON,
"*U. S. Senate.*"

It will be noted that the suggestions of Dr. LETTERMAN were incorporated in the bill.

following basis, viz: one captain, who shall be commandant of said ambulance corps; one first lieutenant for each division in such army corps; one second lieutenant for each brigade in such army corps; one sergeant for each regiment in such army corps; three privates for each ambulance, and one private for each wagon; and the officers and non-commissioned officers of the ambulance corps shall be mounted: *Provided*, That the officers, non-commissioned officers, and privates so detailed for each army corps shall be examined by a board of medical officers of such army corps as to their fitness for such duty; and that such as are found to be not qualified shall be rejected, and others detailed in their stead.

"SEC. 3. *And be it further enacted*, That there shall be allowed and furnished to each army corps two-horse ambulances upon the following basis, to wit: three to each regiment of infantry of five hundred men or more; two to each regiment of more than two hundred and less than five hundred men or more; and one to each regiment of infantry of less than two hundred men; two to each regiment of cavalry of five hundred men or more; and one to each regiment of cavalry of less than five hundred men; one to each battery of artillery—to which battery of artillery it shall be permanently attached; to the headquarters of each army corps two such ambulances; and to each division train of ambulances two army wagons; and ambulances shall be allowed and furnished to division brigades and commands not attached to any army corps upon the same basis, and each ambulance shall be provided with such number of stretchers and other appliances as shall be prescribed by the Surgeon General: *Provided*, That the ambulances and wagons herein mentioned shall be furnished, as far as practicable, from the ambulances and wagons now in the service.

"SEC. 4. *And be it further enacted*, That horse and mule litters may be adopted or authorized by the Secretary of War, in lieu of ambulances, when judged necessary, under such rules and regulations as may be prescribed by the medical director of each army corps.

"SEC. 5. *And be it further enacted*, That the captain shall be the commander of all the ambulances, medicine and other wagons in the corps, under the immediate direction of the medical director, or chief medical officer, of the army corps to which the ambulance corps belongs. He shall pay special attention to the condition of the ambulances, wagons, horses, mules, harness, and other fixtures appertaining thereto, and see that they are at all times in readiness for service; that the officers and men of the ambulance corps are properly instructed in their duties, and that their duties are performed, and that the regulations which may be prescribed by the Secretary of War, or the Surgeon General, for the government of the ambulance corps are strictly observed by those under his command. It shall be his duty to institute a drill in his corps, instructing his men in the most easy and expeditious manner of moving the sick and wounded, and to require in all cases that the sick and wounded shall be treated with gentleness and care, and that the ambulances and wagons are at all times provided with attendants, drivers, horses, mules, and whatever may be necessary for their efficiency; and it shall be his duty also to see that the ambulances are not used for any other purpose than that for which they are designed and ordered. It shall be the duty of the medical director, or chief medical officer, of the army corps, previous to a march, and previous to and in time of action, or whenever it may be necessary to use the ambulances, to issue the proper orders to the captain for the distribution and management of the same, for collecting the sick and wounded and conveying them to their destination. And it shall be the duty of the captain faithfully and diligently to execute such orders. And the officers of the ambulance corps, including the medical director, shall make such reports, from time to time, as may be required by the Secretary of War, the Surgeon General, the medical director of the army, or the commanding officer of the army corps in which they may be serving; and all reports to higher authority than the commanding officer of the army corps shall be transmitted through the medical director of the army to which such army corps belongs.

"SEC. 6. *And be it further enacted*, That the first lieutenant assigned to the ambulance corps for a division shall have complete control, under the captain of his corps and the medical director of the army corps, of all the ambulances, medicine and other wagons, horses, mules, and men in that portion of the ambulance corps. He shall be the acting assistant quartermaster for that portion of the ambulance corps, and will receipt for and be responsible for all the property belonging to it, and be held responsible for any deficiency in anything appertaining thereto. He shall have a travelling cavalry forge, a blacksmith, and a saddler, who shall be under his orders, to enable him to keep his train in order. He shall have authority to draw supplies from the depot quartermaster,

upon requisitions approved by the captain of his corps, the medical director, and the commander of the army corps to which he is attached. It shall be his duty to exercise a constant supervision over his train in every particular, and keep it at all times ready for service.

"SEC. 7. *And be it further enacted*, That the 2d lieutenant shall have command of the portion of the ambulance corps for a brigade, and shall be under the immediate orders of the 1st lieutenant, and he shall exercise a careful supervision over the sergeants and privates assigned to the portion of the ambulance corps for his brigade; and it shall be the duty of the sergeants to conduct the drills and inspections of the ambulances, under his orders, of their respective regiments.

"SEC. 8. *And be it further enacted*, That the ambulances in the armies of the United States shall be used only for the transportation of the sick and wounded, and, in urgent cases only, for medical supplies, and all persons shall be prohibited from using them, or requiring them to be used, for any other purpose. It shall be the duty of the officers of the ambulance corps to report to the commander of the army corps any violation of the provisions of this section, or any attempt to violate the same. And any officer who shall use an ambulance, or require it to be used, for any other purpose than as provided in this section, shall, for the first offense, be publicly reprimanded by the commander of the army corps in which he may be serving, and for the second offense shall be dismissed from the service.

"SEC. 9. *And be it further enacted*, That no person except the proper medical officers, or the officers, non-commissioned officers, and privates of the ambulance corps, or such persons as may be specially assigned, by competent military authority, to duty with the ambulance corps for the occasion, shall be permitted to take or accompany sick or wounded men to the rear, either on the march or upon the field of battle.

"SEC. 10. *And be it further enacted*, That the officers, non-commissioned officers, and privates of the ambulance corps shall be designated by such uniform or in such manner as the Secretary of War shall deem proper. *Provided*, That officers and men may be relieved from service in said corps and others detailed to the same, subject to the examination provided in the second section of this act, in the discretion of the commanders of the armies in which they may be serving.

"SEC. 11. *And be it further enacted*, That it shall be the duty of the commander of the army corps to transmit to the Adjutant General the names and rank of all officers and enlisted men detailed for service in the ambulance corps of such army corps, stating the organizations from which they may have been so detailed; and, if such officers and men belong to volunteer organizations, the Adjutant General shall thereupon notify the governors of the several States in which such organizations were raised of their detail for such service; and it shall be the duty of the commander of the army corps to report to the Adjutant General from time to time the conduct and behavior of the officers and enlisted men of the ambulance corps, and the Adjutant General shall forward copies of such reports, so far as they relate to officers and enlisted men of volunteer organizations, to the governors of the States in which such organizations were raised.

"SEC. 12. *And be it further enacted*, That nothing in this act shall be construed to diminish or impair the rightful authority of commanders of armies, army corps, or separate detachments, over the medical and other officers and the non-commissioned officers and privates of their respective commands.

"*Approved March* 11, 1864."

By the passage of this act the authority of the Medical Department over the Ambulance Corps was fully established. How effectually, and at the same time how considerately, the medical officers availed themselves of the power thus conferred upon them is strikingly shown in the systematic manner with which the immense number of wounded after the battles of the Wilderness, Spottsylvania Court House, Cold Harbor, Petersburg, and of the campaign in Georgia and the Carolinas, were cared for on the battle-field, were removed to field and base hospitals, and were finally distributed in general hospitals throughout all parts of the United States. Notwithstanding the opinion of General H. W. Halleck, no *panics* or *stampedes* were reported as having been caused by the presence of the non-combatants of the ambulance corps.

AMBULANCE WAGONS.

Ambulance wagons, or wagons especially designed for the transport of sick and wounded, had not been in use in the armies of the United States until a year or so before the outbreak of the War of the Rebellion. Transport carts, army wagons, ox teams, in fact anything that could be made available for the purpose, had been employed. In the War of Independence, in April, 1777, the Congress of the United States passed a bill "devising ways and means for preserving the health of the troops" which contained the following paragraph:[1] "That a suitable number of covered and other wagons, litters, and other necessaries for removing the sick and wounded, shall be supplied by the Quartermaster or Deputy Quartermaster General; and in case of their deficiency, by the Director or Deputy Director General." There is no record that such vehicles were supplied. During the war with Great Britain, in 1812–'14, there were evidently no ambulance wagons in the United States army, as Surgeon James Mann,[2] in his report of that campaign, is found to make the request that, "to facilitate the movement of the hospital department attached to an army, it should be furnished with a number of wagons and teams, so as not to be immediately dependent on the Quartermaster's Department, when requisite either to take the wounded from the field of battle, or transport the sick in case of a retrograde march, or remove invalids after having recovered from wounds to a remote hospital. The flying machines called *volantes*, drawn by horses (an improvement of Larrey, Chief Surgeon of the French army), are useful in open countries, where a corps is assigned to accompany them on the field of battle, upon Larrey's plan." The same author (*loc. cit.*, p. 126) relates that he transported, in February, 1814, four hundred and fifty sick men from Malone to Plattsburgh and Burlington, a distance of seventy miles, in sleighs, losing six patients by death. In the Florida war, in 1838, ambulance wagons are mentioned by Surgeon R. S. Satterlee, U. S. A., Medical Director south of Withlacoochee, in a report from Fort Brooke, Tampa Bay, dated January 5th: "I found the ambulances very serviceable, but as some of the wounded could not be transported in them, on account of the roughness of the road, between thirty and forty of them were brought a part of the way on litters between two horses." Surgeon Satterlee probably had reference to the ordinary transport wagons used on this occasion for conveying sick and wounded.

In the *General Regulations for the Army of the United States*, Washington, 1847, page 123, paragraph 704, it was ordered that: "For the accommodation of the sick and disabled, a wagon will be attached to the rear guard, when necessary and practicable, and a surgeon will attend to give assistance, and to see that no improper persons are suffered to avail themselves of the accommodation." No ambulance wagons were attached to the American army in Mexico in 1846–'48, or to the expeditions in Indian territories before the outbreak of the war.

In 1858 an ambulance wagon (FIGS. 452, 453) had been proposed by Dr. I. Moses, of New York, and on March 2, 1858, a Board of Officers, consisting of Surgeons R. S. Satterlee, C. H. Laub, and Assistant Surgeon C. H. Crane, had been appointed to examine and report on its merits. The report of the Board is appended: "The ambulance resembles an omnibus, is entered by two steps in the rear, contains seats for eighteen persons—fourteen inside and four on the front seat. By raising the flaps of the inside seats and supporting them by the

[1] BROWN (H.), *The Medical Department of the United States Army from* 1775 *to* 1873, Washington, 1873, page 36.
[2] MANN (JAMES), *Medical Sketches of the Campaigns of* 1812-13-14, Dedham, 1816, page 250.

uprights attached, and removing the cushions from the backs of the permanent seats, a bed is arranged which will accommodate *one*, *two*, or, on an emergency, *three* men lying down. With *one* man in a recumbent position, room for *twelve* men seated remains; with *two* men lying down, room for *eight*, and with *three* men lying down, room for *six* remains. A

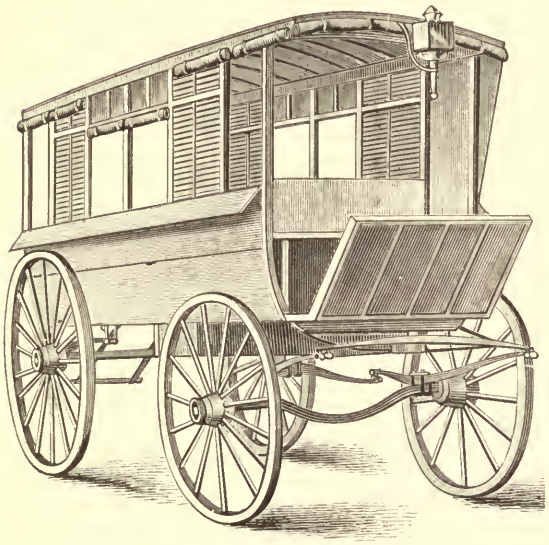

FIG. 452.—The "MOSES" ambulance wagon—front view.

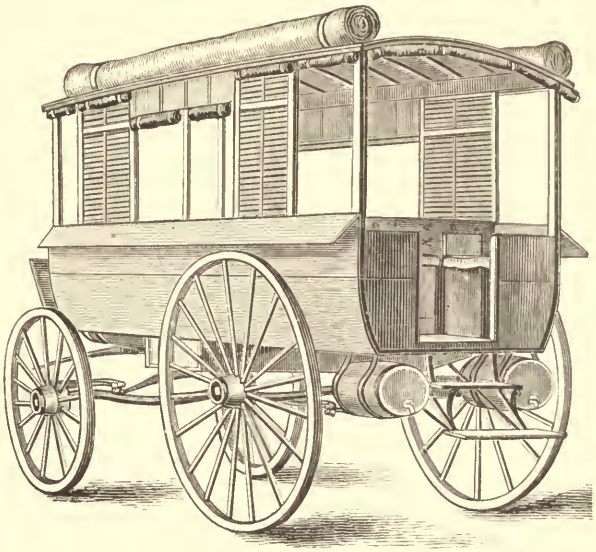

FIG. 453.—The "MOSES" ambulance wagon—rear view.

canvas, stretched and suspended by cords from the top, will accommodate two men lying down where the roads are rough. A close-stool is provided in the vehicle. Two seats, separated from the rest, next to the door, are provided for the hospital steward and attendant. Two movable chests are placed under these seats to contain what may be required for daily use. The movable door closing the ambulance may become, by change of position, a table for writing or dispensing medicine. The interior is closed entirely by curtains of prepared canvas, or partly by curtains and Venetian blinds for free ventilation—windows admitting sufficient light when entirely closed. Under the front seat are placed two store chests. Underneath the carriage, on either side of the door, are two five-gallon kegs for water. Under the body of the vehicle are hooks for camp kettles, pails, and cooking utensils. Two drawers are arranged on each side, between the wheels and under the carriage, which may be used as panniers when necessary. On the hooks surrounding the ambulance, five feet from the ground, canvas is stretched, extending ten feet on *each* side of the carriage, the front and rear being protected in the same manner, which forms a comfortable and ample tent protec-

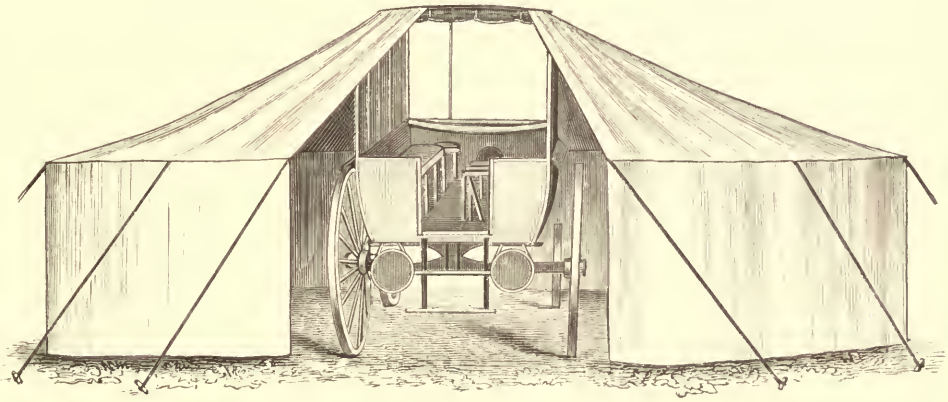

FIG. 454.—The "MOSES" ambulance wagon and tent.

tion for *thirty* sick men, and which may be arranged in a few minutes after arriving in camp by one or two men. In more permanent encampments, or in hot weather, this canvas may be fastened to hooks around the top of the ambulance wagon (FIG. 454), serving a better purpose by giving more space and freer ventilation. It is suggested that a light iron railing, about four inches in height, should surround the top of the ambulance, where, by having a suitable canvas cover, blankets and other indispensable articles might be securely carried. A lantern suspended over the front seat may be removed to the rear of the carriage, at will. It will admit of sufficient accommodation in the way of transportation and provide tent shelter for the sick of a regiment on marches. The dimensions are: extreme length, thirteen feet eight inches; height of floor from ground, three feet three inches; height of top from ground, eight feet four inches; height of inside, five feet; width, four feet four inches. Weight, two thousand one hundred and fifteen (2,115) pounds. When loaded with men, medicines, tent canvas, etc., it can be readily drawn by six horses or mules. The size of the wheels and the track of the same correspond with those of the government wagons. After a close examination of the ambulance, the Board is of the opinion that it is well adapted for field and frontier service, and for the comfortable transportation of sick and wounded men on long marches; that the tent arrangement forms a valuable, useful, and comfortable shelter for hospital patients. On marches it does away with the use of hospital tents, is easily arranged, keeps the hospital separate, and requires no detail of pioneers or extra duty men to pitch and arrange it. In submitting this opinion the members of the Board must also express their views, based upon their own individual experience, that to be made thus available and useful for the comfort and well-being of the sick the ambulance should be the property of the Medical Department, and that the team, harness, etc., should be under the exclusive control and direction of the medical officers under all and every circumstance." No action seems to have followed the recommendations of this Board, and no ambulances were built.

In October, 1859, a Board of Medical Officers, consisting of Surgeon C. A. Finley, R.

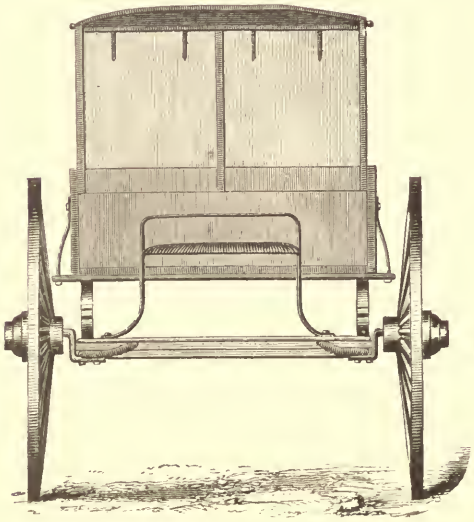

FIG. 455.—The "FINLEY" two-wheeled ambulance wagon—front view.

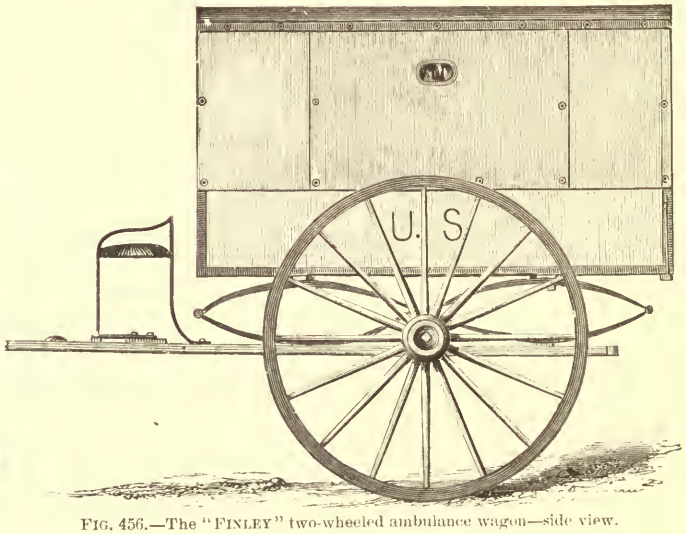

FIG. 456.—The "FINLEY" two-wheeled ambulance wagon—side view.

S. Satterlee, C. S. Tripler, J. M. Cuyler, and Assistant Surgeon R. H. Coolidge, had recommended: 1st, that ambulance transportation ought to be furnished for forty men per thousand—twenty lying extended and twenty sitting; 2d, that both two and four-wheeled

ambulance wagons are necessary for the hospital service; 3d, that a two-wheeled ambulance wagon is the best for the conveyance of dangerously sick or wounded men * * *; that to each company one two-wheeled ambulance wagon, to a battalion of five companies one four-wheeled and five two-wheeled ambulance wagons, and to a regiment two four-wheeled and ten two-wheeled ambulance wagons be allowed; and that for hospital supplies to commands of less than three companies one two-wheeled transport cart, to commands of more than three or less than five, or five companies, two, and to a regiment four two-wheeled transport carts be assigned; and that the transport carts be made after the models of the two-wheeled ambulance wagons (their interior arrangement for the sick excepted). The same Board selected, from a number of the most approved plans laid before them, the two-wheeled wagons designed by Surgeon C. A. Finley and Assistant Surgeon R. H. Coolidge. The bottom of the body of the Finley pattern (FIGS. 455, 456) was divided into two compartments, each containing a movable mattress frame or stretcher; four longitudinal pieces either in or upon the frame-work were grooved on their upper surfaces so as to receive the rollers in the mattress frame. The body of the wagon rested on four elliptical springs fastened upon the shafts, which extended the whole length of the body, crossing, and connected with the axle. The body

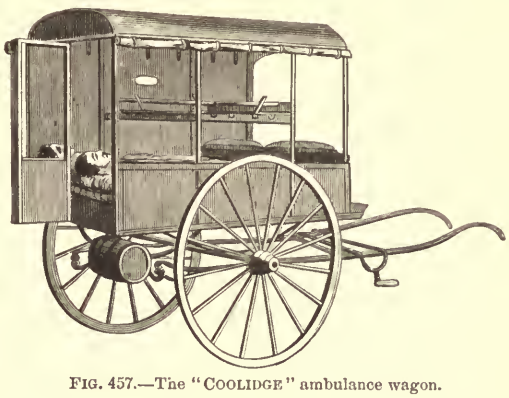

FIG. 457.—The "COOLIDGE" ambulance wagon.

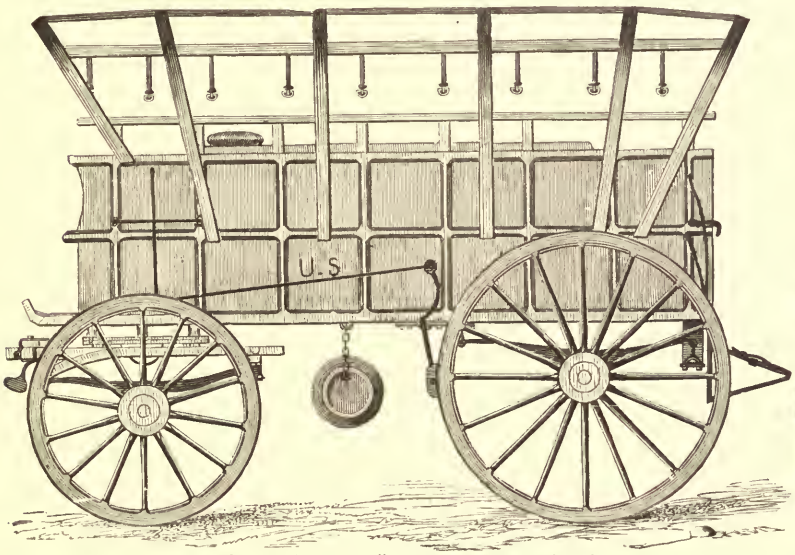

FIG. 458.—The "TRIPLER" ambulance wagon—side view.

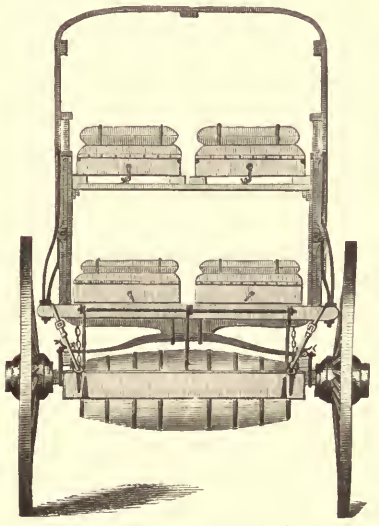

FIG. 459.—The same—rear view.

of the Coolidge cart (FIG. 457) was hung on platform springs. The body was seven feet long, four feet wide, and one foot and eight inches deep, covered with a ribbed frame-work five and a half inches above the floor. Upon the relative merits of the two patterns of two-wheeled ambulance carts the Board hesitated to express an opinion, and therefore recommended "that one of each pattern be sent to the respective Military Departments of Texas, New Mexico, Utah, California, and Oregon, and two of each pattern to Fort Leavenworth, and that they be placed in service at the scene of Indian hostilities and on marches across the plains, in order that their practical advantages might be ascertained." The Board con-

sidered the two-wheeled cart as the most convenient for the conveyance of dangerously sick and dangerously wounded men. A number of these two-wheeled carts[1] were furnished to the troops in the early part of the war, but experience soon proved them useless; their motion was intolerable and excruciating; wounded men begged to be taken out, wounded officers insisted upon leaving them, and they were supplanted by four-wheeled vehicles, the earliest of which was the Tripler ambulance wagon recommended by the Medical Board of 1859 (FIGS. 458–460).

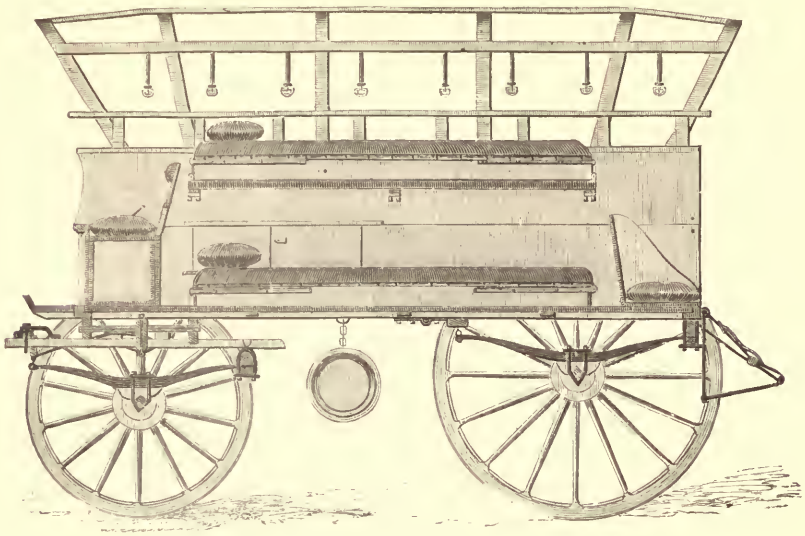

FIG. 460.—The "TRIPLER" ambulance wagon—longitudinal section.

It was constructed to carry ten men,[2] four lying at length and six seated, and required four horses. The body of the wagon was ten feet long, four feet wide, and the sides three feet high. Upon the floor were permanently laid four parallel iron rails seven feet long and one-fourth of an inch wide and high, with convex faces. Two spring mattresses were run in upon these rails. Twenty-two inches above the surfaces of these mattresses another set of rails was fitted to the wagon, upon which another set of mattresses was run. In front of the wagon was a chest intended for instruments, dressings, etc., which, when closed, formed a seat for three persons. At the tail of the carriage was another seat for three persons. All or any part of the interior of

FIG. 461.—The "WHEELING" or "ROSECRANS" ambulance wagon.

[1] On May 20, 1861, Acting Surgeon General R. C. WOOD wrote to the Secretary of War: "It is highly important that provision be made for the safe and comfortable transportation of the sick and wounded, and in conformity with the recommendations of a Board of Medical Officers convened by the Secretary of War, and their report approved by him in General Orders No. 1, January 19, 1860, I have to recommend that . . . two hundred of the two-wheeled ambulances be immediately constructed by the Quartermaster's Department. The recommendation was approved by the Secretary of War and the wagons were constructed and sent to the troops."

[2] LONGMORE (T.) (*A Treatise on the Transport of Sick and Wounded Troops*, London, 1869, page 382) erroneously states that this wagon was constructed to carry eight men, all lying down.

the wagon was arranged so that it could be removed at pleasure, making it available for the transportation of hospital supplies. The cover of the wagon was of heavy duck supported on five hoops. The carriage was hung on platform springs, and underneath the body was suspended a water-butt three feet six inches long and fourteen inches in diameter. This wagon was extensively used and answered the purpose, although it was cumbrous and very heavy.[1]

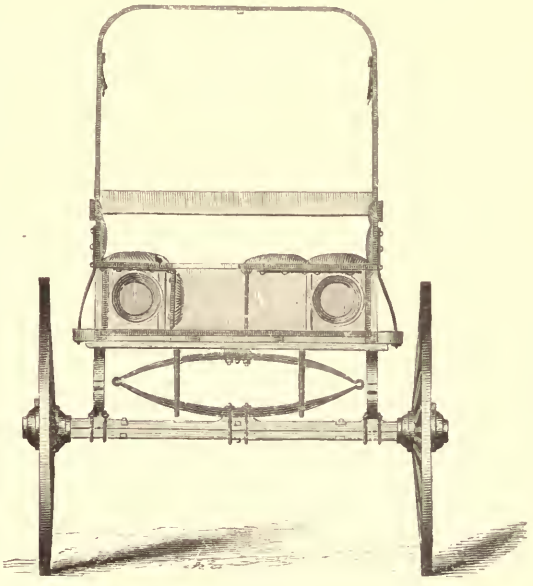

FIG. 462.—The same—rear view.

The Wheeling or Rosecrans ambulance wagon (FIGS. 461, 462) was also used in the early part of the war. It was built in the Government workshops after a design of General W. S. Rosecrans, U. S. A. It was lighter than the Tripler or the Coolidge, could be readily drawn by two horses, and would accommodate eleven or twelve sitting or two recumbent and two or three sitting patients. Two cushioned benches were attached to the two sides of the interior of the wagon, running along its whole length. From the edge of each of these benches, fastened by hinges, depended a cushioned seat the length of the benches. These seats could be readily brought on a level with the benches, and when thus elevated could be securely fixed by iron feet, folded in the suspended seat. For the ends of the iron feet receptacles were fitted in the floor of the wagon. When both seats were raised they met in the middle of the carriage and made one continuous bed for two patients. When only one seat was raised it formed a bed for a recumbent patient, while the other bench, with its suspended seat, allowed space for at least four sitting patients. A water-tank, capable of holding five gallons, was stored away under the seats in the rear end of the ambulance wagon; not unfrequently stretchers took the place of one of the water-tanks. In front of the benches a transverse seat, accommodating the driver and two or three patients, was

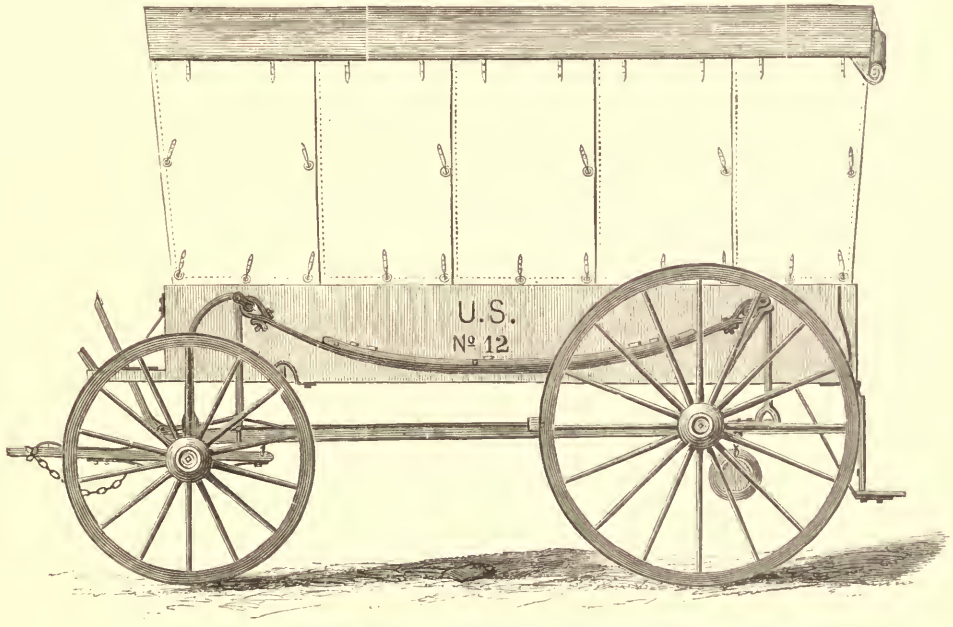

FIG. 463.—New COOLIDGE ambulance wagon—side view.

[1] Detailed specifications for the TRIPLER ambulance wagon will be found in a *Report of a Board of Officers to decide upon a Pattern of Ambulance Wagon for Army Use*. Washington, 1878. page 50.

provided. Under the seat was a box for medicines and other articles for field use. Accurate specifications for the building of this ambulance will be found on page 59 of the Report of a Board of Officers to decide upon a pattern of ambulance wagon above referred to. The body of the wagon rested upon four elliptical springs, two placed transversely (one on the front and one on rear axle), and two on the rear axle running longitudinally. A frame of light wood, with canvas cover, protected the patients against the inclemencies of the weather, and on the sides curtains of canvas could be closely buttoned to the top and the body. At the rear of the wagon was a step to assist patients and bearers in lifting in the wounded. The weight of the wagon was between seven hundred and eight hundred pounds.

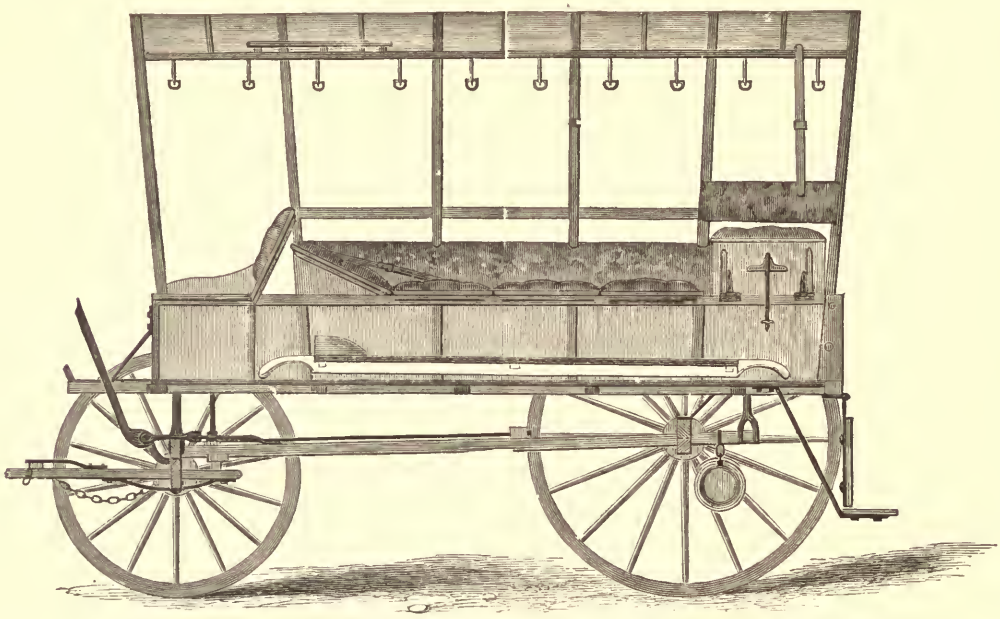

FIG. 464.—New COOLIDGE ambulance wagon arranged for two recumbent patients—perpendicular section.

A four-wheeled ambulance wagon (FIGS. 463, 464), designed by Assistant Surgeon R. H. Coolidge, was very little used. The sills of the wagon were ten feet four inches long, and the body rested between two semi-elliptical springs seven feet nine and three-quarter inches in length (FIG. 463). It was intended to accommodate two patients in recumbent and four in sitting postures, two with the driver on the front seat, and two at the end of the wagon, one on each side (see FIG. 465). The beds for the two prone patients

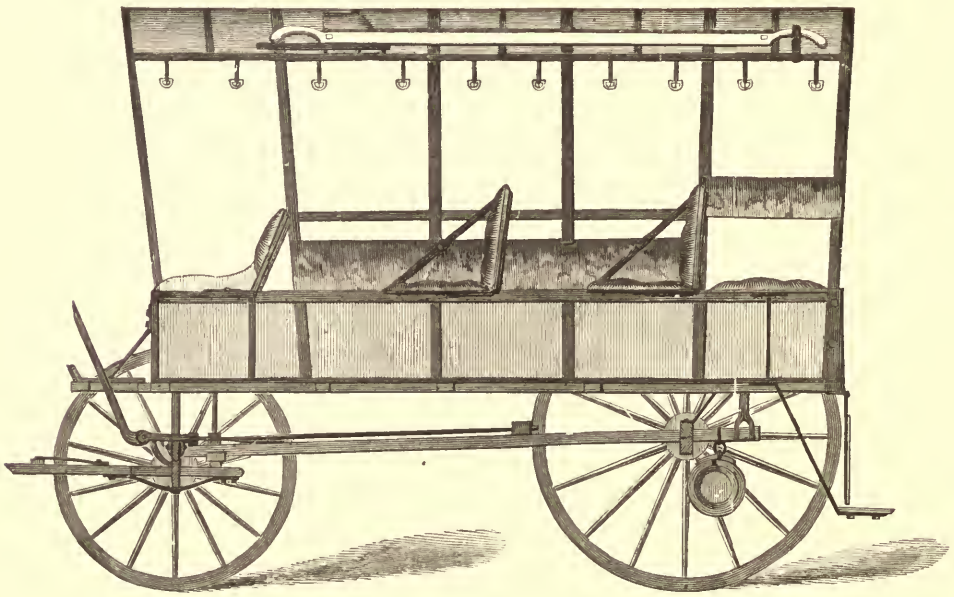

FIG. 465.—New "COOLIDGE" ambulance wagon arranged for sitting patients—perpendicular section.

were so arranged that they could be changed into seats, as shown in FIG. 465, when the wagon would accommodate ten patients and the driver. Detailed specifications of this ambulance wagon will be found on page 61 of the Report of a Board of Officers to decide upon a pattern of ambulance wagon already referred to.

Other plans for ambulance wagons were proposed during the war, and for the information of those interested in this subject we will here refer to such as were submitted to boards of medical officers for examination and report. In June, 1863, A. W. Süs (*Subject-Matter Index of Patents for Inventions issued by the United States Patent Office*, Washington, 1874, Vol. I, page 14, No. 39,595) exhibited a wagon intended to carry four severely wounded men in a recumbent position. A Medical Board (Medical Inspectors E. P. Vollum and W. H. Mussey, and Surgeon J. H. Brinton, U. S. V.) considered an "increase in the carrying capacity advantageous and feasible," but was not prepared to endorse the plan of Mr. Süs in all its details. The Board was of the opinion that the Wheeling ambulance wagon, then largely in use in the army, could readily be altered to carry four patients in a lying position, as in Mr. Süs's plan. Mr. Süs, in April, 1864, offered an improved plan, which was, by order of Surgeon R. O. Abbott, Medical Director, Department of Washington, inspected by Assistant Surgeon W. E. Waters, U. S. Army, who reported, on June 2, 1864: "These improvements consist in adapting the ambulance for the conveyance of four patients lying down, instead of two, as with the present arrangement, while, at the same time, the carrying capacity for such as can sit up is not at all interfered with. The improvement is effected by having the seats fastened with hooks to the side of the ambulance so that they can be detached and put upon the floor, thus forming a bed, on which the patient can lie with full as much comfort, as regards position, as with the present arrangement, while they are made more comfortable by the addition of elastic springs within the cushion." Surgeon Waters' report was approved by Medical Director Abbott, who recommended that ten or twelve ambulances fitted with these improvements be sent to the field for trial. In April, 1864, G. W. Arnold (*Subject-Matter Index of Patents, etc.*, page 14, No. 45,152) brought to the notice of the Surgeon General an ambulance wagon for which he claimed advantages over the Wheeling ambulance wagon in the arrangements of the seats or beds. The Board (Surgeon O. A. Judson and Assistant Surgeon W. Thomson) to whom the examination of the vehicle was referred reported, on April 5, 1864, that "the only advantages it possessed over the Wheeling model was that its litters could be removed from the wagon, the patient placed upon them, and then easily returned; but that the capacity for carrying men was diminished, and that the litters accompanying the wagon were too heavy, weighing about seventy pounds each, and would add, with their apparatus for suspension, nearly two hundred pounds to the weight of the ambulance wagon." On October 11, 1864, E. R. McKean patented an ambulance wagon (*Subject-Matter Index of Patents, etc.*, page 14, No. 44,643) with litters or beds suspended by rubber rings. Surgeons R. O. Abbott, C. Sutherland, and Assistant Surgeon William Thomson inspected the wagon and reported, on March 25, 1865: "The principle of suspending the stretcher upon which the patient lies by rings of India rubber, in lieu of the springs of steel usually placed beneath the body of the wagon, is the main difference between this and the ambulance now in general use. However valuable this principle may be, the mechanical contrivances by which it is obtained in the wagon submitted are, in the opinion of the Board, too complicated, wanting in solidity and durability, and too liable to the loss of detached pieces, to render this ambulance fit for the severe test of field service." In September, 1865, an India rub-

ber spring ambulance wagon, by Perot & Co., was brought to the attention of the Surgeon General by Brigadier General C. H. Crossman, U. S. Army. Surgeons C. McDougall, John Campbell, and A. K. Smith, and Assistant Surgeon C. H. Alden, appointed a Board to examine the rubber spring wagon, reported, on October 26, 1865: "The Board is very favorably impressed with the plan proposed, and as its peculiarities are best shown by contrast, would state the following as some of the particulars in which it is thought the India rubber spring is superior to the ordinary steel spring. It more perfectly controls the movements of the body of the ambulance in every direction, either upward, downward, or laterally, rendering the motion of those seated or lying within steadier and more equable. It is better adapted to carrying weights in the ambulance, acting with nearly the same effect with a light or heavy load. It is believed to be more durable. An ambulance built upon this plan was shown to the Board, belonging to the West Philadelphia Fire Company, which had been in use for several years, and which showed but little evidence of wear in the springs. It is easily repairable, as a spare spring can be readily carried in the ambulance wagon, and can be substituted for a broken one with but little delay and trouble. The India rubber springs weigh thirty-five and three-quarter pounds, which at seventy-five cents per pound would amount to $26.81. Steel springs of the same power would weigh about two hundred pounds and cost about $50.00."

The most serviceable ambulance wagon used during the latter part of the war was that designed by Brigadier General D. H. Rucker, and built at the Government repair shops at Washington. It accommodates patients either in the sitting or lying postures. On the floor of the vehicle are two stretchers suitable for carrying one patient each, and each divided by a longitudinal hinge-joint. These stretchers have the usual handles, and run on elastic rollers so as to move readily longitudinally in the bottom of the wagon. When required as seats, the joints of the stretchers are bent, and the two parts are made to assume (see FIG. 469) a position at right angles to each other, the half which has the horizontal position being hooked to the sides of the vehicle, the other part forming the support or leg for the front of the seat. When the lower bed or stretcher is thus bent to form a seat, the upper beds are turned down to make backs for the lower seats (see FIG. 469). These backs are only joined to the sides of the wagon by hinges at their upper edge, and the lower edge can be raised upward and inward, toward the middle of the carriage. When thus elevated the two backs meet in the middle of the carriage and are there supported by iron supports, which, being hinged to their under surfaces, can be readily lowered for the purpose. In the floor are springs for the reception of

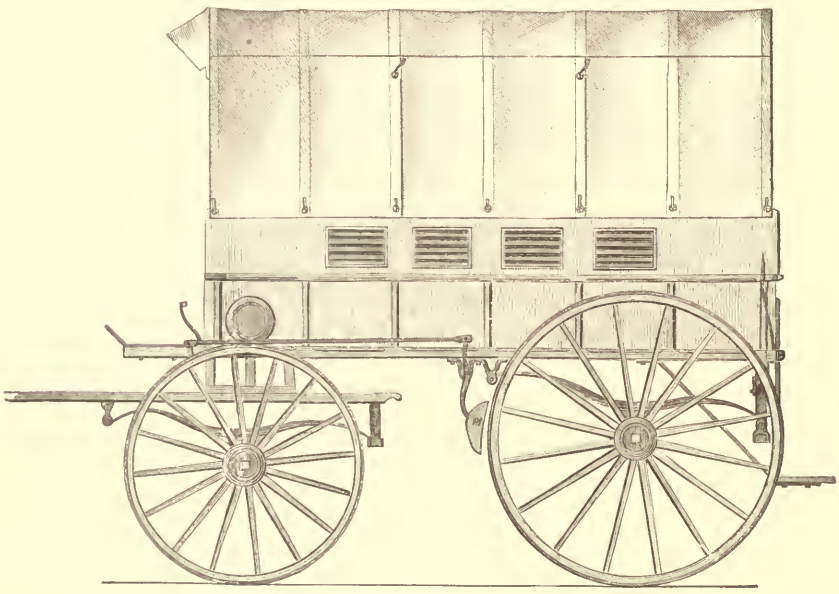

FIG. 466.—The "RUCKER" ambulance wagon.

the iron supports. A platform is thus built on which two patients, on stretchers, can be laid (FIG. 468). These stretchers ordinarily are suspended from the roof of the carriage, each stretcher being slung with one side to the middle of the roof and with the other to the bend of the arched roof (see FIG. 469). The space between the upper surface of the lower and the lower surface of the upper stretchers was about twenty-one inches. This space was ventilated by lattice openings on each side of the body of the ambulance wagon, as indicated in FIG. 466. The body rested on platform springs, and the fore wheels were smaller than the hind wheels. The water-cask was under the driver's seat, and the spigot projected slightly through the side of the body. The weight was about one thousand one hundred and twenty pounds, exceeding that of the Wheeling, which only weighed from seven to eight hundred pounds, but the Rucker wagon was somewhat longer and broader. Detailed specifications of this ambulance wagon will be found on page 48 of the *Report of a Board of Officers to decide upon a Pattern of Ambulance Wagon for Army Use*, Washington, 1878.

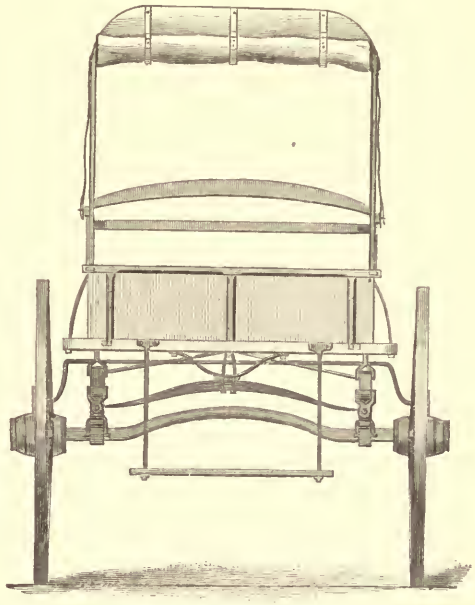

FIG. 467.—The same—rear view.

In October, 1864, Assistant Surgeon B. Howard, U. S. Army, constructed an ambulance wagon (FIGS. 470, 471) for which he claimed many advantages. A full description, with illustrations, will be found on pages 981–994 of *The Sanitary Commission Bulletin*, Vol. I, 1866; an extract, omitting some of the minor details, is here reproduced: "To enable the badly wounded to be easily loaded and unloaded, two litters or beds are provided, made of wood, like an ordinary shutter, with sliding handles at each corner. Upon this the patient is easily shifted, and without any disturbance. The litter is slid into the ambulance wagon on rollers. In the same way the patient is removed on arrival at the hospital, and without being disturbed until he reaches his bed. If part, or all the patients are able to sit up, one or both of the litters can be slid into a compartment provided for that purpose under the floor of the vehicle. There are six permanent seats, each situated transversely, and each a corner seat with back and cushioned seats. This gives a comfortable purchase, secures the patients against much of the usual jolting, and prevents them being driven against each other in going over rough roads. The sides of the

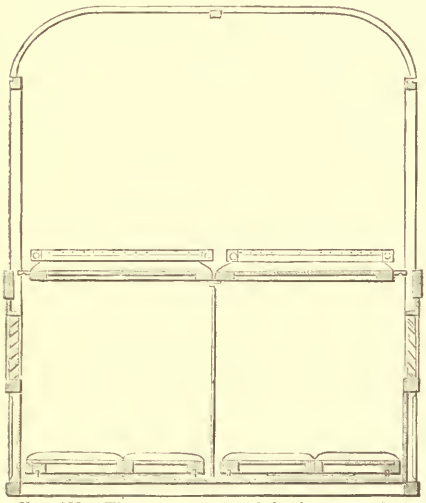

FIG. 468.—The same—arranged for four recumbent patients.

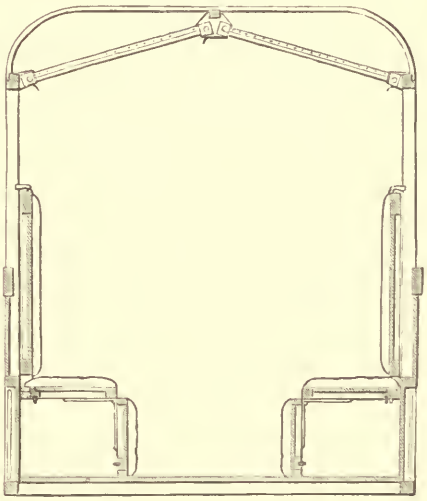

FIG. 469.—The body of the "RUCKER" ambulance wagon arranged for ordinary use.

ambulance wagon, as also both sides of the back of the driver's seat, and the inside of the upper section of the tail-board, are cushioned, while the middle seats have for a back a leather strap, like that used in stage coaches; thus each seat is rendered very comfortable, and being transverse instead of longitudinal is in every respect easier for the patient. In order to diminish the motion of the body of the wagon and prevent rolling and pitching, so intolerable in the ordinary ambulance wagon, semi-elliptical springs have been substituted for the elliptical ones.. In order that the limited motion

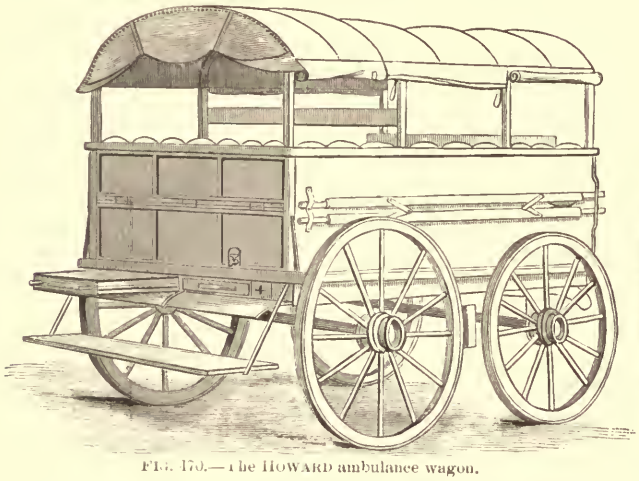

FIG. 470.—The HOWARD ambulance wagon.

FIG. 471.—The same—rear view.

thus obtained be so modified as to give least jar to patients, internal counterpoise springs are used, the delicacy of which may be modified to any extent desired. The platform or frame on which the seats and beds rest is as long but not so wide by about two inches as the inside of the body of the wagon. Between the inside of the body and the frame of the platform is an interspace; this is occupied by two lateral semi-elliptical steel springs on either side, fastened at the centre of their arc to the inside of the body of the vehicle, the feet of which play upon iron plates on the outside of the frame. Opposite the centre of the arc on the frame is fixed a block of soft rubber, so that on the application of much force it should be received by the rubber blocks, which thus act as buffers. The platform or frame on which the seats and beds rest stands upon four iron stanchions, each of which rests on springs like the lateral springs described above, but much stronger, as seen at FIG. 472, the iron stanchions resting on steel springs, the feet of which play upon iron plates let into the floor of the ambulance wagon. The spring is restrained in its motion upward by an iron staple, and when, by an unusual weight, it is heavily pressed down, the force is received by a block of soft India rubber enclosed within the staple. An impulse communicated to the floor of the wagon, instead of being propagated to the beds or seats, causes a counteraction downward of the spring, which, if the force be very great, spends itself upon the block of rubber. In this way, both laterally and perpendicularly, a constant poise is preserved, and what would otherwise be a very violent jar is reduced to little more than a vibration. The steadiness of the entire vehicle is preserved by the stout semi-elliptical spring beneath the body, and the delicacy regulated to any degree by the internal counterpoise springs within the body. That the water may be carried securely, immobility of the vessel containing it during transportation is neces-

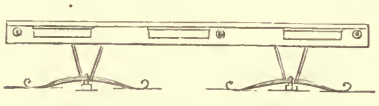

FIG. 472.—Springs for bed or litter frame.

sary. This is effected by substituting for the casks in ordinary use a tank, which slides into a grooved bed and is secured by an ordinary fastening. In a military point of view it possesses a great advantage in this: that besides the prescribed articles which may be carried in the driver's box, a large amount of medical supplies may be carried in the body of the ambulance wagon without interfering with the comfort of badly wounded patients. There being but four stanchions, and these being close up to the side of the vehicle, the entire body beneath the platform is free for transportation of supplies. There is an arrangement for suspension of fractures of the lower extremity, which is very grateful to the patients. Two parallel iron bars are attached to the roof of the ambulance wagon longitudinally over each bed, between which runs a roller with a dependent hook. The fractured limb being placed in a double-inclined plane or other splint, a bandage is passed through terrestra of the box splint and then carried over the hook from which the limb is suspended. In this way, instead of the jolting and jarring so commonly experienced, simple oscillation is substituted, or, if desired, guys of bandage may be so extended to the uprights of the ambulance as to render the limb nearly motionless during transportation."

The weight of the Howard ambulance wagon was twelve hundred and thirty-two pounds. The plan of this wagon, with recommendations of some twenty officers of the Army of the Potomac, was submitted for examination by Surgeon T. A. McParlin, Medical Director of the Fifth Army Corps, to a Board of Medical Officers, consisting of Surgeon J. J. Milhau, U. S. A., Surgeon L. W. Read, U. S. V., and Assistant Surgeon George A. McGill, U. S. A., who reported, on October 6, 1864, that: "the ambulance wagon meets the approbation of the Board as one presenting some decided advantages over that now in use. It is recommended further that at least two to a division be furnished, so that a fair trial can be made of such vehicles." A number of the old pattern ambulance wagons were thereupon altered according to the plans submitted by Assistant Surgeon B. Howard, U. S. A., at the Government repair shops at Washington. But it seems that after nine months' experience in the field these ambulance wagons failed to meet the expected advantages. In a letter dated Medical Director's Office, Headquarters Fifth Corps, June 29, 1865, Surgeon Charles Page, U. S. A., remarks: "There have been two of the ambulance wagons in each division train of the corps, and for ease to the patient the report is universal in their favor. They are apt to get out of order, and being heavy cannot be carried where the other ambulance wagons can go. For marches I think the Howard ambulance wagon is superior; but for field work, in time of action, I would prefer the present Rucker pattern of ambulance wagon." In a reply to a note of enquiry from the Surgeon General dated June 29, 1865, Surgeon T. R. Spencer, U. S. V., from Headquarters of the Fifth Army Corps, takes a similar view: "So far as I can learn in this corps, it is not regarded as an improvement upon the old one. It is so heavy as to require four horses, else it rapidly destroys two. It is so complicated as to be continually getting out of order. As now constructed the ambulance wagon does not ride as easy over all roads as the old one. The only advantage it seems to possess is in the greater convenience of loading and unloading; this soon results in the loss of the bed, as officers will not consent to be removed from the bed during transportation. Once lost, or taken from the ambulance wagon, the bed is never returned, and the wagon is henceforth useless."

In the winter of 1864–'65 an ambulance wagon, proposed by Dr. I. Langer, was used at the Fifth Army Corps Depot Hospital before Petersburg. It was arranged to accommodate eight persons, four in sitting and four in recumbent positions, or six in sitting

and two in recumbent, or all eight in sitting postures. The advantages claimed were, greater seating capacity, greater facilities for loading and unloading, greater comfort to patients, offering easier access to each single patient, superior ventilation, and that it had apparatus for suspending two patients with compound fractures of the thigh. In April, 1865, a Board was convened, consisting of Colonel R. O. Abbott and Assistant Surgeons

FIG. 473.—An army wagon fitted up as an ambulance wagon. [After LANGER.]

J. J. Woodward and William Thomson, U. S. A., to examine and report on this ambulance wagon. The Board considered seriatim the advantages claimed by Dr. Langer, basing its opinions on comparisons with the Wheeling and the Rucker patterns then most generally in use: "The model examined is altered from a Wheeling ambulance wagon; the changes are radical and the additions numerous. So ingeniously complicated are the appliances, and so multitudinous the objects to be obtained, that the wagon would fail to meet the test of field service. The probable loss of its numerous detached pieces would rob it of all its special advantages, and leave it less useful than the Wheeling and Rucker wagons. In comparison with the former it has some advantages; but it fails to compete in practical usefulness with the ambulance wagon devised by Brigadier General Rucker." With regard to the apparatus for the purpose of transporting two thigh fractures the Board find: "The novelty of the method and the uncertainty of its practical value would not warrant the alteration of all the ambulance wagons in the service to fit them for transporting in this manner an occasional fractured femur." The Board refused to recommend the introduction of the Langer ambulance wagon into the service in preference to those then in use. At the same time Dr.

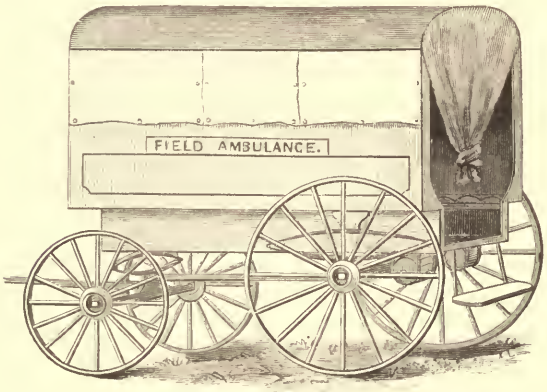

FIG. 474.—The Confederate field ambulance wagon. [After CHISOLM.]

Langer submitted to the Surgeon General for inspection an army wagon (FIG. 473) which had been fitted up with twelve beds for transporting patients. Dr. Langer claimed "that this change of the army wagon would not interfere with its design of conveying forage or other articles to and from a camp; that when the wagon is used for carrying forage the twelve beds are packed under a movable bottom, and the railing supporting them is stowed away on the sides, so that the capacity of the wagon box is not impaired; that in ten minutes after the wagon is unloaded it is changed into an ambulance wagon with all the equipments for transport—six patients in a sitting posture, six in a lying, two of which, if necessary, suspended on fracture beds of Dr. Langer's pattern; that there is room for all the equipments of the patients, for a water-keg, and for boxes with provisions and bandages, and that the wagon can be loaded from the front as well as the rear." As far as can be ascertained the experiment was tried but once. A drawing of the Confederate field ambulance wagon is copied from Chisolm[1] in FIG. 474. No description of the vehicle could be obtained.

RAILWAY TRANSPORTATION.

The facilities afforded by railroads for the movement of troops and material to the theatre of warfare have formidably augmented the destructive power of armies; but they have also offered useful and most effective means of saving lives and alleviating suffering by the speedy removal of the sick and wounded from the scene of active operations. After the battle of Gettysburg, in July, 1863, for instance, twenty thousand three hundred and forty-two wounded came under the care of the medical officers of the Army of the Potomac, and in two weeks fifteen thousand four hundred and twenty-five had been forwarded to Baltimore, York, Harrisburg, and New York City. Of the remainder a large proportion was unable to bear the fatigues of a protracted journey. After the bloody battles of the Wilderness and Spottsylvania the distribution of the wounded was even more rapidly effected, and, with a few exceptions, the fallen were, within a few days, comfortably sheltered in the hospitals at Alexandria, Washington, Baltimore, Philadelphia, and New York.

By rapid dispersion of the disabled the fighting force is less diminished than by any other plan. Fewer combatants are withdrawn from their proper duties to attend their sick and wounded comrades. With proper inspection of those sent to the rear, and such enforcement of discipline in the base hospitals as will ensure the prompt return of convalescents, the number of sick and wounded engaging in fresh active service will be greater than by any other arrangement; and a less proportion of division, brigade, and regimental medical officers and hospital attendants need be detached from the marching columns, which, in the exigencies of actual battle, are rarely adequately supplied with surgical assistance. Large accumulations of medical and hospital supplies with the army become superfluous. The depot hospitals, frequently great lurking places for malingerers, may be reduced to the smallest compass. If, without changes, the wounded can be directly placed in a fixed hospital not too distant, many primary mutilations may be justifiably avoided, with a view of employing more delicate special operations when the patients arrive at a safe place of rest. Lastly, the most important consideration is the most obvious, the distribution of the sick and wounded prevents the generation of those pestilences that are the greatest scourge of armies. The sick and wounded avoid infecting each other, and those who are well escape contagion.

In a report published from this office[2] on the subject of transportation of wounded by

[1] CHISOLM (J. J.), *A Manual of Military Surgery*, Columbia, 1864. PLATE I.

[2] OTIS (GEORGE A.), *A Report on a Plan for Transporting Wounded Soldiers by Railway in Time of War*, Washington, War Department, Surgeon General's Office, 1875.

railway, the means employed have been considered at length, and as there is very little to be added to that report, it is deemed best to reproduce such portions of the report as refer to railway transportation during the late war:

"After the action at Wilson's Creek and minor engagements in central Missouri, in August, 1861, the severely wounded fell into the hands of the enemy. They were soon paroled and concentrated at Rolla, the southwestern terminus of the St. Louis railroad, whither two hundred less grievously injured, and carried off by the retreating army, had previously been sent. Here, the freight cars available were fitted up for the transportation of this large body of wounded to the hospitals established at St. Louis. Various expedients were employed to adapt the cars to the requirements of the different classes of patients. * * * Seasoned tent-poles were shaved down to give them as much elasticity as was compatible with requisite strength, and secured transversely near the roof, passing through holes in the side studs of the car. Ropes attached to these poles and also to the floor suspended two tiers of field stretchers, on which pallets were laid. With this plan a feeling of insecurity was common to the patients and attendants, and additional lashings and constant inspections were necessary to prevent accidents. Another method consisted in placing a double row of upright stanchions, which were erected on either side of the car (FIG. 475), connecting the floor and roof, at intervals of seven feet lengthwise. To these firm posts tiers of two or three litters were securely lashed. In other cars rough wooden bunks were built along the sides of the vehicle and filled with straw, and made more comfortable by being floored by narrow elastic slats. In all cases large window spaces were sawn out of the ends and sides of the car to afford ventilation. There was often cause to remark on the great ingenuity displayed, on this and other similar occasions, by the line officers, quartermaster's men, and the soldiers themselves, in improvising various contrivances for the comfort of the wounded subjected to these rough modes of transportation. With an intelligent adaptation of the means at hand it was found practicable to make the condition of the wounded on freight cars very tolerable with the aid of articles belonging to the field equipment alone. * * *

FIG. 475.—Interior of an improvised hospital car.

"After the Army of the Potomac left the vicinity of Washington the sick and wounded were removed mainly by the hospital transport steamers on the Potomac, Rappahannock, York, and James rivers. The short lines from Savage's Station to White House, on the York, and from Aquia Creek to Fredericksburg, were largely utilized, however, for the same purpose; and when the theatre of hostilities was transferred to Maryland and Pennsylvania numerous railway lines became available. Medical Director J. Letterman recorded the transfer[1] of no less than nine thousand sick and wounded over the Aquia Creek road on June 12th, 13th, and 14th, 1863, when the army moved northward after the disasters of Chancellorsville. All patients that would be injured by sitting up were carried by hand to the railway on the beds they occupied in hospital, the beds being placed on hay-covered floors in freight cars.

"The following year, when this army was massed before the entrenched line at Petersburg, a large depot hospital was erected at City Point, the base of supplies, at the junction of the James and Appomattox rivers. This depot was connected with the positions of the several army corps by a railroad with branches, and the sick and wounded from the division hospitals were brought to the depot chiefly in the box-cars which had carried forward supplies for the troops, and were transferred to hospital steamers, or retained at City Point for treatment, at the discretion of the medical director for transportation, Surgeon E. B. Dalton, U. S. V. There were at first two, and, subsequently, a larger number of passenger cars converted into hospital cars by the erection of rows of stanchions, to which litters were suspended by elastic rubber rings, each car having accommodation for thirty recumbent patients. The box-cars, with door-ways at the sides 5 feet in width and an interior height in the centre of 6 feet 9 inches, had a floor space of 25 feet 2

[1] LETTERMAN (J.), *Medical Recollections of the Army of the Potomac*, New York, 1866, p. 150.

inches in length by 7 feet 8 inches in breadth, or about 192 square feet. They afforded comfortable accommodation for nine recumbent patients, but were sometimes packed with as many as twenty. When the floors were covered with a thick bed of fresh straw or hay, on which well-filled bed-sacks or mattresses could be laid, the concussions from the motion of these rough cars were so much deadened as not to be intolerable even to severely wounded men. There was a great advantage in carrying the wounded on the beds or litters on which they lay through the wide doorways of the box-cars, and unloading them, in like manner, at the depot hospital or the wharves of the transport steamers at City Point. It was, however, very difficult to obtain an adequate supply of straw or hay when, after a general engagement, train after train was sent in rapid succession, and recourse was sometimes had to bedding of dry leaves or evergreen boughs. In one of the reports to Medical Director T. A. McParlin[1] it is stated that it was necessary to empty the bed-sacks of the field hospitals of a corps in order to obtain sufficient bedding for the box-cars of a train of wounded.

"In the summer and autumn of 1862, and during the two succeeding seasons, four large brigades stationed at New Berne suffered from malarial fever to that extent that general hospitals, or rather *sanitaria*, of great capacity, were established on the sea-coast at Carolina City, near Fort Macon, the former connected with New Berne by a railway forty miles long. The patients were conveyed in freight cars, for there were no others available. The floors of the cars were covered with dry 'pine tags' supplemented by a layer of loose hay or straw when it could be procured. The patients were laid upon bed-sacks on this substratum, and even those most gravely ill were transported with comparative comfort. Medical Inspector E. P. Vollum, U. S. A., has recorded[2] that after the battle of Gettysburg, July 1–3, 1863, over fifteen thousand wounded were sent from the field hospitals prior to July 22d, nearly all by railway to Baltimore, York, Harrisburg, and Philadelphia. They were transported, in large proportion, in the box-cars of the returning supply trains. 'Each car was supplied with a sufficient quantity of hay, and, on the longer routes, water-coolers, tin cups, bed-pans, and urinals were placed on them.' After the battle of Olustee, February 20, 1864, where the wounded of the Union side numbered over eleven hundred, Assistant Surgeon John H. Janeway, U. S. A., states that the grave cases of compound fracture and of penetrating wounds of cavities, and, indeed, all the more seriously wounded, were transported on the Mobile Railway on freight cars bedded with pine boughs, palmetto leaves, and a small allowance of straw, covered with blankets. The trains moved slowly from Sanderson to Jacksonville, on the coast, a distance of nearly fifty miles, and patients who had undergone amputation, and others severely wounded, complained but little of the rough method of transit. In the campaigns about Chattanooga, also, Medical Director G. E. Cooper, U. S. A., reported that in emergencies, when the regular hospital trains were overcrowded, recourse was often had to transport by freight cars bedded with dry leaves.

"In a letter to the Surgeon General, dated Philadelphia, January 7, 1863, Surgeon A. K. Smith, U. S. A., describes 'a car recently fitted up by the Philadelphia Railroad Company for the better conveyance of the worse class of sick and wounded. * * * The internal arrangements are similar to those of sleeping cars, with the exception that the berths slide in and out, and two men can carry each, with its patient, to the ambulance wagon or the nearest hospital, the berths being, in fact, comfortable stretchers. The car has fifty-one of these berths, and a seat at each end for an attendant. It is provided with a stove, on which soups can be cooked, a water-tank and locker, and a convenient water-closet. It is proposed to use the car with the regular passenger trains, and to bring to Philadelphia cases of a more serious nature than can be selected for transfer by the ordinary mode of travel. This arrangement is entered into with great zeal by Mr. Felton, president of the road, the plan being in a great measure due to the efforts of Mr. William Welsh. If proved to work well, I am satisfied in saying that more cars will be similarly constructed for the purpose of bringing the seriously sick and badly wounded from Frederick and Harper's Ferry.' This proposition was warmly seconded at Washington, and a number of passenger cars, converted to hospital requirements, and hospital cars also of special construction, were soon in operation on the railway lines connecting the theatre of hostilities with Baltimore, Harrisburg, Philadelphia, and New York. They were not fitted up on a uniform plan, but under the auspices of different

[1] A Report from the Fifth Corps headquarters by Assistant Surgeon C. K. WINNE, U. S. A.

[2] VOLLUM (E. P.), *Report on the Transportation of the Wounded after the Battle of Gettysburg*; in *Appendix to Part I, Medical and Surgical History of the War of the Rebellion*, Washington, 1870, p. 143.

benevolent associations; but all secured a comparatively comfortable mode of transport for recumbent patients, and rendered almost inestimable service in relieving the crowded hospitals near the scene of hostilities. The hospital cars fitted out by the United States Sanitary Commission are understood to have been arranged in accordance with plans furnished by Dr. Elisha Harris.[1] A model of one of these cars was exhibited at the Paris Exposition of 1867 (see FIG. 476). These cars were about fifty feet in length. A passage-way extended through the middle to the doors at either

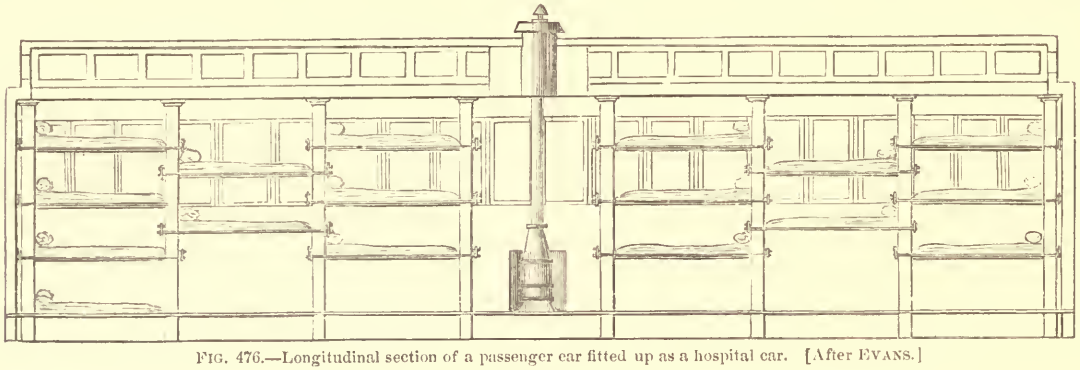

FIG. 476.—Longitudinal section of a passenger car fitted up as a hospital car. [After EVANS.]

end. On either side of the passage-way were eight upright wooden posts, three inches square, connecting the floor and ceiling, and so placed that the distances apart should correspond with the length of a field stretcher. At a distance somewhat less than the width of a field stretcher, opposite each pillar, another post of like dimensions was placed next the side of the car; thus one side-pole of a stretcher was attached inside the wall-pillar and outside the pillar next the passage-way, and its suspension was rendered easier than if it was confined between the rigid pillars. Wooden pegs inserted in the posts served for the attachment of large rubber rings (FIG. 477), which received and sustained the ends of the stretcher poles. Thirty-two litters could be suspended, leaving a space in the middle for a stove and seats for attendants or wounded who could travel in a sitting posture. It is stated[2] that some of the india-rubber rings that had been in use in these cars were exhibited in Paris in 1867, and were still in perfect order. I have been informed that these cars had doors of three feet in width; but even this space would be insufficient, if the litters were as wide as represented by Dr. Evans. The ordinary field stretchers used in the United States were uniformly 24 inches wide, and it was this form of stretcher that was generally employed upon the hospital trains. Although the advantage of caoutchouc rings for the suspension of litters was generally conceded, and the inventor and exhibitor were rewarded with medals, many objections were raised to the arrangements of the car exhibited in Paris. Dr. Lœffler[3] declared that the inconveniences attending the transport of wounded in tiers of three superimposed berths were so considerable that the project must be abandoned. Professor Gurlt[4] referred to the danger of 'the frequent jolting of the car, striking the poles of the stretchers against the posts and communicating concussions to the litters and the patients, which may have the gravest consequences for the latter.' Professor Billroth[5] objects to these and all other arrangements for the railway transport of wounded that cannot be extemporized.

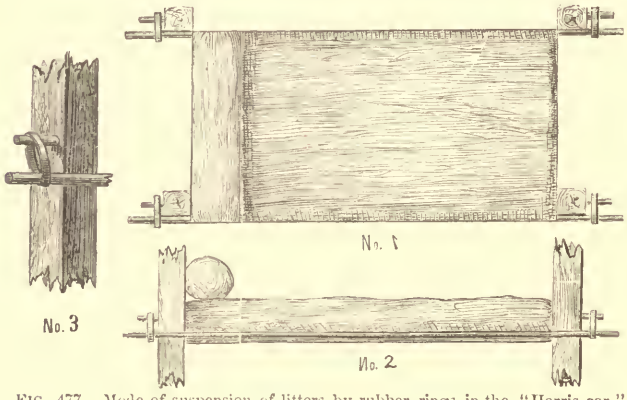

FIG. 477.—Mode of suspension of litters by rubber rings in the "Harris car." 1. Vertical view; 2. Lateral view; 3. Enlarged view of one of the rings. [After EVANS.]

[1] STILLÉ (C. J.), *History of the U. S. Sanitary Commission*, Philadelphia, 1866, p. 161; HAMILTON (F. H.), *A Treatise on Military Surgery and Hygiene*, New York, 1865, p. 168; and EVANS (T. W.), *La Commission Sanitaire des États-Unis*, Paris, 1865, p. 133, *et Planche* IV. A letter on file in the Office of the Quartermaster General indicates that Dr. HARRIS invited General MEIGS to inspect one of these hospital cars as early as March 20, 1863.

[2] LONGMORE (T.), *A Treatise on the Transport of Sick and Wounded Troops*, London, 1868, p. 476.

[3] LŒFFLER (F.), *Das Preussische Militär-Sanitätswesen, und seine Reform nach der Kriegserfahrung* von 1866, Berlin, 1869, B. II, s. 251.

[4] GURLT (E.), *Abbildungen zur Krankenpflege im Felde*, u. s. w., Berlin, 1868, s. 5, Taf. II.

[5] BILLROTH (TH.), *Chirurgische Briefe aus den Kriegs Lazarethen*, u. s. w., Berlin, 1872, s. 71.

"When the Army of the Potomac advanced to the line of the Rapidan, the Medical Director of the Department of Washington, Surgeon Robert O. Abbott, U. S. A., recommended that an hospital train of twelve cars, one fitted up as a dispensary and store-room for supplies, one for the surgeon in charge and attendants, and ten for the sick and wounded, should be constructed on plans and specifications prepared by the Assistant Superintendant of Military Railroads, J. McCrickett,[1] remarking that 'during the past year two or three cars somewhat similarly fitted up, provided with medical officers, nurses, and the proper medical appliances, have been running, under my direction, between this city, Philadelphia, and New York, and I make this request upon my experience of their practical working and the satisfaction they have given to patients, their friends, and this office. At present, the sick and wounded are transported in cars illy adapted for the purpose, and with difficulty spared from the other pressing demands, and lives are lost on the route, not infrequently, which in all probability might be saved by a more comfortable and easy method of transportation. These considerations and the extended facilities such cars will give for transportation of the wounded particularly, will, in my opinion, justify the expense of construction.' It was designed that this hospital train should ply between the advance of the army, near Culpeper, and the base hospitals at Alexandria and Washington, and should supplement or supersede the freight cars bedded with straw or hay that had been hitherto in use. The Surgeon General and Quartermaster General cordially endorsed this project, and several complete hospital trains were soon in operation on this line.

FIG. 478.—Transverse section of hospital car on the Orange and Alexandria railroad.

"FIGURE 478 is a reduction from Mr. McCrickett's 'end elevation of the hospital car, showing the litters in place, and the mode of hanging them. The bottoms of the permanent couches, two and a half feet wide, are made either of wooden slats or of canvas, with mattresses laid upon them. For the second and third tiers, ordinary field stretchers are used. The inside poles of the litters are suspended by a leathern strap or by strong webbing, the strap secured to a carling of extra strength; the outside handles of the litters are supported by hooks of spring steel. There should be some space between the inside litter handles and the side of the car to prevent concussions;

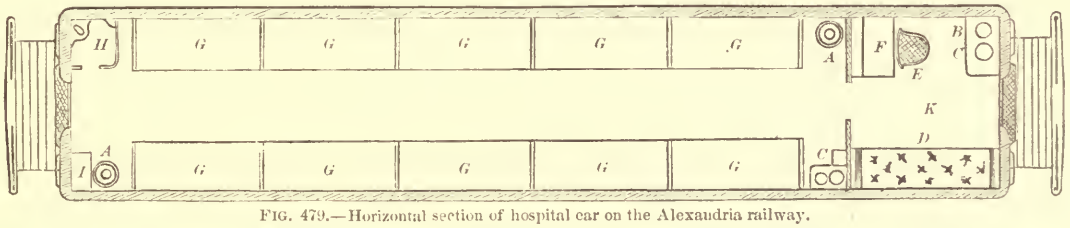

FIG. 479.—Horizontal section of hospital car on the Alexandria railway.

A—Stoves. C—Wash Basin. E—Chair. G—Tiers of couches. I—Wood Box.
B—Water-cooler. D—Lounge or couch. F—Table. H—Water-closet. K—Surgeon's office.

the hooks so constructed as to act as springs. The litters of the second and third tiers, when not in use, can be taken down and folded under the permanent couches. The straps also can be taken down or rolled up; there will then be no obstacles in the way when loading the cars with patients.

A door three feet and a half wide, *at one end*,[2] gives ample room for ingress and egress of loaded stretchers. The aisle is three feet and a half wide and can be occupied by folding chairs for those who can travel in a sitting posture, the chairs being stored under the permanent couches. The

[1] Mr. J. McCRICKETT estimated that the twelve cars could be built in thirty days, at an expense not exceeding $30,000, if the task of construction was divided among the factories at Wilmington, York, Harrisburg, Philadelphia, and Springfield, Massachusetts. He thought it "much better in many respects to have the cars made to order than to buy them at second-hand and have them altered," since railroad companies "can ill spare any of their rolling stock at this season, and would sell only worn-out or condemned cars, the alteration and fitting up and repairs of which, added to the prime cost, would demand a greater sum than would be required for new hospital cars." It is impracticable to ascertain from the records of the Bureau of Construction of Military Railways whether a full train was built in accordance with the plans and specifications of Mr. McCRICKETT, prepared in consultation with Surgeon E. BENTLEY, U. S. V. It is known that the construction of a number of hospital cars was authorized about this time, at different car-shops, and that several hospital trains were soon in operation on the Orange and Alexandria line; but they were not of uniform patterns. In many of them, the litters were suspended by india-rubber rings. It is probable that the cars constructed under the direction of the Sanitary Commission and those built by Government order would often be connected or separated on the different lines as the exigencies of the service required.

[2] At the other end, represented in the elevation (FIG. 478), the door opening into the attendant's room is only two feet wide.

capacity of the car, which measures inside eight and a half feet in width, forty-five and a half feet in length, and six feet eight inches in height, permits the transportation of fifty or sixty patients—thirty in couches and the others in chairs.' FIGURES 479 and 480 explain themselves.

"With the addition of special cars fitted up with rooms for kitchens, dispensaries, store closets, quarters for the employés of the train, offices for the executive officer, etc., a well-organized railway ambulance train became a nearly complete movable hospital establishment, with every reasonable appliance for the sustenance, dressing, nursing, and medication of the patients. The hospital trains of the armies in the East traversed railways within the Union lines, and were seldom molested. They were moved generally at a low rate of speed. They were distinguished by displaying the yellow hospital flag near the engine, and by the inscription 'U. S. Hospital Train' painted in large letters on the panels of the cars.

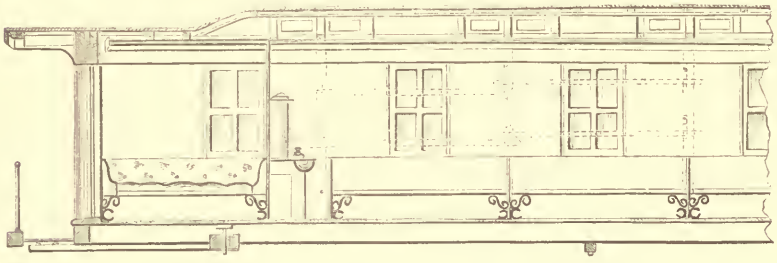

FIG. 480.—Lateral elevation of a part of one of the cars on the Alexandria line.

"The hospital cars prepared under the supervision of the Government officials and those arranged under the direction of the agents of the Sanitary Commission were usually passenger cars converted to hospital use, although the kitchen and executive cars, and a few of those for the conveyance of the sick and wounded, were built specially for the purposes they were designed to subserve. There was great variety in the details of the internal arrangements; but nearly all conformed to the general plan of securing berths in tiers to rows of uprights. The cars constructed by different builders varied in dimensions. The longest were 58 feet in length including the platforms. The usual interior length was 45 to 50 feet, which afforded space for five or six sections of stretchers on each side, and space for stoves, lavatories, water-closets, and seats for attendants. The height at the sides was 6½ feet, the roof sloping upward to 7½ feet, and being surmounted by a clear story of 2 feet provided with windows and ventilators.

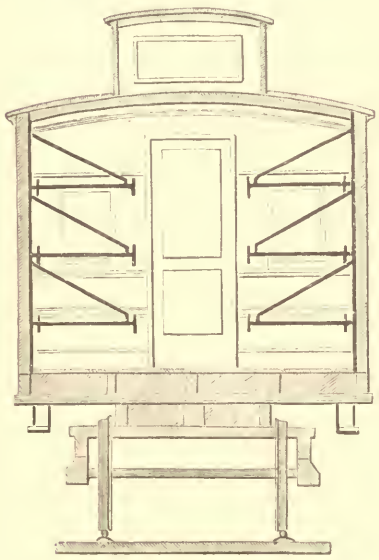

FIG. 481.—Transverse section of a passenger car fitted out by Acting Assistant Surgeon J. P. Barnum, and known as the "HARRIS Car."

"It was in General George H. Thomas's Army of the Cumberland, of which Surgeon George E. Cooper, U. S. A., was Medical Director, its long line of communication extending hundreds of miles away to its base of supplies, that the utility of railway transport, in relieving the army of its disabled men, was most conspicuous. Although freight cars were used for very severe cases, several trains of hospital cars of special construction were prepared at the Government work-shops for the conveyance of patients in the recumbent posture. In 1864 there were three hospital railway trains, each consisting of ten or twelve cars, with several freight or baggage cars attached sometimes, connecting the advance of the army with Nashville and Louisville; one train, at least, daily leaving the vicinity of the field hospitals. In each train one car was fitted up exclusively as a kitchen and store-room, and another as a dispensary, with accommodation for the medical officer in charge, and an ample supply of medicines, stores, instruments, and appliances. Surgeon Cooper reported that upon his arrival in the Department a train of passenger cars fitted up for the transport of sick and wounded by Acting Assistant Surgeon J. P. Barnum was already in operation on the line, a hundred and eighty-five miles in length, between Louisville and Nashville. This train had been prepared at Nashville under the direction of the Western Sanitary Commission. Each of the cars accommodated thirty-three recumbent patients. The pallets were placed in tiers of three, supported by iron brackets attached to the sides of the car, and swung on india-rubber springs (FIG. 481). 'The bed-frames,' Surgeon Cooper remarks, 'resemble stretchers with a portion of the handles sawn off. This style of car is objection-

able on account of the surgeon being unable to manipulate the wounds, when they require dressing, without great inconvenience to himself. The space between the beds is too contracted, and causes much complaint from the wounded. There is too much motion in the beds, and altogether the car is not a good one.' Dr. Barnum states that during his connection with the railway hospital service he 'supervised the transportation of 20,472 patients and lost but one, who, despite the advice of his surgeons, implored that he might be taken to die in the bosom of his family.'[1]

"The cars thus arranged, and others in which litters were suspended by india-rubber rings from pegs inserted in upright posts, as in the Eastern hospital trains, were alike known at the West, under the designation of the 'Harris car.' Dr. F. L. Town, U. S. A., in a report to Assistant Surgeon General R. C. Wood, refers to them as follows: 'Other ways of securing the beds have been tried. The 'Harris car' is in use, with beds arranged in three tiers, each bed resting on stretchers, suspended by four rubber rings, between uprights. Each rubber ring encircles a pin in the upright

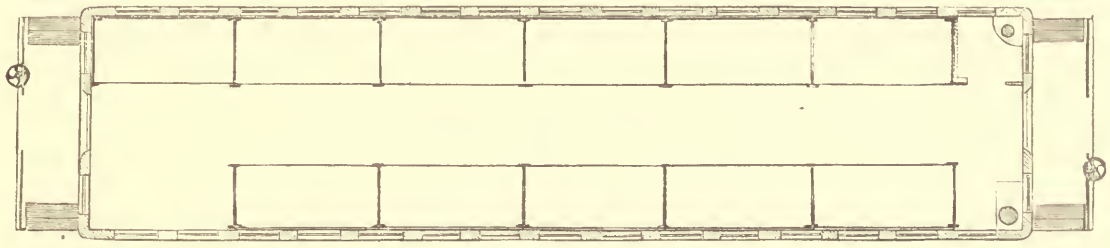

FIG. 482.—Reduced plan of a horizontal section of one of the cars of Dr. Barnum's train, showing the positions of thirty-three litters, the wash-room, and water-closet. [From a drawing furnished by Medical Director COOPER.]

and holds up one end of the lateral bar of the stretcher. This arrangement has one advantage—the stretcher can be unshipped, and, if necessary, the occupant can be borne away without disturbing him. A ward in the 'Harris car' contains thirty-three or thirty-six beds. The removal of one section of the tiers, that is, three litters, affords room for a stove in cold weather. The 'Harris car' has not worked well in practice. The elasticity of the rubber bands keeps the bed in constant vibration while the car is in motion, to the great annoyance of the patients, who complain of reclining on what they term 'a capering bed.' Severe cases are now conveyed in the cars to be hereafter described.

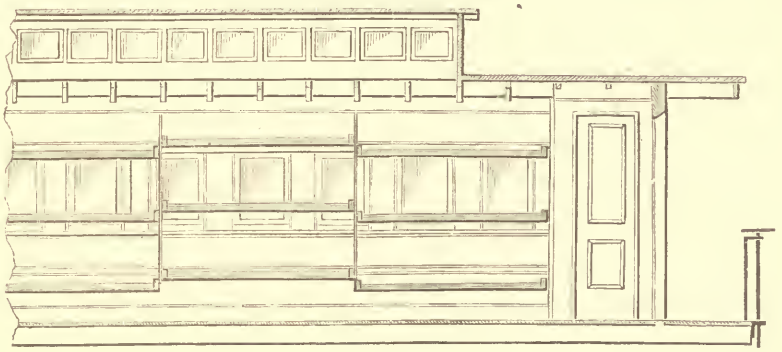

FIG. 483.—Lateral view of half of a hospital car of Dr. Barnum's train, showing the arrangement of the litters and the wide side door. [From a drawing from Dr. COOPER.]

"FIGURES 482 and 483 further illustrate, by horizontal and lateral views, the arrangement of one of the hospital cars of Dr. Barnum's train. They are reductions from drawings prepared for Dr. Cooper by a draughtsman of the Nashville Car Manufactury. Some further particulars respecting the method of suspending litters by rubber tugs or rings, and the means of obviating the excessive oscillation often complained of as a grave objection to this system, will be noticed further on.

"Medical Director George E. Cooper preferred the arrangement of the ordinary first-class passenger cars on the plan indicated in FIG. 484. The cars of this class were usually fifty-five feet long and nine feet four inches wide, with a doorway twenty-two inches wide at either end, a passage way of equal width through the middle, and, on either side, a row of fourteen double seats. Dr. Cooper describes the arrangement (FIGS. 479, 480) he commends as follows: 'The cars thus prepared have a capacity for thirty-three patients. The beds are made by removing the alternate seats, and connecting the remaining seats with slats of ash or some other springy wood. Two bed-sacks are laid on the slats. The wounded are carried on the slats covered with bed-sacks, and are placed

[1] EVANS (T. W.), *La Commission Sanitaire des États Unis*, Paris, 1865, p. 135. Medical Director COOPER doubts this remarkable immunity from deaths in transit on the hospital trains directed by Dr. BARNUM, while testifying to the indefatigable zeal and efficiency of the latter during his protracted service. "Acting Assistant Surgeon J. P. BARNUM," remarks Dr. TOWN, "had charge of the first hospital train built at Nashville. He studiously labored to improve and systematize its working, and devised many expedients looking to the comfort of the patients in days when the theory of hospital trains was not so well understood as now."

two on each bed. The upper beds are framed as stretchers, and are hooked to the side and ceiling of the car and covered with a mattress. On this upper tier the less gravely wounded are carried. This plan was found to be the best, the least expensive, and the most comfortable to the patients of all the hospital cars in use. The medical attendants could dress wounds in these cars without much inconvenience.' On the drawings sent with this description Surgeon Cooper annotates: 'This is the simplest and best form.'

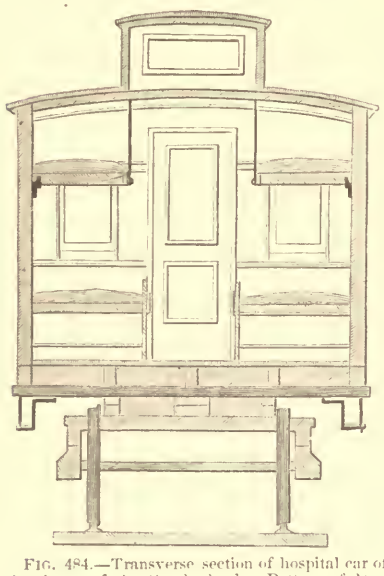

FIG. 484.—Transverse section of hospital car of the Army of the Cumberland. Pattern of Drs. Cooper and Herrick.

"Dr. F. L. Town, U. S. A., gives the following description of five of these cars which he inspected: 'Each ward contains about twenty-four beds, arranged lengthwise along either side of the car, in two tiers; the upper bed exactly above the lower. In the lower tiers the bed is fixed firmly upon the car-seats; the backs of these [and an intervening seat] are removed. Its width is that of the car-seat [about forty-four inches], and its distance from other beds is the space between adjacent seats. In the upper tier the beds are about two-thirds as wide, and are on stretcher-frames, attached firmly on the outer side to the wall of the car, and suspended on the inside by two iron bars from the roof. Each upper bed thus stands or hangs immovably in its place. The wide beds in the lower tier are considered double, and, on short routes, are often occupied by two patients regarded as mild cases. The American railway companies appreciate economy of space in their sleeping cars, and the plan of transporting two persons in one bed is not claimed as original in hospital trains. The hospital car is supported on trucks with elliptical steel springs, as is usual in passenger cars, and, in addition, india-rubber springs are so arranged as to equalize the motion and deaden the jarring of the car. This is a very valuable improvement and adds much to the comfort of the patients. In the wards above described the patients ride with much ease and every possible provision for their comfort.' FIG. 485 shows the horizontal plan of one of these cars.

"These cars were fitted up under the immediate supervision of Medical Director Cooper and of Surgeon O. O. Herrick, 34th Illinois Volunteers. The latter was at one time in charge of one of the trains, and is officially reported as having rendered signal service in devising expedients for

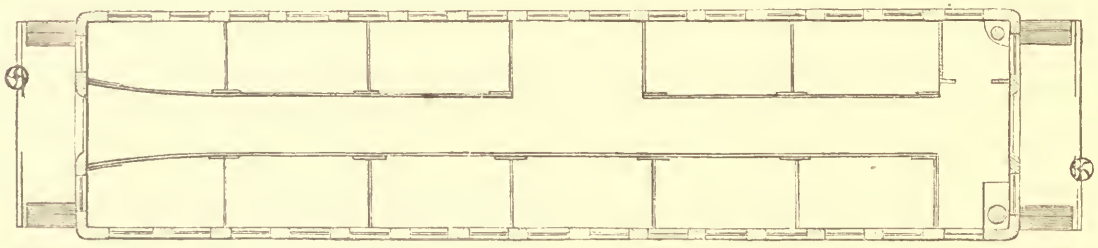

FIG. 485.—Horizontal plan of one of the hospital cars of the Army of the Cumberland.

facilitating the safe transport of wounded and in promoting the organization and administration of the system. General Thomas accorded the fullest authority to Medical Director Cooper to select for the hospital trains the best locomotives and cars to be found among the rolling stock, and to have new cars fitted up whenever necessary, and caused to be detailed for the hospital service the most experienced conductors, engineers, and other employés of the several railway lines. Medical Director Cooper informs the reporter that the smoke-pipes of the locomotives of the hospital trains were painted of a brilliant scarlet; the exterior of the hood, and of the tender car with water and fuel, were of the same conspicuous color, with gilt ornamentation. At night, beneath the head-light of the engine, three red lanterns were suspended in a row. These distinguishing signals were recognized by the Confederates, and the trains were never fired upon or molested in any way. Dr. Cooper 'was informed by wounded Confederate officers in Nashville, who were captured at the battle near that place, of the stringent orders given his troopers by General N. B. Forrest for the non-interference with and protection of the U. S. A. hospital trains,' by giving

them timely warning in the event of the railway being obstructed or torn up. The partisan troops of Colonel John Morgan's command had similar instructions. It is related that on one occasion Colonel Morgan's scouts stopped the train directed by Dr. Barnum, and having switched it off upon a siding, after inquiring if there were sufficient stores on the train for the sick and wounded, they tore up the main track, and then rifled and destroyed five supply trains that successively arrived at the point where the line was interrupted.

"Ventilation without exposure to drafts was well provided for in these cars by windows in the elevated part of the ceiling and by valvular openings near the roof (FIG. 486). Dr. Town comments on the admirable manner in which the apparatus for lighting and heating were made also to promote ventilation. He refers to many other details, which there is not space to notice here, and concludes that 'the conception of a complete hospital, with all its appliances and means of comfort, propelled by steam, was first carried into practical operation in the medical department of the West, and its perfect success was most gratifying to all. In visiting these hospital trains, the air is found sweet and pure, the wards neat and inviting, and it may unhesitatingly be said that men on hospital trains are often as comfortable, and better fed and attended than in many permanent hospitals.' Besides Drs. Barnum and Herrick, Medical Director Cooper mentions Surgeon L. J. Dixon, 1st Wisconsin Volunteers, and Assistant Surgeon E. J. Darken, U. S. A., as having supervised hospital trains with great skill and devotedness. Of the Medical Director himself, Dr. Town observes: 'Colonel George E. Cooper has made the study of hospital railway trains his pride. All of the western trains have been in the Department in which he directs the medical service, and many of the cars have been fitted up under his supervision. * * * He has just cause to be proud of his hospital trains.' As far as the records of the Assistant Surgeon General's Office show, the first official step toward organizing hospital cars was a letter written August 11, 1863, from that Office by Surgeon Joseph P. Brown, U. S. A. (during the temporary absence of the Assistant Surgeon General on other duty), directing the Medical Director of the Army of the Cumberland 'to take immediate measures to fit up a special train for hospital purposes, with every possible comfort,' to run between Nashville and Louisville.

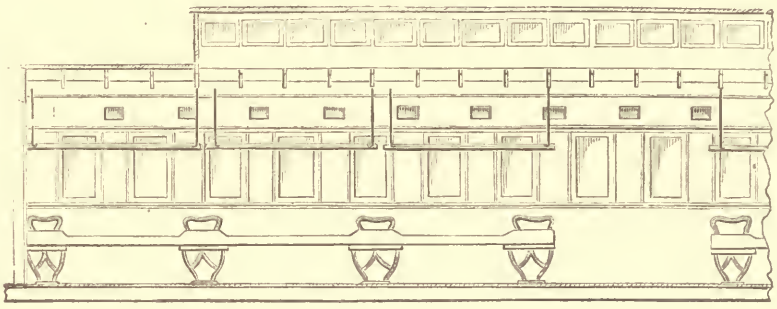

FIG. 486.—Side elevation of one of the hospital cars constructed under Dr. Cooper's supervision.

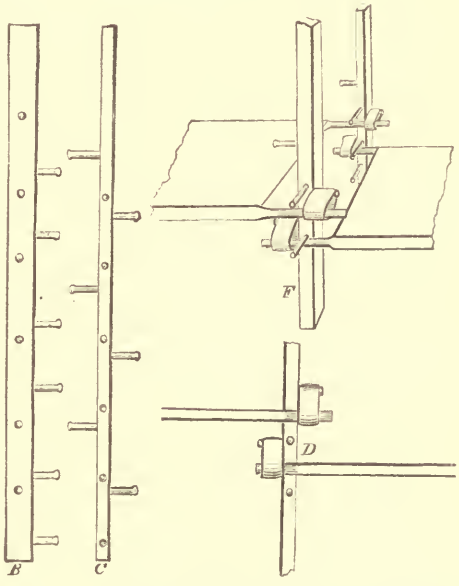

FIG. 487.—Uprights and elastic ring couplings for suspending litters in hospital cars. B. The upright post next the passage-way; C. The fellow-post next the side of the car; F. Oblique view of the coupling by rubber bands; D. Lateral view of the coupling by rubber bands. [After HARRIS.]

"When General Sherman's army was before Atlanta, until the lines of communication were destroyed preparatory to the march to the sea, hospital cars ran regularly from the front to base hospitals, some of which were four hundred and seventy-two miles distant.[1]

"The difficulty of introducing loaded stretchers or litters through the narrow end doors of the converted passenger cars was obviated, in the train prepared under the supervision of Drs. Cooper and Herrick, by leaving the middle section on one side free from beds, removing two windows and the paneling beneath, and introducing a sliding door, six feet in width, affording an ample space for the ingress and egress of litters with the most severely wounded patients. Descrip-

[1] Surgeon F. L. TOWN'S report.

tions of the kitchen, office, and dispensary cars, which added greatly to the efficiency of these trains, are omitted here. A further description of the hospital trains of the Army of the Cumberland has been given by Dr. Dallas Bache, U. S. A.[1] In addition to the illustrations that were published with his paper, it may be useful to add diagrams explaining the details of the arrangements for suspending litters from upright posts in adapting cars for hospital purposes (FIGS. 487, 488, 489) that were planned by Dr. Harris in December, 1862, and successfully put in practical operation in the Spring of 1863. It has already been shown that the adaptation of cars to hospital purposes by securing field stretchers to rows of stanchions was practised from a very early period of the late war; but the merit of devising a simple and effective method of suspending the stretchers by rubber rings was exclusively due to Dr. Elisha Harris, who, moreover, promoted with great earnestness, during the war, the establishment and organization of railway transport for the sick and wounded. A brief and somewhat inaccurate account of this system was published in 1865 by Professor F. H. Hamilton.[2] The plan was cursorily alluded to the same year in a surgical report from this Office,[3] and more fully described in a work by Dr. T. W. Evans, of Paris.[4]

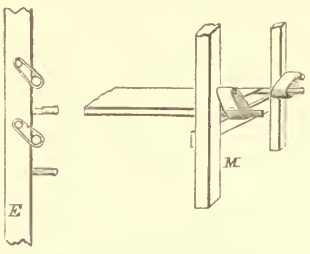

FIG. 488.—The "free" or inside method of suspending litters by rubber rings. [After HARRIS.]

"Dr. Harris proposed to suspend three tiers of litters from upright oaken stanchions 4 inches wide by 2 inches thick, extending from the floor to the roof of the car, which gave a length of about 6 or 6½ feet (FIG. 487, B and C). The stanchions were placed in pairs, the fellow posts 22 inches apart, and 6½ feet distant from the next couple (FIG. 492). The stanchions at the end of each row of uprights were perforated to receive on the broad face three hickory pins an inch in diameter, and three on the narrow face; the other stanchions, each pair contributing to the support of two tiers of litters, were provided with twelve pins (FIG. 487, B, C), six termed holder or loop-pins, and six arresting pins or stops (FIG. 487, F, D), designed to prevent the undue descent of the litter. Around the pins on the broad face of the pillars were placed loops or tugs of vulcanized india-rubber 3 inches broad, ½ inch thick, with 4 inches aperture, and weighing 9½ ounces Troy. The handles of the stretchers, sawn off at 7½ inches from the margins of the canvas, were inserted in the rings, which were put upon the stretch by the weight of the patient. Too great oscillation was prevented by the stopping-pins or by substituting more massive rubber rings. The holder-pin for the lower stretcher was 9½ inches from the floor, the stop-pin three inches. The space between the upper and middle and the middle and lower stretchers was about 19 inches. The inside length of the cars fitted up varied from 41 to 47 feet, and would accommodate four or five tiers of litters on either side, with space reserved for seats, closets, and offices at the ends. The inside width of the cars was 8 or 8½ feet, and as the two series of berths occupied but 2 feet 4 inches on either side, a passage-way of 3 feet 4 or 10 inches was left in the middle. The end doors, usually opening 2 feet, were widened to 2½, or, in the best models, to 3 feet. Hair pillows (FIG. 489) were attached to head-boards of ½-inch light wood, and secured by straps to the litter poles. Dr. Harris proposed a modification of this plan, designed to afford greater elasticity to the litters for the transport of severe cases. The inner edges of the upright stanchions were placed 26 inches apart, and the handles of the litter were hung between the posts (FIG. 488, M); a wooden or iron traverse was substituted for the stop-pins, and the mode of insertion of the pins in the uprights was altered (FIG. 488, E); larger rubber rings, weighing 12 ounces, were used. On experiment this

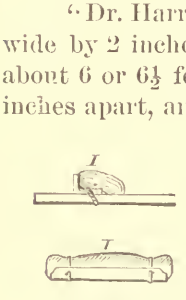

FIG. 489.—Pillows for stretchers. [After HARRIS.]

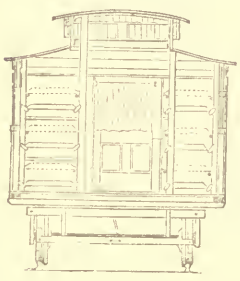

FIG. 490.—Hospital railway car—rear elevation.

[1] See Report of Assistant Surgeon D. BACHE, U. S. A., in *Appendix to Part I, Medical and Surgical History of the War of the Rebellion*, p. 289.

[2] HAMILTON (F. H.), *A Treatise on Military Surgery and Hygiene*, New York, 1865, p. 168. The remarkable statement is made that: "The stretchers are suspended on loops made of *gutta-percha*," a singularly unsuitable material.

[3] Circular No. 6, S. G. O., Washington, 1865. *Reports on the Extent and Nature of the Materials available for the Preparation of a Medical and Surgical History of the Rebellion,—Surgical Report*, p. 81. Diagrams were given (FIGS. 88, 89, 90), from a photograph by Gardner, of the working drawings of the first hospital car exhibited by Dr. HARRIS in Washington in March, 1863. I found the photograph on file, but, at that time, could obtain no precise information of its origin.

[4] EVANS (T. W.), *La Commission Sanitaire des États-Unis, etc.*, Paris, 1865.

plan was found inferior to the first. Most of the cars were provided at one end with a wash-room and water-closet (FIG. 491), and at the other end with a couch and seats for attendants, a stove, and a small closet for a few essential medicines and dressings, and a copper boiler with an alcohol lamp. This brief statement of details applies to many of the long passenger cars fitted up for hospital purposes upon specifications supplied by Dr. Harris. This original design of Dr. Harris was

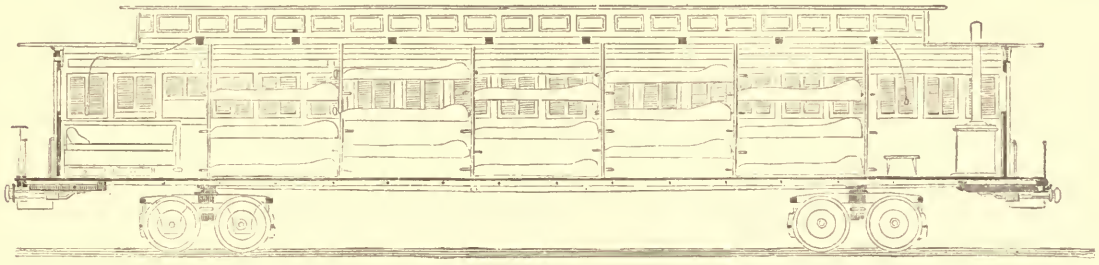

FIG. 491.—U. S. Army Hospital railway car used at the East—side elevation.

not, however, limited to transforming passenger cars to hospital use;[1] and the adaptation of elastic rubber rings[2] to the suspension of litters, though valuable, was not the most important and enduring part of his system. There will probably be many changes and improvements in the methods of moving wounded men by railway, but the idea of utilizing the ordinary field stretchers for railway transport, keeping the patients upon them until they reach a fixed hospital, will not soon be abandoned. This expedient had been already resorted to in isolated instances, but Dr. Harris proposed its systematic adoption and devised a feasible method for its accomplishment. The system was much commended in Europe.[3]

"At the close of the war there were in use thirty-nine cars that had been fitted out under the supervision of the Sanitary Commission. Except in a few instances, however, the Government had reimbursed the Commission for the original cost and the expenses of the outfit."

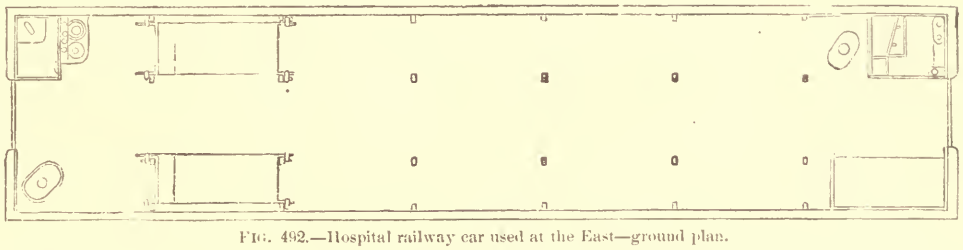

FIG. 492.—Hospital railway car used at the East—ground plan.

In the fall of 1863 and winter of 1864 the chief army of the West was concentrated[4] principally along the line of railroads leading from Nashville, Tennessee, southwest via Chattanooga, Tennessee, and stretching on toward Atlanta, Georgia. Heretofore such sick and wounded, on railroad lines, as could bear transportation were taken to points in the rear and north by ordinary passenger cars. Severe cases could not be removed at all and had to remain in the nearest hospital depots. Those *in transitu* often suffered from being delayed on the route by accident, or by the immense supply trains destined for the army constantly passing over the road. Not unfrequently the delay was at points where no rations could be drawn, and if they were to be had no means were at hand for cooking them, or feeding the men, or of making them comfortable. Hence the idea of a hospital train, an ambulating hospital, an independent hospital organization, which could furnish

[1] Dr. HARRIS wrote me, August 17, 1875: "The original sketch, made in June, 1862, is now before me, with the simple proposition: *To readily and securely suspend in any railway car* as large a number as possible of the field litters, as portable hammocks, to be passed onwards, as beds for patients, without delaying or encumbering transportation. The method of swinging in position and securely fastening the litters was settled in the first pencil-sketch; the details of a complete ambulance car were arranged the last week in December, 1862, and the first car fitted up, the pioneer, was the favorite old 51-feet car that was mutilated, when occupied by the 6th Massachusetts Volunteers, in the Baltimore riot of April, 1861."

[2] The elasticity of the rubber rings was objected to by some surgeons. Assistant Surgeon F. L. TOWN, U. S. A., remarks: "The Harris car does not work well in practice; the elasticity of the rubber rings keeps the bed in constant vibration while the car is in motion. This greatly annoys the patient, who objects to riding a capering bed."

[3] HAUROWITZ (H. v.), *Das Militärsanitätswesen*, 1866, S. 87.

[4] For the account of the management of the hospital trains of the Department of the Cumberland alluded to here, the editor is largely indebted to a manuscript report of Assistant Surgeon F. L. TOWN, U. S. A.

each sick and wounded patient with a comfortable bed, feed and care for him *en route*, the same as if in a general hospital, without regard to time or distance. Such hospital trains were in successful operation during the last eighteen months of the war.

A hospital train, when complete, is made up of ten cars, and accommodates from one hundred and seventy-five to two hundred patients comfortably. The arrangement of the train is as follows: One box car, one kitchen car, an ordinary passenger car with seats, five cars with beds, *i. e.*, hospital wards, an office car, and a conductor's car. The forward box car is fitted up as a storeroom and carries provisions, hospital stores, bedding, etc. The drawings and brief descriptions of this as well as of kitchen and surgeon's cars of the Army of the Cumberland

FIG. 493.—Baggage and commissary car of the Army of the Cumberland—horizontal plan.

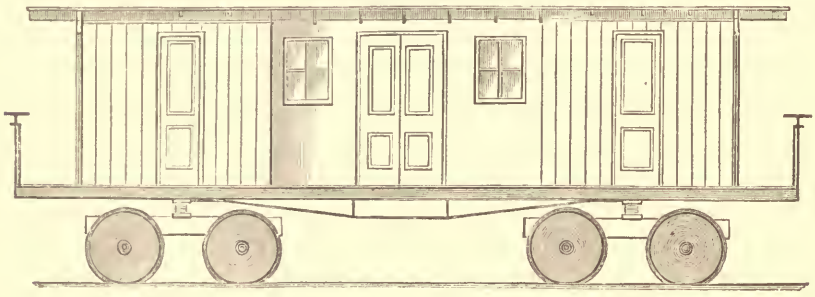

FIG. 494.—Baggage and commissary car of the Army of the Cumberland—longitudinal section.

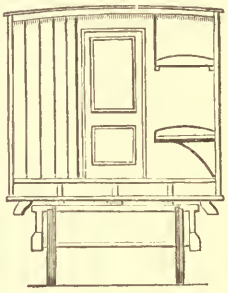

FIG. 495.—The same—transverse section.

were furnished by its Medical Director, Surgeon George E. Cooper, U. S. A. The baggage car (FIG. 493) contained three closets to store rations; the centre open space was intended to carry barrels and large stores. The two bunks shown in the transverse section (FIG. 495)

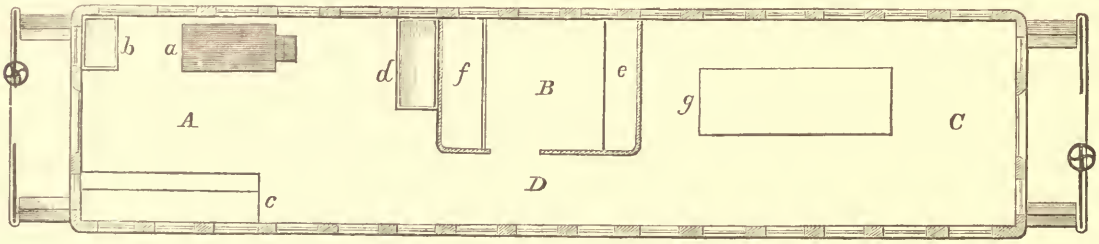

FIG. 496.—Kitchen car of the Army of the Cumberland—horizontal plan.

were for the attendants belonging to the car. The kitchen car (FIGS. 496, 497) was divided into three compartments, the dining-room, storeroom, and kitchen proper. The storeroom occupied the centre portion of the car, leaving a passage-way from the kitchen to the dining-room. The kitchen proper was furnished with a small range with boilers, etc., complete. There were stands, tables, and a closet for kitchen utensils in the kitchen proper. The letters indicate: A, kitchen, *a*, cooking range; *b*, sink; *c*, cupboard; *d*, table and shelves. B, store-room; *e*, ice-box; *f*, shelves for provision. C, dining-room; *g*, table, surrounded by benches. This apartment contained also a stove and wood-box. The car answered well the purpose required and gave perfect satisfaction.

The passenger car with seats was occupied by those not confined wholly to their beds,

and others, men furloughed from general hospitals, etc., who did not ordinarily require them at all. The five bed-cars were first-class passenger cars transformed into hospital wards.

The surgeon's car was an ordinary passenger car with the seats removed and with partitions and fixtures introduced for the accommodation of the surgeon in charge of the train and his medical assistant; there was also a small dispensary and an office for the transac-

FIG. 497.—Kitchen car of the Army of the Cumberland—longitudinal section.

tion of business (FIGS. 498, 499). The letters indicate: A, dispensary and steward's quarters; *a*, desk and book-case; *b*, shelves for medicines. This apartment contained also a revolving chair at the desk and a bed for the steward. B, surgeon's sitting-room; *d*, lounge;

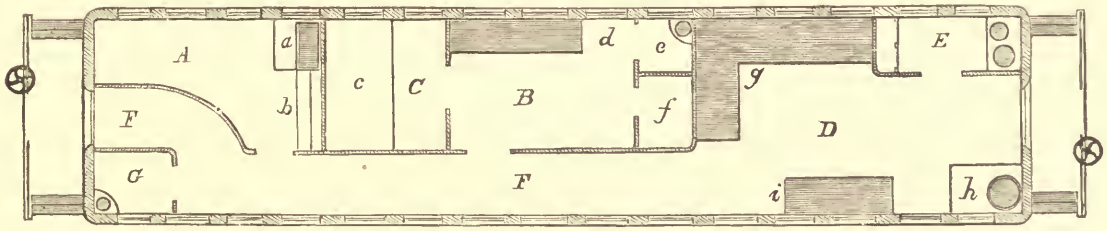

FIG. 498.—Surgeons' car of the Army of the Cumberland—horizontal plan.

e, water-closet; *f*, clothes closet. C, surgeon's bedroom; *c*, bed. D, office; *g*, lounge; *h*, water-cooler; *i*, wood-box and stove. E, wash-room, with water basin, tank, and dressing

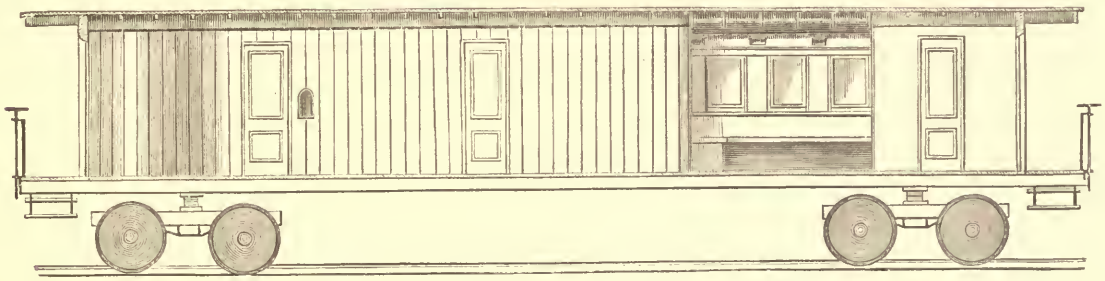

FIG. 499.—Surgeons' car of the Army of the Cumberland—longitudinal section.

locker. F F, passage through car. G, water-closet. The conductor's car in the rear was similar to the car so called attached to freight trains on ordinary railroads. It was appropriated to the use of the conductor and the citizen employés running the train. The hospital cars were warmed and lighted in the winter in the same way as passenger cars on our railroads. The same means were adopted in some cars as were in use in general hospitals, combining warming and ventilation. The hospital wards were originally those cars in which the central portion of the roof was raised considerably above the general plane; by opening the windows occupying the space between the planes very perfect ridge ventilation was obtained. The wards had also such other means of ventilation as were in use in

first-class passenger cars. If necessary, except in the coldest weather (and the seasons were mild in this climate), the car doors could be thrown open for a few minutes, at intervals, which rapidly supplied a fresh atmosphere.

The surgeon in charge of a hospital train was its sole head, the same as on a hospital transport or in a general hospital. He had a citizen conductor and engineers, firemen, and brakemen, employed by the Quartermaster's Department, who, under the immediate control of the conductor, moved the train when and wherever he ordered it. Unlike the chief medical officer of a hospital transport, he was not required to act as a commissary of subsistence or an assistant quartermaster. He drew his rations from time to time as in a general hospital. One medical assistant and one hospital steward was ordinarily all that were required on a train. Enlisted men were detailed as cooks, nurses, and hospital attendants. Only a limited number of the latter were required, and those not on duty occupied beds, if necessary, kept vacant in one of the wards. The needful washing of bedding, etc., was done at one of the termini of the route.

In the spring of 1864, and during the advance of General Sherman's army on Atlanta, Georgia, and while that place was occupied by General Sherman previous to his cutting loose from all communication with the north and striking across the country to Savannah, three hospital trains ran regularly between Louisville, Kentucky, and Atlanta, Georgia, a distance of four hundred and seventy-two miles, viz: Train No. 3, from Louisville, Ken-

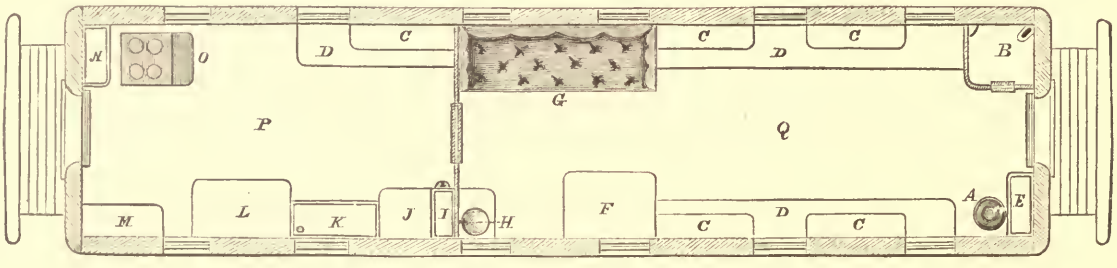

FIG. 500.—Kitchen and dispensary car, Army of the Potomac—horizontal view.

tucky, to Nashville, Tennessee, distance one hundred and eighty-five miles; train No. 2, from Chattanooga, Tennessee, to Atlanta, Georgia, distance one hundred and thirty-six miles. These trains passed over the road once every day—down one day and returning the next. Train No. 1 connected with No. 3 at Nashville, and with No. 2 at Chattanooga, on

FIG. 501.—Kitchen and dispensary car, Army of the Potomac—longitudinal view.

alternate days. A time-table was prepared by which the running of the hospital trains was regulated—which was adhered to for some time. Sick and wounded in the sanguinary engagements of this eventful campaign were taken from the large hospital depots at Atlanta, Marietta, Kingston, and Rome, Georgia, to the permanent hospitals at Chattanooga and Nashville, Tennessee, and Louisville, Kentucky. Some men were brought directly through

from Atlanta, Georgia, to Louisville, Kentucky, over this long span railway line, stretching south four hundred and seventy-two miles to the distant army. If necessary, a ward in one train was uncoupled and attached to the connecting train without disturbing the patients. The ordinary *modus operandi* in railroad transportation was to empty the hospitals at Nashville and Chattanooga of men partially recovered, and who would not be injured by moving, and take them up to Louisville. The beds thus vacated at these points were filled from below.

In the Army of the Potomac the complete hospital train consisted of twelve cars—one for the surgeon in charge, one for the kitchen and dispensary, and ten for the sick and wounded. The cars fitted up for the carrying of patients have been described on page 961. The kitchen and dispensary (FIGS. 500, 501) car was built according to plans prepared by the Assistant Superintendent of Military Railroads, J. McCrickett. The car was divided into two compartments. The dispensary contained a stove, A; a water-closet, B; cases for shelves, C; cases of drawers, D; wood-box, E; table or desk, F; couch, G; wash-basins, H. In the kitchen, P, were: C, cases of shelves; D, cases of drawers; I, water-cooler; J, refrigerator; K, sink for washing dishes; L, table; M, pantry; N, wood-box; O, cooking-stove.

WATER TRANSPORTATION.

The military operations in the western departments in the spring of 1862 embraced a large extent of territory and necessitated the moving of large bodies of men from point to point. As a result, the fresh unacclimated levies fell victims to malignant fevers, diarrhœa, dysentery, etc. The resources of the Medical Department under these circumstances were entirely inadequate to the pressing necessities. It became evident that to disembarrass the medical officers and to have them in readiness for the exigencies of battles, which all knew were impending, the sick must be removed to points remote from the scene of operations. For this purpose the large rivers of the Western States, especially the Mississippi, offered the best facilities. But there were no transports at the disposition of the medical officers. In order to send a single sick soldier it was necessary to apply to the quartermaster of the army, who naturally gave the preference to his immediate duties, and even when, after much circumlocution, a boat was secured and partly filled with patients, it was frequently delayed until the demands of other departments were complied with. The necessities of the sick and wounded were of a secondary consideration, and the surgeon who exerted himself in the interest of common humanity was regarded as asking favors for himself. The fact that the efforts of the Medical Department were thus paralyzed was brought to the notice of the General Commanding by Surgeon J. Simons, U. S. A., Medical Director, who recommended that a suitable number of boats be taken and fitted up comfortably with beds, cooking apparatus, surgeons, and nurses, etc. The appeal was favorably received, and several steamers were chartered and placed under the charge of medical officers. We will quote from the excellent report of Surgeon A. H. Hoff, U. S. V., master of hospital transportation on the Mississippi, made in September, 1863: "The City of Memphis, a very large and fine steamer, was chartered, and Assistant Surgeon W. D. Turner, 1st Illinois Light Artillery, placed in charge. The steamer City of Louisiana was also chartered and fitted up under the control of Assistant Surgeon C. Wagner, U. S. A., and, with the City of Memphis, was at once employed in the carrying of sick and wounded. About the 1st of April, 1862, after the experiment had been made and proved successful,

Surgeon Simons requested that boats be purchased and fitted up as floating hospitals. On his report and the co-operation of Mr. Yeatman, the President of the Western Sanitary Commission, the steamer D. A. January was purchased and placed in my charge. This boat, on account of her light draught and airy cabin, was well suited for the purpose. There was no time to make more than temporary arrangements, and she was not reconstructed until September, 1862, when she was fitted up with every convenience as a hospital. These boats proving inadequate to supply the amount of transportation required, two of the largest steamers on the river were chartered (the Empress and Imperial) and temporarily fitted up, and Surgeons T. F. Azpell and J. H. Grove, U. S. V., were placed in charge of them. The transportation still being insufficient, the steamers Stephen Decatur and J. S. Pringle were added to the list, and these, together with the several boats sent by different states, made quite a formidable fleet; yet they all had plenty of employment, as sick and wounded had to be transferred to the number of thousands. These boats, as they ceased to be needed, were discharged, leaving the D. A. January alone. As the hospital accommodations at Pittsburg Landing were very imperfect, Medical Director Charles McDougall, Surgeon, U. S. A., requested the construction of a floating hospital, which could be towed from point to point, to be used as a receiving hospital, from which the transports could load and in which the sick and wounded could be placed and made comfortable in the absence of the transports. In this he was finally successful, and the hulk of the steamer Nashville was purchased and fitted up so that she would be able to receive in an emergency one thousand men, and Surgeon Strawbridge, U. S. V., was placed in charge. She was towed to Milliken's Bend, La., and was of great service, as the submerged condition of the country made it impossible to care for the sick on shore. Up to this time, although the Assistant Surgeon General, on taking charge of the Western Department and visiting the scene of active operations, repeatedly urged the purchase of more steamers for hospital purposes, for some reason, unknown to him as well as to others, he was unsuccessful; but the unsuccessful attack on Vicksburg, in December, the battle of Arkansas Post, and the advance of the whole army in the direction of Vicksburg made it necessary to again resort to chartering transports. The City of Memphis and City of Alton were again temporarily fitted up, and with the D. A. January transferred the sick and wounded from Milliken's Bend, Young's Point, and Sherman's Landing, to Memphis and St. Louis. In the meantime, however, several boats had been taken—the steamers Von Phul and J. C. Swon, in fact at least one-fourth of the returning transports—without a single comfort for the sick and wounded on board, were made use of to transfer them to the general hospitals North. Under such circumstances the suffering was terrible and the mortality frightful. I am not disposed to find fault, nor do I wish to censure any one, but I feel it my duty to remark that the Medical Department did everything in their power to correct this matter, with but poor success. The Assistant Surgeon General, never tiring in his determination to push this matter, finally succeeded in getting the City of Louisiana purchased and fitted up in a most comfortable manner, with good accommodations for four hundred, with every improvement that a year's experience could suggest. During this time the Navy had fitted the Red Rover in a most elegant and substantial manner; the Marine Brigade also fitted the Woodford as a hospital with every comfort that could be made available. The U. S. Hospital Steamer D. A. January having run for a year and a half it became necessary to repair her, and upon examination new boilers were found to be necessary. As we came in possession of more of the Mississippi additional accommoda-

tions for the comfort of the sick and wounded were required. Under these circumstances the January was reconstructed, better ventilation secured, better and more convenient arrangements for cooking were made, and a fan, one hundred and sixty feet long and propelled by machinery, was placed in the main ward for the purpose of cooling the atmosphere and as a means of ventilation. It answered an admirable purpose and did away with the necessity of covering the decks with an awning, which was not only difficult but a very expensive matter. After her reconstruction her name was changed to Charles McDougall, in honor of Surgeon McDougall, U. S. A., who had interested himself when Medical Director of the Department in securing proper transportation for the sick and wounded, and by whose request she was finally fitted with all the conveniences for a hospital transport.

"It would be impossible for me, not being in possession of records, to give any idea of the number of sick and wounded transferred—nor do I believe it would be possible, from the fact that emergencies required boat after boat to be made use of where no record was kept to give the exact figures—suffice it to say that the U. S. Hospital Steamer Charles McDougall (D. A. January) carried from April 5, 1862, to September 12, 1863, twelve thousand two hundred and ninety-nine sick and wounded to the several general hospitals, she being constantly employed. A fair average may be made by taking into calculation the time the other boats were employed, most of them probably carrying more at each load. The use of steamers for hospital purposes being a new thing, changes in the arrangements were required as the necessities became apparent. Orders were made by the chiefs of the several Departments of such a character as would secure prompt attention on the part of all their subordinates and at the same time place the surgeons in charge in such a position that the least possible delay should occur. Believing it to be of interest and forming a part of the success of the subject to which this history relates, I will append these orders as they were made from time to time. The first great difficulty to be overcome was to do away with the idea that as these boats were for the transportation of the sick and wounded they were the vehicles for carrying not only all the friends of the sick and wounded, but every man, woman, and child who became impressed with the slightest inkling that their hearts contained one particle of sympathy for the poor soldier; curiosity seekers, sanitarians, state agents, sutlers, committees from various associations, one and all concluded they had a right to transportation on such a boat. This of course was out of the question, as it prevented the employés from properly cleaning the boat and took up room required for patients. More than this, it used up the subsistence which belonged to the hospital fund, which was used to buy so many things necessary for the diet of the sick. It was annoying to the surgeons, it was in the way of all discipline, and in fact disagreeable to every one. Under these circumstances Major General Halleck issued the following order:

'HEADQUARTERS, DEPARTMENT OF THE MISSISSIPPI,
PITTSBURG LANDING, TENNESSEE, *April* 20, 1862.

Surgeon Simons has authority to prevent persons from travelling on hospital boats.
BY ORDER OF MAJOR GENERAL HALLECK: (Signed) A. C. KEMPER,
Assistant Adjutant General.

No person will hereafter be permitted on floating hospitals except by permission of the Surgeon in charge. (Signed) J. SIMONS, *Surgeon of Army, Medical Director.*'

"This left the Surgeon in charge an opportunity of using his discretion in reference to who should travel on his boat, and, I think, in most instances it has been confined to medical officers who could assist instead of being in the way.

"The next important step was to be arranged with the Subsistence Department. This was surrounded with some difficulties, as there was no room on board for a commissary. The difficulty was soon remedied by making the Surgeon in charge an Acting Assistant Commissary of Subsistence, thereby enabling him to receive subsistence from any commissary by invoice and receipt, and to purchase such articles as the sick required.

'CAIRO, ILLINOIS, *April* 7, 1863.

SIR: By authority from Major General Halleck, commanding the Department of the Mississippi, Surgeons in charge of hospital boats will act as A. A. C. S., so far as receiving and issuing stores for the hospital under their charge is concerned.

Respectfully your obed't servant,

B. DUBARRY,
Capt., &c., C. S., U. S. A.

To Surgeon in charge of hospital boat D. A. January.'

"By a similar order the surgeon was held responsible for all the property belonging to the Quartermaster's Department in his charge, and required to receipt for it. This, of course, was an anomaly in departmental matters, but one that was required for the proper administration of the affairs of the floating hospitals; without such an arrangement the unavoidable delays would have destroyed their efficiency. The Medical Department is much indebted to Major Generals Halleck and Grant for the kindness shown and interest taken by them in this branch of the service. We are also indebted to Quartermasters, Brigadier General Allen and Colonel Myers, and to Colonel Parsons, in charge of the river transportation, for their uniform kindness and assistance in the purchase and reconstruction of the boats; also to Colonel Haines, Chief Commissary, for the liberal manner in which the boats have been supplied with subsistence, and, through his orders, the little delay occasioned in receiving supplies. In fact, all have wished us a 'God speed' in a work which has been the means of relieving so much distress and probably of saving many lives."

Steamer City of Memphis.—The first boat chartered on the western rivers for the transportation of wounded was the steamer City of Memphis, which was taken into the service as a hospital boat at Fort Henry on February 7, 1862, by order of Major General U. S. Grant, and placed under the charge of Assistant Surgeon W. D. Turner, 1st Illinois Light Artillery. She was fitted out as thoroughly as circumstances permitted. Spring mattresses were placed on the floor of the upper deck and saloon; the state-room was rearranged, and medicine and commissary stores supplied. Her length was three hundred and thirty feet and her beam seventy feet; her main deck was large and roomy, and her saloon of great length, and she was capable of carrying comfortably seven hundred and fifty wounded men. From February 7th to 18th she was used as a receiving boat, conveying a large number of sick and wounded from Fort Henry and transferring them to other boats. No record of this work was kept; but the number thus transported is estimated at two thousand. On February 18th she left Fort Henry with four hundred and seventy-five sick and wounded for Paducah, Kentucky, where she arrived on February 19th; the patients were transferred to the general hospitals, and the boat left for Fort Donelson the same day and arrived there on February 21, 1862. The boat was discharged from the hospital service in July, 1862, by Medical Director McDougall, of the Army of the Tennessee, but re-engaged and employed in carrying wounded from the vicinity of Vicksburg during Grant's campaign. No record of the number transported during her second engagement is found.

From February 18th to July 19th, 1862, the boat made fourteen trips and conveyed seven thousand two hundred and twenty-one sick and wounded men, as follows:

TABLE CLXXVI.

Tabular Statement of Trips made by the Steamer City of Memphis from February 18 to July 19, 1862.

No. of Trip.	Date of Departure.	Place of Departure.	Date of Arrival.	Place of Arrival.	No. Sick and Wounded.
1	February 18, 1862	Fort Henry, Tenn	February 19, 1862	Paducah, Ky	475
2	February 22, 1862	Fort Donelson, Tenn	February 23, 1862	Mound City, Ill	600
3	March 6, 1862	Fort Donelson, Tenn	March 8, 1862	Mound City, Ill	400
4	March 14, 1862	Savannah, Tenn	March 18, 1862	Saint Louis, Mo	410
5	April 6, 1862	Shiloh, Tenn	April 6, 1862	Savannah, Tenn	860
6	April 9, 1862	Pittsburg Landing, Tenn.	April 12, 1862	Mound City, Ill	1,093
7	April 15, 1862	Pittsburg Landing, Tenn.	April 18, 1862	Evansville, Ind	413
8	April 21, 1862	New Madrid, Mo	April 23, 1862	Evansville, Ind	520
9	April 27, 1862	Pittsburg Landing, Tenn	May 1, 1862	Cincinnati, Ohio	400
10	May 13, 1862	Pittsburg Landing, Tenn	May 18, 1862	Keokuk, Iowa	400
11	June 2, 1862	Pittsburg Landing, Tenn	June 5, 1862	Louisville, Ky	350
12	June 15, 1862	Pittsburg Landing, Tenn	June 20, 1862	Keokuk, Iowa	400
13	July —, 1862	Paducah, Ky	July 10, 1862	Keokuk, Iowa	550
14	July 16, 1862	Helena, Ark	July 17, 1862	Memphis, Tenn	350
Total					7,221

Steamer Louisiana, afterwards named R. C. Wood.—The fast steamer Louisiana was chartered on March 12, 1862, and placed under the charge of Assistant Surgeon C. Wagner, U. S. A., who mainly furnished the data here adduced. The boat was immediately supplied with bedding and the necessary hospital commissary stores; the Western Sanitary Commission very liberally supplied many articles not procurable at the time from the Medical Purveyor. The boat was divided into four wards, two on the lower deck and two on the upper or boiler deck, each of which had a medical officer, a wardmaster, six permanently detailed male nurses, and one female nurse. The nurses were relieved from duty every six hours, day and night. Upon the lower deck was the kitchen, commissary, storeroom, bakery, and ice-house; upon the upper deck the captain's office was converted into the office of the Surgeon in charge, and the bar-room into a dispensary, the barber-shop and wash-room into a kitchen for low and half-diet patients under the supervision of a female nurse. The bulkheads between the state-rooms were removed, improving the ventilation and rendering access to the patients more easy. Beds were also placed on the guards of the boat, tarpaulins being stretched to protect the patients from the inclement weather. The texas upon the hurricane deck was used as quarters for the hospital attendants and the boat's crew. An oven was on board capable of baking bread for a thousand men daily. In admitting as well as in removing the patients a systematic arrangement was adopted. A medical officer was stationed at the gangway to receive them, one on the boiler, and another on the lower deck. Each wardmaster remained in his ward, and a sufficient number of nurses was detailed to carry the patients on or off the boat. By this arrangement all confusion was avoided; no one was admitted as a patient except upon a written order from the Medical Director. The boat at this time had accommodations for four hundred patients. She carried, in less than four months, about three thousand patients from Pittsburg Landing and other points on the western rivers to northern hospitals, and was released from service during the summer of 1862. An account of the trips is taken from the report of Assistant Surgeon C. Wagner, U. S. Army:

TABLE CLXXVII.

Tabular Statement of Trips made by the Steamboat Louisiana from March 23 to June 14, 1862.

No. of Trip.	Date of Departure.	Place of Departure.	Date of Arrival.	Place of Arrival.	No. Sick and Wounded.
1	March 23, 1862	Island No 10, Tenn	March 28, 1862	Cairo, Ill	35
2	March 25, 1862	Mound City, Ill., and Paducah, Ky		Cincinnati, Ohio	280
3	April 6, 1862	Crump's Landing, Tenn	April 8, 1862	Saint Louis, Mo	310
4	April 12, 1862	Pittsburg Landing, Tenn	April 14, 1862	Saint Louis, Mo	325
5	April 20, 1862	Savannah, Tenn	April 24, 1862	Cincinnati, Ohio	306
6	May 1, 1862	Pittsburg Landing, Tenn	May 3, 1862	Saint Louis, Mo	328
7	May 7, 1862	Pittsburg Landing, Tenn	May 9, 1862	Saint Louis, Mo	340
8	May 15, 1862	Savannah, Tenn	May 17, 1862	Mount Vernon, Ind	325
9	May 31, 1862	Hamburg, Tenn	June 2, 1862	Saint Louis, Mo	350
10	June 13, 1862	Hamburg, Tenn	June 14, 1862	Paducah, Ky	400
	Total				2,999

In April, 1863, the boat was purchased by the Government and remodelled as a permanent hospital boat, with beds for four hundred and fifty patients, and was named the 'R. C. Wood,' in honor of the Assistant Surgeon General of the United States Army, to whose wisdom, humanity, and constant foresight many of the improvements in the hospital arrangements were due. Surgeon T. F. Azpell, U. S. V., was placed in charge. Her state-rooms were removed, the whole upper deck was made into one large ward, with abundant light and excellent means of ventilation, with ample provisions of bath-rooms, hot and cold water, cooking apartments, nurses' rooms, dispensary, laundry, and many other conveniences.[1] Her length was two hundred and fifty feet, beam forty feet, hold seven feet. From April, 1863, to April 11, 1865, this boat made thirty-three trips, travelled thirty-four thousand eight hundred and five miles, and carried eleven thousand and twenty-four (11,024) sick and wounded, as follows:

TABLE CLXXVIII.

Statement of Trips made by the Hospital Steamboat R. C. Wood from April 1, 1863, to April 11, 1865.

No. of Trip.	Date of Departure.	Place of Departure.	Place of Arrival.	No. Sick and Wounded.
1	April 1, 1863	Milliken's Bend	Saint Louis	107
2	May 26, 1863	Saint Louis	Chickasaw Bayou and Memphis	425
3	June 2, 1863	Memphis	Chickasaw Bayou and Memphis	410
4	June 8, 1863	Memphis	Chickasaw Bayou and Memphis	459
5	June 23, 1863	Memphis	Vicksburg and Memphis	397
6	July 4, 1863	Memphis	Helena and Memphis	360
7	July 8, 1863	Memphis	Vicksburg and Saint Louis	371
8	July 25, 1863	Saint Louis	Vicksburg and Saint Louis	389
9	August 8, 1863	Saint Louis	Vicksburg and Memphis	330
10	August 7, 1863	Memphis	Vicksburg and Keokuk	412
11	August 28, 1863	Keokuk	Vicksburg and Saint Louis	355
12	September 19, 1863	Saint Louis	Vicksburg and Memphis	418
13	October 2, 1863	Memphis	Saint Louis	387
14	October 24, 1863	Saint Louis	Vicksburg and Saint Louis	178
15	February 6, 1864	Saint Louis	Natchez and Saint Louis	303
16	February 28, 1864	Saint Louis	Vicksburg and Memphis	349
17	March 14, 1864	Memphis	Nashville	240
18	March 19, 1864	Nashville	Louisville	120
19	April 14, 1864	Louisville	Cairo and Louisville	
20	April 22, 1864	Louisville	Alexandria and New Orleans	213
	Carried forward			6,223

[1] See *Report of the Western Sanitary Commission for the year ending June* 1, 1863, St. Louis, Mo., 1863, page 18.

No. of Trip.	Date of Departure.	Place of Departure.	Place of Arrival.	No. Sick and Wounded.
	Brought forward			6,223
21	May 3, 1864	New Orleans	Louisville	292
22	May 18, 1864	Louisville	Evansville and Louisville	366
23	September 1, 1864	Louisville	Mound City and Louisville	365
24	September 12, 1864	Louisville	Evansville and Louisville	114
25	November 13, 1864	Louisville	Nashville and Louisville	405
26	November 30, 1864	Louisville	Mound City	485
27	December 1, 1864	Mound City	Clarksville and Louisville	134
28	December 13, 1864	Louisville	Cairo and Louisville	610
29	December 30, 1864	Louisville	Nashville and Louisville	705
30	March 1, 1865	Louisville	Keokuk and Mound City	333
31	March 14, 1865	Mound City	Saint Louis and Louisville	163
32	March 24, 1865	Louisville	Vicksburg and Saint Louis	459
33	April 11, 1865	Saint Louis	Vicksburg and Saint Louis	370
	Total			11,024

With the two thousand nine hundred and ninety-nine (2,999) patients carried during her first engagement, from March 23d to June 14, 1862, the boat altogether conveyed fourteen thousand and twenty-three (14,023) sick and wounded from the scene of action to northern hospitals.

Perhaps the most perfect of the western hospital boats was the steamer 'D. A. January.' She was purchased on April 1, 1862, and placed under the orders of Assistant Surgeon A. H. Hoff, U. S. A. She had been built at Cincinnati in 1857. She was a side-

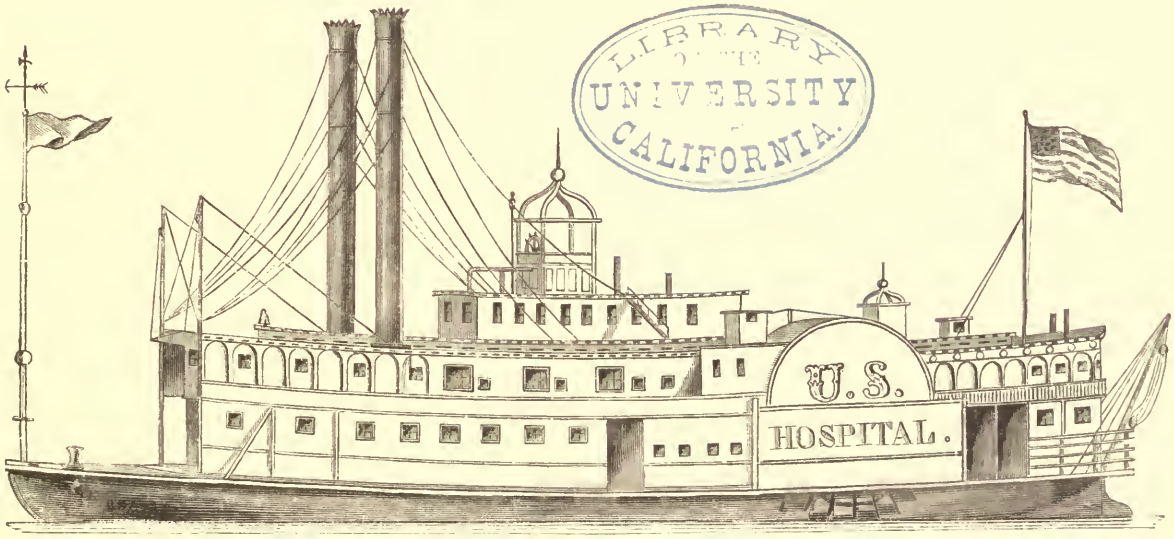

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FIG. 502.—U. S. Army Hospital Steamer D. A. January.

wheel steamer of four hundred and fifty tons burden, two hundred and thirty feet in length, thirty-five feet beam, and sixty-five feet extreme width. She had two high-pressure engines, with cylinder twenty-two inches in diameter and seven feet stroke. As a precautionary measure against accident by fire, she had a small steam fire engine, which worked independently, and was supplied with sufficient hose. During the summer of 1862 the boat carried patients from Pittsburg Landing, Paducah, and Helena, to St. Louis, Keokuk, New Albany, and Cincinnati. In the fall of 1862 she was entirely remodelled under the supervision of Assistant Surgeon A. H. Hoff, to whom the department is indebted for many important suggestions, especially in the earlier days of hospital transportation. On the

hurricane deck (FIG. 503), the roof of the boat, was the texas, on top of that the pilot-house. The staterooms were taken out and the whole cabin deck converted into one spa-

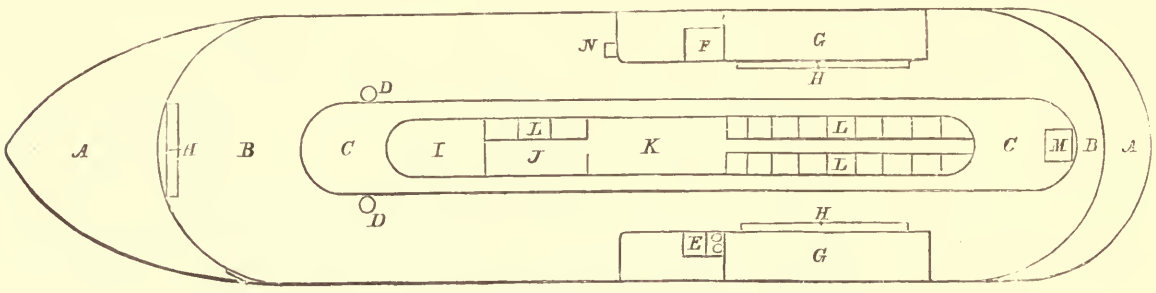

FIG. 503.—Upper deck, or texas, of U. S. Hospital Steamer D. A. January.

A A	Projections of lower deck.	E	Water-closets.	I	Captain's room.	M	Private rooms.
B B	Roof.	F	Wash-house.	J	Social hall.	N	Dummy, or provision railway, extending from lower deck to hurricane deck.
C C	Cabin roof above skylights.	G G	Wheels.	K	Texas dining-room.		
D D	Smoke-stacks.	H H H	Water-tanks.	L L L	Rooms for steamboat officers.		

cious ward (FIG. 504). Long windows were placed on all sides of this ward, attached by strong butts along the centre of the ward. About the centre of this deck, on one side, was

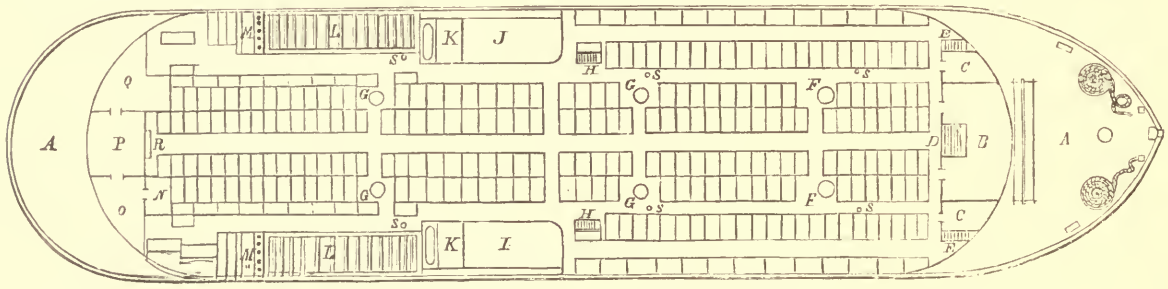

FIG. 504.—Cabin deck of U. S. Hospital Steamer D. A. January.

A A	Projections of lower deck.	F F	Steamboat chimneys.	K K	Bath-rooms, hot and cold.	P	Surgery.
B	Office.	G G	Stoves.	L L	Steamboat's wheels.	Q	Linen-room.
C C	Private rooms.	H H	Middle ward stairs.	M M	Water-closets.	R	Space occupied by the mirror.
D	Front stairs.	I	Nurses' dining-room.	N	Private room.	S S	Cold-water pipes.
E E	Texas stairs.	J	Kitchen.	O	Drug-store.		

a nurses' dining-room, a bath-room, and water-closet, and on the other a special diet kitchen, bath and wash-room, and water-closet. Away aft there was on one side a drug-shop and steward's room, on the opposite side a linen-room, in the centre an operating-room. Drinking-water throughout the ward was drawn from faucets placed at convenient distances. The bath-rooms were supplied with water from a large tank on the hurricane deck, filled

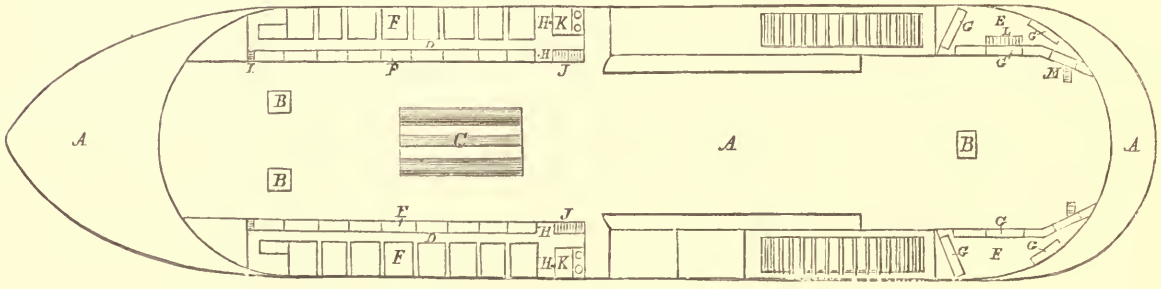

FIG. 505.—Middle deck of U. S. Hospital Steamer D. A. January.

A A	Lower deck.	D D E E	Middle deck.	I	Side or middle deck.	K K	Water-closets.
B B B	Hatchways.	F F	Space for sick.	J	Stairs to lower deck. Stairs to upper deck.	L	Nurses' stairs from cabin deck.
C	Boilers.	G G	Nurses' quarters.			M M	Nurses' stairs to lower deck.
		H H	Cold water.				

with water by steam-power. The drinking-water arrangement was a refrigerator on a large scale. Pipes ran from the tank on the hurricane deck into two large ice-chests in the hold of the boat, one on each side. In these chests were large worms through which the water

passed and was carried through the different wards, furnishing iced water, or water cool enough for all purposes. By this plan a large amount of ice was saved, as the chests were seldom opened.

Between the main and the boiler decks, on the middle deck (FIG. 505), where the wood-racks used to be, two wards, one on each side, were arranged, containing thirty beds each, with water-closets, wash-troughs, and faucet for drinking-water. The wards were low, but the bulkheading was composed almost entirely of windows, so that plenty of air could circulate. On the lower deck (FIG. 506) there was a comfortable ward for one hun-

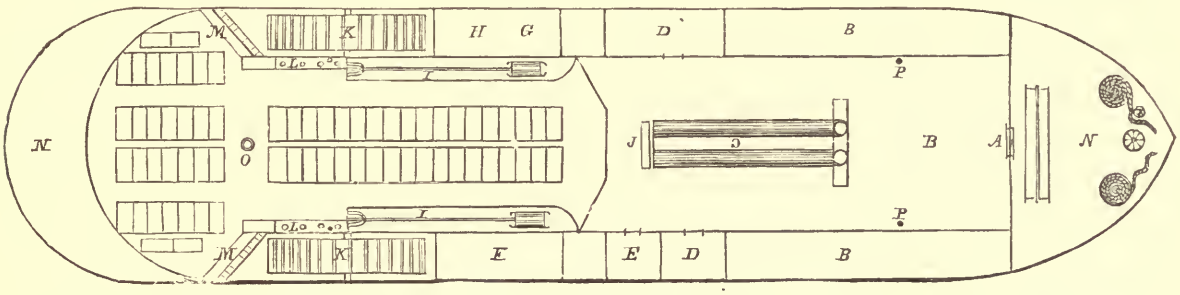

FIG. 506.—Lower Boiler Deck of the U. S. Hospital Steamer D. A. January.

A	Foot of stairs.	E	Pastry room.	I	Engines.	M M	Water-closets.
B B	Space for wood and coal.	F	Kitchen.	J	Donkey engine.	N N	Main deck.
C	Boilers.	G	Carpenter's shop.	K K	Wheels.	O	Stoves.
D	Stores.	H	Blacksmith's shop.	L	Washstands	P P	Cold water.

dred beds, water-closets, and wash-troughs; a large kitchen connected with the wards on the upper decks by a dumb-waiter; a bakery on one side, a blacksmith shop, carpenter shop, and commissary room on the other. Through the whole length of the main ward ran a fan, worked by steam from below (it made about ninety revolutions a minute), and as the transom windows opened just above it, at the sides, it created a pleasant current of air and kept out all flies and mosquitoes. This boat carried from April, 1862, to August, 1865, altogether twenty-three thousand seven hundred and thirty-eight patients, as follows:

TABLE CLXXIX.

Trips made by the Hospital Steamer D. A. January from April, 1862, to August, 1865.

No. of Trip.	Date of Departure.	Place of Departure.	Date of Arrival.	Place of Arrival.	No. Sick and Wounded.
1	April 11, 1862	Pittsburg Landing	April 14, 1862	Saint Louis	431
2	April 18, 1862	Pittsburg Landing	April 23, 1862	Keokuk	284
3	May 2, 1862	Pittsburg Landing	May 4, 1862 May 6, 1862	New Albany Cincinnati	300
4	May 10, 1862	Pittsburg Landing	May 14, 1862	Jefferson Barracks	284
5	June 9, 1862	Pittsburg Landing	June 12, 1862	Jefferson Barracks	375
6	June 19, 1862	Pittsburg Landing	June 20, 1862 June 22, 1862 June 23, 1862	Paducah Jefferson Barracks Keokuk	459
7	July 6, 1862	Paducah	July 7, 1862 July 8, 1862	Evansville Louisville	287
8	July 17, 1862	Helena	July 21, 1862	Jefferson Barracks	317
9	July 25, 1862	Paducah	July 27, 1862	Jefferson Barracks	298
10	August 4, 1862	Paducah	August 6, 1862	Saint Louis	444
11	August 20, 1862	Helena	August 23, 1862	Mound City	160
12	August 23, 1862	Paducah	August 23, 1862	Mound City	30
13	September 29, 1862	Helena	October 3, 1862	Saint Louis	386
14	October 7, 1862	Helena	October 10, 1862	St'r T. L. McGill, Columbus.	273
15	October 12, 1862	Columbus	October 15, 1862	Saint Louis	372
	Carried forward				4,400

No. of Trip.	Date of Departure.	Place of Departure.	Date of Arrival.	Place of Arrival.	No. Sick and Wounded.
	Brought forward				4,400
16	October 21, 1862	Columbus	October 23, 1862	Mound City	88
17	October 30, 1862	Columbus	November 4, 1862	Keokuk	378
18	November 18, 1862	Columbus	November 21, 1862	Saint Louis	410
19	November 28, 1862	Columbus	November 30, 1862	Jefferson Barracks	435
20	December 9, 1862	Helena	December 16, 1862	Saint Louis	440
21	January 14, 1863	Arkansas Post	January 18, 1863 January 28, 1863	Memphis Saint Louis	432
22	March, 1863	Served as receiving hospital at Milliken's Bend, Louisiana.	March, 1863	Transferred to other hospital steamers.	1,174
	April, 1863		April, 1863		1,460
	May, 1863		May, 1863		736
	June, 1863		June, 1863		1,195
23	August 11, 1863	Milliken's Bend	August 18, 1863	Saint Louis	378
24	August 27, 1863	Vicksburg	August 31, 1863	Memphis	387
25	September 5, 1863	Vicksburg	September 8, 1863	Memphis	377
26	September 15, 1863	Vicksburg	September 18, 1863	Memphis	244
27	September 29, 1863	Vicksburg	October 7, 1863	Memphis	78
28	October 28, 1863	New Orleans	November 2, 1863	Cairo	100
29	November 23, 1863	Memphis	November 25, 1863 November 27, 28, 1863	Cairo Saint Louis	345
30	December 9, 1863	Nashville	December 12, 1863	Evansville	344
31	February 11, 1864	New Albany Louisville	February 15, 1864	Jefferson Barracks	97
32	March 18, 19, 1864	Louisville	March 19, 1864	Madison, Ind.	463
33	April 7, 1864	Louisville New Albany Jeffersonville	April 8, 1864	Madison	382
34	April 27, 1864	Vicksburg	May 1, 2, 1864	Memphis	398
35	May 1, 1864	Memphis	May 3, 1864	Cairo	
36	May 3, 1864	Cairo	May 8, 1864	Louisville	
37	May 3, 1864	Mound City	May 9, 1864	New Albany	
38	May 14, 1864	Mound City	May 17, 1864	Jefferson Barracks	289
39	May 22, 1864	Nashville	May 26, 1864	New Albany	239
40	June 10, 1864	Mound City	June 12, 1864	Jefferson Barracks	120
41	June 21, 1864	Louisville	June 22, 1864	Evansville	498
42	June 22, 1864	Evansville	June 25, 1864	Jefferson Barracks	
43	August 10, 1864	Memphis	August 16, 1864	Jefferson Barracks	345
44	August 22, 1864	Memphis	August 27, 1864	Jefferson Barracks	309
45	September 2, 1864	Helena	September 9, 1864	Jefferson Barracks	332
46	September 19, 1864	Helena	September 24, 1864	Jefferson Barracks	229
47	September 20, 1864	Memphis			
48	October 12, 1864	Duvall's Bluff	October 19, 20, 1864 October 22, 1864	Mound City Jefferson Barracks	407
49	November 3, 1864	Mouth of White River	November 6, 1864	Cairo	127
50	November 10, 1864	Mouth of White River	November 14, 1861	Mound City	48
51	November 25, 1864	Nashville	November 29, 1864	Evansville	361
52	December 1, 1864	Nashville	December 5, 1864	Jefferson Barracks	416
53	December 19, 1864	Louisville Jeffersonville	December 21, 1864	Covington Cincinnati Camp Dennison	545
54	December 26, 1864	Louisville Jeffersonville	December 27, 1864	Cincinnati Covington	496
55	January 5, 1865	Louisville Jeffersonville	January 8, 1865 January 9, 1865	Cairo Evansville	426
56	January 27, to— February 4, 1865	Eastport Waterloo	February 5, 1865 February 8, 1865	Mound City Memphis	373
57	February 12, 1865	Eastport	February 19, 1865	New Albany Jeffersonville	318
58	February 14, 1865	Waterloo			
59	February 14, 1865	Johnsonville			
60	February 16, 1865	Nashville			
61	March 12, 19, 1865	Chickasaw	March 23, 1865	Jeffersonville	554
62	April 13, 1865	New Orleans	April 14, 1865	Baton Rouge	192
63	April 17, 18, 1865	New Orleans	April 24, 1865 April 25, 1865	St'r E. Carroll, N. Orleans Vicksburg	169
	Carried forward				21,534

No. of Trip.	Date of Departure.	Place of Departure.	Date of Arrival.	Place of Arrival.	No. Sick and Wounded.
	Brought forward				21,534
64	May 6, 1865	Selma			
65	May 8, 1865	Mobile	May 15, 1865	New Orleans	389
66	May 9, 1865	Fort Gaines	May 25, 1865	Mound City	
67	May 18, 1865	New Orleans			
68	May 31, 1865	New Orleans	June 5, 1865	Vicksburg	
	June 2, 1865	New Orleans	June 8, 1865	Memphis	560
69	June 5, 1865	Vicksburg	June 10, 1865	St'r W. Butler, at Cairo	
70	June 20, 1865	New Orleans	June 28, 1865	Cairo	229
71	June 21, 1865	Baton Rouge			
72	June 23, 1865	Vicksburg	June 29, 1865	Jefferson Barracks	
73	July 17, 1865	New Orleans	July 24, 1865	Cairo	328
74	July 18, 1865	Baton Rouge			
75	July 24, 1865	Cairo	July 26, 1865	Jefferson Barracks	
76	August 3, 9, 1865	New Orleans	August 16, 1865	Cairo	439
77	August 10, 1865	Baton Rouge			
78	August 12, 1865	Vicksburg	August 18, 1865	Jefferson Barracks	
79	August 26, 1865	New Orleans	September 3, 1865	Cairo	259
80	August 27, 1865	Baton Rouge			
81	August 28, 1865	Vicksburg	September 4, 1865	Jefferson Barracks	
	Total				23,738

Steamer Empress.—The steamer 'Empress' was chartered on April 10, 1862, and placed in charge of Surgeon Thomas F. Azpell, U. S. V. Being built expressly for a cotton boat, and said to be the largest engaged in that trade, she was found to be admirably adapted to hospital purposes. Her capacious dimensions and the unusually large area on each deck, which could be used for beds, rendered her accommodations for the sick unsurpassed. Her cabin was small, containing only forty state-rooms, which were principally used by the hospital corps in consequence of their imperfect ventilation. Canvas flies on the upper and tarpaulins on the lower deck completely protected the guards from the weather. Her length was two hundred and sixty-six feet, width of beam forty-five feet, depth of hold eight feet three inches. Her carrying capacity was five hundred patients, but this number could be largely increased in mild weather. The largest number she carried on one trip was eight hundred and seventeen. The 'Empress' made six trips, but her draught of water was such as to render her unfit for the navigation of the Tennessee and Cumberland rivers during their low stage. She was therefore discontinued as a floating hospital in June, 1862.

Steamer Imperial.—On April 10, 1862, the steamer 'Imperial,' a new and very large boat, was fitted up as a transport for sick and wounded by Surgeon J. H. Grove, U. S. V. She made four trips, carrying one thousand seven hundred and eighty-one (1,781) patients, but her services were discontinued on May 17, 1862, as her draught of water was too great for the low state of the Tennessee River during the summer season.

Other steamers employed on the western waters were the 'City of Alton,' the 'Baltic,' the 'Ginnie Hopkins,' the 'Mercury,' 'Woodford,' 'Decatur,' 'Pringle,' 'Nashville,' etc. Space will not permit to enter in detail into a description of these boats or the nature of their service.

In the eastern armies, although many boats were temporarily employed for the purpose of conveying sick and wounded, few were fitted up as regular hospital transports. In the early summer of 1862, when the scene of active operations was transferred from the interior of Virginia to the eastern seaboard on the Peninsula, it became evident that unusual means would be required to remove the sick and wounded as fast as possible from these malarial

districts to healthier localities. The boats used for the transport of troops were all under the immediate direction of the Quartermaster General. On application to the Secretary of War quite a number were turned over to the medical authorities, but these boats were destitute of all conveniences. Perhaps the earliest boat thus assigned in the latter part of April, 1862, was the 'Daniel Webster.' She was entirely without mattresses, bedding, medicine, and surgical appliances, but was hastily fitted up by the Sanitary Commission, filled with patients, and, on May 1st, left the York River for New York. The 'Ocean Queen,' a large, commodious vessel, capable of carrying comfortably one thousand patients, was, a few days later, also turned over to the Medical Department and fitted up by the Sanitary Commission. When received there was not a bunk nor an article of food on board. The 'Ocean Queen' took about nine hundred patients to New York, but, on her arrival there, was withdrawn from the hospital service and sent with troops to the Gulf of Mexico.

The principal boats employed in the eastern waters, besides the two already mentioned, were the 'Connecticut,' 'State of Maine,' 'Western Metropolis,' 'De Molay,' 'Spaulding,' 'Baltic,' 'Atlantic,' 'J. K. Barnes,' 'Commodore,' 'Cosmopolitan,' 'Knickerbocker,' 'Elm

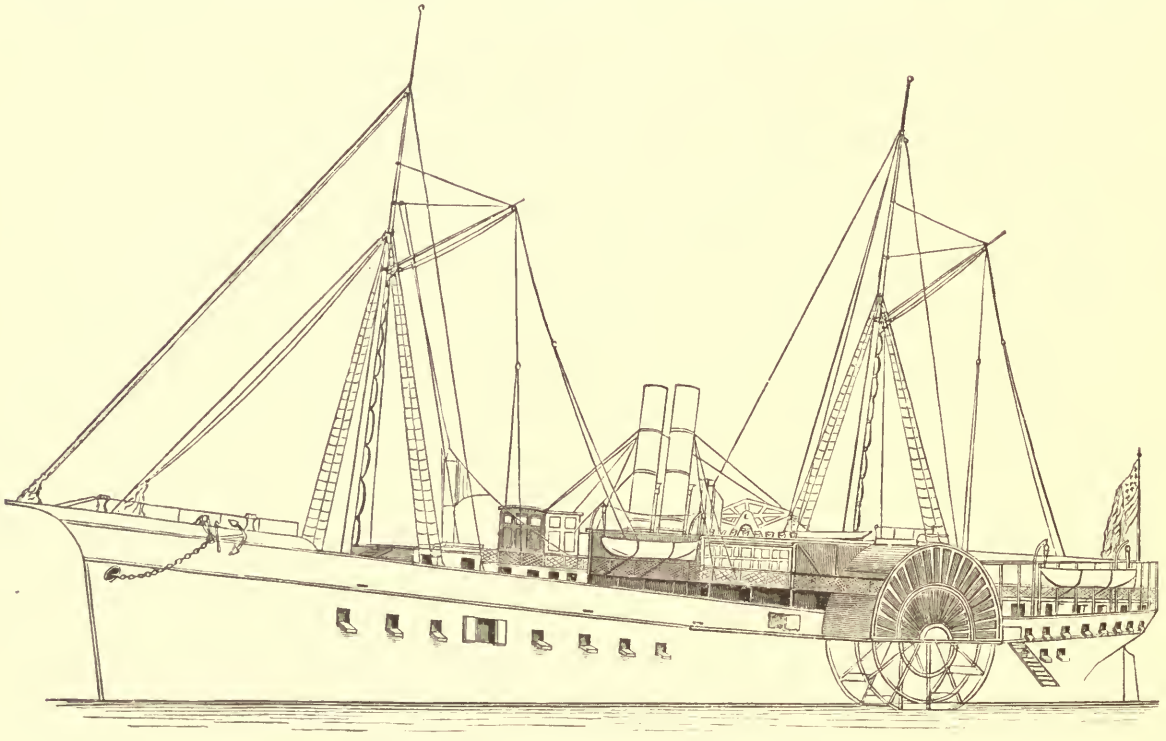

FIG. 507.—U. S. Hospital Steamship 'J. K. Barnes.'

City,' etc. The capacity of the 'Connecticut' was four hundred patients. She made altogether forty-seven trips and conveyed eighteen thousand nine hundred and nineteen (18,919) patients. The capacity of the 'State of Maine' was three hundred patients, and she carried in forty-eight trips fifteen thousand seven hundred and eleven (15,711) patients. The capacity of the 'Western Metropolis' was four hundred and fifty patients, of the 'De Molay' three hundred, of the 'Baltic' five hundred, and of the 'Atlantic' five hundred patients. Some of these boats were employed on the inland waters, others, like the 'Western Metropolis,' 'De Molay,' 'Cosmopolitan,' and 'Baltic,' conveyed the wounded from all points along the Middle and Southern Atlantic coast to Philadelphia, New York, and points in the North and East. Of the latter class was the 'J. K. Barnes,' fitted up

in New York city during the latter part of 1864, under the supervision of Assistant Surgeon A. H. Hoff, U. S. A., to whose large experience in the transport of the sick and wounded in western waters we have had occasion to allude. The 'J. K. Barnes' was two hundred

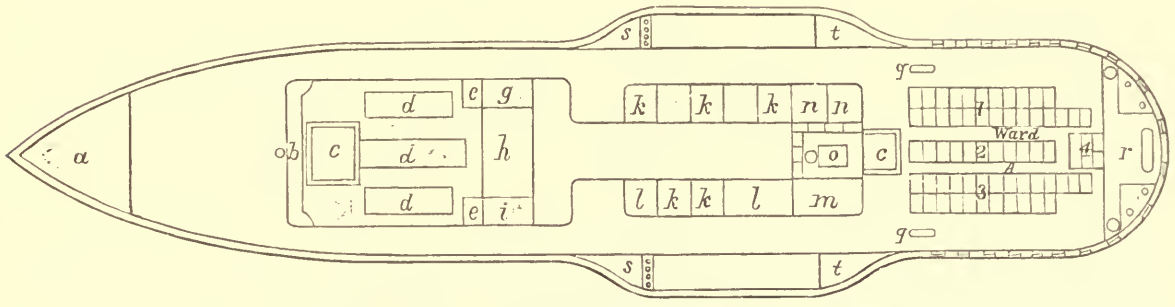

FIG. 508.—Spar deck of the U. S. Army Hospital Steamship 'J. K. Barnes.'

a	Forecastle.	*g*	Officers' mess.	*m*	Saloon.	*s s*	Water-closets.
b	Table.	*h*	Galley.	*n n*	Wine-room and office.	*t t*	Guard-rooms.
c c	Hatches.	*i*	Ice-house.	*o*	Table.	Ward **A**—1, 2, 3—72 bunks.	
d d d	Mess tables and mess-room.	*k k k k k*	Quarters of medical officers.	*q q*	Heaters.		
e e	Pantries.	*l l*	Linen-room.	*r*	Bath-room and water-closet.		

and twenty-three feet in length, thirty-five feet two inches beam, and twenty-two feet nine inches depth of hold. In fitting her up an orlop deck was introduced and a mess-room was built on the forward deck in front of the galley. The arrangement of the bunks is shown

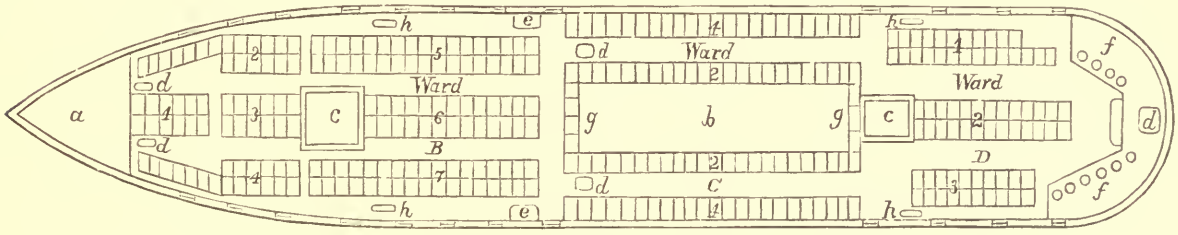

FIG. 509.—Gun deck of U. S. Army Hospital Steamship 'J. K. Barnes.'

a	Commissary storeroom.	*d d d d d*	Ventilators.	*g g*	Closets.	Ward **C** (midships), 2, 2, 4, 4—42 bunks.
b	Engine.	*e e*	Wash-tables.	*h h h h*	Steam heaters.	Ward **D** (aft), 1, 2, 3—63 bunks.
c c	Hatches.	*f f*	Water-closets.	Ward	(forward), 1, 2, 3, 4, 5, 6, 7—138 bunks.	

in FIG. 509. On the completion of the 'Barnes,' Assistant Surgeon Thomas McMillin, U. S. A., was assigned as Surgeon-in-charge, and, on December 23d, was ordered to report to the Medical Director of the Department of the South, at Hilton Head, South Carolina,

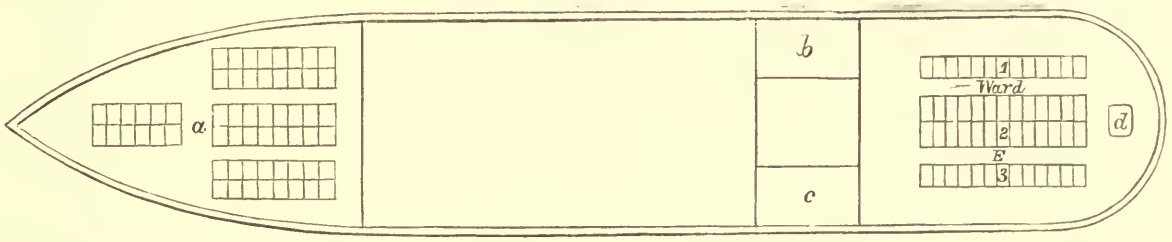

FIG. 510.—Orlop deck of U. S. Army Hospital Steamship 'J. K. Barnes.'

a	Quarters for nurses.	*c*	Baggage-room.	Ward **E**, 1, 2, 3—48 bunks.
b	Knapsack-room.	*d*	Ventilator.	

where she took her first load of sick on board on January 1, 1865. She continued on this service until November, 1865, during which time she carried three thousand six hundred and fifty-five (3,655) patients, as follows:

TABLE CLXXX.

Statement of Trips made by the U. S. Army Hospital Steamship 'J. K. Barnes,' from January 1st to November 2, 1865.

No. of Trip.	Date of Departure.	Place of Departure.	Date of Arrival.	Place of Arrival.	No. Sick and Wounded.
1	January 1, 1865	Hilton Head and Beaufort	January 5, 6, 1865	De Camp General Hospital, David's Island, N. Y.	368
2	January 31, 1865	New Orleans	February 9, 1865	Grant General Hospital, Willet's Point, N. Y.	119
3	February 25, 1865	Savannah, Ga	February 26, 1865	Beaufort, S. C.	9
4	February 26, 1865	Beaufort, S. C	February 27, 1865	St'r Northern Light, Port Royal, S. C.	68
5	March 14, 1865	Beaufort, S. C	March 19, 1865	McDougall General Hospital, Fort Schuyler, N. Y.	320
6	March 15, 1865	Beaufort, S. C; Steamers Spaulding and Atlantic			
7	April 5, 1865	Wilmington and Morehead City, N. C.	April 11, 1865	De Camp General Hospital, David's Island, N. Y.	439
8	April 24, 25, 1865	Beaufort, New Berne, and Morehead City, N. C.	April 28, 1865	De Camp G. H., David's Island, N. Y., Grant G. H., Willet's Point, N. Y., McDougall G. H., Fort Schuyler, N. Y.	449
9	May 7, 1865	Hilton Head and Beaufort, S. C.	May 11, 1865	Washington, D. C	385
10	May 19, 1865	Savannah, Ga., and Hilton Head, S. C.	May 23, 1865	Alexandria, Va	375
11	June 9, 1865	New Orleans, La	June 17, 1865	Philadelphia, Pa	217
12	July 8, 1865	New Orleans, La	July 16, 1865	New York City	25
13	August 5, 1865	Key West, Fla	August 23, 1865	De Camp General Hospital, David's Island, N. Y.	345
14	August 10, 1865	Barrancas and Fort Pickens, Fla			
15	August 12, 1865	Mobile, Ala			
16	August 16, 1865	Beaufort, S. C			
17	August 17, 1865	Hilton Head, S. C			
18	August 19, 1865	Charleston, S. C			
19	August 21, 1865	Morehead City and New Berne, N. C			
20	September 19, 1865	New Orleans, La	October 1, 1865	De Camp General Hospital, David's Island, N. Y.	338
21	September 26, 1865	Savannah, Ga			
22	September 27, 1865	Hilton Head, S. C			
23	October 23, 1865	New Orleans, La	November 4, 1865	De Camp General Hospital, David's Island, N. Y.	198
24	October 25, 1865	Pensacola, Fla			
25	October 27, 1865	Key West, Fla			
26	October 30, 1865	Savannah, Ga			
27	October 31, 1865	Hilton Head, S. C			
28	November 2, 1865	Morehead City, N. C			
	Total				3,655

One of the greatest difficulties that the Medical Department had to contend with in the early part of the war was its want of control over the hospital transports. Many boats were assigned for the conveyance of wounded, but no sooner had they been fitted up and had made a few trips than they would be claimed by the Quartermaster's Department, by which they had originally been chartered, as transports for troops. When they were finally returned to the Medical Department they had been stripped of all the appurtenances for the comfort of the sick, thus necessitating their refitting at enormous costs. This anomalous condition continued until November, 1863, when the hospital steamer 'Cosmopolitan,' which had been used in transporting sick from one point to another in the Department of the South, was taken away from the Medical Department and turned back to the Quarter-

master's Department by order of Major General Gilmore. The Acting Surgeon General requested the return of the steamer to the Medical Department, which being referred to General Gilmore for remark, he replied that the vessel was only temporarily loaned to the Medical Department, and that "as commanding officer of the department I hold myself responsible for the administration of its internal affairs, and consequently assume the right to apply its resources as the exigencies of the service may seem to require."[1] To this endorsement the Acting Surgeon General replied, on December 25th, in the following letter to the Secretary of War:

"SURGEON GENERAL'S OFFICE,
"*December* 25, 1863.

"SIR: I have the honor to acknowledge the receipt of Major General Gilmore's endorsement upon my application for the restoration of the steamer Cosmopolitan to the Medical Director, stating that 'the steamer Cosmopolitan belongs to the Quartermaster's Department, and was placed at the disposal of the Medical Director for temporary purpose by orders from these headquarters.'

"In the request of November 24th no question was made of the power of the general commanding the department to dispose of the steamer, but the necessity for her services was stated as a reason for her restoration. The Cosmopolitan was selected by the then Medical Director, under orders from Major General Hunter, and by his orders was fitted up and especially assigned to the Medical Department as a hospital steamer, and *not* as a temporary transport. All hospital steamers are owned or employed by the Quartermaster's Department, but their outfits and movements are under charge of the Medical Department. Upon the only occasion of emergency when Major General Hunter used the Cosmopolitan as a dispatch boat he did so after advisement with his Medical Director * * * *

"Very respectfully, your obedient servant,

(Signed) "J. K. BARNES,
"*Acting Surgeon General.*"

The Secretary of War directed the steamer to be returned to the Medical Department, which was accordingly done; but in the following June she was again taken from it by General Hatch, and much suffering to the sick and wounded resulted. A similar interference with the Medical Department in the case of the hospital steamer 'Spaulding' was reported to the Surgeon General by Medical Inspector G. H. Lyman, in December, 1864. This report was forwarded to the Secretary of War with the following endorsement:

"Respectfully forwarded to the Honorable Secretary of War, with the urgent request that orders may be issued prohibiting interference with hospital transports by other departments.

"The hospital transport Spaulding has just been fitted up at great expense, and was dispatched to meet General Sherman's army upon notification of its arrival at Savannah. To divert it to other purposes entirely cripples this Department in its efforts to provide properly for the sick and wounded, and subordinates all its interests to the caprice or whim of local commanders.

(Signed) "J. K. BARNES,
"*Surgeon General.*"

"S. G. O., *January* 3, 1865."

On January 23, 1865, the Surgeon General addressed a further letter to the Secretary of War on this subject, of which the following is a copy:

"SURGEON GENERAL'S OFFICE,
"*January* 23, 1865.

"SIR: From the nature of the service upon which they are employed it is absolutely essential that hospital transports and hospital boats should be exclusively under the control of the Medical Department, and not, under any circumstances, diverted from their special purposes by orders of local commanders or officers of other departments. I have, therefore, the honor to request that

[1] BROWN (H. E.), *The Medical Department of the United States Army from* 1775 *to* 1873. Washington, D. C., 1873, page 243.

orders to this effect be issued, and that the hospital steamer Cosmopolitan be restored to the Medical Department and placed under the immediate control of the Medical Director, Department of the South, at Hilton Head, South Carolina, to be used as a hospital tender for the troops operating under Major General Sherman in that department.

"Very respectfully, your obedient servant,

(Signed) "J. K. BARNES,
"*Surgeon General.*"

In accordance with this request the following order was issued on February 8th:

"WAR DEPARTMENT, ADJUTANT GENERAL'S OFFICE,
"WASHINGTON, *February* 8, 1865.

"GENERAL ORDERS No. 18.

"Hospital transports and hospital boats, after being properly assigned as such, will be exclusively under the control of the Medical Department, and will not be diverted from their special purposes by orders of local or department commanders, or of officers of other staff departments.

"BY ORDER OF THE SECRETARY OF WAR.

(Signed) "E. D. TOWNSEND,
"*Assistant Adjutant General.*"

This order effectually ended the interference of local or department commanders and vested the control of the hospital transport steamers where it properly belonged—*i. e.*, in the Medical Department.

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SUBJECT-MATTER INDEX

OF THE

THREE VOLUMES OF THE SURGICAL PART

OF THE

MEDICAL AND SURGICAL HISTORY OF THE WAR OF THE REBELLION.

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Page 2, fifteenth line, for 454, read 434.
Page 8, forty-third line, for furroughed, read *furrowed.*
Page 24, sixth line, for XI, read XII.
Page 24, ninth and tenth lines of Note 1, for A. G. D., read A. *J.* D.
Page 24, tenth line of Note 1, for 1862, read 1861.
Page 26, first line of Note 1, for shussverletzungen, read *schussverletzungen.*
Page 27, first line of Note 2, *dele* comma after *anatomie.*
Page 47, transpose Notes 2 and 3.
Page 50, TABLE IV, No. 15, for CASE 107, read CASE 110.
Page 58, TABLE VIII, No. 32, for amputation left thigh, read amp. left *leg.*
Page 62, fifty-fourth line of Note 1, for p. 16, read p. 316.
Page 63, eighth nonpareil line, for 26, read 36.
Page 63, ninth nonpareil line, for 16, read 26.
Page 82, thirty-ninth line, for meager, read *meagre.*
Page 87, fifty-fifth line, for J. F. Smith, read *H.* F. Smith.
Page 88, eighth line, *dele* the hyphen between the words forty and days.
Page 102, ninth line, for 87th New York, read *8th New Jersey.*
Page 104, description of FIG. 55, for right, read *left.*
Page 128, sixty-ninth line, for 1848, read 1851.
Page 130, fifty-sixth line, for Dominico Ludovess, read *Boasso Dominico.*
Page 136, first line, for for wounds, were, read *were for wounds,* and *dele* the comma after the word wounds.
Page 142, first line of Note 3, for Kinlock, read *Kinloch.*
Page 151, TABLE XVII, No. 9, for C. Warner, read C. *Wagner.*
Page 152, eighteenth line of Note 1, for Coxe's, read *Cox's.*
Page 153, description of FIG. 111, for *Spec.* 5614, read *Spec.* 5684.
Page 156, first line of Note 1, for p. 26, read p. 17.
Page 163, first line, *dele* the word *or* after *Williamson.*
Page 168, thirty-ninth line of Note 2, for *rézection,* read *résection.*
Page 171, first line of Note 3, for Case 340, read *Case* 338.
Page 174, first line of Note 3, for siege, read *siége.*
Page 179, Case 363, seventeenth line, for W. S. Smull, read W. *G.* Smull.
Page 181, Case 368, thirty-third line, for O. H. Hitchcock, read *H. O.* Hitchcock.
Page 186, Case 379, second line, for B. Brinton, read B. *Stone.*
Page 188, eleventh line, for McCollom, read *McCollum.*
Page 190, sixteenth line, for J. M. Gemrig, read J. *H.* Gemrig.
Page 191, thirty-eighth line, for eighty-six, read *sixty-eight.*
Page 192, twenty-fifth line, insert after Lidell a reference to Note 1.
Page 194, Case 397, third line, for W. A. Childs, read W. A. *Child.*
Page 195, Case 399, fourth line, for Brenneman, read *Breneman.*
Page 208, TABLE XXV, No. 7, for Mosely, read *Moseley.*
Page 209, seventh line, for T. Fitzgerald, read *P.* Fitzgerald.
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Page 214, Note 2, sixth line, for L. Johnson, read *C.* L. Johnson.
Page 215, second line of Case 429, for Jameson, read *Jamison.*
Page 220, TABLE XXX, No. 295, for L. Barney, read L. *Barnes.*
Page 222, TABLE XXX, No. 509, for N. Falsom, read N. *Folsom.*
Page 228, TABLE XXXI, No. 119, for J. M. Rizer, read *M. Rizer.*
Page 232, TABLE XXXI, No. 437, for J. F. Galloupe, read *I.* F. Galloupe.
Page 232, TABLE XXXI, No. 407, for J. H. Beach, read J. H. *Beech.*
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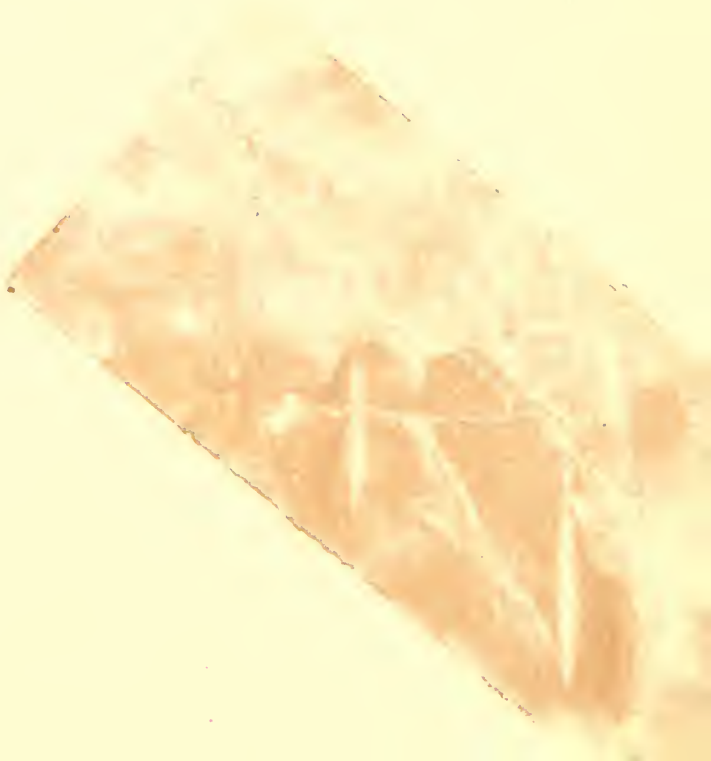
Page 235, TABLE XXXI, No. 703, for *Spec.* 4332, read *Spec.* 4232.
Page 236, TABLE XXXI, No. 790, for W. O. Meagher, read *W. O'Meagher.*
Page 237, TABLE XXXI, No. 854, for H. C. Messenger, 56th Ohio, read *A.* C. Messenger, 57th Ohio.
Page 239, TABLE XXXI, No. 1049, for A. Surg. M. Rizer, read Surg. M. Rizer.
Page 240, TABLE XXXI, Nos. 1116 and 1119, for Surg. C. M. Clarke, read Surg. C. M. *Clark.*
Page 240, TABLE XXXI, No. 1121, for Surg. W. R. Wray, read Surg. W. R. *Way.*
Page 240, TABLE XXXI, No. 1122, for Surg. A. M. Dougherty, read Surg. A. *N.* Dougherty.
Page 240, TABLE XXXI, No. 1140, for J. F. Kimbly, read J. *T.* Kimbly.
Page 243, forty-fourth line, for middle, read *lower.*
Page 244, descriptions of Figs. 186 and 187, for *Spec.* 1966, read *Spec.* 2966.
Page 246, TABLE XXXII, No. 140, for H. Taylor, read *J.* H. Taylor.
Page 247, TABLE XXXII, No. 173, for J. Owens, read J. *Owen.*
Page 257, TABLE XXXII, No. 1052, for *Spec.* 3882, read *Spec.* 3832.
Page 276, TABLE XXXIV, No. 95, for *Spec.* 3895, read *Spec.* 3875.
Page 276, TABLE XXXIV, No. 105, for *Spec.* 4280, read *Spec.* 4820.
Page 277, TABLE XXXIV, No. 142, for Left, read *Right.*
Page 281, TABLE XXXV, Nos. 55, 56, transpose the remarks in the third column opposite these numbers.
Page 285, TABLE XXXV, No. 390, *dele* comma after word *flaps.*
Page 286, TABLE XXXV, third column heading, for opeeators, read operators.
Page 288, Case 465, line thirty, for p. 63, read p. 53.
Page 288, Case 466, second line, for C. W. Chamberlain, read C. *N.* Chamberlain.
Page 290, Case 470, first line, for *J. N. Saxon,* read *J. N. Saxton.*
Page 295, TABLE XXXVI, No. 140, for *Spec.* 182, read *Spec.* 1882.
Page 296, TABLE XXXVI, No. 198, for Vannetta, read *Vannatta.*
Page 296, TABLE XXXVI, No. 236, for 116th Pennsylvania, read 116th *Illinois.*
Page 298, TABLE XXXVI, No. 364, for Right, read *Left.*
Page 301, TABLE XXXVI, No. 571, for Saxon, read *Saxton.*
Page 309, third line of Case 484, for Hatchett, read *Hatchitt.*
Page 313, TABLE XXXIX, No. 11, for Disch'd April 12, 1865, read Disch'd *August* 12, 1865.
Page 314, TABLE XXXIX, No. 92, for Vanvourst, read *Vanvorst.*
Page 318, line four of Case 492, for J. M. Burr, read *W. J. Burr.*
Page 336, TABLE XLVIII, 7th line, for 1739, read 1743.
Page 337, forty-ninth nonpareil line, for 1876, read 1871, and for B. XXIII, read B. XXIV.
Page 348, second line of Note 1, for Schrady, read *Shrady.*
Page 351, second line of Case 497, for L. W. Reed, read L. W. *Read.*
Page 372, descriptions of Figs. 223 and 224, for Schenk, read *Schenck.*
Page 373, thirteenth line, for 272, read 372.
Page 449, TABLE LXIII, No. 1, third column, strike out the words *leg useful.*
Page 458, first line of Note 2, for middle, read *upper.*
Page 459, TABLE LXV, No. 47, for large portion of tibia and fibula, read *small portion of fibula above malleolus.*
Page 464, sixth line of Case 727, for *Spec.* 4081, read *Spec.* 4018.
Page 477, TABLE LXVIII, No. 999, for Walters, read *Waters.*
Page 586, for Case 385, read Case 835.
Page 658, description of Fig. 368, for fibula, read *tibia.*
Page 838, sixteenth line, for Feburary, read *February.*



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